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R2017-0078/1

March 24, 2017

Closing Date: Wednesday, April 12, 2017 at 6:00 p.m.

FROM: Vice President and Corporate Secretary

India - Capacity Augmentation of the National Waterway-1 (Jal Marg Vikas) Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed loan to India for a Capacity Augmentation of the National Waterway-1 (Jal Marg Vikas) Project (R2017-0078), which is being processed on an absence-of-objection basis.

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Report No: PAD1915

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$375 MILLION

TO THE

REPUBLIC OF INDIA

FOR THE

CAPACITY AUGMENTATION OF THE NATIONAL WATERWAY-1 (JAL MARG VIKAS) PROJECT

March 21, 2017

Transport and ICT Global Practice
South Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective as of March 15, 2017)

Currency Unit = Indian Rupee (INR)
US$1 = INR 65.69

FISCAL YEAR
April 1 – March 31

ABBREVIATIONS AND ACRONYMS

AIS	Automatic Identification System
ASCI	Administrative Staff College of India
BoQ	Bill of Quantities
CAAA	Controller of Aid Accounts & Audit
CAG	Comptroller and Auditor General
CCSA	Cross-Cutting Solution Areas
CIA	Cumulative Impact Assessment
CNA	Communications Needs Assessment
COP21	21st Conference of Parties (to the Treaty on Climate Change)
CPGRAM	Centralized Public Grievance Redress and Monitoring System
CSD	Cutter Section Dredgers
CQS	Selection Based on Consultants' Qualifications
DC	Direct Contracting
DGS & D	Directorate General of Supplies & Disposals
DWT	Dead Weight Tons
EA	Environmental Assessment
EDP	Electronic Data Processing
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
EHS	Environmental, Health, and Safety
EIRR	Economic Internal Rate of Return
EPC	Engineering, Procurement, and Construction
FA	Framework Agreement
FM	Financial Management
GDP	Gross Domestic Product
GoI	Government of India
GHG	Greenhouse Gas
GFR	General Financial Rules
GRIHA	Green Rating for Integrated Habitat Assessment
GRS	Grievance Redress Services
ICB	International Competitive Bidding

ICT	Information and Communication Technology
IFC	International Finance Corporation
INDC	India's Nationally Determined Contribution
IUFR	Interim Unaudited Financial Report
IWAI	Inland Waterways Authority of India
IWT	Inland Water Transport
JMVP	Jal Marg Vikas Project
LAD	Least Available Depth
LNG	Liquefied Natural Gas
MIS	Management Information System
MOU	Memorandum of Understanding
NCB	National Competitive Bidding
NIC	National Informatics Center
NPV	Net Present Value
NINI	National Inland Navigation Institute
NW-1	National Waterway- 1
ODC	Over-Dimensioned Cargo
OP	Operational Policy
PBC	Performance Based Contract
PDO	Project Development Objective
PIANC	World Association of Waterborne Transport Infrastructure (formerly Permanent International Association of Navigation Congresses)
PIU	Project Implementation Unit
PMU	Project Management Unit
POC	Project Oversight Committee
POL	Petroleum Oil & Lubricant
PPP	Public-Private Partnership
P-RAMS	Procurement Risk Assessment Management System
R&R	Rehabilitation and Resettlement
RAP	Resettlement Action Plan
RIS	River Information Service
ROB	Road Over Bridge
Ro-Ro	Roll on, Roll off
RPF	Resettlement Policy Framework
RFCTLAR&R	Right to Fair Compensation and Transparent Land Acquisition and Rehabilitation and Resettlement
SBD	Standard Bidding Document
SIA	Social Impact Assessment
SMP	Social Management Plan
SPV	Special Purpose Vehicle
SSS	Single-Source Selection
STEP	Systematic Tracking of Exchanges in Procurement
TTL	Task Team Leader
TMS	Terminal Management System
ToR	Terms of Reference
TSSC	Technical Support Services Consultant

QCBS Quality and Cost Based Selection

Vice President:	Annette Dixon
Country Director:	Junaid Kamal Ahmad
Senior Global Practice Director:	Jose Luis Irigoyen
Practice Manager:	Karla Gonzalez Carvajal
Task Team Leaders:	Arnab Bandyopadhyay, Tapas Paul and Charles Kunaka

INDIA
CAPACITY AUGMENTATION OF THE NATIONAL WATERWAY-1 (JAL MARG VIKAS) PROJECT

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PAD DATA SHEET

India

Capacity Augmentation of the National Waterway - 1 (P148775)

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA

GTI06

Report No.: PAD1915

Basic Information		
Project ID P148775	EA Category A - Full Assessment	Team Leader(s) Arnab Bandyopadhyay, Charles Kunaka, Tapas Paul
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 30-Apr-2017	Project Implementation End Date 31-Dec-2023	
Expected Effectiveness Date 01-Jul-2017	Expected Closing Date 31-Dec-2023	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Karla Gonzalez Carvajal	Jose Luis Irigoyen	Junaid Kamal Ahmad	Annette Dixon

Borrower: Republic of India					
Responsible Agency: Inland Waterways Authority of India					
Contact:	Pravir Pandey		Title:	Project Director	
Telephone No.:	91-120-2544004		Email:	vc.iwai@nic.in	

Project Financing Data (in US$ millions)					
[X] Loan	[ ] IDA Grant	[ ] Guarantee			
[ ] Credit	[ ] Grant	[ ] Other			
Total Project Cost:	800.00		Total Bank Financing:	375.00	

Financing Gap:	0.00

Financing Source	Amount
Borrower	380.00
International Bank for Reconstruction and Development	375.00
Local Sources of Borrowing Country	45.00
Total	800.00

Expected Disbursements (in US$ millions)

Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	45.00	60.00	60.00	60.00	60.00	60.00	30.00
Cumulative	45.00	105.00	165.00	225.00	285.00	345.00	375.00

Institutional Data

Practice Area (Lead)

Transport & ICT

Contributing Practice Areas

Environment & Natural Resources, Trade & Competitiveness, Social, Urban, Rural and Resilience Global Practice

Proposed Development Objective(s)

The Project Development Objective is to enhance transport efficiency and reliability of National Waterway 1 and augment institutional capacity for the development and management of India's inland waterway transport system in an environmentally sustainable manner.

Components

Component Name	Cost (US$ millions)
Component A: Improving the navigability of NW-1 (Haldia to Varanasi)	770.00
Component B: Institutional Strengthening and improving the investment climate, vessel design and construction framework	30.00

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Low
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	High
8. Stakeholders	Substantial

9. Other	Low
OVERALL	Substantial

Compliance		
Policy		
Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Implementation Arrangements I	**X**		CONTINUOUS

Description of Covenant

IWAI to maintain (i) a Project Oversight Committee ("POC") for general oversight and policy guidance for the Project; and (ii) a Project Management Unit ("PMU") responsible for the day-to-day implementation of Project activities.

Name	**Recurrent**	**Due Date**	**Frequency**
Implementation Arrangements II	**X**		CONTINUOUS

Description of Covenant

IWAI to establish six (6) Project Implementation Units (PIUs), Two (2) months after the Effective Date, located in Kolkata, Patna, Haldia, Farakka and Sahibganj in order to provide implementation support to the PMU and coordinate with Participating States and local authorities in the carrying out of the Project.

Name	**Recurrent**	**Due Date**	**Frequency**
Technical Support Consulting Services	**X**		CONTINUOUS

Description of Covenant

IWAI to hire, three (3) months after Effective Date, and thereafter maintain the services of two technical supports consulting firms to assist the PIUs in the execution of their activities/responsibilities in their respective geographical jurisdictions.

Name	Recurrent	Due Date	Frequency
Assets Management Framework	X		CONTINUOUS

Description of Covenant

IWAI to develop, six (6) months after Effective Date, and thereafter implement an operational framework for the management of project financed assets

Name	Recurrent	Due Date	Frequency
Vessels Design Standards	X		CONTINUOUS

Description of Covenant

IWAI to develop, One (1) year after Effective Date, design standards for vessels suitable for navigation in the different Project stretches of the NW-1

Name	Recurrent	Due Date	Frequency
Project Finance	X		CONTINUOUS

Description of Covenant

IWAI to carry out the Project in accordance with the Finance & Accounts Manual.

Name	Recurrent	Due Date	Frequency
Safeguard Documents	X		CONTINUOUS

Description of Covenant

IWAI to carry out the Project in accordance with the EA(s)/EMP(s), the SIA(s), and the RAP(s), prepared or to be prepared in accordance with the CIA, the Consolidated SIA, the Consolidated EIA and the RPF (Safeguard Documents).

Name	Recurrent	Due Date	Frequency
Environmental and Social Screening	X		CONTINUOUS

Description of Covenant

IWAI to refrain from awarding any civil works to contractors and/or undertaking any activities under the Project, until and unless: (a) the proposed civil works/activities have been screened by the PMU in accordance with Safeguard Documents; (b) all of the Safeguard Documents required for such civil works/activities have been prepared and submitted to the Bank for review and no-objection; and (c) the Safeguard Documents have been publicly disclosed by IWAI in local language(s) at the relevant Projects' sites.

Name	Recurrent	Due Date	Frequency
Permits and Clearances	X		CONTINUOUS

Description of Covenant

IWAI to ensure, prior to commencing any civil works under the Project, that: (a) all necessary governmental permits and clearances have been obtained; (b) all pre-construction conditions imposed under such permit(s) or clearance(s) have been complied with; and (c) all required resettlement measures set forth in the applicable RAP(s) have been fully executed, including the full payment of compensation prior to displacement and/or the provision of relocation assistance.

Name	Recurrent	Due Date	Frequency
Civil Works Contracts	X		CONTINUOUS

Description of Covenant

IWAI to ensure that each contract for civil works under the Project includes the obligation of the relevant contractor to comply with the relevant Safeguard Documents.

Name	Recurrent	Due Date	Frequency
M&E Safeguard protocols	X		CONTINUOUS

Description of Covenant

IWAI to maintain monitoring and evaluation protocols and record keeping procedures acceptable to the Bank and adequate to enable the Borrower and the Bank to supervise and assess the implementation of/compliance with the Safeguards Documents.

Name	Recurrent	Due Date	Frequency
Ineligible Expenditures	X		CONTINUOUS

Description of Covenant

IWAI to ensure that: (a) all land acquisition required for the purpose of the Project; and (b) any compensation, resettlement and rehabilitation payment to Displaced Persons as per the RAPs, are financed exclusively out of IWAI's own resources.

Conditions

Source Of Fund	Name	Type

Description of Condition

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Arnab Bandyopadhyay	Team Leader (ADM Responsible)	Lead Transport Specialist	Task Team Leader	GTI06
Charles Kunaka	Team Leader	Lead Private Sector Specialist	Co-TTL	GTC09
Tapas Paul	Team Leader	Lead Environmental Specialist	Co-TTL and Environmental Specialist	GEN06
Swayamsiddha Mohanty	Procurement Specialist (ADM Responsible)	Senior Procurement Specialist	Procurement Specialist	GGO06
Dilip Kumar Prusty Chinari	Financial Management Specialist	Finance Analyst	Financial Management Specialist	GGO24

Bernard Aritua	Team Member	Senior Infrastructure Specialist	Technical Expert	GTI06
Martin M. Serrano	Team Member	Senior Counsel	Senior Counsel	LEGES
Mridula Singh	Safeguards Specialist	Senior Social Development Specialist	Safeguards Specialist	GSU06
Neetu Sharda	Team Member	Program Assistant	Administrative Support	SACIN
Nitika Surie	Team Member	Program Assistant	Administrative Support	SACIN
Santosh Kumar Sahoo	Team Member	Program Assistant	Administrative Support	GPV01
Sona Thakur	Team Member	Senior Communications Officer	Senior Communications Specialist	SAREC
Victor Manuel Ordonez Conde	Team Member	Senior Finance Officer	Finance Officer	WFALA
Vidya Kamath	Team Member	Program Assistant	Administrative Support	SACIN

Extended Team

Name	Title	Office Phone	Location
Anthony Hughes	Consultant, Inland Water Operations	-	Tanzania
H F W De Leijer	Consultant, Institutional Development	-	Netherlands
Honey Gupta	Consultant, Technical Specialist	-	New Delhi
Kartik Chandra Ta	Consultant, Technical Specialist	-	Kolkata
Paul Amos	Consultant, Transport Policy Advisor	-	Germany
Rashi Grover Kashyap	Consultant, Monitoring & Evaluation	-	New Delhi

I. STRATEGIC CONTEXT

A. Country Context

1. The Indian economy experienced a high rate of growth during 2000–2010, followed by a sharp drop from over 8 percent to below 6 percent in 2011. In 2015, the economic growth rate slightly recovered to 6.4 percent and is expected to achieve over 7 percent in the next few years if the investment levels are maintained. Infrastructure investment is one of the main building blocks of the Government of India (GoI) for sustaining growth. Its 12th five-year plan (2012–2017) sets out an infrastructure investment target of US$1 trillion.

2. One of the constraints on India's efforts to accelerate manufacturing-based economic growth and trade competitiveness is excessive logistics costs. It is estimated that logistic costs are equivalent to 18 percent of India's current gross domestic product (GDP). The major drivers of the high cost of logistics in India include congested road and rail systems, carrying more than 90 percent of the overall freight, and the virtual absence of multi-modalism.[1] The current logistics network is also insufficient to accommodate the threefold increase in freight movement expected over the coming decade. To build logistics infrastructure capable of efficiently handling rapidly growing freight traffic, India will need to pursue an integrated approach that aims to optimally utilize all transport modes. It will specifically require the realization of the huge potential of its waterways. Inland water transport (IWT) forms an integral part of the transport mix in most countries but infrastructure investment in India has remained focused almost exclusively on roads and railways.

3. There is a long history of using waterways for transport in India but they were supplanted in the 19th century as a nationally significant mode of transport by the expansion and improvement of the railway system. Thereafter, there was minimal investment in maintaining or modernizing IWT routes and many shipping channels, canals, and navigation assets fell into disuse and disrepair. The country continues to ply the waterways with small, shallow draft vessels but a commercial shipping industry using large modern vessels is not currently feasible on most rivers. As a result, IWT today plays a negligible role in national freight transport carrying only 0.5 per cent of India's freight while in China, the United States, and the European Union, between 5 percent and 7 percent of all freight traffic is conducted on inland watercourses.

4. The 12th plan seeks to develop IWT in India in a significant manner, targeting an eventual tenfold increase in the modal share of freight transported by IWT, particularly of bulk and semi-bulk cargo, over-dimensional loads, and hazardous goods.[2] While the long-term target may be considered aspirational, the policy direction is firmly set. The GoI's increasing commitment to IWT is reflected in the National Waterways Bill (2015), which will increase India's declared national waterways from nearly 4,400 km to over 18,000 km, thereby also transferring the authority to develop the navigation infrastructure for commercial shipping from the states to the GoI. This policy coheres with the GoI's 'Sagarmala' port-centric development strategy to exploit underutilised inland and coastal waterway connections, as well as traditional road and railway

[1] Multi-modalism is a concept by which individual transport modes may be combined and coordinated through single transport contracts to provide more efficient and flexible supply chains.
[2] Planning Commission, Government of India. 2011. "Faster, Sustainable and More Inclusive Growth: An Approach to the 12th Five Year Plan." Working Papers id: 4452, eSocialSciences.

links, to integrate the development of ports, industrial clusters, and port hinterlands.

5. There are potential economic, environmental, and social benefits in using India's inland waterways for transport, as carrying bulk goods on waterways can be cheaper, more reliable, and less polluting than transporting them by road or rail. For instance, the costs of carrying 1 ton of freight over 1 km is INR 2.28 for highways, INR 1.41 for railways, and INR 1.06 for waterways. Moreover, 1 liter of fuel can move 24 tons of cargo per km by road, 85 tons by rail, and 105 tons on water. The 12th plan estimates that the total external costs of inland navigation, after accounting for accidents, congestion, noise emissions, air pollution, and other environmental impacts could be one-seventh of that of road transport.

6. India ranks 35 (out of 160) in the World Bank's 2016 Logistics Performance Index ranking (Figure 1), significantly behind South Africa and China, respectively ranked 20th and 27th, despite strong investments in developing the road and railway infrastructure. Major drivers behind the high logistics cost in India are poor infrastructure, weak transport network, and long procedural complexities coupled with high variability and uncertainty in transit times; therefore, the cost continues to increase at an alarming rate-14 percent of GDP in 2014-compared to developed countries in the range of 8–10 percent. Reports also estimate that waste caused by poor logistics and transport infrastructure is about US$45 billion or about 2 per cent of India's GDP. Given its pivotal role, logistics infrastructure will be a critical enabler for India's economic development and to advance the Prime Minister's vision of 'Make in India'.

Figure 1. Logistics Cost Benchmarking

7. Climate change is an important driver of the GoI's IWT policies. According to the Fifth Intergovernmental Panel on Climate Change Assessment Report, the transport sector—primarily through its fuel or energy end-use—produced 7.0 Gigatons of carbon dioxide equivalent ($GtCO_2e$) of direct greenhouse gas (GHG) emissions (including non-CO_2 gases) in 2010 and, hence, was responsible for approximately 23 percent of total energy-related CO_2 emissions (6.7 $GtCO_2e$).

Transport-related emissions account for about 10 percent of India's overall GHG emission[3] but have been increasing at a rapid rate. With an existing relatively low motorization rate, an extensive and congested road network, and an outdated vehicle fleet, transport emissions are expected to continue to increase. Tackling emissions in the transport sector therefore features prominently in India's Nationally Determined Contribution (INDC) toward climate change mitigation and adaptation goals committed in the 21st Conference of Parties (COP21), Paris. India's INDC lays out a move toward a 'Safe, Smart and Sustainable Green Transportation Network', and clearly recognizes the need to promote IWT keeping in mind gains in fuel efficiency, environmental sustainability, and cost-effectiveness. The Capacity Augmentation of the National Waterway-1 Project has also been explicitly noted as part of this program. Facilitating a modal shift toward low emission, freight transport systems are one of the key strategies for achieving a 33 per cent to 35 per cent reduction goal by 2030.

8. IWT also plays a key role in the efforts of India and Bangladesh to enhance regional cooperation and integration. The two countries have had a bilateral protocol on international waterway transit routes since 1972 and in June 2015 signed the Coastal Shipping Agreement, which allows goods to move by coastal shipping from Kolkata in West Bengal to Chittagong Port in Bangladesh and thereafter by inland waterways or road transport to the northeastern Indian states. The countries also agreed to seek international financing for development of year-round navigability of the protocol (waterway) routes between the two countries as envisaged in the Bilateral Framework Agreement on Trade and Transit. The World Bank has already approved financing of the Dhaka-Chittagong Waterway in 2016.

9. High quality inland waterway networks that provide a competitive advantage over other forms of transport require substantial investments in navigation, ports, terminals, and modally interconnecting infrastructure. This project is aimed at creating the required infrastructure and institutional support for market development on National Waterway- 1 (NW-1), one of India's most important waterways located in one of its busiest freight transport corridors.

B. Sectoral and Institutional Context

10. NW-1 is the longest of the 111 newly declared national waterways. It is a natural river system linking the seaport of Kolkata (including Kolkata Docks and a deep-water dock at Haldia) to Allahabad, some 1,620 km inland, via the Hooghly/Bhagirathi and Ganga Rivers. It offers the greatest potential contribution to economic development of any of India's waterways: it passes through four resource-rich but low-income states (West Bengal, Jharkhand, Bihar, and Uttar Pradesh) and can potentially contribute to sharper poverty reduction in this region. It also has the potential to serve the rapidly growing seaports of Paradip and Dhamra that lie just south of the river estuary in Odisha, another low-income state. NW-1 also connects to the western end of the waterway that constitutes the India-Bangladesh Protocol Route to Bangladesh, and via that route, links further to the states of northeastern India, a region that continues to lag in development. The GoI has requested financial and technical support from the World Bank to develop a 1,360 km stretch of NW-1 between Haldia and Varanasi as an inland water fairway for bulk cargo.

[3] Transport GHG emissions is 188,008.96 gigagrams CO_2e out of total India GHG emissions of 1,884,309.46 gigagrams CO_2e, *Source:* India First Biennial Update Report to the United Nations Framework Convention on Climate Change, December 2015.

11. **Integral part of the high-density Eastern Transport Corridor.** NW-1 together with the proposed Eastern Dedicated Rail Freight Corridor (being financed by the World Bank) and National Highway 2 (NH 2) constitute the Eastern Transport Corridor of India connecting the national capital region with the eastern seaport of Kolkata. It is estimated that the annual freight flow through the corridor is about 370 million tons. The total freight flow generated from or destined to the six states in the corridor is a significant 40 percent of the overall flow in India; however, NW-1 currently carries only an average of about 5 million tons of cargo each year.

12. It is also noteworthy that despite a significant difference in geographical distance, the hinterland states of Bihar and Uttar Pradesh prefer to use the western sea ports of Jawaharlal Nehru Port Trust (Mumbai) and Kandla over Kolkata, while the port usage for Jharkhand is almost equidistant between the western ports and Kolkata. This is largely due to the limited choice of transport modes, poor hinterland connectivity, and, to some extent, suboptimal port infrastructure and efficiency in Kolkata Port. The proposed NW-1 can help divert some of the freight from these states to the closer Kolkata/Haldia Port. Further, West Bengal and the hinterland have the potential to become the gateway for trade with the northeastern region as well as link to Bangladesh, Myanmar, Thailand, Nepal and other south-east Asian countries. The augmentation of NW-1 as well as the Eastern Dedicated Rail Freight Corridor will thus help enhance the overall capacity and efficiency of the Eastern Transport Corridor transport and logistics system. In addition, compared to other forms of linear transport infrastructure being developed in the region, the augmentation of NW-1 will need minimal land acquisition and cause minimal disruption to lives of people living in the densely populated region.

13. **High potential cargo volumes.** A value chain analysis of freight flows in the corridor supported by structured consultation with freight shippers indicates that agriculture is the single most important economic activity in the NW-1 Corridor. The four states (Uttar Pradesh, Bihar, Jharkhand, and West Bengal) produce surpluses, which are traded with the rest of the country, generating inbound flows of fertilizer, poultry feed, and agricultural equipment and outbound flows of wheat, rice, sugar, vegetable oil, and other produce. The region also produces high volumes of construction materials (chips, limestone, sand, and cement) that are shipped to the major economic centers, including Kolkata, and also exported to Bangladesh. There are also significant flows of mineral and industrial commodities (coal, iron ore, fly ash, plastics, paper, and so on) as well as 'over-dimensional' cargo for the mining and construction industries. These are all commodities for which IWT has proven most successful in China, Europe, the United States, and elsewhere. There is also some containerized cargo flow of industrial inputs and outputs (textiles, cars, carpets, motorbikes, and so on) that mirror intermodal cargo flows in China (on the Yangtze) and Europe (on the Rhine). Particular concentrations of potential transport demand around Kolkata, Farakka, Patna, and Varanasi support the GoI's decision to prioritize the development of the stretch between Haldia (Kolkata) and Varanasi.

14. Consultations with firms, producers, shippers, and logistics service providers along the Eastern Transport Corridor helped to identify constraints that will have to be addressed to improve the overall performance of the logistics system along the Eastern Transport Corridor. The main constraints are delays in loading and unloading cargo in the port; weak coordination between and poor orientation of services providers to logistics efficiency; poor hinterland connectivity due to channel restrictions on IWT, congestion on road and rail transport, cross-border checkpoints, and high tariffs on rail transport; patchy warehousing and storage infrastructure, and generally

unreliable services across all modes of transport. To enhance logistics efficiency, the project aims to address several of these constraints as they pertain to IWT.

15. **Growing role of the Inland Waterways Authority of India (IWAI).** The Ministry of Shipping is responsible for national IWT policies, while day-to-day sector administration is undertaken by the IWAI. IWAI was established by statute in 1985 as an executive authority to develop, regulate, and encourage the better utilization of India's national waterways for transport. Its aim is to be an infrastructure provider, while the operation of shipping services is provided by shipping companies, at cargo levels determined by market forces. The GoI has progressively permitted IWAI a more proactive role in developing markets, to create market incentives and encourage private sector participation.

16. However, IWAI has lacked financial and institutional resources to make much headway, and its challenge has become sharper with the scaling up of the IWT program planned by the GoI. Notwithstanding the recent creation of more than 100 new staff positions, the current skills mix in IWAI needs to undergo significant change in favor of asset management, logistics, and market development, as well as in some operational capabilities such as managing environmental and safety issues. IWAI is funded from the national budget and between 2010 and 2015, its average annual expenditure (for operations, maintenance, and investment) was less than US$30 million equivalent. About one-third of these funds were allocated to NW-1, which has seen an increase in traffic of around 77 percent over five years (from a very low base) to about 5.0 million tons per year.

17. **Inadequate navigation infrastructure.** The main supply-side constraint is weak navigation infrastructure which results in low usage. Currently, IWAI targets a navigation 'fairway' of 45 m width, with least available depth (LAD) that varies at different reaches—3.0 m between Tribeni and Farakka, 2.5 m between Farakka and Barh, 2.0 m between Barh and Ghazipur, and 1.5 m between Ghazipur and Allahabad. However, year-round availability of depth in the river for reliable navigation, particularly upstream of Farakka, is not assured. Current usage is thus largely limited to the southern stretch (Haldia to Farakka) of the river which enjoys a favorable draft (2.5 m to 3.0 m) all year round and is closer to the seaport. The situation is compounded by an ageing ship lock at Farakka, which is a slow, low-capacity and high-maintenance facility, built more than 40 years ago and now in need of major rehabilitation. The river also lacks modern navigation aids to allow safe, 24-hour operations. Environmentally sound cargo handling facilities that can serve larger vessels are also very limited. The existing infrastructure thus does not provide the confidence necessary for potential freight shippers or barge operators to invest in a modern vessel fleet and terminals.

18. The key demand-side imperative, thus, is to match infrastructure and services to market needs. The corridor served by NW-1 is characterized by substantial flows of cargoes that are the mainstay of IWT, internationally. However, the current supply-led infrastructure strategy needs to be transformed into a combined infrastructure and transport operations strategy, geared to the needs of these specific markets and customers. The proposed project seeks to provide the infrastructure and services that are needed to secure the viability of the waterway, including low-draft and fuel-efficient vessel design, modern terminals, and good intermodal connectivity. The project also envisages adoption of modern dredging technologies and gradually switching over to a performance-based 'assured depth' contracting framework. This will not only improve efficiency

but also provide confidence to investors in the navigation capability.

19. **Absence of agglomeration.** The other significant demand-side constraint is around agglomeration of flows and clustering opportunities. The hinterland of NW-1 is largely agrarian and dominated by small and medium enterprises. The transport service providers are currently limited in number and lack capacities for agglomerating and integrating services. The clustering of related activities is particularly important for small-scale producers as it helps consolidate volumes of cargo and benefits from economies of scale. Further, the current capacity of warehousing and logistics centers is suboptimal and impedes potential future growth of intra-regional and export and import trade. With relatively easier availability of land, as well as proximity to highways, railways, and the main agricultural markets in the region, the strategically located terminals along NW-1 could emerge as potential hubs for warehousing and distribution, thus creating thousands of jobs in these four low-income states. The project will also support the capacity enhancement of transport and logistic service providers.

20. In institutional terms, while IWAI is responsible for providing and maintaining the navigation 'fairway', it does not own the water resource itself or adjacent land. Landside activities such as development for ports or jetties, logistics clusters, or industries that may wish to take advantage of IWT are largely regulated by state governments or municipal authorities. Their involvement as active stakeholders is necessary for the strategic planning, delivery, and development of the complementary landside facilities and services essential to the success of IWT.

21. **Weak intermodal opportunities.** Intermodal connectivity provided by efficient transshipment nodes with road and rail transport (and in some circumstances conveyors or pipelines) are critical. Road transport typically provides last-mile/first-mile connectivity for IWT cargoes when the traffic origin or destination is not directly located on the riverbank. Each of the modes of transport in India evolved separately but discussions have recently started between the responsible authorities to try and attain a shared vision of the evolution of the freight markets in the country and the crucial role of intermodal and multimodal transport opportunities. The location and design of transshipment terminals are being based on various factors: cargo needs, potential to attract cluster industries, and physical and environmental suitability.

22. **Need to focus on sustainability.** The Ganga is a critical environmental and cultural resource for India, and sustainability needs to be a crucial aspect of the project. Given the iconic status of the Ganga in India, certain stakeholders have also expressed concerns about the possible social and environmental impacts of developing a stretch of the river for inland navigation. There were also some misconceptions about the scope of the current project, popularly known as the Jal Marg Vikas Project (JMVP), for instance the belief that it will entail the construction of several barrages on the Ganga or that widespread dredging will be needed to make the watercourse navigable. The option of constructing heavy infrastructure interventions (such as barrages and weirs) on the river was ruled out at an early stage, and careful siting of land-based infrastructure such as terminals and jetties has ensured that no major pilgrim or urban center on the banks of the Ganga will be affected by project facilities. The project will provide some enhancement to the cultural values of the river and the important cultural heritage along the river by (a) boosting cultural tourism and pilgrimage by facilitating movement of tourist vessels and cruises and (b) providing augmented access to culturally significant places such as Varanasi and Sahibganj-Rajmahal.

23. Project preparation has focused on understanding the possible impacts of navigation operations on the complex and dynamic ecosystem of the Ganga. Pollution and lack of adequate environmental flows in the Ganga have been issues for the past few decades. More than 69 percent[4] of potentially usable water from the entire basin is withdrawn from surface water for agricultural, industrial, and other usage and, as a result, low flows during the lean season are a major issue, especially between Hardwar and Varanasi. However, it is expected that the revival of inland navigation on the Ganga and the emergence of the sector as a major stakeholder, in relation to the river, will only help strengthen efforts to maintain instream flows. In fact, it is expected that the maintenance of flows in the river for navigation could also help with the revival of some wetlands along the Ganga that have lost their connections to the river. Similarly, embankments built to prevent erosion of riverbanks by the wave-action of passing vessels can also protect local communities living by the river from the risk of floods, especially in the lower reaches of the river.

24. **Preventing further pollution in the Ganga.** The GoI has an ambitious program of reducing the pollution load in the Ganga (also supported by the World Bank), and it is important that the proposed operation of the waterway provides complimentary actions to reduce pollution load. All terminals and vessels have thus been designed as zero-discharge facilities, thereby ensuring that waste management takes place only at designated barge maintenance stations and terminals that have adequate infrastructure for treatment. Accidents on the river can also lead to oil spillage which may affect the water quality of the river. Specific enhancements to the River Information System (RIS) being developed under the project will decrease the chances of accidents or of vessels running aground. Switching to cleaner fuel such as liquefied natural gas (LNG) for vessels plying the river will also help maintain a low-polluting and clean operational framework.

25. **Acquiring navigable depth with minimal intrusion.** Efforts have been made to integrate sustainability into the design of the project, aligned with IWAI's operating principle of 'working with nature'. The Ganga is a large meandering river system with high levels of sediment transport. The river has large water-level fluctuations and unreliable water depths, leading to unavailability of adequate depth suitable for navigation. Cognizant of the potential environmental impacts of large-scale dredging of the riverbed, the project has striven to balance the trade-offs between LAD and associated dredging quantity while assessing design options for the development of the navigational fairway. The strategy adopted focuses on optimizing LAD[5] with minimal dredging,[6] coupled with the operation of low-draft vessels plying in lower depths. The adoption of an assured depth contract will also incentivize reduced dredging and improve ecological stability with respect to water flow and quality. Whatever minimal dredging is required will be done with the low-intrusion water injection method, wherein the dredged material is transported horizontally along the waterbed and the sediments are retained within the ecosystem.

26. **Setting benchmarks for India.** As NW-1 is designed to lead the realization process of the potential of India's waterways, this project is also expected to set standards and benchmarks for

[4] IWMI (International Water Management Institute). 2005. *Spatial Variation in Water Supply and Demand Across the River Basins of India*.
[5] The final LADs proposed are 3.0 m between Haldia (km 0) to Barh (km 980), 2.5 m from Barh (km 980) to Ghazipur (km 1,250) and 2.2 m from Ghazipur (km 1,250) to Varanasi (km 1,360), with a channel width of 45 m. This would support two-way movement of commercial barges carrying an average payload of 1,500 to 2,000 tons.
[6] The estimated annual dredging quantity would be 10–11 million cu. m which is less than 1 percent of the sediment load carried by the river.

the industry; be it for world-class facilities and infrastructure, 'working with nature' to develop least-intrusive solutions, energy-efficiency, minimizing pollution at source, comprehensive pollution management, or best practices for health and safety assurance. Accordingly, opportunities for environmental enhancement have been taken in the project, including (a) reduction of emissions by switching to a clean fuel such as LNG for river vessels; (b) building energy-efficient, and 'zero-discharge' infrastructure; (c) avoiding adding to congestion and pollution in major cities by siting multimodal terminals away from population hubs; and (d) strict operational protocols to conserve protected aquatic areas.

C. Higher Level Objectives to which the Project Contributes

27. The project will contribute to the two main engagement areas in the Country Partnership Strategy 2013–2017 (Report No. 76176-IN dated March 21, 2013): integration and transformation. The project will improve integration threefold: (a) improving economic integration among the four economically weaker states of Uttar Pradesh, Bihar, Jharkhand, and West Bengal through better transport connectivity and freight logistics; (b) opening up market opportunities and boosting trade in the less developed northeastern region through improved connectivity with industries and economic centers in northern and eastern India; and (c) reinforcing regional integration with Bangladesh, Bhutan, and Nepal. The project will be transformational (a) in reducing the growth of transport-related pollution and GHG emissions by rebalancing the freight mode shares; (b) by promoting what in the modern era is an essentially new and complementary mode of transportation; and (c) by strengthening the institutional capacity of the sector.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

28. The Project Development Objective (PDO) is to enhance transport efficiency and reliability of National Waterway- 1 and augment institutional capacity for the development and management of India's inland waterway transport system in an environmentally sustainable manner.

Project Beneficiaries

29. The main beneficiaries of the project will be (a) shippers of goods to/from the four directly adjacent states (West Bengal, Jharkhand, Bihar, and Uttar Pradesh); (b) vessel operators providing services on NW-1; (c) the Kolkata/Haldia Port and to a lesser extent, the ports of Paradip and Dhamra; and (d) IWAI. The project will create job opportunities for communities living around the six major multimodal/intermodal terminals and surrounding industrial clusters, two vessel repair facilities and about ten roll-on roll-off (Ro-Ro) truck crossings. The direct job creation potential for this project is estimated to be about 25,000,[7] while the indirect job creation potential could be much greater, estimated around 1,25,000, of which it is estimated that 5 percent could go to women. Lastly, by supporting the augmentation of passenger ferry services in six cities along

[7] The jobs have been estimated for vessels, nodal point infrastructure, and also supporting logistic operations. Broadly, each 1 million tons of cargo carried over the waterway system for an average distance of 1,000 km will create about 150 direct jobs, while each terminal of up to 5-million-ton annual capacity will create about 1,000 direct jobs. Enhanced women's work force participation is anticipated through enhanced tourism and in the information and communication technology (ICT)-supported areas in the logistics domain.

the river, the project will provide improved access for about 1 million people, about half of them women.

PDO Level Results Indicators

30. The project seeks to achieve the following key indicators:

    (a) Supporting navigation of higher vessel sizes on NW-1

    (b) Reduction in cost of cargo traffic transported by inland water transport between Haldia and Varanasi

    (c) Improved reliability of navigation on NW-1 (days available for transport operations per year)

    (d) Net annual GHG emission avoided

    (e) Enhanced IWT sector capacity through improved institutional structure and operational framework for sector institutions

More details are provided in annex 1.

III. PROJECT DESCRIPTION

A. Project Components

31. The project consists of two main components: (A) Improving the Navigability of NW-1 (Haldia to Varanasi) at an estimated cost of US$770 million; and (B) Strengthening Institutional Capacities and Improving the Investment Climate, Vessel Design, and the Construction Framework at an estimated cost of US$30 million.

Component A: Improving the Navigability of NW-1 (Haldia to Varanasi)

32. The subcomponents are the following:

    (a) **Subcomponent A1 (US$10 million).** This subcomponent includes Retroactive financing for detailed topographic and bathymetric surveys, preparation of technical feasibility and detailed engineering studies, preparation of environmental and social impact assessment (ESIA) studies and other supporting technical assistance/studies for project preparation, most of which have been completed. This subcomponent will further support incremental operating costs for the Project Management Unit (PMU) and Project Implementation Units (PIUs), and preparation of engineering designs for approximately 18 passenger terminals in six cities which will be constructed and operated by the participating states.

    (b) **Subcomponent A2 (US$372 million).** This subcomponent includes improvement of river fairway through dredging and river conservancy works. These works will be undertaken to provide the target LAD in the various reaches (see section VI B -

Technical). The works will be executed through a combination of three performance-based 'assured depth' contracts and one input-based dredging contract (already in place) on the Farakka to Varanasi stretch except for the protected aquatic sanctuaries.[8] IWAI's internal resources will be used to carry out marginal maintenance dredging in the Haldia to Farakka stretch. Procurement of one assured depth dredging contract (Farakka to Kahalgaon stretch) is currently in progress.

(c) **Subcomponent A3 (US$17 million).** This subcomponent includes construction of permanent protection works for erosion- prone banks in selected locations, totaling up to 40 km. The works will be executed through engineering, procurement, and construction (EPC) contracts.

(d) **Subcomponent A4 (US$57 million).** This subcomponent includes rehabilitation of the existing Farakka ship lock and construction of a new parallel lock to allow concurrent two-way working. The works will be implemented through an EPC contract and procurement is currently in progress.

(e) **Subcomponent A5 (US$303 million).** This subcomponent includes construction of (i) six multimodal/inter-modal freight terminals with future provision to allow evolution as market clusters;[9] (ii) two vessel repair and maintenance facilities; and (iii) five pairs of Ro-Ro crossings. IWAI will provide land and road access for the Ro-Ro terminals, while the private sector will build infrastructure, procure vessels and equipment and operate the facilities. All other works will be executed through EPC contracts. Construction of a multimodal terminal in Varanasi has been initiated and procurement is currently ongoing for Sahibganj and Haldia multimodal terminals. Land acquisition and resettlement, environmental management, utility relocation, and independent monitoring and quality assurance are included.

(f) **Subcomponent A6 (US$11 million).** This subcomponent includes (i) navigational aids in the form of night navigation facilities and channel marking; (ii) enhancement of the existing RIS through addition of app-based systems, an improved communication platform, and expanded user reach; (iii) support for the development of a Terminal Management System (TMS); and (iv) provision of other support services, for example, search and rescue, distress response and casualty incident management, and upgrading vessel and river monitoring systems. These activities will be implemented through a combination of small civil works, services, and goods contracts.

Component B: Strengthening Institutional Capacities and Improving the Investment

[8] In the protected aquatic sanctuaries, dredging will not be done, but nonstructural measures such as *bandalling* may be required to provide the 'assured depth'.

[9] For example, Varanasi has the potential of evolving as a multimodal transport terminal taking advantage of its close proximity to the Eastern Dedicated Freight Corridor and for serving as an agriculture cluster (food grains, fertilizer, feed stock and so on). Sahibganj has the huge potential of evolving as a gateway river port for north-eastern India because of its close proximity to Katihar railhead and also has significant potential for agro-based freight and fly ash. Haldia has the dual potential of serving the local demands of a large Kolkata-Haldia industrial area as well as a coastal shipping/transhipment port.

Climate, Vessel Design, and the Construction Framework

33. The subcomponents are the following:

(a) **Subcomponent B1 (US$11 million):** The subcomponent includes institutional strengthening of sector institutions and capacity building of the sector through (i) undertaking a review of current IWAI staffing, future institutional options and enhanced staffing/skill needs including on areas such as logistics and marketing, social development, grievance redressal, procurement, financial management (FM), and environmental, occupational health, and safety (EHS) management; (ii) undertaking review and alignment of laws and regulations[10] with respect to IWT vessel design, construction, manning, operation, maintenance, insurance, and multimodal transport; and (iii) exploring the option of developing sector institutions including a Research and Development Unit/Center for IWAI and enhancement of training institutions (National Inland Navigation Institute [NINI]). Adequate training, exposure visits, and international benchmarking will be supported through this component. The procurement process for activity (i) has been initiated and IWAI has also commenced activity (ii) through the recent initiative in amending the Inland Vessels Act (1917, amended in 2007).

(b) **Subcomponent B2 (US$5 million).** This subcomponent includes improving the overall investment climate through (i) undertaking market development studies and preparation of business cases (by location, industry, and cargo type); and (ii) investigating arrangements for private sector participation in the construction and operation of terminals. Both of these activities will be executed through consulting service contracts. The International Finance Corporation (IFC) has been engaged by IWAI in 2015 as a transaction adviser to support activity (ii) which is well under way. Activity (i) is also in progress.

(c) **Subcomponent B3 (US$14 million).** This subcomponent includes (i) vessel design and standardization with a focus on low draft and efficient and clean fuel (LNG) vessels; (ii) undertaking public/private stakeholder consultations to encourage investment in modern vessel technology through review of fiscal and other barriers hindering vessel construction; and (iii) construction and / or leasing of 10 low-draft vessels to kick-start the use of modern vessels in NW-1. Activities (i) and (ii) will be implemented through consulting service contracts, while activity (iii) will be implemented through goods contracts. Procurement for activity (i) is already under way.

B. Project Financing

34. The total cost of the project is estimated at US$800 million. The World Bank share is estimated at US$375 million. Government of India share will be US$ 380 million and the balance

[10] Will include but is not limited to Inland Vessels Act, Inland Waterway Authority Act and Rules, and Inland Waterway Tariff Regulation (2011).

US$ 45 million would be funded through local private financing sources.

Project Cost and Financing

Table 1. Project Cost and Financing (US$, million)

Item	Cost	IBRD	GoI	Private Sector	Remark
Subcomponent A1	10	5	5	—	—
Subcomponent A2	372	215	157	—	—
Subcomponent A3	17	8	9	—	—
Subcomponent A4	57	38	19	—	—
Subcomponent A5	303	88	170	45	Ro-Ro facilities will be developed using private sector contribution
Subcomponent A6	11	5	6	—	—
Subcomponent B1	11	5.5	5.5	—	—
Subcomponent B2	5	2.5	2.5	—	—
Subcomponent B3	14	7	7	—	—
Total Baseline Cost	799	374	—	—	—
Front-end Fee	0.9	0.9	—	—	—
Total Financing Required	800	375	380	45	—

Rationale for Public Sector Financing

35. The practical experience of countries with substantial and mature IWT industries, for example, in China, Europe, and the United States, is that most of the investments and operating and maintenance costs of navigation infrastructure is publicly provided and funded with only a small proportion of such costs charged to waterway users. Cargo shipping operations are mainly privately operated. Passenger ferry operations are sometimes privately and sometimes publicly operated (in the latter case sometimes administered by road agencies). Provincial and local governments are heavily involved in developing ports that often host private terminal operators as lessees or concessions. Private sector companies are widely contracted to undertake construction works, dredging, bank stabilization, installation and maintenance of navigation aids, and so on.

36. The project design is based on the expectation of a similar long-term disposition of roles in India. Public sector leadership in the planning and funding of the navigation infrastructure itself is even more essential in India because IWT on NW-1 is an infant market. Investment to enhance capacity along the Eastern Transport Corridor is critical given the anticipated continued expansion in freight flows as the economy maintains its strong growth trajectory. Under the circumstances, only the Government can manage potential public policy trade-offs between the different roles of India's rivers; in addition to their transport role they supply irrigation and drinking water and are a source of livelihood for farmers and fishermen. Moreover, the Ganga itself has a huge cultural and religious significance that requires sensitive strategic public management of its development. Public sector provision and financing of navigation infrastructure is therefore the only feasible approach for the infrastructure and an appropriate way forward. Private sector participation will be sought in shipping operations, management of port and transshipment facilities, and support services such as repair yards.

Value-added of World Bank Support

37. The project will deploy the World Bank's global multimodal freight transport and logistics expertise to help the GoI achieve its sector strategy. The World Bank's technical advice and material support are crucial for IWAI. IWAI has a total staff (including operational staff based at the waterways) of around 300 (including 100 newly inducted positions), and about 10 officers from the senior management are involved in the strategic planning of waterway development across India. The World Bank is currently supporting the dedicated rail freight corridors project in this corridor and several national and state highways, urban transport, and rural road improvement projects. To provide comprehensive knowledge and operational support, the core World Bank task team has been drawn from multiple Global Practices including the Transport and ICT, Trade and Competitiveness, and Environment and Natural Resources Global Practices; it is working closely with the IFC advisory services who has been appointed by IFC as transaction advisers for identifying opportunities for private sector engagement in the IWT sector.

38. World Bank engagement is based on six key principles: (a) apply a transport systems approach to the challenge, which will scrutinize the potential markets and transport capabilities of the entire waterway, its tributary feeders, and its connectivity to other modes; (b) incorporate market segmentation and development as a core project activity, including all commodities successfully carried by IWT internationally such as coal, fertilizer, agricultural produce, food grains, cement, fly ash, chemicals, bulk liquids, and others; (c) exploit the potential of NW-1 to emerge as a development corridor, which could help unlock the economic potential of more remote rural hinterlands of northern and eastern India and influence future industrial and other land-use zoning plans to create momentum, standards, and benchmarks for the productive use of waterways; (d) ensure alignment of infrastructure development strategies with sustainable operational strategies with regard to promoting low-intrusive development and 'working with nature', evolving technologies that maximize energy-efficiency, minimizing pollution and environmental impacts, designing trends and changing technology of inland waterway vessels and river training technologies; (e) engage with the private sector to pinpoint the preconditions for an investment climate that will encourage private investment in shipping services and terminals; and (f) strengthen interagency coordination by co-opting state government representatives and representatives of the Farakka Barrage Authority in the program oversight committee and extending inter-ministerial coordination arrangements already set up by the GoI for the 'Clean Ganga' mission.

39. The project design draws on lessons of similar projects implemented by the World Bank in India (for example, Assam and Kerala) and several other countries, among them, Bangladesh, Brazil, China, and Vietnam. Some of the key lessons were the need to adopt a system approach that includes navigation as well as access to the system through the development of terminals and implementing key reforms to even the operating environment for all modes of transport. The project draws also on the experience with the more mature and heavily used IWT systems in Europe and the United States. Those systems show the importance of designing an IWT system to respond to the needs of potential users and the mechanism that can be adopted to encourage and nurture innovation in vessel design and technology. The European systems also promote the derivation of even greater environmental benefits. All these issues were taken on board in the design as reflected in the components of the project. In addition, key decision makers and technical staff in the implementing agencies are being also exposed through study visits and knowledge

exchanges, to cutting edge research and innovations in modern IWT systems.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

40. The Ministry of Shipping has designated IWAI (vide Gazette Notification dated October 15, 2014) to be the project implementation agency. A Project Oversight Committee (POC) chaired by the Chairperson, IWAI, has been set up to guide and monitor project progress. The POC comprises senior officers of the Ministry of Shipping, IWAI, representatives of the stakeholder state governments of Uttar Pradesh, Bihar, Jharkhand, and West Bengal and a representative of the Central Water Commission. The POC is responsible for all coordination with participating states including land acquisition/transfer, obtaining state level clearances and permits and promoting inland water sector in respective states. To involve the participating states for even more active role and to fast track inland waterway development, IWAI is also creating special purpose vehicles (SPVs) in joint venture with the states.[11]. IWAI plans to explore a similar approach to develop project ownership in the participating states and improve interagency coordination for development of NW-1. A description of the proposed implementation arrangements is presented in annex 3.

41. A PMU headed by the Vice Chair of IWAI as Project Director has been set up within IWAI since October 2014, steering the project preparation, supervising procurement management, and overall project monitoring. The PMU is staffed with senior experts in technical and engineering fields, procurement, environmental and social development, business development strategy, legal, communications, and finance. It has so far procured and managed the baseline investigations for improving the navigability of Haldia-Varanasi stretch of NW-1 and has managed all procurement activities. Three project preparation consultants have been appointed to help the PMU prepare engineering designs, an ESIA, and market development studies. Procurement of consultancy on research and development on vessel designs has also been recently completed. Procurement of technical assistance for institutional development, communication strategy, and others are in process. The required skilled resources needed for activities undertaken by the PMU are procured through outsourcing to an HR agency, in accordance with the prescribed GoI rules (General Financial Rules [GFR] 2005) and other applicable GoI guidelines.

42. Two regionally based PIUs in Kolkata and Patna and two field offices in Varanasi and Sahibganj have been set up in 2016. Four more PIUs, one each at Varanasi, Haldia, Farakka and Sahibganj are planned to be set up in 2017. These PIUs will augment the regional directorates reporting to the PMU and shall be responsible for field-level coordination on land acquisition and rehabilitation and resettlement (R&R), environmental and statutory clearances, and interaction with states on market development, logistics, monitoring, and other operational issues related to overall project implementation. Each PIU is to be headed by a Regional Director / Deputy Director of IWAI and staffed with technical, social development, environmental management, accounting,

[11]A Memorandum of Understanding (MOU) has been entered into, between IWAI and the Government of Andhra Pradesh, to develop NW-4: the Kakinada- Puducherry canal system along with Krishna and Godavari Rivers in Andhra Pradesh, through an SPV. Another SPV has been formed for NW-5 between IWAI, Industrial Infrastructure Development Corporation, Paradip Port Trust, and Dhamra Port Company Limited.

and administrative professionals.

43. Three technical support services consultants (TSSCs) would be engaged to work with the regional directorates to provide implementation and project management support in the execution of the civil works and installation of key equipment. Procurement of two TSSCs is in progress and, by June 2017, these will be appointed to one of two clusters: Cluster1- Varanasi, Sahibganj, Kalughat, and Ghazipur terminals and Cluster 2- Haldia terminal and Farakka ship lock. A third TSSC is proposed to be engaged shortly under Cluster 3 involving Kalyani terminal, bank protection works, vessel repair facilities, navigation aids, and other ancillary works. These TSSCs will assist with technical design review, construction supervision, quality control, and monitoring of works under the project components. A monitoring consultant for dredging will also be procured to assist with fairway management. They will all report to the corresponding director under the overall guidance, technical control, and direction of the Project Director at the PMU.

44. During the operations phase, IWAI proposes to outsource operational management of various assets/nodal point facilities to the private sector. An operational strategy and tariff structure is being developed for managing the various nodal point facilities.

B. Results Monitoring and Evaluation

45. The Results Monitoring Framework is described in annex 1. The framework broadly indicates the performance indicators, target values, and available baselines. It is proposed that some of the indicators measured as part of this project would be expanded to develop an IWT sector-wide monitoring framework in line with the current initiative on Result Framework Document for the Ministry of Shipping, Road Transport, and Highways.

46. The PMU would be responsible for preparing the baselines and monitoring the performance indicators. IWAI is also extending the RIS for the entire project stretch and has the ability to capture real-time data on freight flow and reliability of services.

C. Sustainability

47. **Political and economic sustainability.** Project success requires long-term government commitment and financial support. This project is a flagship project for the sector as a whole, being the largest and most far-reaching project in the IWT sector, located on what is India's most promising national waterway. Its success and long-term political and economic sustainability will depend, first and foremost, on how successful it is in winning traffic to NW-1 and creating economic opportunity for the impoverished hinterland. A supply-led infrastructure strategy focused just on navigation capability will not guarantee market success for an 'infant' mode against established competitors in the corridor. The project has therefore been designed to be market-led, regionally focused, and multimodal, as set out in the six principles outlined in Paragraph 38.

48. **Operational sustainability.** In operational terms, the most critical factor will be long-term fairway maintenance. Similar to many of India's waterways, NW-1 is subject to high siltation and a changeable river course. Potential shippers and investors in vessels and ports need to be convinced of availability of the targeted navigation standards over a long period in the future to justify their investments. The project plans to introduce performance-based assured depth dredging

contracts, which will respond to the freight market's need for reliable all-weather fairway availability. For managing the various nodal point facilities (for example, terminals, navigational locks, and repair facilities), IWAI is currently developing an operational strategy for management of assets and also revamping the tariff policy (2011) to a more balanced, market-based, and sustainable cost recovery structure. IWAI will also develop, by end 2017, operational and vessel financing strategies for commercial application of the standard vessels being designed.

49. **Ecological and environmental sustainability and climate change-resilient planning**. Sustainable development and climate resilience were integrated from the project planning stage. The design was based on a balanced maintenance and operational strategy to minimize damage to the ecosystem, aligned with the principle of 'working with nature'. Design volume of dredging has been minimized absolutely, through reducing the desired LAD (and simultaneous introduction of 'low-draft' vessels) and avoidance of dredging in sensitive locations including protected aquatic areas. Adopting an assured depth dredging contract regime will reduce unnecessary dredging and improve ecological stability with respect to water flow and quality. Water injection dredging is proposed in addition to cutter suction dredging instead of other traditional dredging techniques (to retain the dredged sediments within the lower vertical confines of the water ecosystem). The promotion of clean fuel (including LNG) vessels, 'no discharge in water' vessels, and construction of zero discharge, clean and energy-efficient terminals and other riverside facilities will reduce the risk of environmental pollution. The project has adopted a practical approach by planning for potential impacts of climate-induced events. The vulnerability to these potential impacts and the possible risks to both the assets and the services provided were considered; measures such as low-draft vessels (to reduce volume of annual maintenance dredging, to extend the overall operational window in summer months, and to operate in drought or low water situations), jetties adjustable at variable heights (to deal with abnormal changes, and to facilitate terminal operations in high- and low-flow periods), storm shelters in ship repair facilities and other anchor points/floating jetties (as a community and workers' adaptation measure) were included. Significant disaster management services, that is, rescue boat, patrol boat, and oil recovery vessel/attachment and service leasing of salvage tugs, has been included. Erosion protection for a 40 km stretch will provide some climate adaptation benefits to the riverside communities, apart from serving the waterway itself. Specific enhancements to RIS to alert users on environmental resources and climate events have been planned. The overall strengthening of the assets and information systems will contribute toward building climate resilience for communities in the vicinity of the waterways.

V. KEY RISKS AND MITIGATION MEASURES

A. Overall Risk Rating and Explanation of Key Risks

50. The risk ratings summary table is summarized in Table 2.

Table 2. Systematic Operations Risk-Rating Tool (SORT)

Risk Category	Rating
Political and governance	Moderate
Macroeconomic	Low
Sector strategies and policies	Moderate
Technical design of project	Substantial
Institutional capacity for implementation and sustainability	Substantial
Fiduciary	Substantial

Environment and social	High
Stakeholders	Substantial
Others	Low
Overall	Substantial

51. The key risks rated High or Substantial for this project relate to technical design of the project, institutional capacity for implementation and sustainability, environmental and social, fiduciary, and stakeholder risks.

52. The risks related to technical design mainly arise from IWAI's limited experience in similar operations, especially for Component 1 (improving the navigability of NW-1) which involves river works, river terminals, and immediate access works. The World Bank also has had few similar operations to learn from or build upon and this risk is rated Substantial. The risk will be mitigated by the engagement of international experts experienced in similar operations and through extensive international exposure and knowledge exchange the project has been facilitating.

53. The risks related to institutional capacity for implementation and sustainability is rated Substantial, this being the first large project investment in the sector. The implementation risks have largely been mitigated through a robust project implementation structure and an efficient procurement and contract management strategy. With predominant use of quality- and cost-based selection for consultants and EPC contracts for civil works, the project has been able to secure the support of internationally acclaimed specialized consulting agencies and nationally renowned large construction firms. The implementation risks are also planned to be mitigated through close monitoring from senior management of the Ministry of Shipping and IWAI and the high-level POC. The project sustainability risks are being mitigated through a robust policy and regulatory framework which, among others, includes revamping and modernizing the Inland Vessels Act, rules for the Inland Waterways Act, and the IWAI tariff policy.

54. The fiduciary risks of the project are rated 'Substantial because of involvement of multiple implementation units and IWAI's unfamiliarity with World Bank procedures. Specifically, for procurement, although the implementing agency has procurement capacity for implementation of conventional Bill of Quantities (BoQ) contracts following their own procurement rules and procedures, it has no experience in World Bank-funded procurement and limited experience in procurement of EPC and non-consulting services involving prequalification. The new procurement approach through EPC and limited experience in the sector also entails market uncertainty and may contribute to delays in procurement and contract management or noncompliance with agreed procedures. The implementing agency does not have a procurement manual. There is no procurement unit/cell with permanent procurement staff. Mitigating measures include providing support to departments on the World Bank's FM, procurement reform, and disbursement processes/procedures and guidance on contracting techniques envisaged under the project. A detailed Procurement Capacity Assessment has also been undertaken and is available in the Procurement Risk Assessment Management System (P-RAMS). The use of the National Informatics Centre (NIC) e-procurement system for all procurements is likely to increase the efficiency and transparency of procurement.

55. The environmental and social risks of the project are rated 'High' because of the risk that the project may have unintended impacts on the environment and on poor people and vulnerable

groups through (a) residual modifications to the riverbed, riverbanks, and floodplains, even after absolute minimization of dredging and avoidance of any obstruction to water flow; (b) possible accidental damage to the aquatic fauna, including dolphins, turtles, and fishes, and to the nesting and breeding grounds and sanctuaries on and along the riverbed; (c) potential future construction-related impacts including impacts from siting of future terminals, logistics parks, bank protection works, and jetties; (d) possible pollution of the waterway and safety and health issues arising during operation from regular shipping operations or by accidental spills—all of these will require close monitoring during implementation. All upstream and downstream riparian countries (China, Nepal, and Bangladesh) have been notified in compliance with applicable World Bank Group Operation Policy 7.50 and the project has been discussed at a bilateral level with counterparts in Bangladesh. However, a well-designed and implemented project has the potential to complement the Government's 'Clean Ganga' program.

56. Possible social impacts include issues relating to land acquisition (especially given the additional requirements due to the Land Acquisition and Resettlement and Rehabilitation Act 2013), likely adverse impacts on livelihoods, and impacts on current cross-river passenger movements. It will also be important to ensure occupational health and safety standards for labor and mitigate the impact on host communities of an influx of labor during the implementation and operational period (for example, the risks associated with HIV/AIDS). Although, a social impact assessment (SIA) and resettlement management framework and action plans have been prepared, these issues will require close monitoring during implementation.

57. The stakeholder risks are rated Substantial. There is a likelihood of opposition from groups generally opposed to major construction works on the Ganga River, who may think the project poses unacceptable environmental, social, and cultural costs. The project team has sought to partly mitigate this risk by closely consulting the stakeholders and soliciting their views during project preparation. Another stakeholder risk is inadequate coordination with the four states and other agencies in matters including (a) identifying the ferry crossing and Ro-Ro crossing needs and integrating these with the overall NW-1 capacity augmentation strategy; (b) acquisition and zoning of lands for the terminals and road/rail connectivity; (c) coordinating with other parallel initiatives of flood protection and river embankment strengthening and riverfront development taken up under the concurrent GoI/states' program; and (d) reaching out with states to local industries and jointly promoting IWT as a viable alternative mode of transport. As a first step, the four states have nominated their representatives to the high-level POC but the project will need to ensure that close cooperation is maintained throughout the project process. Finally, the project will need to ensure cooperation with other agencies/organizations involved in the development of transport infrastructure in the region. An MOU between IWAI and the Dedicated Freight Corridors Corporation of India Ltd has been signed in 2016 with the shared objective of developing a multimodal framework in this corridor. Similar MOUs are expected to be entered into with the Indian Railways Board, Port Trusts/Authorities, and National Highways Authority of India by 2018. Apart from the POC, a suitable mechanism for improved coordination with states is being explored.

58. The risks involved in attaining the transformational objectives of the project are therefore considerable and the overall implementation risk is rated 'Substantial' because five of the key risks (stakeholder risk, technical design risk, implementation, and sustainability risk, fiduciary risk and environmental and social risk) are rated Substantial or High. While the team has taken strong

measures to address and mitigate these risks, they are not wholly controllable and may affect the achievement of key project results and objectives.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

59. An economic analysis of the project was carried out, which quantified the main economic costs and benefits expected from implementing the project along NW-1. The project is expected to result in an increase in freight movement on NW-1 with associated economic, social, and environmental impacts; more reliable navigation, which will affect vessel operators as well as shippers of goods; and reduced transportation time and costs. Details are provided in annex 6.

60. One of the anticipated benefits is a reduction in the growth of carbon emissions in India's transport system through use of a lower-emitting transport mode and through reduction in road congestion. The waterway transport system is also expected to help reduce costs of transport for agricultural inputs and outputs in some of the poorer states in the country, resulting in higher incomes for farmers and consumers.

61. A two-step process could be followed in the economic evaluation of the project. In the first instance, the economic viability of the major components of the project can be assessed individually to test their justification for inclusion in the project. However, in networked industries, such as transport and logistics, this is not desirable, as system components are complementary, and their combined effects often exceed the sum of the impacts of constituent elements. For instance, it will not be possible to have an operational waterway without proper terminals and vice versa. As such, the economic evaluation considered the totality of the core elements of the system, comprising the waterway and main multimodal terminal, which are proposed for financing. The direct costs and benefits of the project were estimated based on empirical evidence and experience from similar projects implemented in different countries. The calibration of the models used was based on detailed studies carried out as part of the preparation of the project and drew on findings and recommendations of specialized working groups in India as well as international specialized bodies particularly the World Association of Waterborne Transport Infrastructure (PIANC). The factors that were included in the economic analysis were operating costs and energy consumption coefficients for different modes of transport, efficiency gains from deployment of larger vessels and cleaner energy, capital development costs through the project, costs of infrastructure and system maintenance, vessel and vehicle operating costs, air pollution, emission of CO_2, noise pollution, soil and water pollution, accidents, and land occupation. The analysis was based on the volume of traffic increasing to 65 million tons per year by 2045.

62. Using the above approach, the project was found to have a net present value (NPV) of INR 48,478 million (about US$735 million) at a discount rate of 12 percent and an economic internal rate of return (EIRR) of 21 percent.

63. However, the above estimate excludes several other elements that should normally be included in any economic evaluation. A project such as this has impacts on several economic agents both during its development and operational phases. The IWT system will be used to ferry both passengers and goods. For goods, the system will have domestic, regional, and international

trade flows. The impacts on goods shipments can be important and should be determined from the perspective of the users. The impacts will be transmitted through lower unit costs of shipment as well as logistics cost. The economic evaluation was therefore expanded to include estimates of cost savings to users with regard to direct transport costs from using a cheaper mode and moving inventory costs from reduced shipment times, both on the roads and on the waterway. In this regard, a supply chain approach was applied as it is suited to disentangling logistics costs deriving from the sequence of cargo movements and subsequently assessing the impact of the investment measures. Supply chain modeling is one of the simple approaches for assessing the likely impact on logistics costs of changes in transport systems.

64. Using a supply chain approach, the estimated logistics costs savings were estimated with an NPV of US$41.3 million over the 30-year horizon of the project. Shippers will therefore benefit directly from a reduction in tied-up capital during transportation.

65. The project is expected to also significantly reduce the contribution of transport to carbon emissions. The reduction of such emissions will be in three specific ways: (a) increased capacity and efficiency of the waterway system to carry larger volumes of traffic, some if it contributing to slower growth in road and rail traffic; (b) use of larger vessels that are more efficient and with lower emissions per unit of cargo carried; and (c) adoption of innovative vessel designs that use cleaner fuels.

Table 3. Expected Impacts of Project Interventions

Intervention	Impacts on Shippers/Users	Impacts on Vessel Operators	Impact on IWAI
Subcomponent A2: Fairway improvement and maintenance	• Reduced cargo transit time • Increased service reliability	• Increased vessel usage • Increased vessel size	• Increased certainty in maintenance costs • Reduced unit costs • Increased availability of waterway
Subcomponent A3: Bank protection works at selected locations	• Enhanced availability and reliability of fairway	• Increased vessel utilization	• Increased availability of waterway and enhanced safety
Subcomponent A4: Rehabilitation of existing lock and installation of new navigational lock at Farakka	• Reduced delays at lock - reduced cargo transit time • Increased reliability of shipping services	• Reduced vessel delays and increased vessel usage	• Increased capacity • Increased quality of service
Subcomponent A5: Cargo terminals (with appropriate equipment)	• Reduced cargo losses • Increased frequency of service • Reduced cargo dwell time • Increased mode choice combinations	• Reduced vessel time in terminal • Greater efficiency in vessel handling	• Increased market access • Increased volume of traffic

Intervention	Impacts on Shippers/Users	Impacts on Vessel Operators	Impact on IWAI
Subcomponent A6: Navigational aids including RIS, incident management systems	• Increased service availability and reliability • Reduced probability of loss of goods	• Increased vessel operating hours • Improved safety	• Increased service availability • Reduced recovery costs
Subcomponent B1: Improved investment climate for private sector	• Greater competition in services • Reduced costs • Increased efficiency	• Increased competition	• Increased market potential
Subcomponent B2: Vessel design innovation	• Reduced carbon footprint	• Improved vessel design • Increased opportunities for vessel renewal • Increased renewal costs • Reduced operating costs	• Reduced GHG emissions • Contribution to India's COP21 INDC commitments
Subcomponent B3: Institutional strengthening	• Increased responsiveness of service providers • Increased utilization of IWT and lower unit shipment costs	• Enhanced regulatory capacity • Increased availability of skilled staff	• Enhanced capacity and capability

66. The accounting of GHG emissions from the project is based on a simple model used to estimate with and without project emission volumes. The baseline GHG emissions (that is, without the project) are calculated based on the volume of cargo carried by each mode of transport, on a per ton-kilometer basis. The volume is then projected over the project period, based on annual percentage traffic growth rate for each main type of traffic and for each mode. GHG emissions are calculated separately for each type of commodity and for each mode of transport. The impact of project interventions is then included in the model and the with-project emissions are estimated.

67. The net GHG emissions per year are expected to continue increasing at the current rate over the first few years of project implementation. However, as the improvements begin to have an impact, more traffic will be attracted to IWT while the rate of growth of road and rail modes should diminish. Based on the conservative estimates obtained using the model, the net savings in CO_2 emissions are estimated to average 151,468 tons per year or a total of 4.5 million tons over the economic life of the project interventions (see annex 5). These savings were monetized using World Bank guidelines and values and found to translate to a monetary NPV equivalent to US$45 million over the life of the project.

68. The economic analysis considered the likely monetary effects of the project on fishermen along the waterway. While the project design aims to avoid characteristic aquatic habitats for fish and other species, it is likely that it may still affect fishermen who rely on it for their livelihood. A survey was carried out to determine the extent of the likely losses and it was estimated that fishermen may suffer losses of approximately INR 0.75 in the lower stretch and INR 18 per kilogram, in the upper stretch of the waterway. In addition, a fisherman could incur a loss of INR

1,500 to INR 2,000 for each occurrence of damage to a net should it entangle with a barge. Rather than seeking to quantify the potential monetary losses without solid data, the project design focusses on measures to minimize their likelihood of occurrence. As such, the design includes specific mitigation measures described in annex 3 that include empowering the fishermen to enable them to coexist with the expected increased waterway traffic movements.

69. Based on all the estimated costs and benefits of the project, the NPV of the additional benefits was estimated at US$314 million at a discount rate of 12 percent. The results of the economic analysis were found to be robust under different tests. World Bank guidance is to test project feasibility without the valuation of GHG emissions and the project was found to be feasible. In addition, the feasibility was also tested for sensitivity to cost escalation of 5 percent as well as for lower growth of traffic using IWT. In both instances, the results were found to be robust, with the EIRR ranging from 16 percent upward. A detailed description of the economic evaluation is given in annex 6.

B. Technical

70. The feasibility and detailed engineering study, ESIA study, and market development study were taken up simultaneously so that all of those studies could benefit from each other and the technical designs could be made environmentally sustainable and adequately market responsive. Extensive topographic, bathymetric, and environmental surveys were conducted; and alignment and vertical clearance of all cross structures likely to interfere with navigation were surveyed and geo-referenced to arrive at the most feasible alignment of the navigation channel.

71. Several design options were investigated for the fairway depending on the trade-off between LAD and the associated dredging quantity and cost. A strategy was adopted for optimal LAD and dredging coupled with operation of low draft vessels. The final LADs proposed are 3.0 m between Haldia (km 0) to Barh (km 980), 2.5 m from Barh (km 980) to Ghazipur (km 1,250) and 2.2 m from Ghazipur (km 1,250) to Varanasi (km 1,360), with a channel width of 45 m (which also avoids characteristic aquatic habitats for fish and other species). This will support two-way movement of commercial barges carrying an average payload of 1,500 tons to 2,000 tons. The estimated annual dredging quantity will be 10–11 million m^3 which will be deposited in the lower riverbed pockets outside the main navigation channel. To reduce dredging, gradually over the project operation life, a three-pronged strategy of (a) adoption of performance-based assured depth dredging contracts, (b) use of low-intrusive dredging techniques, and (c) use of low draft vessels have been adopted.

72. The low draft vessels will be introduced to navigate the stretches with lower LAD (for example, 2.2 m), primarily north of Ghazipur. These vessels will have a wider beam to accommodate the planned carrying capacity and a specially shaped hull, flat bottom and optimized layout, for the propeller system to streamline the water flow and reduce resistance and hydraulic drag. The vessel will be designed to optimize sailing and maneuvering in the local navigation conditions, so as to reduce energy consumption, operating costs, and emission levels, prevent discharge of wastes in the river, and achieve a higher safety standard than existing vessels.

73. The six multimodal/inter-modal terminals with first/last mile road/rail linkages are planned to evolve as logistic clusters. The terminals will be made operational in a phased manner as demand

increases from the low initial usage base. Road and rail connectivity will also be provided in a phased manner as demand and usage pick up. Two barge repair facilities and five pairs of Ro-Ro crossings to promote cross-river movement of freight are also proposed. The project will also support preparation of designs for a modern passenger ferry system in 18 locations, which will eventually be implemented and operated by the four participating states. All of these riverside facilities are being designed as zero discharge facilities to avoid water pollution. The project will also support construction of about 40 km of protection works to protect unstable and erodible banks and retain the riverbank at sharp bends, but without obstructing connections to nearby wetlands

C. Financial Management

74. **Implementing arrangements.** Implementation arrangements are described in section IV A. The project governance structure will flow from the Chair, IWAI, advised by a POC, through a centrally located PMU and six regionally based PIUs in Kolkata, Patna, Varanasi, Haldia, Farakka and Sahibganj.

75. **Budgeting and funds flow.** The World Bank funds will be provided to the GoI under IBRD loan terms. The project will be budgeted as a separate line item[12] in the budget of IWAI, set up to receive funds from the GoI as an externally aided project. The PMU and PIUs will have project-dedicated bank accounts. The budgeted funds for this project will flow from the GoI Treasury into the project bank account of the PMU, periodically on the basis of projected project needs. The transfer of funds will be made monthly from the PMU bank account to respective PIU bank accounts, depending on their projected expenditure requirements. The payments made at the PIU level are expected to be primarily for routine expenditures and may include certain minor procurements.

76. **Internal controls.** The project will follow the mercantile system of accounting. IWAI is presently following internal control and accounting procedures set out in its accounts manual. The manual will be reviewed and revisions made as deemed necessary. A detailed Finance and Accounts Manual specifically for this project is under preparation.

77. **Accounting.** The accounting function will be decentralized and maintained at the central PMU in Noida and at all the participating PIUs (at Patna and Kolkata for now). IWAI at presently is using ‘ERP 9 TALLY’ accounting software. The project will be established as a separate ‘company’ in TALLY with an appropriate chart of accounts to enable project funds to be tracked and reported separately at both PMU and PIU levels.

78. **Disbursement arrangements.** The applicable disbursement method will be ‘reimbursement’. The PMU/PIUs will use its budgetary resources to finance the project expenditures. All the PIUs will submit their respective quarterly Interim Unaudited Financial Reports (IUFRs) to the PMU. The PMU will consolidate and submit quarterly IUFRs (along with the approval of the Task Team Leader (TTL) of the World Bank on the previous IUFR)[13] to the office of the Controller of Aid, Accounts & Audit (CAAA), GoI, within 45 days of the end of the

[12] A separate budget line for the project under the IWAI budget has been opened.
[13] In the case of the first 2–3 IUFRs, the project will send a copy of the IUFR in advance to the World Bank TTL for review and comments, before submitting to the CAAA.

reporting quarter. These financial reports will be submitted by the CAAA to the World Bank for reimbursement.

79. **External audit.** The Comptroller and Auditor General (CAG) of India will be the external auditor for the project and will conduct an annual audit of the project financial statements covering sources and uses of funds of the PMU and the PIUs. The audit will be conducted in accordance with the terms of reference (ToR) agreed with the World Bank.[14]

80. The FM arrangements, existing and proposed, have been assessed and judged adequate to provide assurance on usage of funds. The FM risk of the project is nevertheless assessed as Substantial because of the involvement of multiple implementation units and because of IWAI's unfamiliarity with the World Bank. The assessment indicates that departments may require support on the World Bank's FM and disbursement processes/procedures and guidance on contracting techniques envisaged under the project.

D. Procurement

81. Procurement for the project will be in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD loans and IDA credits and Grants by World Bank Borrowers' dated January 2011 as updated in July 2014 (Procurement Guidelines); 'Guidelines: Selection and Employment of Consultants under IBRD loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 as updated in July 2014 (Consultant Guidelines); and the additional provisions in the legal agreement.

82. The proposed project will finance two components. Under Component A (Improving the Navigability of NW-1 (Haldia to Varanasi), there will be procurement of goods, works, non-consulting services, and consultancy services. All procurement activities will be managed centrally through the PMU. Some of the procurements under this component are in progress. Under Component B (Strengthening Institutional Capacities and Improving the Investment Climate, Vessel Design, and the Construction Framework) the procurement of non-consulting services and consultancy services are also involved. Under Subcomponent B1, the World Bank will support IWAI in developing their institutional procurement system, through development of a procurement unit/cell with recruitment of procurement staff, development of a procurement manual and Standard Bidding Documents (SBDs), and capacity building of procurement staff.

83. **Procurement capacity.** The PMU (described above) is currently staffed with two procurement consultants. The implementing agency does not have permanent procurement staff. Procurement of several packages are in process. Although the procurement consultants in the PMU have procurement capacity for implementation of conventional BoQ contracts following the GoI's GFR, 2005, the implementing agency has no experience in World Bank-funded procurement and limited experience in procurement of EPC and non-consulting services involving pre-qualification. The new procurement approach through EPC and limited experience in the sector, also entails market uncertainty. This may contribute to delays in the procurement process and contract management or noncompliance with agreed procedures. A detailed Procurement Capacity Assessment is available in P-RAMS. There will be no procurement at the regional PIU level. A

[14] A request letter along with the ToR has already been sent to the CAG by the PMU finance team.

Procurement Plan for the first 18 months has been prepared by IWAI and the same is acceptable to the World Bank. The Procurement Plan reflects the projected disbursement for the first two years.

84. **E-procurement system.** The PMU will be using the NIC e-procurement system for all procurements. The e-procurement system assessment was carried out against the multilateral development banks' requirements and has been accepted for use for procurements under World Bank-funded projects. This is likely to increase efficiency and transparency of procurement.

E. Social Safeguards

85. Possible social impacts include issues relating to land acquisition (especially given the additional requirements due to the Land Acquisition and Resettlement and Rehabilitation Act 2013), that leads to adverse impacts on livelihoods and relocation of affected people. Similarly, civil works could lead to adverse impacts. At the operation stage, the increase in number and frequency of vessel movement may have some impact on fishing activities and on current cross-river passenger movements. It will also be important to ensure health and safety standards for labor and mitigate the impact on host communities of an influx of labor during the implementation and operational period (for example, the risks associated with HIV/AIDS). Inadequate mitigation measures are likely to increase grievances. Weak collaboration with stakeholders also limits the options of receiving useful feedback.

86. The project will support construction of six terminals, rehabilitation of the Farakka ship lock, five Ro-Ro terminals, two ship repair facilities, strengthening of embankments and design of passenger terminals at 18 locations in six cities resulting in increase in vessel movement. A Resettlement Policy Framework (RPF) has been prepared in accordance with the World Bank's Operational Policy on Involuntary Resettlement, OP 4.12, and the National Law, Right to Fair Compensation and Transparent Land Acquisition and Rehabilitation and Resettlement Act, (RFCTLAR&R) 2013.

87. An SIA has been carried out in consultation with stakeholders at the planned sites of the three freight terminals, and at the Farakka ship lock, to prepare the Resettlement Action Plan (RAP). The assessment indicates that a total of 80.148 ha of land is required. At the Haldia terminal site and the Farakka ship lock site, 39.54 ha of government land is transferred for use in the project and no private land will be acquired. Land acquisition of 33.607 ha is limited to Sahibganj for terminal (Phase I), road over-bridge, and road connectivity. However, an acquisition proceeding has been initiated for 45.02 ha. Land at Varanasi was acquired in 2010 under the Land Acquisition Act (1984) and an additional 1.415 ha of private land will be purchased for road connectivity with NH 7. Land required for the fourth and fifth terminals at Ghazipur and Kalughat is estimated at 10 ha. This land will be acquired. The SIA for the sixth terminal (around Kalyani in West Bengal) would be taken up after finalization of the exact location, expected by end 2017.

88. The project proposes to develop the facilities at Varanasi and Sahibganj in phases. Acquisition of land at Sahibganj is in accordance with the RFCTLAR&R Act (2013) and will adversely affect 275 households and displace 235 families. Transfer of government land at Farakka for the ship lock may lead to limited impact on those cultivating the agricultural land.

89. Increase in numbers and frequency of vessel movement in the Farakka feeder canal might adversely affect the local fishermen in the feeder canal. A study is being undertaken to assess the scale of impact to develop appropriate mitigation plans to restore the livelihood of the fishermen. Results of that study would be available by mid-2017. Additional land will not be required for strengthening of the embankment. However, construction induced impacts on existing community facilities, such as an access road to passenger boats, bathing ghats, anchoring of country boats, and so on, will be assessed to develop appropriate action plan for the construction period. Safety enhancement measures will be integrated with the RIS for safe movement of passenger boats.

90. The SIA cum Social Management Plan (SMP)/RAP includes a detailed entitlement framework in compliance with the provisions of the RPF to address loss of livelihood and resettlement and rehabilitation of affected people with additional support for the vulnerable and women for the identified locations. The RAP also provides an action plan on gender; health and safety management of labor; and a preventive action plan to address adverse impacts of labor influx on neighboring and host communities.

91. The SIA cum SMP/RAP will be prepared for subsequent subprojects after finalization of locations and may be updated for the new navigational lock in Farakka following the finalization of its design by the contractor in accordance with the provisions of the RPF.

92. The project will support detailed designs for a modern passenger ferry system at six locations across four states. To ensure safe and secure mobility of men, women, and children, an assessment will be undertaken on the social and economic cost of gender-related and physically challenged mobility constraints and to evaluate the benefits and efficiency of solutions for gender-informed designs. The project will support qualitative and quantitative information on personal security of both men and women, and so on, to improve the security of the systems. In addition, settlements abutting the terminals at Varanasi, Sahibganj, and at other locations lack basic amenities such as toilets and street lights. IWAI is expected to work with private entities who will use these facilities to invest in community-based program as part of their corporate social responsibility program.

93. The participating state governments have established the institutional mechanism in accordance with the RFCTLAR&R, 2013, to carry out the land acquisition and resettlement and rehabilitation of affected people. IWAI has augmented its capacity and hired a social development specialist at the PMU to coordinate the preparation, implementation and monitoring of the SIA cum SMP/RAP. A livelihood expert and two social officers have been mobilized at the PIU. They are responsible for consultation, preparation of individual's entitlements, and guiding and supporting each affected household through the process of resettlement and rehabilitation. A grievance redress officer, land acquisition facilitator, and a management information system (MIS) analyst will be hired.

94. The existing web-based system Centralized Public Grievance Redress and Monitoring System (CPGRAMS) for grievance management will be enhanced to support the toll-free helpline service for grievance management to provide the platform for women and the vulnerable to register their grievances for timely resolution. IWAI has engaged with different stakeholders including vulnerable groups during the design phase of the project. The SIA cum SMP/RAP includes an ongoing consultation plan to engage with stakeholders to ensure regular feedback from citizens.

The citizen engagement plan, including beneficiary feedback, will enable citizens to participate during implementation and integrate their voice in development of future subprojects. IWAI has adopted three approaches to provide information, consult, and close the loop by sharing information on the action taken on the recommendation. Various platforms have been created to institutionalize citizen engagement such as stakeholder mapping of beneficiaries to engage at regular and structured workshops and a functional web-based system for citizen feedback. It has the option to provide feedback and receive information on the action taken within a given time frame and a focused outreach program specifically designed for the vulnerable community to enhance collaboration and build partnerships at the specific locations identified for the intervention. This will be uploaded on the dedicated project-specific web page to facilitate access to project stakeholders.

95. A mobile application to track implementation of the RAP/SMP on a real-time basis will be integrated with the MIS for monitoring project progress. In addition, the TSSC will monitor the compliance with health and safety regulations.

96. Comprehensive quarterly progress reports will be prepared which will cover implementation of the SIA cum SMP/RAP, compliance with a gender and labor action plan, and tracking of grievance management and citizen feedback. Midterm and end term impact evaluation will be carried out by an independent agency.

97. **External communications**. Historically underdeveloped in India's transport mix, there is limited awareness and understanding about the inland waterways sector and its potential benefits. Even after the Government announced its ambitious agenda for revival and focused high-level political attention on it, there remains a level of skepticism about the feasibility of developing river courses for transporting goods (and people) over long distances. Certain stakeholders have also expressed concerns about the possible social and environmental impacts of developing a stretch of the iconic Ganga River for inland navigation. Proactive communications around the design, scope, and aims of the project will thus be critical to ensure that the facts are widely known and misconceptions addressed. Communication outreach to potential users will also be important for commercial success and long-term sustainability of the waterway.

98. IWAI is cognizant of the need to engage in proactive communications and has established a comprehensive approach and strengthened its in-house capacity to reach out effectively to stakeholders. It has, as part of its project preparation efforts, undertaken a series of consultations with a broad range of stakeholder groups in an attempt to better understand their concerns and expectations in relation to the Jal Marg Vikas Project. It is also undertaking a Communications Needs Assessment (CNA) to identify and address any gaps in understanding/perception pertaining to the project. The comprehensive communication strategy that will stem from this diagnostic is expected to include, but not be limited to, mass communication campaigns, media outreach, social media and other online channels, direct outreach, and so on.

F. Environmental Safeguards

99. As stated above, IWT is an environment-friendly mode of transport, and accelerated development of the waterway will be beneficial in a number of ways, particularly in the densely populated and traffic congested region on either banks of the Ganga. A prominent benefit is the

net reduction in GHG emission (estimated at 4.5 million tCO_2e) from the project compared to the business-as-usual scenario (which is dependent on road transport where augmentation capacity is limited and which may result in additional GHG emission in the medium term). Other benefits include avoided acquisition of forest land and wetlands (for expanding road networks, which otherwise would be required), reduced air pollution (from traffic), improved water quality, given that a developed and established IWT will need and secure an improved flow regime and prevent further diversion of water from the Ganga River. However, at the same time, unless carefully designed and implemented, the project has the potential to have unintended impacts both in the near and long term. Potential major environmental issues that were examined included (a) modifications to the riverbed, riverbanks, and the floodplains, and the consequent impacts; (b) potential modifications to the river and sediment flow, especially during the lean season and the associated impacts; (c) potential damage to the aquatic fauna, including dolphins, turtles, and fishes, and to the nesting and breeding grounds and sanctuaries on and along the riverbed; (d) construction-related impacts including impacts from dredging; disposal of dredged materials; and siting of terminals, logistics parks, bank protection works, and jetties; and (e) potential pollution of the waterway and safety and health issues arising during operation from regular operations or by accidental spills. Opportunities for environmental enhancement were also examined: (a) further reduction in emissions by switching to a clean fuel such as LNG; (b) building energy-efficient and 'zero-discharge' infrastructure; (c) reduction in air pollution in major cities by careful siting of multimodal terminals and thereby reducing potential traffic congestions; (d) conservation of protected aquatic areas; and (e) supporting introduction of 'cleaner' vessels.

100. The project is classified as an 'Environmental Category A' project in accordance with OP 4.01 (Environmental Assessment) due to the nature and scale of the planned civil works, the complexity of environmental issues associated with the river dredging, and the ecological sensitivity of the Ganga River. Of the environmental safeguard policies, the project triggers: (a) OP/BP 4.01 - Environmental Assessment, (b) OP/BP 4.04 - Natural Habitats, and (c) OP/BP 4.11 - Physical Cultural Resources. In addition, the EHS Guidelines of the World Bank Group is applicable to the project.

101. The borrowers prepared (a) a cumulative impact analysis (CIA) report which includes a study on the critical environmental resources to provide guidelines to avoid impacts on these, to the extent possible, and recommends strategies to manage direct, indirect, and induced impacts; (b) a consolidated environmental impact assessment (EIA) report including an overall plan for avoiding, mitigating, and managing EHS impacts; and (c) a stand-alone environmental assessment (EA) including environmental management plans (EMPs), suitable to be incorporated in the contracts for design-build-operate contracts of all major interventions planned in the project and for future barge operations. The consolidated EA was not limited to individual subprojects; rather it addressed environmental impacts of all investment subsectors taken together. Site-specific EMPs have been prepared for known works before appraisal. These include (a) dredging requirements, (b) barge operations, (c) a navigation lock at Farakka, and (d) multimodal terminals at Sahibganj, Varanasi, and Haldia. All future planned infrastructure activities will prepare an EA/EMP, according to the Environmental Management Framework (EMF), (which is prepared as part of the consolidated EA).

102. The CIA and EA processes were guided by an initial assessment of risks, which included: challenges related to complex and dynamic sediment transport and the related ecosystem of the

Ganga. Maintenance of navigational channels in all the stretches is a complex task, because of large variation in discharge (where peak flows are very large and low flows are very low), unstable morphological condition of banks and beds, the heavy sediment load, and continuous braiding and meandering of the river. Addressing these challenges, will usually require structural measures within the water body and, if these are not designed well, environmental and ecological implications may arise. Due to the complexity of investment and operations and the geographical extent and ecological richness of the project areas, the project-financed investments, unless carefully designed, could potentially lead to significant impacts on the river system as well as site-specific impacts, changes in sediment flow of the river, elimination of habitats, and interference to the natural composition of ecological communities. In addition, navigation can also add to the baseline pollution loads, which are already extreme. Based on such initial assessment of risks, the EA of the project set out to avoid (as far as possible) these potential environmental impacts and risks; and manage and mitigate the residual potential impacts and risks. As a result of the EA, its subsequent incorporation in plans and designs for the project has reduced the risks (by avoiding specific interventions, such as dredging in the critical stretches of protected areas; or by minimizing the interventions). Consequently, there are no potential large scale, significant and/or irreversible impacts from the project. The plan for mitigating and managing the residual risks are reasonable and implementable. In addition, the project is aiming at substantial environmental enhancements (by switching to LNG as vessel fuel, by facilitating the introduction of 'cleaner' vessels, by adopting low-draft vessels, by augmenting riverine fishery, or by supporting conservation of protected aquatic areas), and contributing to GHG emission of about 4.5 million tCO2e.

103. The PMU is staffed with an environmental specialist; the PIUs in the states will also have designated environmental specialists who will be responsible for (a) coordinating with the PMU; (b) close monitoring of the implementation of the EMPs, and compliance by the respective contractors including complying with all pre-conditions specified in any applicable regulatory license/permission; and (c) reporting on implementation of the EMPs. Further, the project proposes to use state-of-art technology to monitoring compliance, especially during operation of barges and in annual maintenance dredging. To that end, the project will upgrade the RIS and the navigational tools with spatial data on sensitive environmental features on the river that should not be disturbed and alerts on controlling conditions such as speed limits and hours of operation through the sensitive areas. This RIS and navigational aids will automatically capture all information of movement of dredgers and barges and will also record the frequency of alerts and any case of noncompliance. This systematic capture of compliance records will enable IWAI/PMU to take remedial actions as may be necessary. The PMU will include an update of environmental management in each quarterly progress report prepared for the World Bank. Reports of the independent environmental audits will be submitted to the World Bank within three months of completion of the second and the fourth year of the implementation period, along with a report on 'management actions' on each of the observations of the environmental audits.

104. The EAs were carried out in substantial consultation with stakeholders, to ensure that the environmental assessment, and other compliance requirements will be carried out in compliance with the policies and procedures as specified by the GoI and the World Bank Group safeguard policies. The CIA, the consolidated EA, and the stand-alone EA/EMPs has been disclosed in-country on May 22, 2016 (in the website of IWAI), aided by advertisements in prominent national

and state (English, Hindi, and Bengali) newspapers. After minor revisions based on stakeholder feedback that was received, these documents have been re-disclosed in-country on October15 and December 03, 2016.

G. Other Safeguard Policies

105. **OP/BP 7.50 - Projects on International Waterways.** The World Bank's Operational Policy OP 7.50 is triggered since project activities will take place on the Ganges[15] which is a transboundary river flowing through India, Nepal and Bangladesh. The World Bank, on behalf of India, notified the riparian countries- China, Nepal and Bangladesh in June 2016. The Bank has determined that due to the location and nature of project activities, the proposed project will not cause any appreciable harm to the interests of the other riparians, nor be appreciably harmed by the other riparians' possible use of the Ganges.

106. All planning and design considerations for proposed infrastructure along NW-1 have been aimed at fully avoiding (or absolutely minimizing) any potential adverse transboundary affects (which could have been impacts such as reduction and/or modification of flow of water or sediments, and increased water pollution). The avoidance of any obstruction to or modification of flow, the designs that ensure that there is no pollution of the river, and the limits placed on dredging and disposal of dredged materials mean that there will be no impact on the quality and quantity of flow in the trans-boundary river.

107. **Safeguards compliance and other contract related issues.** Before inviting bids or undertaking any of the proposed construction activities, IWAI will screen the proposed construction activities in accordance with the provisions of the consolidated EA (including the EMF), EMPs, the consolidated SIA cum SMP/RAP, and RPF. As required by such screening and in line with the consolidated EA (including the EMF), EMPs, RFP, SMP, and RAPs, IWAI will ensure that the necessary safeguards documentation, plans, and mitigation and compensation measures, as the case may be, have been agreed, prepared, and documented, and the required safeguards documents have been publicly disclosed in local languages of the relevant project sites and/or on the IWAI website. Before commencing any civil works, IWAI will ensure that all preconstruction activities including necessary governmental permissions and clearances have been obtained; and all resettlement measures, including, if any, the full payments of compensation before displacement and/or the provisions of relocation assistance, have been fully executed. IWAI will ensure that each contract for civil works under the project includes the obligation of the relevant contractor to comply with the relevant safeguards documents applicable to such civil works. The project sites are spread over Eastern Uttar Pradesh, Bihar, Jharkhand, and West Bengal from where the large pool of migrant construction workers are sourced and as such the challenge of labor influx will be insignificant.

H. World Bank Grievance Redress

108. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or to the WB's Grievance Redress Service (GRS). The GRS ensures that complaints

[15] NW-1 is a 1,620 km stretch on the Ganga river system between Allahabad to Haldia.

received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel, which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/grs. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

Project Development Objectives

PDO Statement

The Project Development Objective is to enhance transport efficiency and reliability of National Waterway- 1 and augment institutional capacity for the development and management of India's inland waterway transport system in an environmentally sustainable manner.

These results are at	Project Level

Project Development Objective Indicators

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
Supporting navigation of higher vessel sizes on NW-1 (Metric ton)	1000.00	1000.00	1500.00	2000.00	2000.00	2000.00	2000.00	2000.00
Reduction in cost of cargo traffic transported by inland water transport between Haldia and Varanasi (INR per ton-km)	1.11	1.11	1.11	0.95	0.95	0.89	0.89	0.89
Improved reliability of navigation on NW-1 (days available for transport operations per year) (Days)	270.0	300.0	310.0	330.0	330.0	330.0	330.0	330.0
Net annual GHG emission avoided (Tons/year)					95400.0	100540.0	104015.0	108600.0
Enhanced IWT sector capacity through improved institutional structure and operational framework for sector institutions (Text)	Study for IWT sector capacity enhancement launched	Strategic plan for IWAI staffing and capacity building adopted	Training and capacity building targets for IWT	Staff enhancement target achieved	Skill mix target for IWAI achieved	30% achievement for capacity building target for the sector	50% achievement for capacity building achieved	Full staffing and skill mix target for IWAI achieved and 50% target for sector capacity

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
			sector adopted					building achieved
Direct project beneficiaries (Number) - (Core)	0.0				5000.0			25000.0
Female beneficiaries (Percentage) - (Core)	0.0				5.0			5.0
Performance-based contracts for navigation improvement signed (Number)	0.0	1.0	2.0	2.0	3.0	3.0	3.0	3.0
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway (Meter(m)								
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway- Haldia to Tribeni (Meter)	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0
Least Available Depth (LAD) in meter. maintained on Navigation Fairway, between - Tribeni and Farakka (Meter)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Least Available Depth (LAD) in meter. maintained on Navigation Fairway, between - Farakka and Barh (Meter)	2.5	2.5	2.5	3.0	3.0	3.0	3.0	3.0
Least Available Depth (LAD) in meter. maintained on Navigation Fairway, between Barh and Ghazipur (Meter)	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway- Ghazipur to Varanasi (Meter)	1.5	1.5	1.7	1.7	2.2	2.2	2.2	2.5

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
Multi-modal cargo terminals built (Number)	0.0	0.0	0.0	3.0	4.0	5.0	6.0	6.0
Ro-Ro Terminal (Number)	0.0	0.0	2.0	3.0	5.0	5.0	5.0	5.0
Number of Navigation Locks Built or rehabilitated (Number)	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0
Project-supported organization(s) publish reports on effect of collaboration on project (Text)	N.A.	N.A.	Yes	Yes	Yes	Yes	Yes	Yes
Grievances responded and/or resolved within the stipulated service standards for response times (Percentage)		80.0	80.0	90.0	90.0	90.0	90.0	90.0
Undertake review of IWAI institutional structure and staffing (Text)	Study commissioned	Final report submitted		Study recommendation on staff enhancement implemented				Study recommended skill mix and staffing achieved and maintained
Undertake review and alignment of the legal framework in respect of IWAI operations (Text)	Review commissioned	Review-completed	New legal framework for inland vessels established	New legal framework for IWT established				New Legal and regulatory framework established for Inland Water Transport Sector

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Supporting navigation of higher vessel sizes on NW-1		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Reduction in cost of cargo traffic transported by inland water transport between Haldia and Varanasi		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Improved reliability of navigation on NW-1		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Net Annual GHG Emission Avoided		Annual	Mid-Term Review, Ex-Post Evaluation; Based on data on actual ton-km of cargo transported, and actual vessel-km of trips, using standard coefficients used.	IWAI
Enhanced IWT sector capacity through improved institutional structure and operational framework for sector institutions		Annual	Project progress reports, Consultant reports	IWAI, Consultants

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention (i.e., children who benefit from an immunization program; families who have a new piped water connection). Please note that this indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.	Baseline, Mid-term, End Term	Mid-Term Review, Ex-Post Evaluation	IWAI
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	No description provided.	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	No description provided.
Performance-based contracts for navigation improvement signed		Annual	Signed Contracts	IWAI
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway-Haldia to Tribeni		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway,		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
between - Tribeni and Farakka				
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway, between - Farakka and Barh		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway, between Barh and Ghazipur		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Least Available Depth (LAD) in mtr. maintained on Navigation Fairway-Ghazipur to Varanasi		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Multi-modal Cargo terminals built		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Ro-Ro Terminal		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Number of Navigation Locks Built or rehabilitated		Annual	DPRs, Consultant reports, ex-post evaluation	IWAI, consultants
Project-supported organization(s) publish reports on effect of collaboration on project		Annual	Quarterly Progress Reports	IWAI, Consultants
Grievances responded and/or resolved within the stipulated service standards for response times		Annual	Monitoring report from Grievance Redressal Monitoring System	IWAI, Consultants
Undertake review of IWAI institutional structure and staffing		Annual	Project Progress Reports, Consultant Reports	IWAI, Consultants

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Undertake review and alignment of the legal framework in respect of IWAI operations		Annual	Project Progress Report, Consultant Reports	IWAI, Consultants

Annex 2: Detailed Project Description

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

1. The project consists of two components, as described below.

Component A: Improving the Navigability of NW-1 (Haldia to Varanasi) (estimated cost US$770 million).

2. **Subcomponent A1 (US$10 million).** This subcomponent includes detailed topographic and bathymetric surveys for the entire waterway, preparation of technical feasibility and detailed engineering studies, preparation of ESIA studies, and other supporting technical assistance/studies for project preparation. These services are being undertaken through two consultancy contracts valued at US$4.1 million and US$0.4 million, respectively. Both of these studies are in the advanced stage of completion.

3. This subcomponent will also support three TSSCs and one monitoring consultant. The TSSCs to work with the PIUs are being hired, at an estimated cost of US$1.5 million, to provide implementation and project management support in the execution of the civil works and installation of key equipment. Two TSSCs are being currently appointed under two separate clusters, Cluster1 – Varanasi and, Sahibganj terminals (Kalughat, and Ghazipur terminals to be added later) and Cluster 2 - Haldia terminal and Farakka ship lock. A third TSSC will be hired shortly under Cluster 3, involving Kalyani terminal, bank protection works, vessel repair facilities, and other remaining works. These will assist with technical design review, construction supervision, quality control, and monitoring of works under the project components. A monitoring consultant for dredging will also be procured to assist with fairway management. Few smaller consultancy services including communication strategy development and management are also included in this subcomponent.

4. Further, this subcomponent will also support the preparation of feasibility studies and engineering designs for approximately 18 modern passenger ferry terminals in six cities across the four participating states, at an estimated cost of US$1.0 million. Construction and operationalization of these terminals will be taken up by the respective states subsequently using their own funds. The project will provide implementation support/monitoring services to the states, if required.

5. Lastly, this subcomponent will include the incremental operation costs toward establishment and day-to-day operation of the PMU and PIUs including the remuneration and allowances of the contract staff hired in the PMU and the PIUs, at an estimated overall cost of US$1.5 million.

6. **Subcomponent A2 (US$372 million).** This subcomponent will help improve the river fairway through maintenance dredging and river conservancy works. These works will be undertaken to provide the target LAD in the various reaches. The final LADs proposed are 3.0 m between Haldia (km 0) to Barh (km 980), 2.5 m from Barh (km 980) to Ghazipur (km 1,250) and 2.2 m from Ghazipur (km 1,250) to Varanasi (km 1,360), with a channel width of 45 m. This will support two-way movement of commercial barges carrying an average payload of 1,500 tons to

2,000 tons. The estimated annual dredging quantity will be 10–11 million m^3, which will be deposited suitably in the lower riverbed pockets outside the main navigation channel.

7. The dredging works will be executed through a combination of three performance-based 'assured depth' contracts in the Farakka to Bhagalpur, Barh to Ghazipur, and Ghazipur to Varanasi stretches. The duration of the assured depth dredging contracts will be for five years and will include supplementary intervention on temporary riverbed protection works. IWAI has already procured one input-based dredging contract in the Bhagalpur to Barh stretch, using its own resources. Once the duration of this contract gets over in 2019, a new contract will be procured using the project resources. IWAI's internal resources will be used to carry out marginal maintenance dredging in the Haldia to Farakka stretch. Procurement of one assured depth dredging contract (Farakka to Bhagalpur stretch) is currently in progress.

8. **Subcomponent A3 (US$17 million).** This subcomponent will support construction of permanent protection works for erosion-prone banks in selected locations in West Bengal, totaling up to about 40 km. These works are being harmonized with the state government flood protection works undertaken in these stretches. The works will be executed through EPC contracts.

9. **Subcomponent A4 (US$57 million).** This subcomponent will finance rehabilitation of the existing ship lock in Farakka and construction of a new parallel lock to allow concurrent two-way working. With the construction of the new lock and rehabilitation of the existing lock, the time taken for crossing the lock is expected to be drastically reduced from 120 minutes to 30 minutes. The works will be implemented through an EPC contract and procurement is in progress.

10. **Subcomponent A5 (US$303 million).** This subcomponent will support construction of six multimodal/intermodal terminals with (a) future provision to allow evolution as market clusters; (b) two vessel repair and maintenance facilities; and (c) five pairs of Ro-Ro crossings. Associated land acquisition and resettlement, environmental management, and utility relocation costs, amounting to a total of about US$40 million would be included.

11. The six multimodal/intermodal terminals, at an estimated cost of about US$198 million, are proposed to be developed in Varanasi (Ch. 1,310 km), Ghazipur (Ch. 1,181.5 km), Kalughat (Ch. 990 km), Sahibganj (Ch. 637.5 km), Tribeni/Balagarh/Kalyani (location yet to be decided) and Haldia (Ch. 55 km). The terminal at Kalughat will be an exclusive container terminal, while the remaining five will be mixed use, largely handling dry bulk cargo. All terminals will be developed in phases. Construction of one/two jetties, depending on forecast traffic projection, cargo handling area, and road connectivity will be undertaken in the first phase while further expansion of the terminal through additional jetties, storage and cargo handling areas, and railway connectivity will be provided in the subsequent phase. Varanasi terminal will have the benefit of access to two national highways (NH 2 and NH 6), while the rest will have access to one national highway. An MOU has also been signed between Dedicated Freight Corridors Corporation of India Ltd and IWAI for providing the Varanasi terminal rail access to the dedicated freight corridor, which will be taken up in 5–6 years. Construction of Varanasi terminal has already been initiated, while the procurement process for Haldia and Sahibganj terminals is in the final stages. Development of Ghazipur, Kalughat, and Tribeni/Balagarh/Kalyani terminals will be taken up during 2017.

12. Two vessel repair facilities are proposed to be set up with slipway and workshop facilities at an estimated cost of about US$13 million. The locations of these facilities are yet to be finalized. Designs and procurement for this facility is proposed to be taken up in 2017.

13. The locations for five pairs of Ro-Ro crossings are being finalized. These crossings will be developed through a public-private partnership (PPP) model. IWAI will provide land and road access at an estimated cost of US$5 million while the private sector is expected to invest about US$45 million in developing the infrastructure facilities/platforms, procuring the Ro-Ro vessels and equipment, and operating the Ro-Ro system. The decision on developing this subcomponent through private participation has been taken based on market response obtained through expression of interest and also on the recommendations of a transaction advisory services study for exploring opportunities for PPP in this sector. A transaction adviser will be engaged to develop the bidding/concession documents for developing and operating the system.

14. **Subcomponent A6 (US$11 million).** This subcomponent will include (a) navigational aids in the form of night navigation facilities and channel marking; (b) enhancement of the existing RIS through addition of app-based systems, an improved communication platform, and expanded user reach; and (c) provision of other support services, for example, search and rescue, distress response, and casualty incident management, and upgrading vessel and river monitoring systems. These activities will be implemented through a combination of small civil works, services, and goods contracts.

15. Subcomponent A6 (b), at an estimated cost of US$1.5 million, entails provision of ICT for enhancing RIS and TMS implementation, improving navigational capacities, and capabilities of both IWAI and barge operators, providing a means for engaging citizens' participation, and guiding overall effective project implementation. This may include, but not limited to (a) policy formulation and enforcement to make Automatic Identification System (AIS) use mandatory for all river-faring vessels; (b) rendering an app version of the RIS that can also integrate and overlay weather-related info with AIS data; (c) installing dedicated V-SAT links at the RIS base stations (instead of telephone connectivity); (d) rendering an app-/mobile-based system for civil works monitoring capability to gain real-time information on civil works progress and enabling citizens' participation; (e) supporting the extension of RIS data to populate the TMS; (f) supporting the technical implementation of the TMS (possibly using a mobile tech-based platform) ; and (g) conducting workshops/public relation campaigns to spread awareness among stakeholders on the RIS, TMS, and other ICT implementations.

16. Provision of disaster management and support services will include procurement of rescue boat, patrol boat and oil recovery vessel/attachment, and service leasing of salvage tugs at an estimated cost of about US$7 million.

Component B: Strengthening Institutional Capacities and Improving the Investment Climate, Vessel Design, and the Construction Framework (estimated cost US$30 million).

17. **Subcomponent B1 (US$11 million).** This subcomponent will support institutional strengthening of sector institutions and capacity building of the sector through (a) undertaking a review of current IWAI staffing, future institutional options, and enhanced staffing/skill needs; (b) undertaking review and alignment of laws and regulations with respect to IWT vessel design,

construction, manning, operation, maintenance, insurance, and multimodal transport; and (c) exploring the option of developing sector institutions including a Research and Development Unit/Center for IWAI and enhancement of training institutions (NINI). The procurement process for activity (a) has already been initiated and IWAI has also commenced activity (b) through the recent initiative in amending the Inland Waterways Act.

18. IWAI, currently has a staffing strength of about 300, including a large majority in the field in waterway and vessel management. IWAI's mandate, however, is fast expanding from exclusive waterway management to a more comprehensive role of logistics and market development, project financing and asset (including terminals) management and modern navigational support services and disaster/risk management. While 100 new positions have recently been created in IWAI, including new positions such as logistics officers; the current skill mix and level might not be adequate to cater to the emerging role of and expectations from the organization. To begin with, a staffing and institutional option review study (estimated cost US$1 million) will make an assessment of the current staffing and skill mix and future staffing and skilling needs to manage the growing and diversifying mandate of IWAI and other sector institutions. The skill mapping and needs assessment will cover emerging areas including logistics and marketing, procurement and contract management, social safeguards management and grievance redress, and EHS. The study will assist IWAI to chart out a new human resources and skilling strategy and its implementation to best respond to the rapidly emerging needs of the fledging sector.

19. The legal framework under which IWAI is currently operating needs urgent revamping for effective growth of the sector and functioning of the sector institutions. The recently passed National Waterways Act 2016 has reemphasized IWAI's mandate toward development, management, and regulation of waterways. Efforts have also been undertaken to amend the Inland Vessels Act 1917 (amended in 2007) which will result in improved vessel registration, safety of navigation and shipping regulations, manning and operational regulation thereby modernizing the logistics and vessel fleet. IWAI has also taken up the revision of IWAI rules, 1986, which will make IWAI operations more professional and market oriented. Similarly, the ongoing revision of the IWAI tariff regulation (2011) will make the tariff structure more rational and market oriented and improve sustainability of the investments/operations. Besides these ongoing efforts, few others provisions/regulations, including management of cargo and traffic in inland ports, multimodal transfer, operational framework for terminals, and engagement of the private sector, and so on, need review and amendment. A comprehensive study on review and alignment of various laws and regulations related to inland navigation will, thus be undertaken at an estimated cost of US$1 million and will build on the ongoing initiative on amendment of inland vessels act and other rules/regulations. IWAI has also undertaken initiatives on developing an operational and asset management strategy and a vessel commercialization and financing strategy, expected to be finalized by mid to end 2017.

20. To respond to the needs of rapid growth of the sector, the skilled and semi-skilled human resources requirement will be significant. By 2018/19, when the large multimodal terminals will be ready for operation and about 70–80 vessels could be operating in NW-1, the requirement of skilled and semi-skilled manpower could be up to 6,000 to 8,000. NINI is currently the only dedicated training and research institution for the inland waterway sector and churns out only about 200 skilled and semi-skilled waterway workers every year. The institution is in urgent need of modernization of its academic/research capabilities and diversification and also needs to respond

to the rapidly ramped up demand. This needs to be supported through creation of few other regional institutions like NINI and training/retraining of the skilled manpower from the analogous sectors (for example, merchant navy). Enhancement of NINI to a full-fledged research/training institute and eventually to a center of excellence for the sector and creation of other regional training institutions is envisaged through Subcomponent B3 (c), at an estimated cost of US$9 million. This subcomponent will also support development of massive online open courses and a capacity-building program for IWT stakeholders. Adequate training, exposure visits, and international benchmarking will be supported through this subcomponent. Under this subcomponent, the World Bank will support IWAI in developing their procurement system, by development of a procurement unit/cell with recruitment of permanent procurement staff, development of a procurement manual and Standard Bidding Documents, and capacity building of procurement staff.

21. **Subcomponent B2 (US$5 million).** This subcomponent will include improving the overall investment climate through (a) undertaking market development studies and preparation of business cases (by location, industry, and cargo type) and (b) investigating arrangements for private sector participation in the construction and operation of terminals and other navigational facilities. Both of these activities are being executed through service contracts.

22. As part of activity (b), IWAI has engaged IFC as its transaction adviser in mobilizing private sector involvement in the development of inland waterways in India. As the first step of this engagement, IFC is assisting IWAI with the development and operation of inland water terminals in Kolkata and Patna, located on NW-1, through private sector participation. The focus of this activity is on providing technical and investment assistance to IWAI for improving the navigability and development of base terminal infrastructure on NW-1. This first engagement on equipping, operating and managing inland water transport at Garden Reach terminal in Kolkata and Gaighat and Kalughat terminal in Patna is at an advanced stage, where the structure of the project has already been approved, the tender documents have been issued against which three bids have been received which are under evaluation.

23. **Subcomponent B3 (US$14 million).** This subcomponent will include (a) vessel design and standardization with a focus on low draft and efficient and clean fuel (LNG) vessels, related to expected cargo flow development on different stretches of NW-1, in the areas of liquid bulk, dry bulk, container, LNG, Ro-Ro vessels, and push barge fleets; (b) public/private stakeholder consultations to encourage investment in modern vessel technology through review of fiscal and other barriers hindering vessel construction; and (c) construction and/or leasing of 10 low-draft vessels to kick-start the use of modern vessels in NW-1. Activities (a) and (b) will be implemented through service contracts, while activity (c) will be implemented through goods contracts.

24. Procurement of a study, at an estimated cost of US$2 million, involving vessel design and standardization with a focus on low-draft vessels and an associated investment climate assessment for investing in modern vessel technology is already in advanced stages. This study is expected to facilitate transition in modern and optimal vessel fleet development in the areas of liquid bulk, dry bulk, container, LNG, Ro-Ro vessels, and push barge fleets for the inland waterway sector and more specifically customized for various project stretches. A parallel study and pilot project to promote clean fuel (LNG) vessels is also envisaged at an estimated cost of US$4 million. This study will help analyzing the market demand and supply issues and the regulatory framework

related to use of LNG for inland vessels.

25. One of the key objectives of the project is to promote use of low-draft vessels that will help reduce the perennial dredging requirement and expand commercial navigability to stretches with a restricted draft. To this end, the project envisages to lease 10 low-draft vessels for a period of 6–7 years at an estimated cost of US$8 million.

Annex 3: Implementation Arrangements

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

1. The Ministry of Shipping has designated IWAI (vide Gazette Notification dated October 15, 2014) as the project implementation agency. As it is, IWAI is charged with the overall development, maintenance, and regulation of inland waterways in India. However, particular focus for IWAI in developing the NW-1 project will be to augment the infrastructure capacity on the waterway so as to enable commercial navigation. A POC headed by the Chairman, IWAI, has been set up to provide critical guidance and monitor project progress. The POC comprises senior officers of the Ministry of Shipping, IWAI; representatives of the stakeholder state governments of Uttar Pradesh, Bihar, Jharkhand, and West Bengal; and the Central Water Commission. The POC is also responsible for collaboration of IWAI with participating states in coordinating land acquisition/transfer processes, obtaining various state/local-level statutory clearances, registration of freight vessels, and promoting inland waterways as a viable mode of transport with state-level industrial/business bodies and chamber of commerce.

2. A PMU has been set up from June 2015 onwards to provide focused and sufficiently independent resources for project management. The PMU has since been steering the project preparation and providing full oversight on overall procurement management. Headed by the Vice Chairman of IWAI as the Project Director, the PMU is currently staffed with senior technical/engineering, procurement, environmental and social development, business development strategy, communication, and finance experts. Procuring and managing various inputs to establish ways to improve the navigability of Haldia-Varanasi stretch (Phase 1) of NW-1 through baseline studies is one of the core ongoing activities of the unit. Three project preparation consultants have been hired to provide support on preparation of engineering designs, ESIA, and market development studies. The procurement process for couple of other studies involving softer aspects such as institutional development, research and development on vessel designs, and communication strategy is under way. The required skilled resources needed for activities undertaken in the PMU are procured through outsourcing to an HR agency, according to the prescribed GoI rules (GFR, 2005).

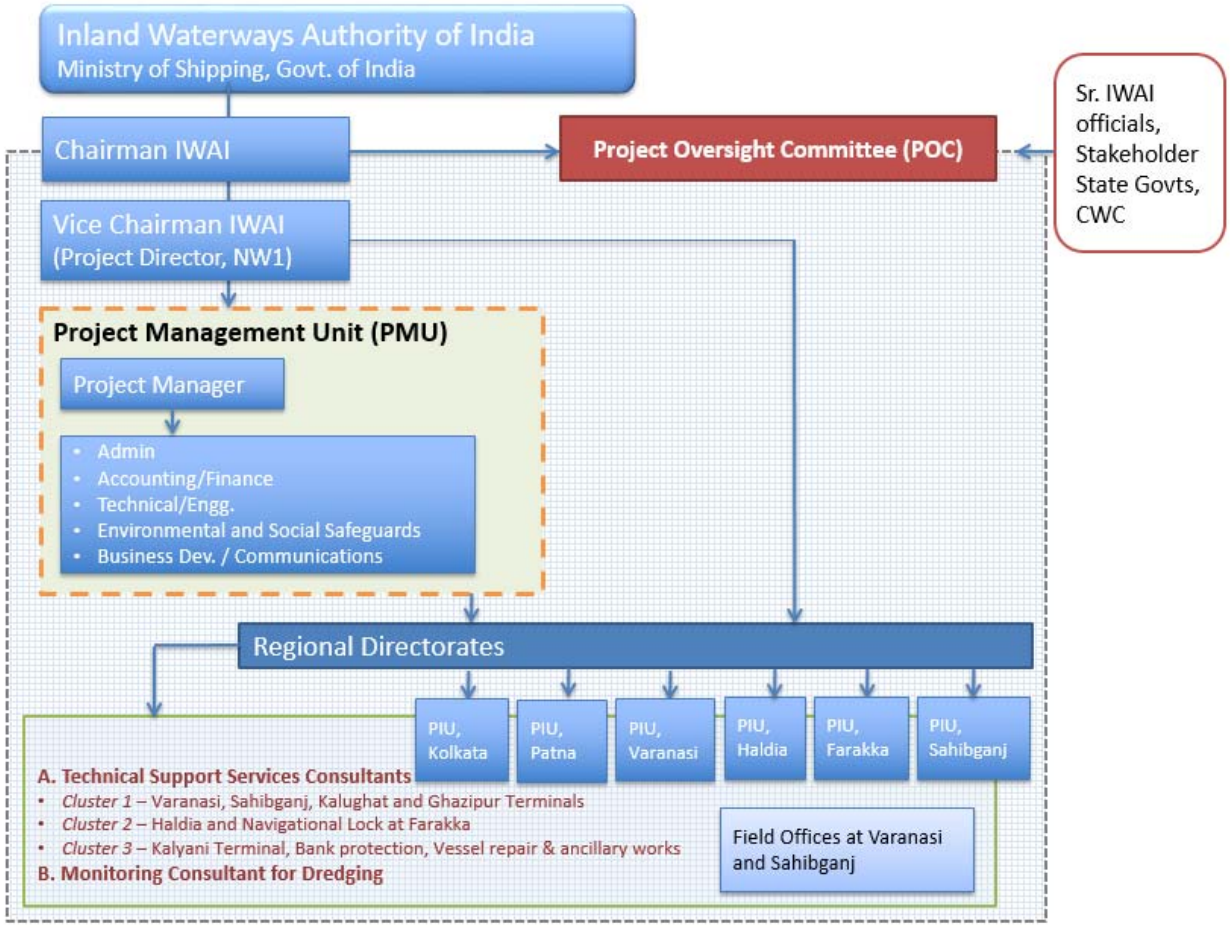
3. Closer to field, two PIUs—one in Kolkata and other in Patna, each headed by a Director, IWAI, and staffed with technical, accounting, and administrative professionals—are also in place. Two field-level offices have also been set up in Varanasi and Sahibganj to support the PIUs in specific discharge of the project components located there. Four more PIUs, one each at Varanasi, Haldia, Farakka and Sahibganj are also planned to be established in 2017. The PIUs are responsible for field-level coordination on land acquisition and R&R, environmental and statutory clearances, and interaction with states on market development, logistics, and other operational issues.

4. Two TSSCs, to work with the PIUs, are being hired to provide implementation and project management support in execution of the civil works and installation of key equipment. The two TSSCs will be appointed under two clusters: Cluster1 - Varanasi, Sahibganj, Kalughat, and Ghazipur terminals and Cluster 2 - Haldia terminal and Farakka navigational lock. A third TSSC is proposed to be hired shortly under Cluster 3, involving the sixth terminal (near Kalyani), bank protection works, vessel repair facilities, and other remaining works. These will assist with technical design review, construction supervision, quality control, and monitoring of works under

the project components. A monitoring consultant for dredging will also be procured to assist with fairway management. They will all report to the concerned PIU Director and will work under the overall guidance, technical control, and direction of the Project Director at the PMU. The regional directors at Kolkata and Patna, assisted by the PIUs at the regional level, will be the main interface between the employer (through the Project Director of the PMU) and the TSSC.

5. An organogram depicting the overall project implementation structure is presented below.

Figure 3.1. Project Implementation Structure



Financial Management, Disbursements, and Procurement

Financial Management

6. The objective of the assessment is to determine whether the implementation agency, namely IWAI, has acceptable financial arrangements in place for (s) use of funds in an efficient and economical manner for the purposes intended, (b) preparation of accurate and reliable periodic financial reports, and (c) mobilization of independent and competent audit/assurance arrangements.

7. **Implementing arrangements.** The project will be implemented by IWAI, an autonomous

body formed in 1986 under the Ministry of Shipping, through the IWAI Act, 1985, for regulation and development of inland waterways for the purposes of shipping and navigation. IWAI is primarily engaged in development, maintenance, and regulation of IWT on national waterways and headed by the Chairman of IWAI. The PMU housed in IWAI, headed by the Vice Chairman of IWAI, is staffed with senior technical, procurement, FM, market development, and communication specialists and an administrative officer. The Vice Chairman of IWAI, Member, Finance presently holds the position of the Project Director for this project. Further, two PIUs, one in Kolkata and the other in Patna, have been set up, each headed by a Director, IWAI, and staffed with technical, accounting, and administrative professionals. The PMU has been steering the project preparation and providing full oversight on overall procurement management. Four more PIUs, one each at Varanasi, Haldia, Farakka and Sahibganj are planned to be set up in 2017. The six PIUs will be responsible for field-level coordination on land acquisition and R&R; environmental and statutory clearances; and interaction with states on market development, logistics, and other operational issues. With the objective of encouraging project ownership in the participating states and to further improve interagency coordination, IWAI also plans to enter into a joint venture partnership with the states and create SPVs for the development of NW-1.

8. **Budgeting.** The World Bank will finance 52.63 percent of the eligible project cost to the GoI under IBRD loan terms. Land acquisition and R&R cost, which is part of the total project cost, will be fully financed by the GoI. The project will be budgeted as a separate line[16] under the budget of IWAI, Ministry of Shipping, to receive funds from the Central Government as an externally aided project. The PMU will be responsible for preparation of the yearly budget/supplementary budget of the project in consultation with the PIU. At the PIU level, the project budget will be prepared annually and sent to the PMU for approval and inclusion in the overall budget. The PIU's proposals will be reviewed by the PMU and the proposals that are selected for funding will form the basis for preparation of the budget. Execution of these activities will be overseen by the PIUs and monitored by the PMU.

9. **Fund flow.** The PMU and PIUs will have separate bank accounts exclusively for project-related activities. The PMU has opened this account with Syndicate Bank, while the PIUs are yet to open a separate account. The budgeted funds for this project will flow from the GoI Treasury into the project bank account of the PMU, periodically on need basis. The transfer of funds will be made from the PMU bank account to the PIU bank account at Patna and Kolkata, as per their requirement, on a monthly basis. At the PMU level, all major project expenditure/payments will be incurred and released to the concerned contractor. The payments made at the PIU level are expected to be primarily toward non-procurement routine expenditures.

10. **Internal controls and accounting.** The project will follow mercantile system of accounting. All the financial controls applicable for IWAI will also apply to the expenditures incurred under this project. IWAI is presently following internal control and accounting procedures as laid out in its Accounts Manual. These documents lay down policies and procedures for the entire FM cycle from budgeting to accounting/internal controls and prescribe formats for reporting and record keeping. Further, a detailed Finance and Accounts Manual specifically for this project is under preparation.

[16] Separate budget line for the project under IWAI budget has been opened.

11. IWAI at presently is using 'ERP 9 TALLY' accounting software, which being a financial accounting software is considered adequate for recording financial transactions and for generating reports for financial disclosure requirements under the project. A separate company in TALLY and the related chart of accounts will be opened to enable the financial activities of this project to be tracked and reported separately. Reconciliation of bank book with the bank statement will be an essential control mechanism.

12. The accounting function will be decentralized and maintained at PMU Noida and participating PIUs at Kolkata and Patna; and possibly at the four other PIUs to be established in 2017, at Varanasi, Haldia, Farakka and Sahibganj. Each accounting unit, that is, PMU/PIUs will maintain a detailed chart of accounts for booking of expenditure under the project. Records with supporting documents/vouchers will be kept at the respective PMU and PIUs. The PIUs will also maintain subsidiary/memoranda records, that is, measurement book, contract monitoring register, and so on according to the accounting norms prescribed in the manual. The PMU will maintain the ledger to monitor financial progress of individual contractors and reconcile the records periodically.

13. Release of funds to the PIU will be accounted for as transfer of fund in the books of accounts and treated as expenditure only upon accounting of actual related expenditure in the books of account based on adequate supporting documents. Similarly, all payments to the contractors will be charged to the relevant project activity account head at the time of making the payments, except advance payment, which will be treated as expenditure only upon submission of actual expenditure information. The running bills for contracts will be prepared by the engineer-in-charge at Regional Offices, approved by the respective PIU Director, and the payments will be processed at the PMU Finance Department.

14. **Finance staffing and training.** The Finance and Accounts Wing of IWAI is headed by the Executive Director, Finance (or the Chief Accounts Officer). The Chief Accounts Officer, reporting to the Member, Finance, will hold additional charge of this project and will be responsible for ensuring that agreed FM and accounting arrangements under this project are carried out seamlessly. Presently, there are two departments (Accounts and Finance) at the PMU level, and both the departments are adequately staffed. In addition, an FM consultant, a qualified chartered accountant with four years of experience, has been engaged under the PMU and will provide requisite support to the finance officers of this project. Each PIU will be staffed with an accountant, who will be responsible for managing finance and accounting functions of the respective PIUs. The hiring of these staff is in process, keeping in mind that they hold sufficient experience in the developmental business.

15. The accountants/consultants working under the project will be provided sufficient training on departmental and World Bank procedures. The staffing needs of the project will be regularly assessed by departments and swift action will be taken to appoint vacant positions.

16. **Financial reporting.** The IUFRs will be prepared by the PMU and PIUs from the respective underlying accounting records and monthly reconciled bank statements. The IUFRs will reflect the actual expenditures incurred and disbursed under the project and the financial report will be consolidated by the PMU and submitted to the World Bank within 45 days from the end of each calendar quarter. The IUFRs will include a list of payments against contracts that are subject

to the World Bank's prior approval.

Disbursement

17. **Disbursement arrangements.** The applicable disbursement method will be 'reimbursement'. The PMU/PIUs will use their budgetary resources to finance the project expenditures. The PIUs will submit their respective quarterly IUFRs to the PMU. The PMU will consolidate and submit quarterly IUFRs (along with the World Bank TTL's approval on the previous IUFR) to the office of the CAAA, GoI. IUFRs submitted to the World Bank will be reviewed by the Task Team on ex post basis, except for the first two or three IUFRs, where Task Team clearance is required before disbursement. These financial reports will be submitted by the CAAA to the World Bank for seeking timely reimbursement.

18. **Disbursement schedule.** IBRD funds will be disbursed against eligible expenditures under the following categories, subject to the allocated amount and the disbursement percentage as indicated in table 3.1:

Table 3.1. Disbursement Schedule

Category	Amount of the Loan Allocated (Expressed in US$, millions)	Percentage of Eligible Expenditure to be Financed (Inclusive of Taxes)
1. Goods, works, non-consulting services, consulting services, incremental operating costs, workshops and trainings under the project	370.50	52.63%
2. Front-end fee	0.94	Amount payable pursuant to Section 2.07(b) of the General Conditions
3. Refund of the Project Preparation Advance	3.56	Amount payable pursuant to Section 2.07(a) of the General Conditions
4. Premia for interest rate cap or interest rate collar	0.00	Amount payable pursuant to Section 4.05(c) of the General Conditions
Total Amount	375.00	—

19. **External audit.** The CAG of India will be the external auditor for the project. The CAG's office will conduct an annual audit of the project financial statements covering sources and uses of funds of the PMU and the PIUs. The audit will be conducted as per the ToR agreed with the World Bank. The audit at the PMU/PIU level will include audit of IUFRs and project accounts. The PMU/ PIUs will be required to maintain the records of IUFRs and the project accounts separately to enable the auditor to carry out necessary checks and verifications effectively. After consolidation of audit reports of the PIUs and the PMU, there will be one single audit report for the entire project, which will be submitted by the PMU to the World Bank by December 31 of every financial year. The audit report for the expenditures incurred under retroactive financing will be combined with the first year audit report. The annual audit report will consist of (a) audit opinion; (b) project financial statements; and (c) management letter highlighting weaknesses, if

any. The following audit report will be monitored:

Table 3. 2. Audit Arrangements

Implementing Agency	Audit Report	Auditor	Due Date
PMU, IWAI	Consolidated* audit report and project financial statements	CAG of India	December 31 of each year

Note: *IWAI is in the process of getting the suggested audit arrangements concurred by CAG.

20. **Internal audit.** The internal audit function in the PMU/PIUs will be outsourced on a rotational basis to chartered accountancy firms that will conduct internal audit on quarterly basis and will issue a report to the Vice Chairman, IWAI, on control weaknesses and issues that require management attention. The project records will also be covered at the time of the internal audit of IWAI and a separate disclosure about the same shall be made in the internal audit report issued and this audit report will be shared with the World Bank. The audit will focus on reviewing the budget, payment, accounting, and internal control processes adopted by the PMU/PIUs. The internal audit reports, along with the corrective actions taken by the project to address control weaknesses (if any), will be shared with the World Bank. The PIUs will also submit paragraph-wise comments to the PMU, mentioning systemic issues and action taken, within 45 days of end of every quarter. The PMU/ PIUs will provide a copy of the quarterly internal audit report, including compliances, to the statutory auditor on account of the project.

21. **Retroactive financing.** This will be permitted subject to the following conditions: (a) financing up to a limit not exceeding 20 percent of the loan amount (US$75 million) will be available to the project to cover eligible project expenditure incurred and paid by the PMU/PIU within one year before the likely date of the signing of the Loan Agreement that is, June 1, 2017) and (b) payments made for expenditures for works, goods, and services supplied under a contract which any international institution or agency or the Association has not financed or agreed to finance under any other agreement.

22. **Action plan.** The following are the action plans, the team is monitoring:

(a) Create the budget head - before project negotiation

(b) Finalize the FM Manual - before project effectiveness

(c) Agree on statement of audit needs for an external audit with CAG - before project negotiation

(d) Train on FM and disbursement - before disbursement

23. **Risk and supervision plan.** The FM arrangement, existing and proposed, have been assessed and judged as adequate to provide assurance on the usage of funds. The FM risk of the project is nevertheless assessed as ‘Substantial’ due to the involvement of multiple implementation units. It is the first ever engagement of IWAI with the World Bank and assessments indicate that departments may require support on the World Bank’s FM and disbursement processes/procedures and guidance on contracting techniques envisaged under the project. The oversight arrangements, that is, the internal and external audit will provide reasonable assurance on use of the World Bank

funds for project activities. During the first year of project implementation, the World Bank will undertake semiannual implementation support missions, including field visits to ensure that agreed FM arrangements, laid down accounting processes, and procedures are appropriately followed. As implementation progresses, it will involve review of financial reports and audit reports. The FM arrangements proposed under this project are considered to be adequate to account for and report on project expenditures. These arrangements will satisfy the fiduciary requirements of OP/BP 10.00.

24. **Public disclosure.** The annual audit reports and project financial statements will be disclosed on the department's website.

Procurement

25. Procurement for the project will be carried out in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD loans and IDA credits and grants by World Bank Borrowers', dated January 2011 and updated in July 2014 (Procurement Guidelines); 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011 and updated in July 2014 (Consultant Guidelines); and the additional provisions mentioned in the Legal Agreement.

26. **Procurement capacity.** All the procurement will be handled by the PMU, at IWAI's Noida office. The PMU has been staffed through a multidisciplinary team comprising officials mapped to technical, procurement, and FM functions. The PMU is staffed with two procurement consultants, who are responsible for all procurements under this project. The implementing agency does not have procurement cell/unit with permanent procurement staff. The implementing agency has no prior experience in World Bank-funded procurement, although they have been doing procurements following the GoI rules (GFR 2005). Though the procurement consultants in the PMU have procurement capacity for implementation of conventional BoQ contracts, they have limited experience on new procurement approaches, which are being used in the project. For example, there will be a few packages under the project on EPC mode for the construction of Sahibganj and Haldia terminals and there will be some non-consulting service contracts for maintenance of LAD package with prequalification. The implementing agency has limited experience in handling these new procurement approaches. Further, this being a new sector in India, the market capacity is not known. Apart from delays in procurement process, contract management delays and noncompliance with agreed procurement arrangements are potential problem areas. Detailed Procurement Capacity Assessment is available in P-RAMS. It has been agreed that under Subcomponent B1 of the project, the World Bank will support the implementing agency in the development of a procurement cell/unit and recruitment and training of permanent procurement staff. The World Bank will also provide support in the development of a procurement manual, SBDs for IWAI, and procurement of an online contract management tool. The estimated cost of procurement support under Subcomponent B1 will be approximately US$600,000.

27. **Procurement planning.** For each contract to be financed by the loan, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are reflected in the first 18 months' Procurement Plan which has been agreed between the borrower and the World Bank project team. The

Procurement Plan for the first 18 months has been approved by the World Bank and is available on the Systematic Tracking of Exchanges in Procurement (STEP) portal. The Procurement Plan is provided in annex 3A.

28. **E-procurement system.** The PMU will be using the NIC e-procurement system for all procurements. The e-procurement system assessment was carried out against the multilateral development banks' requirements and has been accepted for use in procurements under World Bank-funded projects. This is likely to increase efficiency and transparency of procurement.

29. **STEP.** The project will use STEP, a planning and tracking system of the World Bank, which will provide data on procurement activities and establish benchmarks. The details of the procurement activities, presently prepared in the Procurement Plan will be transferred to the STEP system. Initial training on the operation of the STEP system has been provided to the procurement staff of IWAI.

30. **Procurement training.** The procurement staff shall be sent for trainings at the Administrative Staff College of India, Hyderabad, or National Institute of Financial Management (NIFM), Faridabad. The project could also avail of the free Massive Open Online Course on public procurement (www.procurementlearning.org) offered by the World Bank as well as the paid Professional Diploma in Public Procurement Course delivered through the Charter of Public Procurement Studies.

31. **Procurement risk assessment.** This is the first ever engagement of IWAI with the World Bank. Therefore, the implementing agency has no prior experience in World Bank-funded procurement. Table 3.3 describes major procurement-related risks and the mitigation plan. The risk ratings have been decided based on both the probability of occurrence of various events as well as their likely impact. Based on the risk factors and mitigation measures, the overall procurement risk at this stage is 'Substantial'. The risk rating of procurement will be reviewed and updated periodically by the World Bank.

Table 3.3. Assessed Procurement Risks and Mitigation Measures

Risk Factor	Initial Risk	Mitigation Measure	Completion Date	Residual Risk
Inefficient procurement system, that is, there is no procurement cell, no permanent procurement staff, no procurement manual, and no complaint handling system	Substantial	• Development of a procurement cell/unit in IWAI • Recruitment of permanent procurement staff • Development of procurement manual and SBDs for IWAI • Development of a complaint handling system • Training of procurement staff	By Year 1 of the Project	Moderate
Limited capacity in World Bank procurement procedures and in new procurement approaches, which may	Substantial	• Use of skilled procurement staff for handling procurement activities • The packages adopting the new procurement approaches are	Continuous from Year 1	Moderate

Risk Factor	Initial Risk	Mitigation Measure	Completion Date	Residual Risk
lead to delays in procurement and contract management processes		prior reviewed by the World Bank. • Monitoring through the Procurement Plan and quarterly reports • Use of online contract management tool • Attending training/workshops and so on		
Normal fiduciary risks of transparency, fairness, and capacity associated with procurement of goods and works at the PMU level	Substantial	• Use of e-procurement and online contract management tools • Attending training/workshops and so on	Continuous from Year 1	Moderate
Noncompliance with agreed procurement arrangements	Substantial	• Training and hand-holding provided by the World Bank • Prior and post reviews by the World Bank • Internal and external audits	Continuous from Year 1	Substantial
External interference in the procurement process	Substantial	• Disclosure of procurement-related information • Appropriate handling of complaints	Continuous from Year 1	Moderate
Overall Risk	**Substantial**			**Moderate**

32. **Procurement methods.** Table 3.4 describes the various procurement methods to be used for activities financed by the proposed loan. These, along with agreed thresholds, will be reproduced in the Procurement Plan. The thresholds indicated in table 3.4 apply to the initial 18-month implementation period and are based on the procurement performance of the project; these thresholds will be modified as required. Domestic preference will be applicable for International Competitive Bidding (ICB) procurement of goods as per Appendix 2 of the Procurement Guidelines.

Table 3.4. Procurement Thresholds

Category	Method of Procurement	Threshold (US$ Equivalent)
Works	ICB	>40,000,000
	National Competitive Bidding (NCB)	Up to 40,000,000 (with NCB conditions)
	Shopping	Up to 100,000
	Direct Contracting (DC)	According to paragraph 3.7 of the Procurement Guidelines
	Public-Private Partnership (PPP) for Works	According to paragraph 3.14 of the Procurement Guidelines
	Force Account	According to paragraph 3.9 of the Procurement Guidelines
	Framework Agreement (FA)	According to paragraph 3.6 of the Procurement Guidelines

Category	Method of Procurement	Threshold (US$ Equivalent)
Goods and non-consultant services	ICB	>3,000,000
	Limited International Bidding	Wherever agreed by the World Bank
	NCB	Up to 3,000,000 (with NCB conditions)
	Shopping	Up to 100,000
	DC	According to paragraph 3.7 of the Procurement Guidelines
	Public-Private Partnership (PPP) services	According to paragraph 3.14 of the Procurement Guidelines
	Force Account (only for non-consultant services)	According to paragraph 3.9 of the Procurement Guidelines
	FA*	According to paragraph 3.6 of the Procurement Guidelines
	Procurement from United Nations agencies	According to paragraph 3.10 of the Procurement Guidelines
Consultants' Services	Selection Based on Consultants' Qualifications (CQS)/Least-Cost Selection	Up to 300,000
	Single-Source Selection (SSS)	According to paragraphs 3.9–3.11 of the Procurement Guidelines
	Individuals	According to Section V of Guidelines
	Particular types of consultants	According to paragraphs 3.15–3.21 of the Procurement Guidelines
	Quality- and Cost-Based Selection (QCBS)/ Quality-Based Selection/Selection under a Fixed Budget	For all other cases
	(a) International short list (b) Short list may comprise national consultants only	>800,000 Up to 800,000

Note: * Directorate General of Supplies and Disposals (DGS&D) rate contracts may be used as FA, subject to the following conditions:

- Use of DGS&D rate contracts as FA must be reflected in the Procurement Plan agreed by the World Bank for particular goods.
- Before issuing the purchasing order, the implementing agency will carry out a price analysis on the specific good that is intended to be purchased. If after this due diligence, the implementing agency concludes (and the World Bank agrees) that the DGS&D rate contracts are more advantageous, the DGS&D rate contracts may be used as FA.
- To meet the World Bank's requirements for the right to audit and fraud and corruption, these clauses may be included in the purchase orders (in case the purchasers are directly placing the purchase orders to DGS&D rate contract holders). On the other hand, if indent is placed through the DGS&D, the purchaser has the option to sign a separate undertaking with the DGS&D rate contract holder, where the World Bank's right to audit and fraud and corruption clauses could be mentioned.

33. **World Bank review of procurement.** The World Bank will prior review (thresholds are based on the current Substantial risk rating and will be modified if the risk rating is changed after assessment) the following contracts:

(a) Works (including turnkey, supply, and installation of plant and equipment, and PPP): All contracts more than US$10 million equivalent

(b) Goods, information technology, and non-consulting services: All contracts more than US$2 million equivalent

(c) Consultancy services: More than US$1 million equivalent for firms and more than US$300,000 equivalent for individuals

34. The first contract issued by the implementing agency will be subject to prior review irrespective of the value. In addition, the justifications for all contracts to be issued on the basis of Limited International Bidding, SSS, or DC will be subject to prior review. The above thresholds are for the initial 18-month implementation period; based on the procurement performance of the project, these thresholds may be subsequently modified. Even for post review cases, the inputs of the World Bank on technical specifications/ToRs will be obtained by the project. If bids are called concurrently for several contracts in a package and the PMU invites cross discounts, the aggregate value of the total package will form the basis to determine the procurement method as well as the prior review threshold requirements. All amendments to prior review contracts more than 15 percent in contract value or time will be subject to prior review. The prior review thresholds will also be indicated in the Procurement Plan. The Procurement Plan will be subsequently updated annually (or at any other time if required) and will reflect any change in prior review thresholds. The World Bank will carry out an annual ex post procurement review of the procurement falling below the prior review thresholds provided above. To avoid any doubts, the World Bank may conduct Independent Procurement Reviews of all the contracts financed under the loan at any time.

35. **NCB condition.** National competition for the procurement of goods and works according to the established thresholds will be conducted in accordance with paragraphs 3.3 and 3.4 of Section III of the Procurement Guidelines and the following provisions:

(a) Only the model bidding documents for NCB agreed with the GoI Task Force (and as amended for time to time) shall be used for bidding.

(b) Invitations to bid shall be advertised in at least one widely circulated national daily newspaper (or on a widely used website or electronic portal with free national and international access along with an abridged version of the said advertisement published in a widely circulated national daily, among others, giving the website/electronic portal details from which the details of the invitation to bid can be downloaded) at least 30 days before the deadline for the submission of bids.

(c) No special preference will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises, or enterprises from any given state.

(d) Except with the prior concurrence of the World Bank, there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder.

(e) Extension of bid validity shall not be allowed with reference to contracts subject to the World Bank prior review without the prior concurrence of the World Bank (a) for the first request for extension if it is longer than four weeks and (b) for all subsequent requests for extension irrespective of the period (such concurrence will be considered by the World Bank only in cases of force majeure and circumstances beyond the control of the purchaser/employer).

(f) Rebidding shall not be carried out with reference to contracts subject to the World Bank's prior review without the prior concurrence of the World Bank. The system of rejecting bids outside a predetermined margin or 'bracket' of prices shall not be used in the project.

(g) Rate contracts entered into by the DGS&D will not be acceptable as a substitute for NCB procedures unless agreed with the World Bank on a case-to-case basis. Such contracts will be acceptable, however, for any procurement under the Shopping procedures.

(h) Two- or three-envelope system will not be used (except when using e-procurement system assessed and agreed by the World Bank).

36. **Record keeping.** All records pertaining to award of tenders, including bid notification, registers pertaining to sale and receipt of bids, bid opening minutes, bid evaluation reports, and all correspondence pertaining to bid evaluation, communication sent to/with the World Bank in the process, bid securities, and approval of invitation/evaluation of bids by IWAI (as the implementing agency) will be retained by IWAI.

37. **Disclosure of procurement information.** The following documents shall be disclosed on the project website: (a) Procurement Plan and updates; (b) invitation for bids for goods and works for all ICB, NCB, and shopping contracts; (c) request for expression of interest for selection/hiring of consulting services; (d) contract awards of goods and works procured following ICB/NCB procedures; (e) list of contracts/purchase orders placed following Shopping procedure on quarterly basis; (f) short list of consultants; (g) contract award of all consultancy services; (h) list of contracts following DC, CQS, or SSS on a quarterly basis; (i) monthly financial and physical progress report of all contracts; and (j) action taken report on the complaints received on a quarterly basis.

38. The following details shall be published in the United Nations Development Business online through STEP: (a) invitation for bids for procurement of goods and works using ICB procedures, (b) request for expression of interest for consulting services with estimated cost more than US$300,000, (c) contract award details of all procurement of goods and works using ICB procedure, (d) contract award details of all consultancy services with estimated cost more than US$300,000, and (e) list of contracts/purchase orders placed following SSS, CQS, or DC procedures on a quarterly basis.

39. Further, IWAI will create a separate web page for World Bank-funded project and a separate procurement field in the project web page and will publish on their websites any information required under the provisions of 'suo-moto' disclosure as specified by the Right to Information Act.

40. **Implementation support.** The World Bank will normally carry out implementation support missions, including review and support on procurement, on a semiannual basis. Mission frequency may be increased or decreased based on the procurement performance of the project.

41. **Use of government institutions and enterprises.** Government-owned enterprises or institutions in India may be hired for activities of a unique and exceptional nature if their participation is considered critical to achievement of project objectives. In such cases, the

conditions provided in clause 1.13 of the Consultant Guidelines will be satisfied and each case will be subject to prior review by the World Bank.

Annexure 3A: Procurement Plan

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

Procurement Plan for Goods and Works

Procurement Packages with Methods and Time Schedule

1	2	3	4	5	6	7	8	9
Ref. No.	**Contract (Description)**	**Estimated Cost (INR Million)**	**Procurement Method**	**Prequalification (yes/no)**	**Domestic Preference (yes/no)**	**Review by Bank (Prior / Post)**	**Expected Bid-Opening Date**	**Comments**
CANW-1/IWAI/JMV/4A	Interior Works for Office of the Project Management Unit of Jal Marg Vikas Project	7.9	Shopping	No	No	Post	24-Apr-15	The value of contract was increased to INR 9.1 million
CANW-1/IWAI/JMV/4B	Furniture and other equipment for Office of the Project Management Unit of Jal Marg Vikas Project	6.6	Shopping	No	No	Post	24-Apr-15	The value of contract was increased to INR 7.4 million
CANW-1/IWAI/JMV/4C	Office Interiors 2 for PMU	2.5	Shopping	No	No	Post	24-Apr-15	
CANW-1/IWAI/JMV/5	Laptops (6 Nos.)	0.46	Shopping	No	No	Post	26-Sept-14	
CANW-1/IWAI/JMV/7	Self-Propelled Cutter Suction Dredger (2 Nos.)	600	ICB	No	No	Prior	May-16	
CANW-1/IWAI/JMV/8	Inspection cum Survey Vessel (2 Nos.)	100	ICB	No	Yes	Prior	22-Jan-15	The contract is awarded at INR 139.94 million
CANW-1/IWAI/JMV/9	Performance based Maintenance Contract for Navigation on Part of National Waterway – 1 (Farakka – Bhagalpur)	2,034.9	ICB	Yes	No	Prior	15-Feb-16	Contractor finalized, Contract to be signed for INR 1589.1 million
CANW-1/IWAI/JMV/10	Procurement of EPC Contract for	2,018	ICB	No	No	Prior	28-Sept-15	Contractor finalized, Contract signed

1	2	3	4	5	6	7	8	9
	Construction of Terminal at Varanasi							for INR. 1695.9 million
CANW-1/IWAI/JMV/11	Procurement of EPC Contract for Construction of IWT Terminal at Sahibganj, Jharkhand	2,921	ICB	No	No	Prior	14-Mar-16	Contractor finalized, Contract signed for INR 2809 million
CANW-1/IWAI/JMV/15	Procurement of EPC Contract for Construction of Multimodal IWT Terminal at Haldia, West Bengal	4,650	ICB	No	No	Prior	18-Apr-16	Contractor finalized, Contract to be signed for INR 5173.62 million
CANW-1/IWAI/JMV/16	Procurement of EPC Contract for Construction of Navigation Lock at Farakka, West Bengal	3,520	ICB	No	No	Prior	May-16	Contractor finalized, Contract signed for INR 3591.9 million
CANW-1/IWAI/JMV/17	Laptop (1 No.) (Apple)	0.16	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/18	B&W Printer (1 No.)	0.27	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/19	Color Printer (1 No.)	0.19	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/20	Desktop (8 Nos.)	0.37	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/21	Laptop (10 Nos.)	0.62	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/22	UPS (10 Nos.)	0.24	Shopping	No	No	Post	03-Dec-15	Through DGS&D Rate Contract
CANW-1/IWAI/JMV/28	Performance based Maintenance contract for Navigation on Part of National Waterway – 1 (Barh – Ghazipur)	6,925	ICB	Yes	No	Prior	15-Apr-17	

1	2	3	4	5	6	7	8	9
CANW-1/IWAI/JMV/29	Performance Based Maintenance Contract for Navigation on Part of National Waterway – 1 (Ghazipur – Varanasi)	2,346.6	ICB	Yes	No	Prior	15-Apr-17	
CANW-1/IWAI/JMV/30	Procurement of EPC Contract for Construction of IWT Terminal at Third Location	600	ICB	No	No	Prior	18-Mar-17	
CANW-1/IWAI/JMV/31	Procurement of EPC Contract for Construction of IWT Terminal at Kalughat, Bihar	800	ICB	No	No	Prior	18-Feb-18	
CANW-1/IWAI/JMV/32	Procurement of EPC Contract for Construction of IWT Terminal at Ghazipur, Uttar Pradesh	600	ICB	No	No	Prior	18-Jan-17	
CANW-1/IWAI/JMV/33	Procurement of EPC Contract for Construction of Vessel Repair and Maintenance Facility, Site 1	375	ICB	No	No	Prior	18-Jul-17	
CANW-1/IWAI/JMV/34	Procurement of EPC Contract for Construction of Vessel Repair and Maintenance Facility, Site 2	375	ICB	No	No	Prior	18-Aug-17	
	Total	**2,7857.81**						**Rs. 15,015.96 Million worth of contract awarded**

Procurement Plan for Selection of Consultants

1	2	3	4	5	6	7
Ref. No.	Description of Assignment	Estimated Cost (INR Million)	Selection Method	Review by Bank (Prior / Post)	Expected Proposals Submission Date	Comments
CANW-1/IWAI/JMV/1	Detailed Feasibility Study for Capacity Augmentation of National Waterway-1 and Detailed Engineering for its Ancillary Works and Processes	454.34	QCBS	Prior	22-Apr-15	Contract awarded at INR 188.1 Million + GBP 0.74 Million (excluding applicable taxes)
CANW-1/JMV/IWAI/2	Consultancy for Environmental and Social Impact Assessment (ESIA), Environmental Management Plan (EMP) and Resettlement Action Plan (RAP) for Capacity Augmentation of National Waterway-1 (Jal Marg Vikas) Project	57.57	QCBS	Prior	30-Jan-15	Contract awarded at INR 28.61 Million (excluding applicable taxes)
CANW-1/JMV/IWAI/4	Consultant for IWT Sector Development Strategy and Market Development Study for Capacity Augmentation of National Waterway-1 (Jal Marg Vikas) Project	66.79	QCBS	Prior	13-Mar-15	Contract awarded at Euro 0.84 Million + INR 0.62 Million (excluding all applicable taxes)
CANW-1/JMV/IWAI/12	Supporting Services for Design of Inland Vessels for Capacity Augmentation of National Waterway – 1 (Jal Marg Vikas) Project	23.84	QCBS	Prior	04-Apr-16	Contract awarded at Euro 0.28 Million (excluding all applicable taxes)
CANW-1/JMV/IWAI/13	Consultancy for Communications Needs Assessment, Development and Implementation of Communications Strategy and Strategic Communications Support for 'Capacity augmentation of navigational	6.5	QCBS	Post	21-Mar-16	Contract awarded at INR 2.16 Million (excluding all applicable taxes)

1	2	3	4	5	6	7
	infrastructure of National Waterway-1 (Jal Marg Vikas) Project' between Haldia to Allahabad					
CANW-1/JMV/IWAI/14	Implementation of Resettlement Action Plan (RAP) for the Capacity Augmentation of Navigation on National Waterway -1 (Jal Marg Vikas)	3.34	QCBS	Post	04-Apr-16	
CANW-1/JMV/IWAI/23	Consultancy for Inland Waterways Transport Institutional Strengthening and Capacity Building	42.49	QCBS	Post	May-16	
CANW-1/JMV/IWAI/24	Technical Support Services Consultancy – Cluster 1 for MMT at Varanasi and Sahibganj (located at Patna)	97.22	QCBS	Prior	Jun-16	
CANW-1/JMV/IWAI/25	Technical Support Services Consultancy – Cluster 2 for MMT at Haldia and Navigation Lock at Farakka (located at Kolkata)	117.96	QCBS	Prior	Jun-16	
CANW-1/JMV/IWAI/26	Consultancy Services for Project Preparatory and Definition Study for Development of Ferry services on NW-1	37.41	QCBS	Prior	Jun-16	Contract awarded at INR 14.31 Million + USD 0.47 Million (excluding all applicable taxes)
CANW-1/JMV/IWAI/27	Consultancy Services for Plan and Implementation support for commercialization of NW-1	34.42	QCBS	Prior	Jun-16	Contract awarded at Euro 0.5 Million (excluding all applicable taxes)
	Total	**941.88**				**INR 233.8 Million + GBP 0.74 Million + Euro 1.62 Million + USD 0.47 Million worth of contract awarded**

Environmental Management and Enhancement

Environmental Management

42. A large meandering river system such as the Ganga is a highly complex dynamic ecosystem because of its high levels of sediment transport. The river has large water-level fluctuations and unreliable water depths, leading to unavailability of adequate depth suitable for navigation. The high silt loads (estimated 700 million tons at Farakka close to the India-Bangladesh border), lead to shoal formation and in many cases, cause splitting of the main channel. Addressing these challenges would usually require structural measures within the water body, and if these are not designed well, could have environmental and ecological implications. River training works and dredging have the risk of eliminating habitats and natural composition of ecological communities. In addition, navigation can also have other impacts on the water environment, such as pollution. The maintenance of navigational channels in all the stretches is a complex task due to large variation in discharge (where peak flows are very large and low flows very low), unstable morphological condition of bank and bed, heavy sediment load, continuous braiding, and meandering of the river. Due to the complexity of investment and operations, geographical extent and ecological richness of the project areas, project-financed investments, unless carefully designed, could potentially lead to significant impacts on the river system as well as site-specific impacts and changes in sediment flow of the river. Based on such initial assessment of risks, environmental assessment of the project set out to avoid (as far as possible) these potential environmental impacts and risks and manage and mitigate the residual potential impacts and risks. Because of the environmental assessment, subsequent incorporation in plans and designs for the project has reduced the risks (by avoiding specific interventions, such as dredging in the critical stretches of protected areas, or by minimizing the interventions). Consequently, there is no potential large-scale, significant, and/or irreversible impacts from the project. The plan for mitigating and managing the residual risks are reasonable and implementable. In addition, the project is aiming at very substantial environmental enhancements (by switching to LNG as vessel fuel, facilitating introduction of 'cleaner' vessels, adopting low-draft vessels, augmenting riverine fishery, by supporting conservation of protected aquatic areas) and contributing to GHG emission.

43. IWT is a crucial sector in the socioeconomic development of the region and is inextricably linked to other sectors of transport. It is generally considered as a more emission-efficient and low-cost transport route for bulk cargo compared to roads and railways. Currently, existing IWT routes in India only capture 0.34 percent of total inland cargo transport, because of limitations in reliability and availability; this, however, is expected to increase to 2 percent by 2025. It is also proposed that IWT will incorporate high-capacity vessels (1,500–2,000 DWT) that will run on LNG and will move in low draft to further reduce GHG emissions. All terminal facilities proposed, which will have green building design certified by Green Rating for Integrated Habitat Assessment (GRIHA), will reduce energy (fossil fuel) dependence. Overall, avoided GHG emission due to the project will be 4.5 million tCO_2e.

44. Due to the complexity of investment and operations, geographical extent, and ecological sensitivity of the project areas, the complexity of environmental issues associated with the river dredging, project-financed investments could potentially lead to significant impacts on the river system, and hence the project has been classified under environmental Category 'A'. Of the

environmental safeguard policies, the project triggers Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), and Physical Cultural Resources (OP 4.11). Projects on International Waterways (OP/BP 7.50) is also triggered as the Ganga is an international river. To ensure that there are no transboundary impacts on quantity and quality water, a CIA, in addition to identification of critical environmental resources to be conserved, ascertained the regional and cumulative impacts of current and planned investments in NW-1. Consequently, the project's wider area of influence and its interlinkages with various planned investments was also considered, including the analysis of possible cumulative effects and recommendation of integrated mitigation measures, which will be monitored and reported promptly during project implementation.

45. In addition to the CIA, the EA process (both undertaken in consultation with relevant main stakeholders) ensured that the environmental and other safeguard requirements were carried out in compliance with the environmental policies and procedures as specified by the GoI and the World Bank policies. The borrowers prepared (a) a CIA report, which includes a study on the critical environmental resources in the entire Ganga Basin in India to provide guidelines to avoid impacts on these as far as possible and recommends measures to manage direct, indirect, and induced impacts; (b) a consolidated EA report including an overall plan for avoiding, mitigating, and managing EHS impacts in the project; and (c) stand-alone environmental assessments, including EMPs, suitable to be incorporated in the contracts for design-build-operate contracts of all major interventions planned in the project. The consolidated EA was not limited to individual subprojects, rather it addressed environmental impacts of investment sectors taken together based on two categories (a) impacts associated with barge and dredging and other operations and (b) impacts associated with civil interventions. To supplement this consolidated EA, detailed EAs and management plans have been prepared for the construction and operation of all investment categories (construction and operation) and site-specific EMPs have been prepared. These include (a) dredging requirements; (b) barge operations; (c) navigation lock at Farakka; and (d) multimodal terminals at Sahibganj, Varanasi, and Haldia. As required, site-specific EA/EMPs will be prepared for all potential civil interventions supported by the project in future in accordance with the EMF, which is part of the consolidated EA.

46. **Findings and recommendations of the Cumulative Impact Assessment (CIA).** IWAI has carried out a CIA covering the wider area of influence of NW-1 encompassing the effects of the broader program of investments within the Ganga Basin over a longer period. The main recommendations of the CIA include measures for planning and management/mitigation of all critical environmental impacts besides sustainable development considerations. Recommendations proposed include the following: (a) no barrages or storage reservoirs in the main river and tributaries should be built to maintain water depth and reduce silt charge even though such structures could be more economical compared to regular annual dredging; (b) critical environmental resources and natural habitats have been identified as 'no go' zones for dredging; and (c) all terminals will be built maintaining world class infrastructure standards, namely GRIHA certification, zero liquid discharge technologies, and waste management through best practices. In addition to this, the project will introduce (a) the highest health and safety standards for operation of terminal facilities and navigation operations and (b) the vessel fleet proposed will follow international standards for discharge of ballast, wastewater, and use of cleaner and more efficient fuel. Locations for terminals will be based on proximity to intermodal connectivity, at the same time reducing air pollution and congestion impacts within cities and integrating passenger services wherever possible. The CIA also proposes that IWT will incorporate high-capacity vessels that

will run on LNG and will move in low draft so as to reduce the dredging requirement and further reduce GHG emissions. Impacts on adjacent bird and fish habitats in the floodplains that might include habitat disturbances and human interferences (air and noise pollution) will be minimized and prevented wherever possible. These habitats will be mapped and integrated in the overall navigation information system to avoid further impacts due to increase in navigation volume and structural modifications to NW-1 and to respond to any observed negative impacts on aquatic or avifauna species. The environmental objectives of the NW-1 augmentation will be aligned and integrated with the National Ganga River Basin Authority, and institutions should interact cooperatively. Providing a safe and environmentally friendly transport service will also provide effective support to growth of tourism and ecotourism.

47. **Findings and recommendations of the EA.** Detailed EAs were conducted in parallel with preparation of the engineering feasibility report for all proposed interventions. Primary data collection and sampling was carried out between September 15, 2015, and February 28, 2016, at different locations, covering the influence area of the entire stretch of NW-1. A detailed description of project baseline environmental conditions, identified positive and negative environmental impacts, the mitigation measures to eliminate or minimize the adverse impacts and enhance the positive impacts, including institutional responsibilities, implementation schedule, environmental budget, and arrangement for monitoring and evaluation are provided in the consolidated EIA report for NW-1. Environmental impacts are effectively prevented or significantly reduced through good detailed design and the application of appropriate actions specified in the EMPs and incorporated in bidding documents for the works contracts.

48. The major potential environmental impacts of waterway upgrading, as proposed, are potential long-term impacts to ecological functions and short-term disturbance of water quality and aquatic species as a result of dredging and dredge disposal, improper discharge of wastewater from vessels, risk of accidents/collisions and material spillage, and the noise and vibration from piling works for structures built in the water. For civil interventions, the major risk is construction activities being implemented without the due diligence required; dust emission, noise, air pollution from excavation works, and poor material handling and inappropriate disposal of unused debris/spoil are major impacts. These impacts were evaluated as short term and confined within the construction period. Overall, the assessment suggests that the project will not have any significant adverse and/or irreversible environmental impact. During preparation of the EA, consultation and engagement with local and national relevant stakeholders including experts was undertaken, and their feedback were considered when designing appropriate mitigation measures.

49. **Analysis of alternatives**. The EA included an analysis of alternatives of the proposed development options based on three aspects, strategic (with or without project); planning (location, tree cutting, proximity to critical environmental resources, and connectivity); and technology considerations. Overall, the ‘with project' scenario is considered the better option as it will (a) improve the freight transportation efficiency, thereby reducing environmental impacts; (b) substantially reduce the GHG emissions, in part fulfilling India’s Nationally Determined Commitments by 2030; (c) reduce fuel requirements and transport of large quantity of fuel from distant ports, saving emissions and pollution; and (d) improve the socioeconomic conditions. With the already saturated rail and road networks, inland navigation will reduce pressure on land acquisition (especially in the case of agriculture and forestland) and tree cutting for expanding other modes of transport. With respect to planning of facilities such as terminals, and the

navigation channel within the river flow zone, all possible locations upstream and downstream on either banks were studied, and sites and channels that avoid most of the local environmental issues were selected. Additionally, the operational requirements, including avoidance of barrage, speed of vessel, and so on, were introduced to minimize impacts on protected aquatic areas. On the technology side, alternatives were studied, and best technology choices were made, such as low-draft vessels to avoid dredging, as much as possible, intended switch to compressed natural gas as fuel for the vessels, zero discharge and green buildings for all terminals and repair facilities, clean and efficient vessel fleet, and state-of-the-art RIS—all aimed to minimize EHS risks or maximize the environmental enhancement opportunities. Even after avoiding and/or minimizing impacts, there will be residual anticipated impacts on ecological and aquatic environment, but these are low to moderate and manageable with implementation of the EMPs.

50. **Impacts on critical environment resources.** Wild life sanctuaries, namely Kashi Turtle Sanctuary (Varanasi, U.P.) and Vikramshila Gangetic Dolphin Sanctuary (Bihar), lie within the NW-1 stretch. The Hilsa Sanctuary, notified under the Fisheries Act with the aim of increasing productivity of Hilsa fishes, is located at four locations in the West Bengal stretch. Apart from this there are six important bird areas, including Udhwa Bird Sanctuary located within the influence area of the NW-1 stretch. The Gangetic Dolphin (Schedule-1 species) and freshwater turtle species are present in the river stretch of the NW-1. Kashi Turtle Sanctuary and Vikramshila Dolphin Sanctuary are identified as restricted 'no go' areas. No construction or dredging intervention is proposed in these areas to avoid potential impacts. Nonpermanent structures such as bamboo *bandals* will be used to channelize water flow and to avoid any dredging in these 'no go' areas. These measures, in addition to others, described in subsequent paragraphs, are designed to protect the natural habitats and conserve the biodiversity of the entire NW-1.

51. **Natural Habitats (OP/BP 4.04).** The policy is triggered because there are a number of environmentally sensitive areas within the influence zone of NW-1, including wildlife sanctuaries (Kashi Turtle Sanctuary at Varanasi; Vikramshila Dolphin Sanctuary, Bihar, Udhwa Lake Sanctuary in Jharkhand), and reserve forests in Bethuadahari and Bahadurpur. Construction of terminals at Sahibganj and Varanasi might have affected aquatic habitats located within these areas, and therefore the terminal locations were shifted to avoid such impacts. For similar purposes, no intervention, including dredging, is proposed in eco-sensitive areas of Kashi Turtle Sanctuary and Vikramshila Dolphin Sanctuary, and barge movement will be restricted to minimum speed (5 km per hour) and safe distance from the habitats to avoid any negative impacts or degradation of these habitats. The project will monitor chances of accidental spills on ecological resources through EMP monitoring and third-party audits. No dredging shall be carried out in the winter season (November to February) along the Mokama Taal to minimize the impact on aquatic species and avifauna. The EMP includes measures where dredging operations should not be carried out during the breeding and spawning season of the valued aquatic species, including major fish species. Vessel traffic will be avoided in these sanctuary areas during nights and during the basking hours of the key species. These measures are in addition to several other measures planned and designed to conserve the aquatic biodiversity of the Ganga.

52. **Impacts on terrestrial and aquatic ecology.** There are no major endangered species within the terrestrial zones along NW-1; however, several migratory bird species are found at some locations. The higher aquatic vertebrates present in the NW-1 stretch are the Gangetic Dolphin and freshwater turtle. Dredging has the potential to have short- and medium-term impacts on aquatic

biodiversity, as it will alter the riverbed and the diversity of benthic habitat. In some cases, release of toxic pollutants in the dredge material could affect fish species. Vessel engines could also cause suspension of fine sediments, leading to reduced light for plant and algae growth. To mitigate these issues, the EA proposed restricting dredging in biologically sensitive locations during the breeding and spawning season of fishes and the landing season of migratory birds. Nonpermanent structures such as bamboo *bandals* will be used to channelize water flow and reduce the need for dredging wherever possible. The adoption of an assured-depth contract will also incentivize reduced dredging. Whatever minimal dredging is required will be done mainly with the low-intrusion water injection method wherein the dredged material is transported horizontally along the waterbed and the sediments are retained within the ecosystem. This planned low-intrusive dredging, therefore, will not have any significant residual impact on the aquatic fauna. Impact of barge movement on aquatic ecology arising due to spillage of material and collisions will be managed by restricting the speed of vessels in sanctuary areas to 5 km per hour and by installing propeller guards to protect aquatic wildlife. Model studies for underwater noise from dredging indicated that the noise impacts attenuate rapidly in water, and behavioral studies of major species of dolphins, turtles, and fishes suggest that they are adept in moving away from the sources of excessive noise. Given that the width of the navigation channel at any place is only a fraction of the width of the river and due to rapid attenuation of noise generated along the navigational channel, the river will be able to provide shelter to the aquatic animals from excessive noise. Even then, all cargo vessels will have to install sound mufflers to reduce underwater noise, and in no case should exceed 140 dB, which is within the tolerance levels of turtle and dolphins. All dredgers will be maintained properly to reduce noise during the annual maintenance dredging. All vessels will be plying in the designated navigation channel, where the RIS will incorporate the baseline data collected during EA to avoid coming close to any spawning and breeding grounds of fish and other important aquatic species.

53. IWAI will undertake two additional services contracts:

- A study on the details of nesting, breeding, foraging, and spawning grounds of dolphins and the benthic fauna and fish stock, which are a critical part of the ecosystem of the Gangetic Dolphins in NW-1 and monitoring of and risk assessment from project activities such as dredging and barge movement. As required, this study will recommend additional specific measures for protection of the Gangetic Dolphins during the implementation and operation period.

- As part of the environmental enhancement measures in the project (specifically, 'support for fisheries and fish nursery development'), a program for training and awareness support to fisher folk to encourage adoption of better and more appropriate fishing techniques and to minimize the economic impact to fishermen through increased barge movement on NW-1. The training and awareness program will be delivered through reputed expert agencies, such as the Central Inland Fisheries Research Institution.

54. **Impacts on water quality.** River water quality in the stretch between Haldia and Allahabad has been designated as best use Category D, which is applicable for propagation of wildlife and fisheries. The concentration of heavy metal and pesticides in riverbed sediments was found low and is within acceptable limits except for cadmium which is slightly above the prescribed limit in Uttar Pradesh (and in this stretch, water-injection dredging should not be

undertaken even in in future to avoid potential release of such cadmium-contaminated bed sediments). Theoretically, there are several environmental risks associated with maintenance dredging undertaken to maintain LAD. These include increased turbidity, reduced light transmittance, reduced dissolved oxygen, changes in water temperature, and release of heavy metals/chemicals from the riverbed. Dredging activities contemplated in the project are not expected to cause significant long-term effects on water quality, and the release of sediments (being non contaminated except for the Allahabad-Varanasi stretch, which is upstream of the project) is expected to be confined to a small area around the disposal sites and near dredge locations. Dredging will not be carried out during the lean season, as siltation is high and the water current is low. Dissolved oxygen levels were seen to drop suddenly for a maximum of 2 minutes at the dredge plume arrival point, which regains the pre-intervention dissolved oxygen levels within a maximum of 3–4 minutes as the plume passes. Turbidity of water increases substantially close to the dredging point but it reduces with distance and almost normalizes at a distance of 700 m from the dredging point. Increased river traffic and vessels expected from project investment may also increase the risks of improper discharge of waste, ballast waters, and oil spills, with associated impacts to aquatic species, unless managed appropriately. The risk of accidents may lead to spillage of the commodities transported including oil, which may affect the water quality of the river. Discharge of wastewater from terminal facilities and vessels will be regulated according to the GRIHA standards, EMP measures, the Control of Water Pollution Act (1974), and all discharge will take place at designated barge maintenance stations (where there will be adequate facilities and infrastructure for waste treatment). The EMP has incorporated the measures for prevention of water pollution from terminals, dredging, and barge operations. Mitigation measures will be applied to minimize and manage these impacts, and continuous monitoring will evaluate the effectiveness of the planned mitigation and management measures. All maintenance and repair works of vessels shall be carried out at designated locations only. A state-of-the-art RIS will decrease the chances of accidents and also provide information about available LAD compulsorily to all commercial vessels using the waterway, to ensure that no collisions occur.

55. **Impact on sediment transport.** A large meandering river system such as the Ganga is a highly complex dynamic ecosystem due to its high levels of sediment transport. The river has large water-level fluctuations and unreliable water depths, leading to unavailability of adequate depth suitable for navigation. About 95 percent of the sediment load is delivered during the monsoon so sediment loads are very sensitive to variable high flows. The high silt loads (700 million tons per year at Farakka) lead to shoal formation and in many cases, cause splitting of the main channel. Addressing these challenges would require structural measures within the water body, and if these are not designed well, could lead to environmental and ecological implications. The maintenance of navigational channels in all the stretches is a complex task due to large variation in discharge (where peak flows are very large and low flows very low), unstable morphological condition of bank and bed, heavy sediment load, continuous braiding, and meandering of the river. The project aims to maintain a navigation channel of 45 m width and side slopes of 1:10 stretching between Haldia and Varanasi. Maintenance dredging is an essential continual activity for the navigation channel. To meet the objective of the project, IWAI wanted to maintain LAD of 3 m in the entire NW-1 but optimized the dredging requirement for different stretches Haldia to Farakka (3 m, naturally available LAD); Farakka to Barh (3 m); Barh to Buxer (2.5 m); and Buxer to Varanasi (2.2 m). The total dredge volume per year is estimated to be 11 million m^3. Different technologies for dredging have different environmental impacts, which were considered while selecting type of dredgers. These include (a) risk of sediment dispersal during excavation (most of the sediment

excavated should be captured by the dredger to minimize sedimentation); (b) risk of sediment releases from lifting (most of the sediment captured should be lifted efficiently to minimize the resuspension of sediments); and (c) risk of leakage from transportation. The EA includes a full discussion of the various dredging techniques and compares their relative performance on environmental management aspects and the EMP measures and standards to appropriately manage impacts because of dredging operations and disposal. Additionally, in the project, efforts will be made to reduce dredging quantity by installing *bandalling* and usage of low draft vessels. Sediment dispersal will also be minimized through usage of Cutter Section Dredgers (CSD) and water injection dredgers. Usage of silt or air bubble screens/curtains will also be explored to minimize the sediment release during dredging operations. Leakage detection of the sediment transportation pipe will be carried out regularly to prevent any sediment loss and water pollution at possible leakage locations. Disposal of dredge material within the riverbed is the preferred option, to minimize sediment dispersion and accretion. CSD dredgers will dispose the dredged volume sideways (maximum 200 m away from the 45 m wide navigation channel within the wide flow zone of the river, not exceeding 20 m downstream), and water injection dredgers will displace dredged material as little as possible. As a result, no longitudinal change in current/natural sediment flow is expected at any stretch of the river.

56. **Impact on air quality and noise.** Primary data collection revealed that air quality and noise were within permissible limits, though PM10 was higher at Varanasi, Patna, and Howrah. Barge operation will generate emissions; however, the barge-generated emissions are far lower than road and rail for transportation of the same quantity of cargo. New low-draft fleet will also gradually move to the use of LNG as fuel away from diesel. Operation of dredgers and barges generate noise and vibration; however, this is insignificant to ambient noise levels when compared to other modes of transport. Dredging operations will take place between 600 hours and 2000 hours, avoid dredging at night, and the technical specifications for dredgers have been specified to reduce noise levels.

57. **Impact on riverbank and riverbank structures**. Operation of barges causes waves, which can disturb habitats and may lead to bank erosion. However, these impacts are expected to be minimal and will be mitigated by restricting speed of vessels in narrow stretches (which are more prone to erosion) and sharp bends. Civil interventions, such as construction of terminals could have environmental implications during the construction stage, which may involve tree cutting, land acquisition, operation of construction vehicle/machinery, and removal of trees. These impacts have been minimized by careful analysis of alternative sites for such construction. The EMP contains measures for construction waste handling, site drainage, water sprinkling to suppress dust, storage and handling of construction materials, and measures to conform to the relevant pollution control requirements.

58. **Physical and Cultural Resources (OP/BP 4.09).** The influence area of NW-1 is dotted with archaeological, cultural, and historical sites, with the highest concentration in Varanasi. No activity in the project is expected to be sited within proximity of the protected area boundaries of these sites. All such areas of cultural and religious importance have been identified as part of the consolidated EIA. Impacts on any of these sites will be minimized during design and operation of the project. Given that there might be smaller, unprotected locally important cultural assets, which the EA did not identify (such as *kunds*, temples, and local shrines), for such cases, the EMP includes generic mitigation guidelines for (a) dredging operations; (b) dredge disposal; (c) barge

movement; (c) design and construction of terminals, navigation locks, and river training works; and (d) construction and operation of Ro-Ro jetties that provide necessary guidelines and management procedures and minimize any impact on these cultural assets. All these measures will be planned and implemented in consultation with and close involvement of local communities at all the selected locations. The EMPs for dredging and barge operations include dredge disposal requirements to be carried out at a minimum distance of 100 m from the riverbank and not be carried out at the location and time of key festivals. Dredging and barge operations that generate noise will not be carried out in the areas close to Ghats in Varanasi and a buffer of 2 km will be maintained for dredging during the time of religious gatherings such as the *Chhath* and *Kumbh* festivals.

59. **Induced impacts in the long term.** The surrounding of the project (that is, either banks of the Ganga River) is densely populated, with some 67 cities and large towns located on the banks of the river. Consequently, the transport network is also dense, albeit the capacities are not sufficient to cater to the expected rise in traffic—both passenger and goods in the short and medium term. The World Bank has financed capacity augmentation national highways parallel to the river and a large number of projects improving the state highways and rural roads (especially in Uttar Pradesh and Bihar) and is currently financing the Eastern Dedicated Freight Corridor Project (aimed at improving the capacity and efficiency of goods movement by rail), which is also parallel to the waterway. In addition to the World Bank-financed projects, a larger number of road and rail improvement or capacity augmentation projects were also implemented in the last decade and a larger number of such projects are being implemented and planned. Owing to this improvement in the transport network, the pace of urbanization and industrialization has increased in the recent years, and in future, such urban industrialization and consequent land-use changes are expected to be rapid. Overall, the nature of agrarian economy in the districts abutting the river is changing in favor of a more manufacturing and service industry-driven economy. It could be noted that the rapid urban-industrialization (and associated land-use changes) are happening irrespective of river transport.

60. During operation of the project, it is expected that further improvement to navigational reliability and safety will induce increased river traffic and may induce similar improvement in river transport in tributaries and distributaries of the Ganga, which in turn may induce urbanization of the additional multimodal transport nodes. Although the project mainly aims at goods traffic, in future the demand for passenger transport, including tourist transport, will also increase. On the beneficial side, the medium- and long-term impacts will involve additional livelihood and employment opportunities, not only from the river transport but also from the induced urban industrialization. The benefits will also include further additional reduction of GHG emission. On the negative side, there will be increased risks of wastewater generation, ballast waters, and oil spills—with associated impacts to aquatic species and on the livelihood of the fisher-folk. With increased traffic, especially induced in tributaries with narrower flow zones, there would be risks of bank erosion from wave actions caused by vessels, and capital and maintenance dredging in those tributaries might change the dynamic river morphology and associated decrease in abundance and diversity of benthic and aquatic communities. In the project area (which does not include the tributaries), such risks are limited. The risks are also further limited because of the operation of the Namami Gange Program (National Program for Clean Ganga, partly financed by the World Bank NGRBA Project), which aims to clean up the Ganga, avoid any further pollution load, and restore the natural flow and quality of the Ganga River. This project and all other

projects—current or upcoming—need to conform to the aims of the Namami Gange Program and therefore will need to comply with a strict pollution control regime.

61. In the long term, the currently envisaged multimodal terminals and repair facilities may need expansion. It could be anticipated that more terminals will come up, even in the medium term. These will have the potential to change the local land uses. However, given that the both banks of the Ganga River are already densely populated; that there are no significant large continuous stretches of natural forests or protected terrestrial areas; and that sufficient number of cities, towns, and large villages are located on both banks (where these terminals could be located), the chances of destruction of natural forests or wetlands or protected areas are low. It is highly likely that the land-use changes will be about agricultural areas or fallow lands converted to commercial transport infrastructure land uses.

62. **Projects on International Waterways (OP/BP 7.50).** The World Bank's Operational Policy OP 7.50 is triggered because project activities will take place on the Ganges[17] which is a transboundary river that flows through the nations of India, Nepal and Bangladesh. The World Bank, on behalf of India, notified the Riparian countries- China, Nepal and Bangladesh- in June 2016. The Bank has determined that due to the location and nature of project activities, the proposed project will not cause any appreciable harm to the interests of the other riparians, nor be appreciably harmed by the other riparians' possible use of the Ganges.

63. All planning and design considerations for the proposed infrastructure along NW-1 have been aimed at fully avoiding (or absolutely minimizing) potential adverse transboundary effects (which could have been impacts such as reduction and/or modification of flow of water or sediments and increased water pollution). Any instances of flow modification have been avoided as the project (a) will not have any barrages, dams, or other water retention structures; (b) does not include any water diversion or consumptive use; and (c) does not involve any construction on the flood/flow zones of the entire river so as to impede any flood flow.

64. The infrastructure of the project (the multimodal terminals and the barge repair facilities) are designed as 'zero discharge' infrastructure. Licensing conditions for the vessels specify that all vessels must not be discharging any wastewater, bilge water, or any other pollutants in the river and should have inbuilt mechanisms in the vessel itself to ensure this (they will be able to dispose the waste at the terminals, which have facilities for treatment of bilge water and wastewater). All terminals and vessels will have equipment and training to contain and quickly clean any accidental spillage. These would ensure that the project operates within the overall aim of the Namami Gange Program, as well as avoids any chance of polluting the trans-boundary river.

65. The project's annual maintenance dredging program involves a maximum dredge volume of 11 million m^3 along NW-1, which is less than 1.5 percent of the annual sediment volume of 750 million m^3 recorded at Farakka. The LAD available at Farakka is already 3 m, thus reducing the requirement of annual dredging at this point, and it will mainly be focused upstream. Further to this, to reduce the dredge quality, the project has opted for low-draft vessels (less than 3 m) to minimize dredging quantities.

[17] The NW-1 is a 1,620 km stretch on the Ganga River system between Allahabad and Haldia.

66. The project has also proposed cutter section dredgers, which prevent sediment loss and resuspension along the navigation channel and minimize impacts with regard to turbidity and water quality. Dredge disposal will take place downstream of dredge locations in flowing water 200 m away from the 45 m wide navigation channel within the wide flow zone of the river, normalizing at 700 m from the dredging point, and preventing accumulation of sediments. Dredging also has to be avoided at specific periods, and disposal has to be carried out as mentioned in the EMP. As a result, no longitudinal change in current/natural sediment flow is expected, at any stretch of the river. No dredging is expected to occur immediate upstream of Farakka Barrage (which itself is 16.5 km upstream of the international border, and the route of the NW-1 is the feeder which is further upstream of the barrage) and in no case, the temporarily increased turbidity is expected to dispersed across the international border. In conclusion, the World Bank has determined that due to location and nature of project activities, the proposed project will not cause any appreciable harm to the interests of the other riparians, nor be appreciably harmed by the possible use of the Ganges by other riparians'.

67. **Institutions and capacity building**. The PMU within IWAI is staffed with an environmental specialist; field units in the states will also have designated specialists to coordinate with the PMU on monitoring and reporting and ensuring effective implementation of EMP and regulatory compliance by contractors (including complying with all pre-conditions specified in any applicable regulatory license/permission). IWAI will provide half-yearly reports to the World Bank with respect to safeguards compliances and EMP progress; it will also develop EHS guidelines and protocols for navigation operations. A capacity-building and training program has been prepared, which includes training on environmental management, regulatory compliance, and safety aspects for staff of the Environmental and Social Cell of the PMU, contractor's staff (laborers and engineers), TSSC consultants, and IWAI.

68. **Monitoring.** The overall responsibility of environmental monitoring will rest with the central PMU, which will carry out the due diligence required to ensure the project is meeting all specified requirements of the EA and EMP. The PMU environment and social experts will also perform site visits during the various stages of implementation to verify whether the EMPs are being adequately implemented. A report covering the environmental management issues and compliance with the EMP should be included in the overall site visit report. The designated environmental and social specialists will prepare quarterly and annual reports on the key steps, outputs, and results of the environmental management actions taken for all investments throughout the project cycle. The IWAI field units will also report on environmental performance with respect to local investments, including any critical mitigation actions taken and any significant environmental or social incidents. The PMU will include an environmental and social safeguards section in every quarterly progress report prepared for the World Bank. This will specify details of any environmental and social issues that have occurred during the reporting period and the actions taken to resolve them, trainings conducted, and progress of implementation of the overall EMP. Reports of the independent environmental audits will be submitted to the World Bank within three months of completion of the second and the fourth year of the implementation period.

69. **Public consultations and disclosure.** Formal and informal consultations have been undertaken with all concerned stakeholders, including officials of line government departments, experts, academia, village panchayats, and nongovernmental organizations. Consultations were carried out during the impact assessment process to identify the concerns, which were duly

addressed through appropriate mitigation measures and also undertaken after preparation of the draft EA report, to assess the adequacy and acceptability of the proposed mitigation measures and management plans. A draft consolidated EA has been finalized subsequent to the public consultations and it describes the issues raised and how they have been responded to and addressed (Chapter 6 of the consolidated EA).

70. The draft EA documents (the CIA, the consolidated EA, stand-alone EA/EMPs for Farakka Lock, Sahibganj, Varanasi, and Haldia terminals, and the Executive Summary) were submitted to the World Bank's InfoShop on June 2, 2016. All these EA documents along with an Executive Summary in the vernacular Hindi and Bengali was disclosed in-country on May 22, 2016. The final versions of the EA documents were disclosed in the World Bank's InfoShop, and in-country after minor revisions, based on stakeholder feedback received, on October 24, 2016, before appraisal of the project. Any new investments prepared that require a safeguard instrument such as an EA or EMP will also follow World Bank operational policy and procedures for disclosure and public consultation.

Social Safeguard Management

71. The project supports improving the navigability of NW-1 between Haldia and Varanasi for which facilities will be developed for increased cargo vessels. Road and rail connectivity will be provided in a phased manner as demand and usage pick up. One barge repair facility and five Ro-Ro crossings to promote cross-river movement of freight are also proposed. The project would also support preparation of designs for a modern passenger ferry system in approximately 18 locations in six cities (Allahabad, Varanasi, Patna, Munger, Haldia, and Kolkata), which would eventually be implemented and operated by the four participating states. The project would also support construction of about 40 km protection works to protect unstable and erodible banks and retain the riverbank at sharp bends.

72. The capacity augmentation primarily proposed includes development of the infrastructural facilities, that is, river terminals with appropriate cargo handling capacity and equipment for facilitating integration with other modes of transportation, one navigational lock, provision of navigation aids, RIS, Ro-Ro jetties, bank protection/slope protection, and so on.

73. **RPF.** Consultation was carried out to prepare the RFP and the RAP/SMP in accordance with the World Bank's Operational Policy on Involuntary Resettlement (OP 4.12) and National Law, RFCTLAR&R Act 2013. Therefore, the RPF has been prepared mapping the laws and regulations and procedures relating to the agencies responsible for implementation of resettlement and compensation. The RFP provides a brief description of the project and components for which land acquisition and resettlement are required; relocation requirement, estimated population displacement, and likely categories of displaced persons; eligibility criteria of various categories of affected and displaced persons; analysis of legal framework; valuation methodology; specific measures for gender and vulnerable community, mechanisms for consultations, and participation; institutional mechanism; implementation process and linking resettlement implementation to civil works; description of grievance redress mechanisms and citizen feedback; and a monitoring and reporting mechanism.

74. The World Bank's Operational Policy on Indigenous Peoples (OP 4.10) is not triggered.

75. **SIA.** Even though the SIA at Sahibganj was exempted according to the rules of the government of Jharkhand, the SIA was undertaken based on the World Bank requirements, and an SMP/ RAP has been prepared for the area initially notified by the district authorities in consideration of the applicable national laws and rules. The SMP/RAP has been prepared in consultation with stakeholders at the planned sites of the three freight terminals and at the Farakka new navigation lock. For the remaining two terminals, at Kalughat and Ghazipur, the SIA will be undertaken to prepare RAPs during the first year of project implementation. For the sixth terminal (around Kalyani) and for the remaining subprojects the SIA will be undertaken during 2018.

76. **Impact on land.** The assessment indicates that approximately 80.148 ha of land is required for the identified subprojects at four locations. At Haldia terminal site and Farakka ship lock site, 39.54 ha of government land is transferred for use in the project and no private land would be acquired. Land acquisition of 33.607 ha is limited to Sahibganj for terminal (Phase I), Road Over Bridge (RoB), and road connectivity. However, acquisition proceeding has been initiated for 45.02 ha. Land at Varanasi was acquired in 2010 under the Land Acquisition Act (1984) and additional 1.415 ha of private land will be purchased for road connectivity with NH 7. Land required for terminals at Ghazipur and Kalughat is estimated at 10 ha. This land will be acquired, for which the SIA will be carried out during the first year of project implementation. The increase in cargo movement may lead to limited but adverse impact on fisher-folk at sensitive locations. The Central Inland Fisheries Research Institution is undertaking an ESIA to prepare appropriate mitigation plans, if required.

77. **Impact on people.** The SIA indicates that people will be adversely affected at Sahibganj. At Sahibganj, 275 will be adversely affected, out of which 235 will be relocated and the remaining are absentee landlords. However, at Farakka, the detailed design will establish the scale of impact on livelihood of people and mitigation measures will be prepared, if required. As the project will displace 235 residential structures at Sahibganj, site planning and development for the relocation of the 235 affected families has been initiated by the district administration. All project-affected families have been consulted by the Additional Collector and the District Land Acquisition Officer (DLAO) and the families have consented to relocate to the resettlement colony.

78. **Stakeholder consultations.** Group discussions were conducted at all four identified locations during September–November 2015. A range of stakeholders, including villagers, municipal officials, fishermen and other users of the river in the neighboring villages of the project sites, were consulted. Issues regarding the project's impact, livelihood opportunities in the neighboring villages, and the impact on fish catch were some of the major concerns raised at Farakka, Haldia, and Varanasi. At Sahibganj, a formal public consultation meeting was held and the issues raised by the project-affected families included the quantum of compensation for structures and trees and the relocation facilities that would be provided. These were jointly addressed by officials of IWAI and the district administration, who disclosed the valuation method for computation of compensation for land, structures, and trees and provided details of the relocation site.

79. **Impact on gender.** Findings of the SIA carried out at identified locations reveal that a total number of 642 women are affected at Sahibganj and 16 women-headed households have been identified. Specific focus group discussions were organized to consult them to provide information about the project and understand their concerns with the project and any specific needs that need

to be addressed. In accordance with the provisions of RFCTLAR&R Act 2013, women will have 'joint title-holder' to alternate houses. Women from project-affected families will be encouraged and counselled to take on community-building activities in the resettlement colony. The needs of these women-headed households will be given priority while providing support during relocation. Community infrastructure initiatives in neighboring areas of terminal locations (particularly in Sahibganj and Varanasi) such as construction of toilets and streetlights shall be considered upon further consultations and upon availability of budgetary allocations. Budget for various activities in the Gender Development Plan is included in the cost of the RAP/SMP.

80. **Impact on vulnerable groups.** Social categorization of affected families living in the affected area, as presented in table 3.5, reveals that out of total 235 affected families, 206 (87.66 percent) are from other backward classes, 20 (8.51 percent) from scheduled caste, 7 (2.98) percent are from general category, and 2 (0.85 percent) from scheduled tribe.

Table 3.5. Social Category of Affected Families

Village	Social Group					
	ST (Hills)	ST (Plain)	SC	OBC	General	Other
Samda Nala and Rampur	0	2	20	206	7	0

Source: Field Survey.

81. Special assistance for scheduled caste and scheduled tribe according to Section 31 and Second Schedule of RFCTLAR&R 2013 has been budgeted and included in the R&R scheme prepared by the district administration. Support to these families during relocation and special counselling on livelihood enhancement measures will be prioritized.

82. **Livelihood restoration.** Consultation and counselling sessions will be facilitated by the R&R team, particularly with women, to ensure effective usage of the compensation and R&R assistance received in accordance with the RFP. Dovetailing government schemes such as *Pradhan Mantri Kaushal Vikas Yojana* will be facilitated. Community consultations will be ongoing to assess and identify training to enhance skills for employment opportunities. Moreover, consultation with habitations abutting the facilities will be carried out to implement basic infrastructure to improve sanitation and streetlights for safety and security.

83. The SIA and RAP/SMP will be prepared for other subprojects such as terminals at Ghazipur, Kalughat, passenger terminals, Ro-Ro terminals, and access roads in accordance with the RPF that complies with the World Bank's OP 4.12 and RFCTLAR&R Act 2013.

84. **Institution and capacity building.** A social development specialist is hired at the PMU for overall coordination of acquisition and R&R in the four states. A livelihood expert and two social officers have been mobilized for the PIU at Patna and Calcutta. IWAI will hire a land acquisition facilitator and an MIS analyst who will operate from field locations. In accordance with the RFCTLAR&R Act, 2013 the respective state governments have set up the institutional mechanism at the state and district level for land acquisition and resettlement and rehabilitation. The Resettlement and Rehabilitation Authority has been set up at the district to address appeals related to compensation, R&R benefits, and other provisions of the act. In addition, a capacity-building plan is prepared for training all implementing partners to ensure compliance with national

laws on acquisition, resettlement, and rehabilitation and labor standards and World Bank Operational Policy (OP 4.12) on Involuntary Resettlement.

85. **Grievance management.** Complaints can range from resettlement and rehabilitation and grievances pertaining to construction-induced impacts, and so on. The state government according to Section 51–67 of the RFCTLAR&R Act 2013 delineates the responsibilities of the state government in terms of establishing an R&R Authority and in determining the Collector's responsibility in disputes arising because of disbursement of compensation and R&R assistances. Section 60 of the said act delineates that the R&R Authority will have the same powers as that of a civil court under the Code of Civil Procedure 1908 in matters pertaining to land acquisition. The R&R Authority is the designated authority to handle any disputes and grievances related to land acquisition and relocation.

86. In addition to this, the CPGRAM system, a common online portal hosted by the Department of Administrative reforms and Public Grievances, GoI, is the established and functional grievance redress mechanism appropriated by IWAI. Citizens and aggrieved parties can lodge a complaint or a grievance to be redressed by IWAI and the project authority through the CPGRAM online portal. Grievances are forwarded by the parent ministry (Ministry of Shipping) to IWAI and JMVP through the portal and timelines are allocated for the redress of each complaint. Each grievance is monitored by the parent ministry up to its resolution. To ensure access to women and vulnerable, the system will be augmented with a toll-free number, for which a detailed workflow with key officers involved in the process are provided in the RFP. A grievance redress officer will also be mobilized to receive complaints and tracking grievances.

87. **Citizen's feedback.** Feedback is solicited through a three-structured platform to disseminate information, consult, and respond on the actions taken to complete the cycle of citizen engagement. This includes (a) workshops with identified common interest groups; (b) a module available on the IWAI website where citizens can register their suggestions and seek replies and feedback; the feedback generated is monitored by the Electronic Data Processing (EDP) cell and the nodal officer for addressing the feedback is the Secretary, IWAI; and (c) outreach program for the vulnerable community adversely affected by the project intervention.

88. Additionally, a separate website for the JMVP is being planned. News, updates, minutes, and highlights of key consultations pertaining to the project will be put up regularly on the website of the JMVP. The website will also have an option of providing feedback in the form of queries and comments and will be processed by the communication team at the Project Management Unit (PMU).

89. **Monitoring and evaluation.** IWAI will be responsible for the overall monitoring and supervision. ICT tools will be developed for 'real-time' flow of information to track progress. Quarterly progress reports will cover compliance of social safeguard issues, including tracking of grievances and compliance with labor standards. An independent agency will monitor and evaluate the social development outcomes at midterm and end term of the project.

90. **Disclosure.** The disclosure dates for various social safeguards documents are presented below.

Table 3.6. Disclosure Schedule

India - First Phase of Capacity Augmentation of the National Waterway-1 Project	IWAI - website	World Bank - InfoShop
Draft Consolidated SIA and SMP/RAP (English)	May 20, 2016	June 2, 2016
Draft Consolidated SIA and SMP/RAP (Executive Summary Local Language)	May 20, 2016	September 2016
Final RPF (English) Final RPF (local language)	October 25, 2016 December 8, 2016	October 26, 2016
Final Consolidated SIA and SMP/RAP (English) Consolidated SIA and SMP/RAP (Local Language)	October 25, 2016 December 8, 2016	October 27, 2016

Annex 4: Implementation Support Plan

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

Strategy and Approach for Implementation Support

1. The first year will focus on (a) completing procurement of key contracts; (b) setting up systems for project implementation, including project reporting templates, monitoring and evaluation formats, project Designated Account and fund flow processes as well as FM reporting templates; and (c) getting staff trained on the World Bank's procurement, FM, and safeguards systems and policies.

2. The project has significant procurement, technical/engineering, and safeguards aspects, and therefore, at least one full-time procurement staff will need to be dedicated to the supervision of the project, as well as half time of an IWT specialist, a dredging expert, a river port expert, a social safeguards specialist, and an environmental safeguards specialist. Support from the Climate Change, Climate Finance, and Jobs CCSA teams, Trade Facilitation staff, and gender specialists will also be required during all years of project implementation.

3. IFC advisory services have been appointed as transaction advisers for identifying opportunities for private sector engagement in the IWT sector.

Implementation Support Plan

4. The various activities needed for implementation support would require the following resources:

Time	Focus	Skills Needed
First 12 months	• Completion of procurement for key contracts, including review of ToRs and designs, and initiation of selected works and studies • Setting up FM and disbursement systems • Development of project management and monitoring and evaluation manual and systems	• TTL/project management • Co-TTL • Procurement • FM/accounting • Environmental specialist • Social specialist • Infrastructure finance specialist • GAAP/citizen engagement • Gender expert • Trade facilitation/competitiveness • Supply chain/jobs expert • IWT expert • Dredging expert • Bathymetric and hydrographic survey expert • River ports expert
12–84 months	• Procurement of contracts for components identified for later phases • Review and finalization of designs • Initiation of selected works and studies • Contract management • Project management • Monitoring and evaluation	In addition to all of the above skills in Year 1, technical skills in IWT training needs and institutional development

Time	Focus	Skills Needed
	• Environmental and social safeguards monitoring • Climate finance assessments	

Note: GAAP = Generally Accepted Accounting Principles.

Skill Mix Required

Skills Needed	Number of Staff Weeks per Year	Number of Trips per Year	Comments
TTL and co-TTL / project management	20	2	Full time split between two people
Procurement	15	3	Half time of local consultant; 25 percent of staff time
FM	4	2	Providing support in FM due diligence of the project
Environmental safeguards	16	3	Intensive monitoring for high-risk project and extensive scope
Social safeguards	8	2	
Infrastructure finance specialist	4	2	Exploring private sector engagement opportunities and specifically supervising Ro-Ro development and operation concession
Citizens engagement/GAAP	2	1	To provide guidance on citizen engagement and GAAP monitoring efforts
Gender specialist	2	1	To mainstream gender considerations into project, including enhancing employment opportunities, and improving conditions for women on IWT
IWT expert	10	3	Significant time required for refining survey data, restructuring, and monitoring Performance Based Contract (PBC)
Dredging expert	10	3	
River port expert	10	3	To review river terminal ToRs, designs, and implementation, contract management
Jobs expert	4	2	To support jobs assessment and action plan

Note: GAAP = Generally Accepted Accounting Principles.

Name	Institution/Country	Role
IFC	World Bank/India	Transaction adviser for private sector involvement

Annex 5: Project Contribution to Reducing GHG Emissions

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

1. India is one of the more than 162 countries that made commitments to reduce carbon emissions at the Paris COP21 that was held in late 2015. In the INDC commitments toward climate change mitigation and adaptation goals, the transport sector features prominently. Transport-related emissions account for about 10 percent of India's net GHG emission but have been increasing at a very fast rate. With an existing, relatively low motorization rate of 18 percent, an extensive and congested road network, and an outdated vehicle fleet, transport emissions are expected to continue to increase. In the INDC, under 'Safe, Smart and Sustainable Green Transportation Network', the GoI has recognized that IWT has to be promoted, considering the fuel efficiency, environmental friendliness, and cost-effectiveness. The implementation of Jal Marg Vikas for capacity augmentation of the national waterway has also been explicitly noted. Facilitating a modal shift toward low emission freight systems is one of the key strategies for the achievement of a 33–35 percent mitigation goal by 2030, which aligns with the IWT development agenda. This presents an opportunity for IWT, as it is suited to the carriage of similar types of traffic to rail and is currently highly underutilized.

2. In addition to the general lower carbon footprint of IWT per unit of cargo carried, the proposed project interventions would support the introduction and operation of large commercial barges with a carrying capacity of 1,500–2,000 tons, while the waterway would be available for at least 330 days in a year. To promote transport operational efficiency, the project would support development of low draft and clean fuel (LNG) barges and include market development initiatives and measures to enhance logistics capability.

3. Based on the above, the proposed project would have significant impacts in reducing carbon emissions in three specific ways: (a) increased capacity and efficiency of the waterway system to carry larger volumes of traffic; the traffic would not only be because of growth as the economy grows but also traffic attracted from the relatively more polluting modes, particularly road transport; (b) use of larger vessels that are more efficient and have lower emissions per unit of cargo carried; and (c) promotion of innovation in vessel design by facilitating and promoting the adoption and use of cleaner fuel vessels.

Basis for the GHG Accounting

4. The accounting of GHG emissions from the project follows a model that was tested on a similar project—the waterway corridor in Bangladesh between Dhaka and Chittagong—in the South Asia Region. Baseline GHG emissions (that is, without project) are calculated based on the volume of cargo carried by each mode of transport, that is, IWT, road, and rail, on a per ton-km terms. The volume is then projected over the project period, based on annual percent traffic growth rate for each main type of traffic and for each mode. Data collected by market development consultants are used for this purpose. Using these, GHG emissions are calculated separately for each type of traffic and for each mode of transport. These estimates are conservative, as the positive contribution of vessel innovation on emissions is not included.

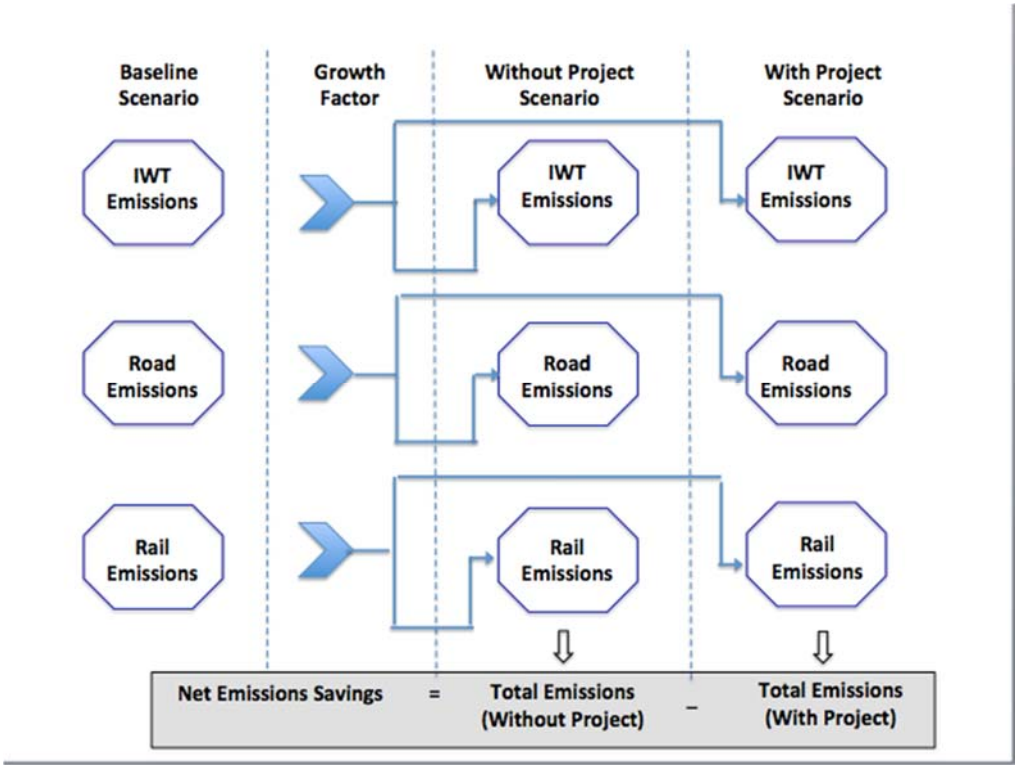
5. The impact of project interventions is then considered for the calculations. The project-

induced increase in ton-km transported through IWT is derived from the projected increase in number of annual navigable days (from 150 navigable days per year to 330, or 90 percent availability) resulting from project supported improvements (see annex 6), which will begin in Year 3 of the project and continue for the projected economic life of the improvements.

Analytical Framework

6. Figure 5.1 shows the analytical framework used for calculating the net GHG emissions savings due to this project.

Figure 5.1. Analytical Framework for Calculating the Net GHG Emissions Savings



7. As indicated in the figure, the baseline scenario includes the current/existing emissions in the three modes of transport. Using growth factors, the emissions for the 'without project' and 'with project' scenarios are calculated. The difference between the 'without project' and 'with project' scenarios is treated as the net savings in the GHG emissions.

8. To estimate CO_2 emissions, the with-project cargo ton-km and baseline without-project ton-km transported on the waterway are multiplied by a fuel coefficient (l/km), and then multiplied by an emission factor (ton CO_2/l). Different fuel coefficients are used for containers, dry bulk, and general cargo. A higher fuel coefficient is used in the with-project case compared to the baseline for bulk and general cargo, to reflect the expected increase in average size of vessel on the waterway. The emission factors used in the analysis are summarized in table 5.1.

Table 5.1. Parameters Used to Estimate GHG Emissions

Parameters	Road	Rail	IWT
Average traffic growth rate	0.85	0.9	1
Fuel consumption l/km	0.0048	0.0313	0.0089
CO_2 emission tons/ton-km	0.00016	0.000029	0.000031

Net GHG Emissions Savings

9. The net GHG emissions savings—calculated as the difference between the 'with-project' emissions and 'without project' emissions—are expected to continue increasing at the current rate over the first few years of project implementation. However, as the improvements begin to attract traffic, the growth rate should diminish and eventually reverse as the proportion of traffic carried by IWT increases. The savings in CO_2 emissions are estimated to average net 151,468 tons per year or a total of 4.5 million tons over the economic life of the project interventions.

Annex 6: Economic Evaluation

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

1. **The development objective of improving NW-1.** The PDO is to enhance transport efficiency and reliability of NW-1 and augment institutional capacity for the development and management of India's IWT system in an environmentally sustainable manner. The economic analysis seeks to determine whether the reductions in cost of current trade and logistics and the generation of new trade are worth the investment cost. It is therefore important that the economic analysis reflects the likely impact of the project on transport and logistics costs and the generation of additional trade volumes.

2. The analysis is important in several respects: (a) it helps provide a measure of the magnitude of flows of goods through the general corridor; (b) the characteristics of the goods provide an indication of the importance of different attributes of the logistics system to attracting traffic and its sensitivity to system changes; (c) it provides a general indication of the ideal locations of logistics nodes and platforms and the capability they should have to handle different types of goods (bulk, break-bulk, containerized, and so on); and (d) it allows analysis of first mile and last mile connectivity that is necessary to develop IWT as an important part of a multimodal logistics system.

3. There are three objectives of the economic evaluation, namely to

(a) Optimize the design of each of the project components,

(b) Ensure that the package of project components is the most appropriate in achieving the project objectives, and

(c) Ensure that the benefits of the sum of the optimized components is worth the investment and other costs that must be incurred to achieve them.

4. The calibration of the models used was based on detailed studies carried out as part of the preparation of the project and drew on findings and recommendations of specialized working groups of the GoI as well as international specialized bodies, particularly the PIANC.[18] The factors that were included in the economic analysis were operating costs and energy consumption coefficients for different modes of transport, efficiency gains from deployment of larger vessels and cleaner energy, capital development costs through the project, costs of infrastructure and system maintenance, vessel and vehicle operating costs, air pollution, emission of CO_2, noise pollution, soil and water pollution, accidents, and land occupation. The analysis was based on the volume of traffic increasing to 65 million tons per year by 2045.

5. A first step is to determine the nature of the current and expected future types of traffic and goods that use or could use the waterway. The determination is based on a value chain analysis of commodities flowing between and through the states served by the waterway. The value chain analysis was executed in three steps: first a review of various datasets, from previous studies as

[18] PIANC is a specialized international organization based in Belgium that advises on standards in the field of navigable waterway traffic on canals and rivers and in ports.

well as primary data collection from a wide range of stakeholders, among them the Kolkata Port Trust, IWAI, and commercial datasets; second, a construction of commodity traffic flow along the Eastern Transport Corridor and identifying their origins and destinations followed by drawing inferences on economic integration; and third, discussions with a focus group and interviews of representatives of shippers. The results of the data collection and discussions helped determine the major flows along and across the regions served by NW-1 and the factors that shippers prioritize in determining their likelihood to use an improved NW-1 transport and logistics system.

6. **Traffic volume estimates.** Agriculture is the single most important economic activity in the corridor along NW-1. It employs a large number of people and is one of the major sources of trade interactions between the NW-1 states and the rest of the country. The four states are net surplus producers of agricultural products, especially rice and wheat, which are traded with the rest of the country. Agriculture generates two main flows, inbound fertilizer, poultry feed, and agricultural equipment and outbound flows of foodstuffs (wheat, rice, sugar, vegetable oil, and so on). In addition to agriculture-related traffic flows, the region also produces a high volume of construction materials, especially aggregates, limestone, sand, and cement. In fact, most of the projected traffic in the future would be of construction materials, which are shipped to the major economic centers, including Kolkata, but also exported to Bangladesh. The other major flow is of feedstock for the numerous power plants that are located along the waterway. The use of IWT is one way of reducing the carbon footprint of the plants, at least during shipment of fuel. Another major source of demand is containerized cargo. The main containerized cargo flows are of industrial inputs and outputs (textiles, cars, carpets, motorbikes, and so on). There are also significant flows of mineral and industrial commodities (iron ore, fly ash, plastics, paper, and so on) flowing through the corridor as well as over-dimensioned cargo (ODC) for the mining and construction industries. Most ODC moves on the inland waterway. The proportions of the different types of traffic have an important bearing on the estimation of the expected impacts of the project, as described further below.

7. The economic analysis is based on estimates that the volume of traffic handled by NW-1 would be as shown in table 6.1. The traffic generation and attraction patterns were analyzed at the district level (figure 6.1). The figure shows the general flow of traffic across all modes in the corridor served by NW-1. It also shows the importance of the stretch between Haldia/Kolkata and Farakka as having the densest volume of traffic. The vicinity of Varanasi also shows a dense flow, especially by rail (highlighted red). The results show that there are a few major sources of demand for cargo flows, concentrated around Kolkata, the districts around Farakka, and the region around Varanasi. This is the main reason the project is prioritizing the stretch of waterway between Haldia and Varanasi.

Table 6.1. Project Traffic Volume

Year	2020 (Million tons)	2025 (Million tons)	2035 (Million tons)	2045 (Million tons)
Projected traffic volume	21.89	37.33	55.63	65.45

Figure 6.1. Traffic Flow in NW-1 Corridor, All Modes of Transport

Source: University of Stellenbosch, 2016.

8. **Terminal requirements.** The demand analysis, consistent with other studies on commodity traffic patterns in the Eastern Transport Corridor, found that there are 11 main types of commodities that require different cargo handling and storage requirements along NW-1. In the case of major dry bulk commodities, such as coal, stone, and fly ash, similar mechanized handling facilities are required for transshipment and storage and they can be unloaded/loaded at one particular terminal. A second category of goods is kerosene and Petroleum Oil & Lubricant (POL) that demand specific handling and storage facilities. Raw jute, jute textile, food grains, and sugar are similar types of cargoes with some features in common in that they are generally transported in sacks or bales and offloaded with the same type of machinery. They also require storage at facilities where they are protected from the elements. Containers need cranes and paved storage areas while ODC cargo would need special gear, either at the receiving facility or on board the vessel used in transportation. The characteristics of the cargo would therefore determine the design and equipment needed at the proposed terminals to be financed by the project.

Table 6.2. Capacities of Identified Terminals between Haldia and Allahabad

Name of Terminal	Land Area	Berth Size (m)	Type of Terminal	District Served
Haldia	10,319 m^2	200.0	Floating	Haldia
Botanical Garden Jetty	996 m^2	50.0	Floating	Haora
BISN Jetty	11,606.64 m^2	100.0	Floating	Haldia Port
G. R. Jetty1/Kolkata	14,606 m^2	216.0	Fixed RCC Jetty	Kolkata
Shantipur	8,000 m^2	100.0	Floating	Shantipur
Katoya/Katwa	Pontoon on waterfront	30.0	Floating	Katwa/Pakur
Hazardwari	Pontoon on waterfront	30.0	Floating	Murshidabad
Farakka	4,800 m^2	80.0	Floating + Fixed RCC Jetty	Farakka
Rajmahal	Pontoon on waterfront	35.0	Floating	Sahibganj, Jharkhand
Sahibganj	Pontoon on waterfront	35.0	Floating	Sahibganj, Jharkhand
Bateshwarsthan	Pontoon on waterfront	35.0	Floating	Bhagalpur, Bihar
Bhagalpur	10,000 m^2	35.0	Floating	Bhagalpur, Bihar
Munger	3.4 acres	35.0	Floating	Munger, Bihar
Semaria	Pontoon on waterfront	35.0	Floating	Semaria, Bihar, Arrah-Berhampur
Barh	—	27.0	Floating	Barh/Bihar, Bihar/Sharif
Patna (Gaighat)	3.24 acres	46.6	Fixed RCC Jetty	Patna, Bihar
Buxar	Pontoon on waterfront	35.0	Floating	Buxar, Bihar, and Bhojpur, Bihar
Ghazipur	Pontoon on waterfront	35.0	Floating	Ghazipur, Uttar Pradesh, Ballia
Rajghat (Varanasi)	Pontoon on waterfront	35.0	Floating	Varanasi, Uttar Pradesh
Allahabad	8.759 ha	35.0	Floating	Allahabad, Mirzapur, Chaundali

Source: IWAI 2014 and Rail India Technical and Economic Service (RITES) 2012

9. **Shipper preferences.** Interviews with shippers helped identify several system attributes that would need to be addressed to attract traffic to NW-1, several of which will be tackled through the project: (a) high tariffs; (b) delays due to congestion and check points especially on the roads; (c) poor orientation toward market requirements; (d) poor coordination between different system component operators, for example, between road and IWT or road and rail; and (e) lack of night operating capability, especially on IWT. All these constraints would have to be addressed for the system to attract an increasing share of new trade traffic. The design of interventions seeks to address several of these issues: (a) IWT using large vessels has lower unit costs than other overland modes of transport; (b) IWT makes it possible to ship high volumes of cargo at once, with minimal enroute interruptions to movement; (c) the development of new markets for IWT is very much part of modern IWT systems based on offering market-oriented services; and (d) the installation of navigational aids and RIS will make it possible to offer services round the clock. The expected impacts of these interventions are summarized in table 6.3.

Table 6.3. Expected Impacts of Project Interventions

Intervention	Impacts on Shippers/Users	Impacts on Vessel Operators	Impact on IWAI
Subcomponent A2: Fairway improvement and maintenance	• Reduced cargo transit time • Increased service	• Increased vessel usage • Increased vessel	• Increased certainty in maintenance costs • Reduced unit costs

Intervention	Impacts on Shippers/Users	Impacts on Vessel Operators	Impact on IWAI
	reliability • Reduced carbon footprint of cargo shipments	size	• Increased availability of waterway
Subcomponent A3: Bank protection works at selected locations	• Enhanced availability and reliability of fairway	• Increased vessel utilization	• Increased availability of waterway • Enhanced safety
Subcomponent A4: Rehabilitation of existing lock and installation of new navigational lock at Farakka	• Reduced delays at lock - reduced cargo transit time • Increased reliability of shipping services	• Reduced vessel delays and increased vessel usage	• Increased redundancy • Increased quality of service
Subcomponent A5: Cargo terminals (with appropriate equipment)	• Reduced cargo losses • Increased frequency of service • Reduced cargo dwell time • Increased mode choice combinations	• Reduced vessel time in terminal • Greater efficiency in vessel handling	• Increased market access • Increased volume of traffic

Table 6.4. Interventions and their Impacts

Intervention	Impacts on Shippers/Users	Impacts on Vessel Operators	Impact on IWAI
Subcomponent A6: Navigational aids including RIS, SAR, incident management systems	• Increased service availability and reliability • Reduced probability of loss of goods	• Increased vessel operating hours • Improved safety	• Increased service availability • Reduced recovery costs
Subcomponent B1: Improved investment climate for private sector	• Greater competition in services • Reduced costs • Increased efficiency	• Increased competition	• Increased market potential
Subcomponent B2: Vessel design innovation	• Reduced carbon footprint	• Improved vessel design • Increased opportunities for vessel renewal • Increased renewal costs • Reduced operating costs	• Reduced GHG emissions • Contribution to India's COP21 INDC commitments
Subcomponent B3: institutional strengthening	• Increased responsiveness of service providers • Increased utilization of IWT and lower unit shipment costs	• Enhanced regulatory capacity • Increased availability of skilled staff	• Enhanced capacity and capability

10. The summary of expected impacts suggests that the economic analysis can be carried out using two main variables, cost and time (and its variation). These are variables that are amenable to monetization and the use of standard cost-benefit analysis. In that case, the analysis can utilize a generalized cost function for trade flows (and passengers). For the purposes of evaluation, the

various impacts in table 6.4 can be grouped into four broad categories: (a) logistics costs impacts on shippers, (b) vessel operator costs, (c) reduced accident losses, and (d) reduced carbon footprint. Passenger time savings could also be included—in which case standard monetary values, based on a utility function, can be applied. In general, for transport infrastructure projects, the World Bank, in Transport Note No. TRN-19,[19] recommends that wider economic benefits should not be used to justify schemes that would otherwise fail in transport terms. Passenger time savings can therefore be assumed to translate into more time for other productive activities, leading in part to the assumed increase in traffic along the corridor.

11. For the economic analysis, it is important to test the economic viability of each component of the project. However, it is possible that the benefits of the package of measures for the system as a whole will be greater than the sum of those of the individual components. The economic analysis could be done for each of the above types of interventions (including for individual subcomponents such as for each terminal) rather than for the entire package of investments. However, at times, an assessment can be based on the entire investment, due to dearth of data for robust analysis of the individual components and second, there are indivisibilities, in that the various interventions are complementary and the results may not be realized as efficiently by focusing only on individual pieces. In fact, it is assumed that the benefits of the package of measures for the waterway as a whole can be greater than the sum of those of the individual components, given the interlinkages between them.

12. **Economic feasibility.** The transmission mechanism for the effects of the project can be traced as follows: changes in logistics costs will serve as a stimulus for the reorganization of economic activity outside of the transport sector. From the change, a manufacturer could change the source of inputs or destination of exports or relocate production, thereby reconfiguring the typology of supply chains. A retailer may centralize operations to serve a larger market area or farmers may change crops to a more marketable combination. In a network setting, such location decisions can then become much more complex to model. These are all examples of what is normally treated as induced traffic in transport projects. Also, it is important to acknowledge that corridor projects are incremental in nature. As is the case with the current project between Haldia and Varanasi, a network already exists. Under the circumstances, the transformational impact of the project would depend on the extent to which existing and new productive firms will alter the organization of their supply chains in response to project interventions.

13. Based on the above, the economic evaluation of the present project was executed as a two-step process, to test the economic feasibility of each of the components, mainly the infrastructure components followed by an assessment of the project as a whole. This was done for the three project components: (a) fairway improvements, (b) rehabilitation of existing lock and construction of new lock at Farakka, and (c) construction of multimodal terminals.

14. The main assumptions used in the economic analysis are as follows:

- Analysis is for Phase 1 development only, from Haldia to Varanasi.

[19] World Bank. 2005. *Projects with Significant Expected Restructuring Effects*. TRN-19. Washington, DC: World Bank.

- The base year is 2014–2015.
- An average rate of inflation will be 5 percent per year.
- The discount rate is 12 percent.
- The cost of diesel fuel would be INR 45 per liter.
- Fairway development would be over a period of seven years.
- The exchange rate as INR 66: US$1.
- Annual maintenance costs would average the Year 7 costs, as shown below.

15. The economic analysis was carried out for the total project cost of US$800 million, of which the GoI would contribute US$380 million, IBRD would contribute US$375 million, and the balance US$45 million would be financed by the private sector.

16. The flow of expenditures over the six years of project financing (Table 6.5)

Table 6.5. Flow of Expenditure

Item	Year 2017/2018	Year 2018/2019	Year 2019/2020	Year 2020/2021	Year 2021/2022	Year 2022/2023
Cumulative percent of total expenditure	12	28	44	60	76	100

Source: Howe Engineering Projects, 2016.

17. Based on the flow of benefits, the estimated EIRR of the project is 21 percent and the NPV is about US$735 million.

18. The above economic evaluation includes the following:

- Energy consumption by all modes of transport
- Vehicle and vessel operating costs
- Air pollution
- Emission of CO_2
- Noise pollution
- Soil and water pollution
- Accidents
- Land alienation

19. However, it excludes several other elements that should normally be included in any economic evaluation. A project such as this has impacts on several parties both during development and operational phases. The system is used for ferrying both passengers and goods and for the latter it handles domestic trade as well as regional and international trade flows. The impacts can therefore be determined in particular, from the perspective of the users and especially on their logistics costs.

20. **Logistics costs estimation.** The economic analysis can adopt a supply chain approach, which provides a convenient conceptual framework to disentangle logistics costs deriving from the sequence of cargo movements and subsequently assess the impact of regulatory or investment measures. Supply chain modeling is one of the simple approaches to assessing the likely impact of changes in transport systems on logistics costs. Such an approach is suited to situations where reduced uncertainty in time and cost through the implementation of the corridor components is considered important.[20] The shipper bears the costs of transport and logistics from/to the port and to/from warehouse or factory (of both containerized and bulk cargo).

21. Based on the model, the total logistics costs can be estimated as follows:

Logistics Costs	**=**	**Transportation Costs**	***(Costs incurred by shipping firms)***
	+	Moving inventory costs	*(tied up capital)*
	+	Delay Hedging Costs	*(induced costs to hedge unreliability inventory and warehousing costs, or shift to faster more expensive mode of transportation)*

22. **Moving inventory costs.** For simplicity, the evaluation was based on the following time linear formula based on the operational value of time and the mean lead time in transit:

$mobile\_inventory = m \times T_{mean} \times V$, where m is a cost per day of the mobile inventory.

23. Using this formula, the estimated logistics costs savings were estimated with an NPV of US$412 million over the 30-year horizon of the project. Shippers would therefore benefit directly from a reduction in tied-up capital during transportation.

24. **Hedging inventory to account for unpredictability.** Several recent studies have highlighted the importance of reliability and confidence of traders in the times and costs of transport. To take account of these in the economic evaluation of NW-1, measurement of the variability of time and cost should be included. This is easier stated than applied, because the variability of time and cost does not figure in the standard measures of economic benefit of a project—NPV or internal rate of return. However, as explained above, a model is feasible that uses variance in lead time to determine inventory costs for firms to reflect the holding of a buffer to hedge against delivery delays and the cost of stock-out exceeding the cost of warehousing.

25. Using the above formula, estimates of the costs and cost savings for the case with and without the project can be calculated.

26. **Carbon footprint.** GHG emissions have been estimated for the project, as described in annex 5. The estimates can be monetized using prevailing rates for a ton of carbon in the cap and trade markets. The World Bank guidance is that

- Economic analysis should be done with and without the social value of carbon, and
- The baseline estimate of social value of carbon should start at US$30 in 2016 and increase to US$80 in real terms by 2050.

[20] See for example, AFCC2/RI - East Africa Trade and Transport Facilitation project (P079734) and *Communauté Économique et Monétaire de l'Afrique Centrale* (CEMAC) Trade and Transport Facilitation Project.

27. Based on the guidance, the following values, as shown in table 6.6, were utilized for the monetization of the GHG emissions impact of the project.

Table 6.6. Social Values of Carbon Recommended for the World Bank Group in US$ per 1 metric ton of CO_2 Equivalent (in Real 2014 US$)

	2015	2020	2030	2040	2050
Low	15	20	30	40	50
Base	**30**	**35**	**50**	**65**	**80**
High	50	60	90	120	150

Source: Guidance note on social value of carbon in project appraisal, July 14, 2014.

28. The reduction in GHG emissions was monetized using the 'base' valuation in table 6.5. This translated into a monetary value equivalent to US$45 million over the life of the project.

29. The economic analysis considered the likely monetary effects of the project on fishermen along the waterway. While the project design aims to avoid characteristic aquatic habitats for fish and other species, it is likely that it may still affect fishermen who rely on it for their livelihood. A survey was carried out to determine the extent of the likely losses. It was observed that fishermen who are upstream are likely to be affected more than those downstream. Assuming INR 150 as the sale price of per kg of fish, the loss in monetary terms is worked out to be INR 37 in the lower stretch to INR 62 in the upper stretch per barge or per batch of barge movement when moving in a group. Overall, in the sample population, the decrease in monetary value in fish catch per kg was observed to be INR 0.75 in the lower stretch and INR18 in the upper stretch. In addition to this, a fisherman could incur a loss of INR 1,500 to 2,000 for a single instance (one-time loss) of damage of net due to entangling with a barge. As these effects can be significant to local fishermen, the project adopts mitigation measures to reduce the likelihood of events that may lead to losses, as described in annex 3. In addition, targeted measures are also proposed to empower fishermen and to enable them to coexist with increased waterway traffic movements.

30. **Passenger time savings.** In common with other transport projects, the economic benefit of the interventions to passengers will be through savings in time and greater shipping schedule reliability. Without shipping, the only other mode of transport would be road which is not readily available for a significant proportion of the population. A common approach is to convert the time savings of transport improvements in monetary terms, using a determined value of time. As noted above, the passenger time savings were not estimated as most of the impacts will be localized and difficult to generalize. Still, given that the project is viable with only goods traffic, then passenger time savings will be additional. In any case, passenger time savings are assumed to be utilized in productive activities, leading in part to the assumed growth in cargo traffic that is generated along the corridor.

Annex 7: External Communications

INDIA: Capacity Augmentation of the National Waterway- 1 (Jal Marg Vikas) Project

1. The GoI's decision to revive the inland waterways sector and launch the revival through the development of NW-1 (known as Jal Marg Vikas) on India's most iconic river, the Ganga, presents certain unique communication challenges.

Need for Communications

2. There is limited awareness and understanding about the inland waterways sector and its potential benefits as the sector has been historically underdeveloped in India's transport mix. For decades now, operations on Indian waterways have been visible only in a couple of states such as Assam and Kerala. Even after the Government announced its ambitious agenda for revival and focused high-level political attention on it, there remains, among certain stakeholders, a level of skepticism about the feasibility of developing river courses for transporting goods (and people) over long distances. So the foremost communication challenge is to raise the sector's profile as a viable transport mode (especially for bulk cargo) and enhance public understanding about its potential benefits, especially in terms of reduced costs, reliability, and emission savings.

3. Given the iconic status of the Ganga in India, certain stakeholders have also expressed concerns about the possible social and environmental impacts of developing a stretch of the river for inland navigation. There were also some misconceptions about the scope of the Jal Marg Vikas Project, for instance, the belief that it would entail the construction of several barrages on the Ganga, or that widespread dredging would be needed to make the watercourse navigable. Consultations to understand stakeholder concerns better have been conducted and detailed studies undertaken to fully assess and analyze the social and environmental impacts of various design alternatives.

4. Proactive communications around the design, scope, and aims of the project will be critical to ensure that the facts are widely known and misconceptions addressed. In this context, it is important that stakeholders are made aware of the robust preparation process undertaken by IWAI. The process entailed conducting comprehensive social and environment impact analyses—including consultations with a range of stakeholders—as well as examining various design alternatives to arrive at the least-impact option for the design and development of this waterway.

5. The long-term sustainability of the project will depend upon the potential users of the waterway—in manufacturing, logistics, trade, and agriculture—recognizing its commercial viability and moving their custom to this mode. The Jal Marg Vikas Project has the potential to emerge as the logistics artery for northern India and also ease congestion on crowded road and rail networks provided enough traffic shifts to the river. Communication outreach to potential users will thus be critical for commercial success.

Communications Objective

6. IWAI is cognizant of the need to engage in proactive communications around the waterways agenda in general and the Jal Marg Vikas Project on NW-1 in particular, with the aim of (a) generating wider understanding about the inland waterways program and its intended benefits and

(b) creating an enabling environment for the Jal Marg Vikas Project through strategic outreach with stakeholders during the design and implementation of the Project.

Communications Approach

7. **Consultations**. IWAI has, as part of its project preparation efforts, undertaken a series of consultations with a broad range of stakeholder groups in an attempt to better understand their concerns and expectations in relation to the Jal Marg Vikas Project. These included consultations with local communities (including those directly impacted) and other stakeholders along NW-1 to discuss the scope of the project as well as its possible social and environmental impacts and their effective mitigation and management. Several focused sessions were held specifically to discuss with experts, academics, and relevant regulatory authorities, the possible impacts on aquatic wildlife in the river and plans to avoid or mitigate them. Consultations were also held with a wide range of stakeholders with a possible interest in the logistics chain along the waterway, such as manufacturing houses, industry associations, transporters, and barge-owners. Larger stakeholder workshops were held at various locations along the NW-1 section, including at Varanasi, Patna, and Kolkata.

8. **CNA.** In an attempt to better understand the perceptions of different stakeholder groups, IWAI is commissioning a CNA. The diagnostic study will help IWAI better address any gaps in understanding/perception pertaining to the project.

9. **Implementing a comprehensive communications strategy.** Based on the findings of the CNA, IWAI would prepare and implement a comprehensive communication strategy. The strategy is expected to include, but not be limited to, mass communication campaigns, media outreach, social media and other online channels, direct outreach, and so on.

10. **Communications capacity.** IWAI has already shored up its internal capacity to undertake systematic outreach to stakeholders. A communications specialist at its headquarters, assisted in time by professionals at the other major locations, will help implement ongoing outreach to stakeholders, including day-to-day media handling, organizing stakeholder meetings, managing the website, preparing statements/talking points, and so on.

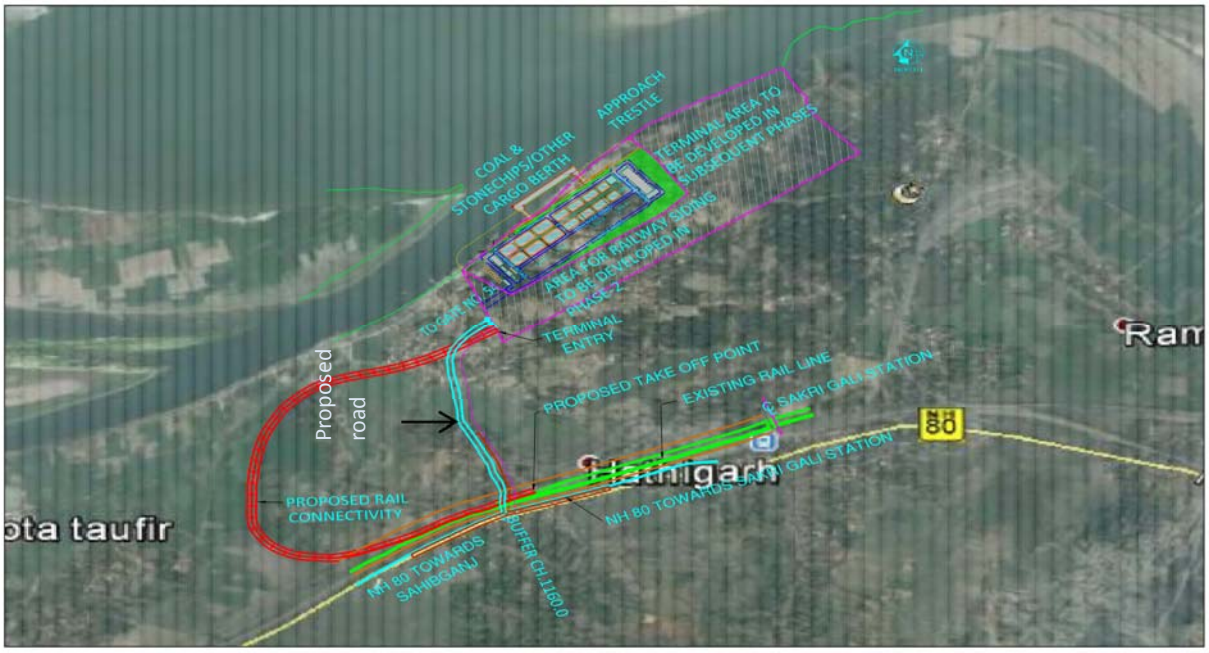
Annex 8: Map of Project Intervention Locations

INDIA: Capacity Augmentation of the National Waterway - 1 (Jal Marg Vikas) Project

INDEX MAPS

Varanasi Terminal

Sahibganj Terminal



Haldia Terminal