

Project Administration Manual

Project Number: P48373-007
Loan Number: L_____

June 2016

India: Bihar New Ganga Bridge Project

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Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The executing and implementing agencies are wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by executing and implementing agencies of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB shall agree to the PAM and ensure consistency with the Loan agreement. Such agreement shall be reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the PAM and the Loan Agreement, the provisions of the Loan Agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the PAM.

Abbreviations

ADB	=	Asian Development Bank
ADF	=	Asian Development Fund
AFS	=	audited financial statements
APFS	=	audited project financial statements
BSRCL	=	Bihar State Road Development Corporation Limited
CQS	=	consultant qualification selection
DMF	=	design and monitoring framework
EARF	=	environmental assessment and review framework
EIA	=	environmental impact assessment
EMP	=	environmental management plan
ESMS	=	environmental and social management system
GACAP	=	governance and anticorruption action plan
GDP	=	gross domestic product
ICB	=	international competitive bidding
IEE	=	initial environmental examination
IPP	=	indigenous people plan
IPPF	=	indigenous people planning framework
LAR	=	land acquisition and resettlement
LIBOR	=	London interbank offered rate
NCB	=	national competitive bidding
NGOs	=	nongovernment organizations
OCR	=	ordinary capital resources
PAI	=	project administration instructions
PAM	=	project administration manual
PIU	=	project implementation unit
PMU	=	Project management consultant
PMU	=	Project management unit
QBS	=	quality based selection
QCBS	=	quality- and cost based selection
RCD	=	Road Construction Department
RRP	=	report and recommendation of the President to the Board
SBD	=	standard bidding documents
SOE	=	statement of expenditure
SPS	=	Safeguard Policy Statement
SPRSS	=	summary poverty reduction and social strategy
TOR	=	terms of reference

I. PROJECT DESCRIPTION

A. Project Rationale, Location and Beneficiaries

1. The project will construct a new road bridge (the new Ganga Bridge) across the Ganges River and an integrated approach roadway network in the state of Bihar. It will improve transport connectivity between north and south Bihar, which is divided by the Ganges River, and better link Patna, the state capital city, and the surrounding areas. The main bridge structure of about 9.8 kilometers (km) is expected to become the longest river bridge in India. It will have a transformational impact by promoting the geographical integration of Bihar, and help balance the benefits of social economic development. In the regional context, it is strategically located near India's neighboring country of Nepal, and will enhance the existing road corridors between the two countries. This will lead to greater physical cross-border connectivity, which is supported by the Regional Cooperation and Integration Strategy of the Asian Development Bank (ADB).¹

2. Bihar is the 12th largest state in India by area, the 3rd most populous with about 104 million inhabitants, and the 6th most densely populated. It is in the eastern region of the country, bordering Uttar Pradesh in the west, West Bengal in the east, and Jharkhand in the south. The Ganges River flows through the middle of the Bihar plain from west to east, physically dividing the state into northern and southern regions. The northern region is bound by Nepal. Bihar has lagged behind other states in terms of social and economic development. According to Government of India estimates based on 2011–2012 data, 34% of Bihar's population lives below the poverty line, compared with 22% nationally.² Bihar continues to be at the bottom among major states in India with per capita income in 2013–2014 of only 39% (Rs15,650) of the national average (Rs39,904), although the gap has since narrowed thanks to increased investment in social infrastructure and improved governance.³

3. The problem of low per capita income in Bihar is accentuated by the physical north–south divide. In 2012, district-wise per capita gross domestic product was on average 40% higher among districts in the south (footnote 4). Among the 38 districts of the state, 7 of the 10 most prosperous districts were in the south, while 7 of the 10 poorest districts were in the north. This disparity is clearly attributed to the Ganges River and its enormous scale, which makes providing connectivity between north and south Bihar a very difficult task. Currently, along the entire length of the Ganges River in Bihar (approximately 200 km), only four bridges are operational, and the combined capacity is far too limited to meet traffic demand.⁴ This not only constrains connectivity but also overall socioeconomic development.⁵

4. Four new bridges are under construction at critical locations to help remove the growing constraint on connectivity.⁶ Moreover, the proposed project will construct a new Ganga Bridge, located about 10 km downstream and east of Patna. The main objective is to provide badly needed additional capacity, and improve connectivity for Patna and the surrounding areas. This includes the Raghapur Diara river island, which is situated and cut off in between two channels of the Ganges River. Its 250,000 inhabitants now have only a seasonal link (pontoon bridge)

¹ ADB. 2006. *Regional Cooperation and Integration Strategy*. Manila.

² Government of India, Planning Commission. 2013. *Press Note on Poverty Estimates, 2011–2012*. Delhi.

³ Government of Bihar, Finance Department. 2015. *Economic Survey, 2014–2015*. Patna.

⁴ As shown on the map, three bridges are between north and south Bihar (Gandhi Setu, Rajendra Setu, and Vikramshila Setu), and one bridge is between south Bihar at Buxar and the state of Uttar Pradesh in the west.

⁵ The combined volume–capacity ratio is currently about 1.6—already three times higher than the desired level.

⁶ As shown on the map, two bridges by the Government of Bihar (Arrah–Chhapra and Bakhiarpur, to be operational in 2018), and two rail-cum-road bridges by the Government of India (Digha and Munger, to be operational in 2017).

connecting it to Patna, apart from boats. The new Ganga Bridge will span the entire width of the Ganges River, including the two channels, with access ramps to the Raghapur Diara river island, and connect to nearby national highways along the north and south banks of the Ganges River. It will also serve as an alternative to the existing Ganga Bridge (also called Mahatma Gandhi Bridge), which currently is the main link between Patna and north Bihar. The old bridge is deteriorating and has insufficient capacity, which causes severe traffic congestion.⁷

5. The new Ganga Bridge, together with the other bridges already under construction, will provide the required transport capacity between north and south Bihar, and significantly improve connectivity. It will substantially reduce the travel time to Patna from the surrounding regions, in particular north Bihar, which will ease access to the state's administrative and social services, and health and higher education facilities. The inhabitants of the Raghapur Diara river island will gain year-round road access, allowing children access to higher-level schooling and women better access to pre- and postnatal health care. It will help balance the benefits of developments in agriculture, tourism, and industrial sectors, and contribute to achieving the priority goal of the Government of Bihar—to connect Patna to the remotest areas in the state, so that people can reach the capital in no more than 6 hours from any place within the state.

6. The Government of Bihar has stepped up investments in the development of quality infrastructure. Since 2008, ADB has provided three loans totaling \$1.02 billion to upgrade 1,466 km of state highways in north and south Bihar, linking rural areas to national highways. With these collectively, the new Ganga Bridge will improve mobility and accessibility between north and south Bihar, and is critical to ensuring that the overall development impact is optimized and its benefits are fully reaped. The new bridge is integral to the vision and action plan of the Road Master Plan for Bihar's State Highways Development, a 20-year strategy (2015–2035) prepared with ADB assistance to direct further investment into fostering overall economic development in the state.⁸

7. **Regional connectivity.** In the context of regional connectivity with India's neighboring countries, the new Ganga Bridge is strategically located at about 190 km southeast from Raxaul, an Indian border town across from Birgunj in Nepal, which enables major cross-border movement of goods and people between the two countries. The bridge will allow better distribution of traffic on the road network, which includes the international and regional trade corridors that connect Nepal to the eastern, northern, and northeastern states of India, including access to ports at Kolkata and Haldia in West Bengal.⁹ The project complements ADB's ongoing support to the South Asia Subregional Economic Cooperation.¹⁰

8. **Sustainable maintenance.** In 2013, the Government of Bihar enacted the Bihar Road Assets Maintenance Policy, which requires the execution of maintenance works throughout the design life of road infrastructure in place and under construction. The annual maintenance budget has more than doubled—from Rs3.500 billion in fiscal year (FY) 2012 to Rs8.932 billion in FY2015—thanks to increasing revenue from vehicle registration and license fees. Long-term performance-based maintenance by the private sector is also being encouraged to provide

⁷ Urgent repairs are being made to maintain operations on the Ganga Bridge, albeit at reduced capacity, while the Government of India is considering options for its complete rehabilitation.

⁸ ADB. 2012. *Technical Assistance for Road Master Plan for Bihar's State Highway Development*. Manila (TA 8170-IND, \$1,000,000, approved on 20 September).

⁹ Asian Highway No. 42, which is also the South Asian Association for Regional Cooperation Corridor 2.

¹⁰ The South Asia Subregional Economic Cooperation program is a project-based partnership that aims to strengthen cross-border transport networks that boost intraregional trade in the subregion (Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka).

greater efficiency. In keeping with this, the contract for the new Ganga Bridge also includes post-completion performance-based maintenance for 5 years, to be financed by the state government. This approach, and a contract modality that combines engineering, procurement, and construction, optimizes incentives for design and construction quality while allowing the use of best practices and innovations for efficiency and economy. It emphasizes efficient use of available resources, and this is consistent with one of ADB's strategic drivers of change being adapted in the development of the private sector.

9. **Climate change resilience.** The probability analysis of rainfall extremes over the Ganges basin has shown a growing trend in maximum 1-day rainfall and in the count of consecutive rainfall days.¹¹ In view of this, the new Ganga Bridge will span from bank to bank over the two river channels and the Raghopur Diara river island. This helps minimize effects on the river regime and is an important climate adaptation measure because the alternative option of constructing an embankment road on Raghopur Diara river island, while less costly, could be vulnerable to floods. The bridge will also meet the navigation clearance requirements of India's Inland Waterways Authority, e.g., vertical clearance of 10 meters from the highest recorded flood level, and horizontal clearance of 100 meters between two piers of the bridge. This is maintained throughout the entire bridge length to accommodate the possibility of any future changes in the river morphology and meandering of the river channels.

10. **Finance plus.** The new Ganga Bridge will have a transformational impact by promoting the geographical integration of Bihar and helping balance the benefits of socioeconomic development. It will also have a systemic impact on large-scale bridge design and construction in India by introducing new engineering and technology, a first of its kind and scale in India.¹² This also includes the implementation of stringent environmental safeguard measures, and a biodiversity conservation plan that will monitor changes to the local biodiversity in the project area and implement conservation activities to avoid any net loss of biodiversity as a result of the project. These activities will be carried out by a joint venture of reputed international and national design-build contractors, and supervised by international and national experts, comprising a project management consulting team. This will enable the local industries to gain valuable experience and know-how that can be replicated for greater benefits in the future.

B. Impact and Outcome

11. The impact will be improved mobility and accessibility within India, and connectivity with its neighboring countries.¹³ The outcome will be improved transport connectivity across the Ganges River between north and south Bihar.

C. Outputs

12. The project output will be the construction of the new Ganga Bridge and an integrated approach road network consisting of about 9.8 km of bridge structures, about 10 km of approach viaduct and embankments, widening of about 3 km of NH-103, and tolling and service facilities from Deedargunj on NH-30 in Patna district to Chak Sikandar in Vaishali district on

¹¹ Project Climate Risk Assessment and Management Reporting (accessible from the list of linked documents in Appendix 2).

¹² The adopted extradosed bridge design incorporates characteristics of a cable-stayed and externally stressed concrete-box segmental structure, which optimizes economy and efficiency. It will become the longest river bridge in India.

¹³ Government of India, Planning Commission. 2013. *Twelfth Five-Year Plan, 2012–2017 Economic Sectors*. Volume II. New Delhi.

NH-103. The loan will also finance consulting services for project management and authority engineer team, and external monitor for environmental safeguards. The TA will enhance bridge operation and management capacity by financing the preparation of an operation management plan for the new Ganga Bridge, development of model maintenance manuals for existing major bridges in Bihar, and transfer of knowledge in international best practices for bridge operation and management.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

13. The project readiness activities, including procurement of a main engineering, procure and construction contract (EPC Contract) and selection of a consulting firm for project management and authority engineering services are in advanced stage.

B. Overall Project Implementation Plan

Item	2015	2016	2017	2018	2019	2020
	Year 1	Year 2	Year 3	Year 4	Year 5	
A. Loan Processing						
Due Diligence & Loan Approval by ADB	■	■	■			
Loan Signing and Effective		■				
B. Preparation						
1. Preliminary Engineering by BSRDCL	■	■				
2. Advance Action and Procurement	■	■				
C. Land Acquisition and Resettlement						
1. LAP prepared and ADB approved	■	■				
2. Part A SIA appraisal, compensation, R&R		■	■	■		
3. Part B SIA appraisal, compensation, R&R		■	■	■	■	
D. Implementation						
1. Engineering and Construction		■	■	■	■	■
2. Commissioning						■

ADB = Asian Development Bank, BSRDCL = Bihar State Road Development Corporation Limited,
 LAP = Land Acquisition Plan, R&R = Resettlement and Rehabilitation, SIA = Social Impact Appraisal
 Source: Asian Development Bank

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

Project Implementation Organizations	Management Roles and Responsibilities
Executing agency (EA)	<p>Government of Bihar acting through BSRDCL</p> <ul style="list-style-type: none"> <input type="checkbox"/> overall coordination of project implementation <input type="checkbox"/> inter-agency coordination <input type="checkbox"/> oversee and monitor project implementation as well as the adequacy of overall project funding <input type="checkbox"/> provide necessary policy guidance related to project implementation <p>BSRDCL</p> <ul style="list-style-type: none"> <input type="checkbox"/> day-to-day project execution, supervision, and management <input type="checkbox"/> consultant recruitment and procurement of works <input type="checkbox"/> project accounts management – establish and maintain project account, submit withdrawal application, administer Statement-of-Expenditure, and maintain supporting documents <input type="checkbox"/> project progress reports <input type="checkbox"/> maintaining project accounts and complete loan financial records
ADB	<ul style="list-style-type: none"> <input type="checkbox"/> Monitor and review overall implementation of the project in consultation with the EAs including: the project implementation schedule; actions required in terms of poverty reduction, environmental impacts, and resettlement plans (RPs) if applicable; timeliness of budgetary allocations and counterpart funding; project expenditures; progress with procurement and disbursement; statement of expenditure when applicable; compliance with particular loan covenants; and the likelihood of attaining the project's immediate development objectives.

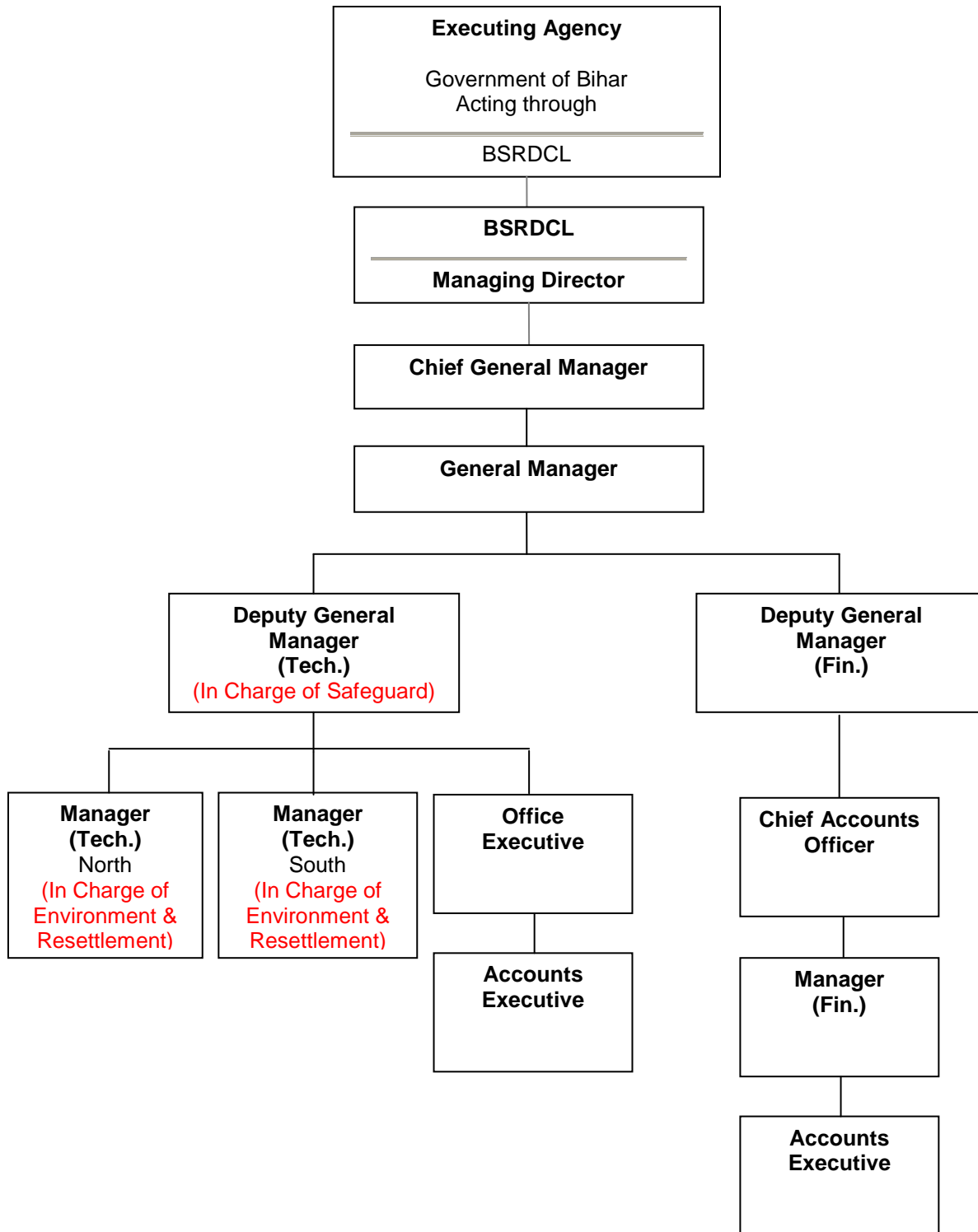
B. Key Persons Involved in Implementation

Executing Agencies	
GOB	<p>Sri Pankaj Kumar, IAS Secretary Road Construction Department Vishweshwaraiya Bhawan, Bailey Road, Patna, Bihar 800 001, India Telephone (91-612) 223 3362 Fax (91-612) 223 3914 Email 1 (prsec_rcd@bihar.gov.in) Email 2 (secy_road@bihar.gov.in) Email 3 (secyr cd-bih@nic.in)</p>
BSRDCL	<p>Sri Pankaj Kumar, IAS Managing Director RCD Mechanical Workshop Campus, Sheikhpura, Shaheed Pir Ali Khan Marg, Patna, Bihar 800 014, India Telephone (91-612) 222 6711 Fax (91-612) 222 6723 Email (mdroadcorp@gmail.com)</p>
	<p>Vijay Shanker Chief General Manager (In-Charge) RCD Mechanical Workshop Campus, Sheikhpura, Shaheed Pir Ali Khan Marg, Patna, Bihar 800 014, India Mobile (91) 94310 05695 Fax (91-612) 222 6723 Email (vijayshanker1957@gmail.com)</p>
	<p>Mahesh Prasad Project Director (PIU) and Deputy General Manager (Tech.) RCD Mechanical Workshop Campus, Sheikhpura, Shaheed Pir Ali Khan Marg, Patna, Bihar 800 014, India Telephone (91-612) 222 6711, Mobile (91) 94310 05728 Fax (91-612) 221 5238 Email 1 (ppp.bsrdcl@gmail.com) Email 2 (bsrdcmahesh@gmail.com)</p>
ADB	
Transport and Communications Division of South Asia Department (SATC)	<p>Hiroaki Yamaguchi Director, SATC Telephone (63-2) 632 6630 Email address: hyamaguchi@adb.org</p>
Mission Leader	<p>Dong-Kyu Lee Unit Head, Project Administration, SATC Telephone (63-2) 632 4157 Email address: dklee@adb.org</p>

Note: Update as changes occur.

C. Project Organization Structure and Key Staff

14. The flow chart below shows the reporting lines essential internal structures of key staff involved in implementation.



IV. COSTS AND FINANCING

15. The project is estimated to cost \$715 million (Table 1).

Table 1: Project Investment Plan
(\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Works for Main Bridge and Approach Roads	483.85
2. Consulting Services	17.32
3. Land Acquisition and Resettlement ^c	127.58
4. Project Management	33.87
Subtotal (A)	662.62
B. Contingencies^d	40.80
C. Financing Charges During Implementation^e	11.58
Total (A+B+C)	715.00

^a Includes estimated taxes and duties of about \$41.88 million for works to be financed from government resources by cash contribution, and about \$2.67 million for consulting services to be financed from the Asian Development Bank (ADB) loan resources. The amount from ADB loan resources is within the threshold identified during the preparations for the country partnership strategy (not exceeding 10% of the project cost), is not excessive (0.53% of ADB loan resources), applies only to ADB-financed expenditures, and is material and relevant to the success of the project.

^b In end-2015 prices.

^c Includes estimated expenses of about \$0.19 million for a local nongovernment organization toward facilitating resettlement and rehabilitation activities.

^d Physical contingencies computed at 3.0% for works and consulting services. Price contingencies computed at 2.5% on foreign exchange costs and at 5.5% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

^e Includes interest and commitment charges. Interest during construction for the ADB loan has been computed at the 5-year forward London interbank offered rate (LIBOR) plus a spread of 0.5% and applicable maturity-based premium of 10 basis points. Commitment charges for an ADB loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

16. The Government of India has requested a loan of \$500 million from ADB's ordinary capital resources to help finance the project. The loan will have a 26-year term, including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, and such other terms and conditions to be set forth in the draft loan and project agreements.

17. The Government of India has requested that repayment follow the straight-line repayment option in equal installments.¹⁴ Based on this and the above loan terms, the average loan maturity is 15.75 years and the maturity premium payable to ADB is 0.10% per annum. The Government of India will make available the loan proceeds to the government of Bihar on a back-to-back basis.

18. The financing plan is in Table 2.

¹⁴ The repayment period and grace period have been customized to suit time frame for revenue generation from toll collection.

Table 2: Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank	500	70
Government of Bihar	215	30
Total	715	100

Source: Asian Development Bank estimates.

A. Detailed Cost Estimates by Expenditure Category

19. The detailed cost estimates by expenditure category and detailed cost estimates by financier are presented below.

DETAILED COST ESTIMATES AND FINANCING PLAN

(\$ million)

Item	Total	ADB		GOB		% of Total Base Cost
		OCR	% Total ADB	% Total GOB	GOB	
A. Investment Costs [a]						
1. Works [b]	483.85	445.14	92.00	38.71	8.00	67.67
a. Main Bridge and Approache Roads	483.85	445.14	92.00	38.71	8.00	67.67
2. Consultants [c]	17.32	17.32	100.00	0.00	0.00	2.42
a. Project Management & Authority Engineer	16.20	16.20	100.00	0.00	0.00	2.27
b. External Monitor for Enviromental Safeguard	1.12	1.12	100.00	0.00	0.00	0.16
3. Local NGO for Resettlement and Rehabilitation	0.19	0.00	0.00	0.19	100.00	0.03
4. Land Acquisition and Resettlement	127.39	0.00	0.00	127.39	100.00	17.82
Subtotal (A)	628.75	462.46	73.55	166.29	26.45	87.94
B. Recurrent Costs						
1. Project Management [d]	33.87	0.00	0.00	33.87	100.00	4.74
Subtotal (B)	33.87	0.00	0.00	33.87	100.00	4.74
C. Contingencies						
1. Physical Contingency [e]	15.78	14.52	92.00	1.26	8.00	2.21
2. Price Contingency [f]	25.02	23.02	92.00	2.00	8.00	3.50
Subtotal (C)	40.80	37.54	92.00	3.26	8.00	5.71
D. Financing Charges During Implementation						
1. Interest During Implementation [g]	9.72	0.00	0.00	9.72	100.00	1.36
2. Commitment Charges [h]	1.86	0.00	0.00	1.86	100.00	0.26
Subtotal (D)	11.58	0.00	0.00	11.58	100.00	1.62
Total Project Cost (A+B+C+D)	715.00	500.00	69.93	215.00	30.07	100.00

[a] In end-2015 prices.

[b] Includes estimated total taxes and duties of about \$41.88 million for works to be financed from government resources in cash.

[c] Includes estimated total taxes and duties of about \$2.67 million for consulting services to be financed from ADB loan resources.

[d] Includes fee for the audit of the annual project financial statements to be financed from government resources.

[e] Physical contingencies computed at 3.0% for works and consulting services.

[f] Price contingencies computed at 2.5% on foreign exchange costs and 5.5% on local currency costs.

[g] Computed at the 5-year forward LIBOR plus a spread of 0.5% and applicable maturity premium of 10 basis points.

[h] 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank.

B. Allocation and Withdrawal of Loan Proceeds

ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS (Bihar New Ganga Bridge Project)			
CATEGORY			ADB FINANCING BASIS
Number	Item	Total Amount Allocated for ADB Financing (\$) Category	Basis for Withdrawal from the Loan Account
1	Works	445,140,000	92% of total expenditure claimed
2	Consulting Services	17,320,000	100% of total expenditure claimed
3	Unallocated	37,540,000	
	Total	500,000,000	

C. Detailed Cost Estimates by Outputs

Item	Total Cost	(\$ million)	
		New Ganga Bridge & Approach Roads Amount	% of Cost Category
A. Investment Costs [a]			
1. Works [b]	483.85	483.85	100.00%
a. Main Bridge and Approache Roads	483.85	483.85	100.00%
2. Consultants [c]	17.32	17.32	100.00%
a. Project Management & Authority Engineer	16.20	16.20	100.00%
b. External Monitor for Enviromental Safeguard	1.12	1.12	100.00%
3. Local NGO for Resettlement and Rehabilitation	0.19	0.19	100.00%
4. Land Acquisition and Resettlement	127.39	127.39	100.00%
Subtotal (A)	628.75	628.75	100.00%
B. Recurrent Costs			
1. Project Management [d]	33.87	33.87	100.00%
Subtotal (B)	33.87	33.87	100.00%
C. Contingencies			
1. Physical Contingency [e]	15.78	15.78	100.00%
2. Price Contingency [f]	25.02	25.02	100.00%
Subtotal (C)	40.80	40.80	100.00%
D. Financing Charges During Implementation			
1. Interest During Implementation [g]	9.72	9.72	100.00%
2. Commitment Charges [h]	1.86	1.86	100.00%
Subtotal (D)	11.58	11.58	100.00%
Total Project Cost (A+B+C+D)	715.00	715.00	100.00%

[a] In end-2015 prices.

[b] Includes estimated total taxes and duties of about \$41.88 million for works to be financed from government resources in cash.

[c] Includes estimated total taxes and duties of about \$2.67 million for consulting services to be financed from ADB loan resources.

[d] Includes fee for the audit of the annual project financial statements to be financed from government resources.

[e] Physical contingencies computed at 3.0% for works and consulting services.

[f] Price contingencies computed at 2.5% on foreign exchange costs and 5.5% on local currency costs.

[g] Computed at the 5-year forward LIBOR plus a spread of 0.5% and applicable maturity premium of 10 basis points.

[h] 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank.

D. Detailed Cost Estimates by Year

Item	(\$ million)					
	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020
A. Investment Costs [a]						
1. Works [b]	483.85	0.00	50.05	106.89	187.23	139.68
a. Main Bridge and Approache Roads	483.85	0.00	50.05	106.89	187.23	139.68
2. Consultants [c]	17.32	0.00	1.80	3.83	6.69	5.00
a. Project Management & Authority Engineer	16.20	0.00	1.68	3.58	6.26	4.68
b. External Monitor for Enviromental Safeguard	1.12	0.00	0.12	0.25	0.43	0.32
3. Local NGO for Resettlement and Rehabilitation	0.19	0.00	0.02	0.04	0.08	0.05
4. Land Acquisition and Resettlement	127.39	63.69	50.96	6.37	6.37	0.00
Subtotal (A)	628.75	63.69	102.83	117.13	200.37	144.73
B. Recurrent Costs						
1. Project Management [d]	33.87	0.00	3.50	7.48	13.11	9.78
Subtotal (B)	33.87	0.00	3.50	7.48	13.11	9.78
C. Contingencies						
1. Physical Contingency [e]	15.78	0.00	1.63	3.49	6.10	4.56
2. Price Contingency [f]	25.02	0.00	2.59	5.53	9.68	7.22
Subtotal (C)	40.80	0.00	4.22	9.02	15.78	11.78
D. Financing Charges During Implementation						
1. Interest During Implementation [g]	9.72	0.00	0.28	1.20	3.03	5.21
2. Commitment Charges [h]	1.86	0.00	0.72	0.61	0.40	0.13
Subtotal (D)	11.58	0.00	1.00	1.81	3.43	5.34
Total Project Cost (A+B+C+D)	715.00	63.69	111.55	135.44	232.69	171.63
% Total Project Cost	100.00%	8.91%	15.60%	18.94%	32.55%	24.00%

[a] In end-2015 prices.

[b] Includes estimated total taxes and duties of about \$41.88 million for works to be financed from government resources in cash.

[c] Includes estimated total taxes and duties of about \$2.67 million for consulting services to be financed from ADB loan resources.

[d] Includes fee for the audit of the annual project financial statements to be financed from government resources.

[e] Physical contingencies computed at 3.0% for works and consulting services.

[f] Price contingencies computed at 2.5% on foreign exchange costs and 5.5% on local currency costs.

[g] Computed at the 5-year forward LIBOR plus a spread of 0.5% and applicable maturity premium of 10 basis points.

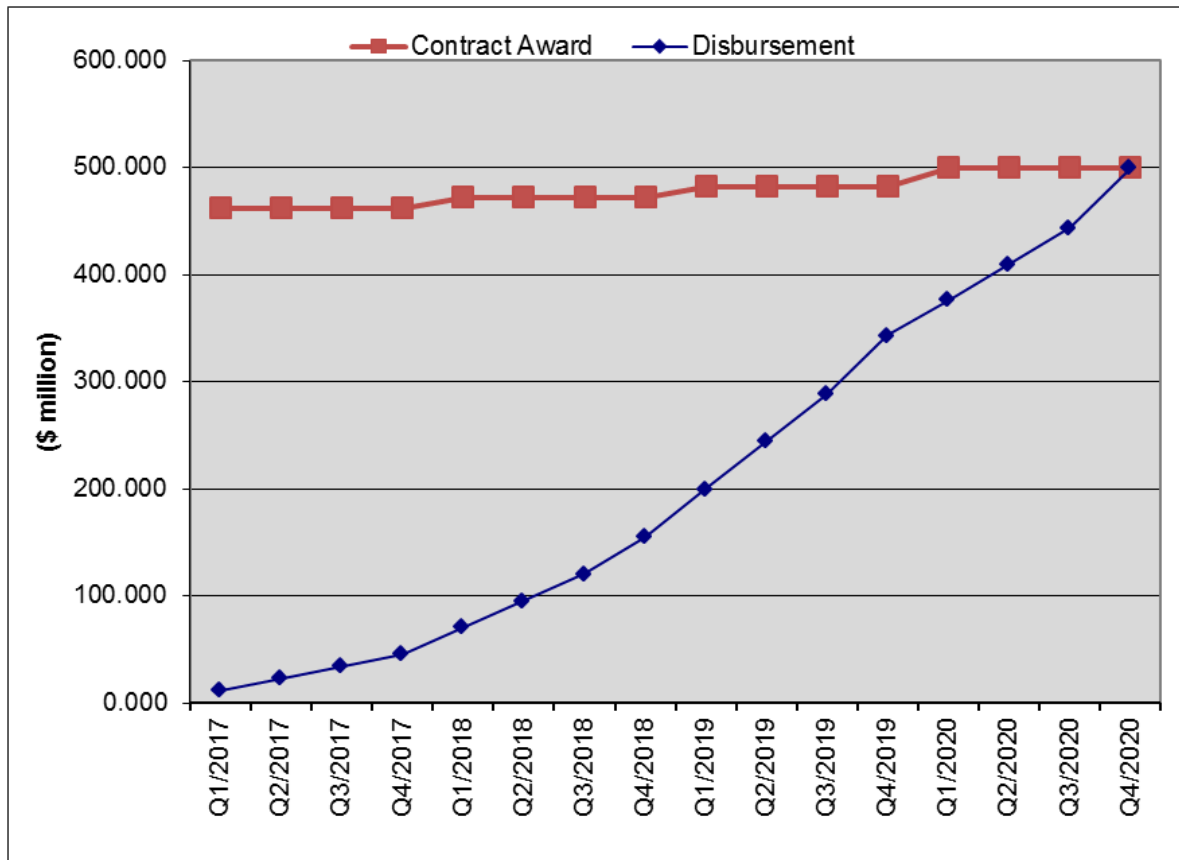
[h] 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank.

E. Contract and Disbursement S-Curve

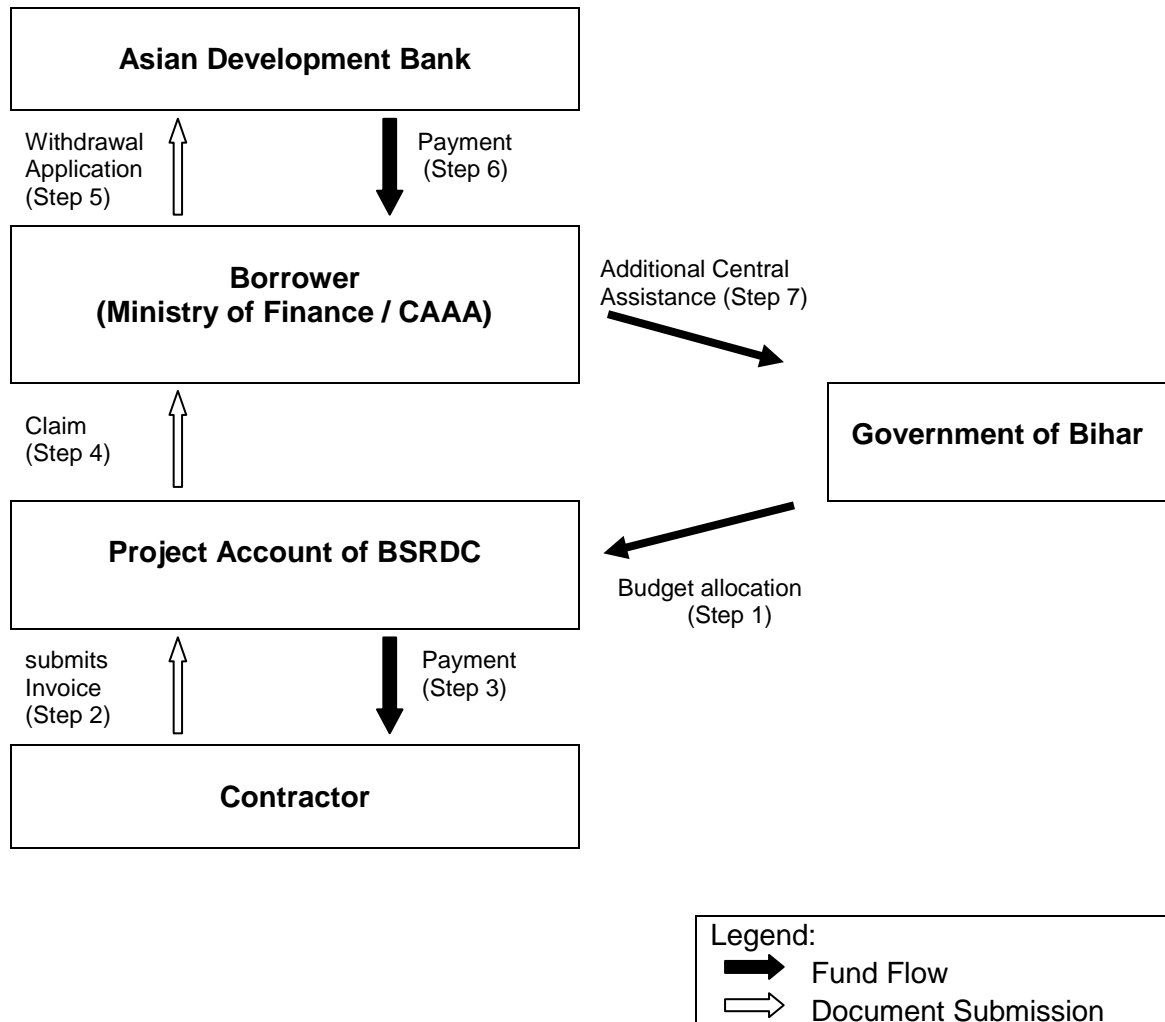
Contract Awards and Disbursement Projection

	Contract Award (in \$ million)					Disbursement (in \$ million)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2017	462.46	0.00	0.00	0.00	462.46	11.40	11.40	11.40	11.40	45.60
2018	10.00	0.00	0.00	0.00	10.00	24.90	24.90	24.90	34.90	109.60
2019	10.00	0.00	0.00	0.00	10.00	44.50	44.50	44.50	54.50	188.00
2020	17.54	0.00	0.00	0.00	17.54	33.50	33.50	33.50	56.30	156.80
Total					500.00					500.00



F. Fund Flow Diagram

20. The Government of Bihar will furnish BSRDCL with a sufficient budget for payments to the consultants and contractors based on the submitted invoices. BSRDCL will then submit claims to the Borrower, who will submit them to ADB. ADB will pay to the Borrower out of the loan and the Borrower will provide Additional Central Assistance to the GOB. The following diagram shows how the funds will flow from ADB and the Borrower to implement project activities.



V. FINANCIAL MANAGEMENT

A. Summary of Financial Management Assessment

21. The financial management assessment (FMA) was conducted in accordance with ADB's *Technical Guidance Note on Financial Management Assessment*.¹⁵ The FMA considered the capacity of the BSRDCL, including funds-flow arrangements, governance, staffing, budgeting, accounting and financial reporting systems, internal control procedures, financial information systems, and internal and external auditing arrangements.¹⁶

22. The overall risk is moderate. The FMA assessed that the capacity of BSRDCL is adequate in project financial accounting and in ADB disbursement procedures. BSRDCL has been the implementing agency for three prior ADB loans. BSRDCL has an accounting system that enables proper recording of project financial transactions, following the double-entry, accrual accounting system since it is a corporate entity. The entity uses established commercial enterprise resource planning software and is able to undertake budgeting and other functions. The accounting system has adequate controls in place to ensure that all transactions are correctly made and properly explained. All accounting and supporting documents are maintained for a minimum 8 years from the date of transaction. Accounts Manual and Procedure Manuals are in the process of being prepared. The Financial Statements are prepared and presented under historic cost convention, on the accrual basis of accounting in accordance with the accounting principles generally accepted in India (Indian GAAP) and in compliance with the Accounting Standards issued by the Institute of Chartered Accountants of India (ICAI) and the relevant provisions of the Companies Act, 2013 to the extent applicable. While there is no Internal Audit Department within the BSRDCL, a firm of Chartered Accountant, appointed as Internal Auditor, have conducted audit of project accounts up to 2014-15. The Internal Auditor submits report periodically to the Chief General Manager. There is also an audit committee to oversee the audit function and to take remedial measures within BSRDCL. The Annual Report of BSRDCL is submitted to the Government and Legislature of Bihar. The Statutory Auditor is appointed by Comptroller & Auditor General (C&AG) every year. Being a government company, the annual financial statements are subject to audit by C&AG, or an auditor appointed by the C&AG. The C&AG may also conduct special audit, review audit, or other audits as required on selective basis. Audited project financial statements under ongoing projects implemented by BSRDCL are being received progressively on a timely basis, and were unqualified for the FY 2014-15. BSRDCL entity level financial statements for the FY 2013-14 are also available. The financial management action plan is given in Table 3.

Table 3: Financial Management Action Plan

Key Risk	Risk Mitigating Activity	Timeline	Responsible Entity
Augment existing accounting manual	Augment the accounting policy and procedure manual	December, 2017	BSRDCL
Enhance Project Reporting	(i) In preparing detailed budget estimates, comprehensive variance analysis is to be done with respect to financial and physical targets, at least on a quarterly basis to have more control on the projects and activities; (ii) Enhance the functionality of	December, 2017	BSRDCL

¹⁵ ADB. 2015. *Technical Guidance Note on Financial Management Assessment*. Manila. Available: <http://www.adb.org/projects/operations/financial-management-resources>

¹⁶ Detailed financial management assessment is available on request.

Key Risk	Risk Mitigating Activity	Timeline	Responsible Entity
	the accounting software to account by funding source and project outputs		

ADB = Asian Development Bank; BSRDCL= Bihar State Road Development Corporation Limited

B. Disbursement

1. Disbursement Arrangements for ADB Funds

23. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time),¹⁷ and detailed arrangements agreed upon between the government and ADB. The online training on disbursement policies and procedures is available at: http://wpqr4.adb.org/disbursement_elearning. The project staff is encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

24. BSRDCL will be responsible for (i) preparing disbursement projections, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting and retaining supporting documents, and (iv) preparing and sending withdrawal applications to ADB. Before the submission of the first withdrawal application, the government shall submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is set in accordance with ADB's *Loan Disbursement Handbook*. Individual payments below this amount should be paid by BSRDCL and subsequently claimed from ADB through reimbursement, unless otherwise accepted by ADB.

25. **Statement-of-expenditure (SOE) procedure.**¹⁸ The SOE procedure will be used for reimbursement of eligible expenditures. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit.

2. Disbursement Arrangements for Government Funds

26. All disbursements under government financing will be carried out in accordance with regulations of the Government of Bihar.

C. Accounting

27. BSRDCL will maintain separate project financial statements and records by funding source for all expenditures incurred on the Project. Project financial statements will follow accounting principles and practices prescribed by the Government of India accounting laws and regulations.¹⁹ Project financial statements shall include at a minimum, a statement of receipts and payments with accompanying notes and schedules. Template financial statements provided in the standardized terms of reference for audit of ADB assisted projects, agreed with the Comptroller and Auditor General of India, the DEA and ADB can be referred to as a guide for preparing financial statements.

¹⁷ Available at: <http://www.adb.org/documents/loan-disbursement-handbook>.

¹⁸ SOE forms are available in Appendix 9B of the *Loan Disbursement Handbook*.

¹⁹ Government laws and regulations, and following Indian Generally Accepted Accounting Principles.

D. Auditing

28. BSRDCL will cause the detailed consolidated project financial statements to be audited in accordance with Government of India audit regulations by an auditor appointed by the Auditor General, which is acceptable to ADB. The audited financial statements will be submitted in the English language to ADB within 6 months of the end of the fiscal year by BSRDCL.

29. SOE records should be maintained and made readily available for review by ADB's disbursement and review mission or upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. The annual audit report will include a separate audit opinion on the use of the SOE procedures.

30. The annual audit report for the project financial statements will include an audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan proceeds were used only for the purposes of the project or not; and (iii) the level of compliance for each financial covenant contained in the legal agreements for the project. If a management letter is prepared by the auditor, this shall also be submitted to ADB.

31. To ensure the timely submission of audited project financial statements, BSRDCL shall formally request the C&AG to include audits of subprojects under the project in their yearly work plan through the DEA. Unaudited project financial statements should be submitted to C&AG for audit within 3 months of the end of the fiscal year.

32. GOI, GOB and BSRDCL have been made aware of ADB's approach on delayed submission, and the requirements for satisfactory and acceptable quality of the audited financial statements.²⁰ ADB reserves the right to require an addition in the auditor as mutually agreed with the borrower, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

33. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

34. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).²¹

²⁰ ADB Policy on delayed submission of audited project financial statements:

- When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (i) the audit documents are overdue; and (ii) if they are not received within the next six months, requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
- When audited project financial statements have not been received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement and issuance of new commitment letters. ADB will (i) inform the executing agency of ADB's actions; and (ii) advise that the loan may be suspended if the audit documents are not received within the next six months.
- When audited project financial statements have not been received within 12 months after the due date, ADB may suspend the loan.

²¹ Available from <http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications>

After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 14 days of their endorsement by posting them on ADB's website. The Audit Management Letter and entity financial statements will not be disclosed.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

35. All advance contracting and retroactive financing will be undertaken in conformity with ADB's *Procurement Guidelines* (2015, as amended from time to time) (ADB's *Procurement Guidelines*)²² and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time) (ADB's *Guidelines on the Use of Consultants*).²³ The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The borrower, GOB and BSRDC have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

36. **Advance contracting.** Steps to be concluded in advance include (i) procurement, including prequalification, of a main engineering, procure and construction contract, (ii) selection of an international consulting firm for project management and authority engineering services, (iii) selection of a national consulting firm for external monitoring for environmental safeguards.

37. **Retroactive financing.** Withdrawals from the Loan Account may be made to finance eligible expenditures incurred under the Project before the Effective Date, but not earlier than 12 months before the date of this Loan Agreement in connection with items to be retroactively financed, subject to a maximum amount equivalent to 20% of the loan amount.

B. Procurement of Goods, Works and Consulting Services

38. All procurement of goods and works will be undertaken in accordance with ADB's *Procurement Guidelines*.

39. International competitive bidding procedures will be used for civil works contracts estimated to cost \$40 million or more, and supply contracts valued at \$1 million or higher. Shopping will be used for contracts for procurement of works and equipment worth less than \$100,000.

40. Under National Competitive Bidding, before the start of any procurement, ADB and the Government will review the public procurement laws of the central and state governments to ensure consistency with ADB's *Procurement Guidelines*.

41. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

42. All consultants will be recruited according to ADB's *Guidelines on the Use of Consultants*.²⁴ The terms of reference for all consulting services are detailed in Section D.

43. An estimated 1,604 person-months (148 international and 1,162 national) of consulting services are required for project management and authority engineering services, and the consulting firm will be engaged using the quality- and cost-based selection (QCBS) method with a standard quality:cost ratio of 90:10. An estimated 108 national person-months are required for

²² Available at: <http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf>

²³ Available at: <http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf>

²⁴ Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: <http://www.adb.org/documents/handbooks/project-implementation/>

external monitoring for environmental safeguard, and the consulting firms will be engaged using the quality- and cost-based selection (QCBS) method with a standard quality:cost ratio of 80:20.

C. Procurement Plan

44. The procurement plan, prepared in accordance with the country specific template, is in Attachment A, describing all procurement of good and works to be undertaken for the project.

D. Consultant's Terms of Reference

45. The outline terms of reference for consulting service is provided in Attachment B.²⁵

²⁵ Terms of reference guidelines available at: http://www.adb.org/Documents/Manuals/Consulting-Services-Operations-Manual/CSOM.pdf?bcsi_scan_D4A612CF62FE9576=AORY9a8Nho2ezS9Xss/IqEAAAANNiAA&bcsi_scan_filename=CSOM.pdf (paras 65–72).

VII. SAFEGUARDS

46. **Prohibited investment activities.** Pursuant to ADB's Safeguard Policy Statement (2009) (SPS),²⁶ ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS. (move to para. 21)

A. Environmental Safeguards

47. The project is classified as category A in accordance with the ADB's SPS due to the presence of the Gangetic Dolphin (*Platanista gangetica*), the Ganges soft shell turtle (*Nilssonina gangetica*) and potential presence of the Gharial (*Gavialis gangetica*) in the project area which are listed as endangered, vulnerable and critically endangered respectively under the IUCN red list and under schedule I of the Wildlife Protection Act of India. In addition the large project scope requires substantial resources including the transport and storage of significant quantities of construction materials and equipment and a large labor force. An EIA report has been prepared and disclosed on the ADB website. The EIA includes an Environmental Management Plan (EMP) and an Environmental Monitoring Plan (EMOP) and a Biodiversity Conservation Plan (BCP). All three plans include budget estimates.

48. The EMP is a plan for mitigating all anticipated environment impacts during project construction and operation. Specific mitigation measures with details on location, time and responsible agency for implementation is given in the EMP. The EMOP is a plan for monitoring various environment quality parameters and checking the effectiveness of the EMP. It comprises of activities on testing the quality of air, water, noise through laboratory tests and physical monitoring of problems of soil erosion, tree plantations and occupational health and safety issues. The BCP is a plan for establishing the biodiversity baseline in the project area, monitoring changes in the local biodiversity during project construction and early stages of project operation and implementing biodiversity conservation activities to ensure that there will be no "net loss" of biodiversity as a result of the project.

49. **Implementation arrangements for Environment Safeguards.** The responsibilities of various agencies and parties for implementing environment safeguards are provided below.

50. **BSRDCL.** BSRCL will be responsible for ensuring the implementation of environment safeguards under the project as required in the EIA and EMP and in accordance with the ADB SPS and environmental regulations of the Government of India. BSRDCL will ensure timely processing and securing of all statutory clearances and permits such as the environmental clearance, tree cutting permits and others. The PIU will include 2 Managers (technical) who will also be responsible for overseeing day to day implementation of social and environmental safeguards on site. All environmental assessment reports, EMPs, and environmental monitoring reports submitted by the PMAE and External Monitor for Environment Safeguards (EMES) will be reviewed and endorsed and forwarded to ADB for disclosure on the ADB website. BSRDCL will authorize civil works for construction of the main bridge and approach roads to begin on site only after ADB approval of the revised EIA that will be prepared by the contractor based on detailed design. BSRDCL will coordinate with and seek technical support and guidance from relevant government agencies such as the Forestry Department, Patna University, Zoological Survey of India and others as needed.

²⁶ Available at: <http://www.adb.org/Documents/Policies/Safeguards/Safeguard-Policy-Statement-June2009.pdf>

51. **PMAE.** The PMAE will be responsible for supervising implementation of the EMP and EMOP by the contractor. The PMAE team will include an Environmental Specialist and a Biodiversity Specialist who will be responsible for supervision and monitoring on implementation of environment safeguards on site. The updated EIA report based on detailed design, supplementary environmental assessments (if required), updated EMP and EMOP prepared by the EPC contractor will be reviewed and approved by the PMAE. The final detailed design prepared by the EPC contractor will be reviewed to ensure that all efforts have been made to avoid and mitigate adverse impacts on the local biodiversity in particular the Gangetic Dolphin and the Ganges turtle. All sub-plans such as construction camp layout plan, waste management plan, borrow area management plan, traffic management plan, tree plantation plan and others prepared by the contractor will be reviewed and approved by the PMAE.

52. Quarterly Environmental Monitoring Reports on implementation and monitoring of environment safeguards will be prepared by the PMAE and submitted to BSRDCL for their endorsement and further forwarding to ADB for disclosure on the ADB website. The PMAE will also carry out capacity building activities on implementation of environment safeguards through training workshops and on-site training for relevant staff of BSRDCL and the contractor.

53. **Contractor.** In accordance with the provisions of the EPC Contract the contractor will provide a team of relevant experts such as environmental, ecological and occupational health and safety specialists in order to ensure proper implementation of the EMP. These personnel will have presence in all construction and camp-sites and active construction fronts.

54. The contractor will update the EIA report based on the detailed design, conduct supplementary environmental assessments (if necessary) and update the EMP and EMOP based on the final detailed design for review and approval by the PMAE. Thereafter the contractor will implement the EMP and EMOP. The EMP will be implemented throughout the construction stage and during the five-year defects liability period during the operation stage. Quality testing of air, water and noise as required in the EMOP may be outsourced by the contractor to recognized and approved laboratories, while physical monitoring activities will be carried out by PMAE and EMES where applicable.

55. **External Monitor for Environment Safeguards (EMES).** The External Monitor will be responsible for conducting third party monitoring of the implementation and supervision of environment safeguards by the EPC contractor and PMAE respectively. The External Monitor will comprise an Environmental Expert and an Ecological Expert. The Ecological Expert will be responsible for updating the Biodiversity Conservation Plan (BCP) and thereafter implementing the BCP. For implementing the BCP close coordination will be carried out with relevant local agencies and institutions such as the Patna University, Forestry Department, Zoological Survey of India and others if required.

56. The External Monitor will prepare semi-annual monitoring reports during the project construction stage on third party monitoring activities and implementation of BCP for submission to BSRDCL who will further forward the reports to ADB for disclosure on the ADB website. The External Monitor will carry out monitoring activities for three years during project operation to check the effectiveness of the BCP, GHG emissions, and effectiveness of mitigation measures implemented. Annual monitoring reports will be prepared during project operation and submitted to BSRDCL for further submission to ADB.

B. Social Safeguards

57. The project is classified as category A under ADB's SPS. One Resettlement Plan (RP) has been prepared for the bridge and approach roads in accordance with (i) the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, which is effective from January 1, 2014 (hereinafter called LA Act 2013); (ii) State laws and regulations; and (iii) ADB SPS. Displaced persons (titleholders and non-titleholders) will be compensated at replacement cost and rates for different categories of loss and special assistance are detailed in the Entitlement Matrix of the RP. BSRDCL will employ NGOs to help to facilitate land acquisition and resettlement and rehabilitation activities.

58. BSRDC will adhere to ADB SPS objectives that are: (i) to avoid involuntary resettlement wherever possible; (ii) to minimize involuntary by exploring design alternatives; (iii) to enhance or at least to restore, the livelihood of all displaced persons in real terms relative to pre-project levels; and (iv) to improve the standards of living of the displaced poor and other vulnerable groups. Specifically, BSRDC will (i) implement the project in accordance with the RP; (ii) ensure that all displaced persons should be paid compensation and assistance prior to the commencement of the civil works; (iii) ensure that land that is free of encumbrance can be handed over to the contractors on a sectional basis and for areas where there are displaced persons (titleholders and non-titleholders), the relevant compensation and assistance must be fully paid before affected households can be displaced; (iv) ensure that civil works can only start after the relevant sections have been declared free of encumbrance; (v) undertake continued meaningful consultation; (vi) establish efficient grievance redress mechanisms in accordance with the RP to assist affected persons to resolve grievances and complaints in a timely manner; and (vii) submit semi-annual monitoring reports to ADB on the implementation of the resettlement activities.

59. If during project implementation, any modification or additional land requirement or involuntary resettlement impacts are identified, the RP will be updated in accordance with the applicable laws referred to in the RP and prior approval of the ADB will be obtained. The RP will be updated by the Resettlement Specialist of the PMAE with input from the NGO.

60. BSRDCL has the capacity to implement safeguard activities. During Inception Mission, ADB will provide training to re-orientate BSRDCL and relevant stakeholders. PMAE experts will provide continued capacity development and advice BSRDCL during implementation. The responsibilities of respective parties and agencies on implementing the social safeguards are given below:

- (i) **BSRDCL:** Ensure that all social safeguard requirements as stated in the RP and loan covenants for the project are complied with. Submit semi-annual social monitoring reports as necessary to ADB for disclosure on the ADB website.
 - **Safeguards Focal Person, PIU Project Director:** Liaise with land acquisition authorities to ensure smooth and quick Implementation of land acquisition activities. Monitor of the requirements of the RP. Review and approve semi-annual social monitoring reports for the project and submission to ADB for disclosure on the ADB website.
 - **Safeguards Focal Person, PIU Manager 1 and 2:** Responsible for on the ground implementation of RP and coordinate with NGO. Liaise with land acquisition authorities at the district level. Review and approval of monthly/quarterly monitoring reports prepared by the NGO and Resettlement Specialist under PMAE.

(ii) **Resettlement Implementation NGO:** Responsible for assisting BSRDCL in facilitating to land acquisition and resettlement and rehabilitation activities. NGO should insure that ongoing meaningful consultations are taken place and assist Displaced Persons in accessing grievance redressal mechanism and ensure complaints are resolved in a timely matter.

(iii) **Contractor:** Ensure the civil works only starts on the relevant section after it has been declared free of encumbrance. Coordinate closely with NGO, and be responsive to address relevant grievances.

(iv) **Resettlement Specialist, PMAE:** Conduct regular site-level monitoring, providing technical advice to the BSRDCL and NGO to enable smooth implementation of the RP. Update the RP as necessary together and in consultation with the NGO. Prepare monitoring reports on a semi-annual basis. Act as External Monitor and provide any other necessary technical support to the safeguard focal person at the site level as well as BSRDCL, NGO and other relevant stakeholders. Prepare and update resettlement planning documents and any other necessary document as required.

C. Indigenous Peoples

61. The project is classified as category C under ADB's SPS for indigenous peoples. One indigenous people's household will be impacted by involuntary resettlement. The census found that this household is not distinctive because it has integrated with the dominant population of the project area. Tribal groups in the subproject areas freely interact with the outside community. Special attention should be paid to indigenous people's household during the implementation of resettlement activities. BSRDCL should ensure continue consultation and proper disclosure of project information. If any unanticipated adverse impacts are identified during project implementation, the BSRDCL with assistance from NGO and PMAE will devise proactive measures to ensure indigenous peoples households will not be adversely impacted.

D. Grievance Redress Mechanism

62. Grievance redress mechanisms (GRM) will be established for environment and social safeguards under the project. The project specific (GRM) will be established to receive, and facilitate the resolution of displaced people's concerns, complaints and grievances about the social and environmental performance at the project level. The GRM will aim to provide a time bound and transparent mechanism to voice and resolve social and environmental concerns linked with the project. The project specific GRM is not intended to bypass the government's own redress process, but to address project affected people's concerns and complaints promptly, making it readily accessible to all segments of affected persons and is scaled to the risks and impacts of the project. Complainants can access the formal legal system at any time. Hence, depending on the nature and significance of the grievances or complaints, the GRM will comprise procedures to address grievances at various levels.

63. For social safeguards all grievance will first be registered with the GRC and resolved by the GRC. Grievances that cannot be redressed by the GRC will be taken up to BSRDCL management level and further to the respective Judiciary if not redressed by the GRC or BSRDCL. The cost of the GRM will be borne by the EA and has already been budgeted as part of budget supporting resettlement activities. Details of the GRC can be found in the RP.

64. For environment safeguards grievances will first be registered and redressed at the PIU level. Grievances which cannot be redressed at the PIU will be taken up to BSRDCL management level and further to the GRC if the issue cannot be resolved at the PIU or BSRDCL level. Details of the GRC can be found in the EIA report.

VIII. GENDER AND SOCIAL DIMENSIONS

A. Gender

65. The project is categorized as “Some Gender Elements” in accordance with the Guidelines for Gender Mainstreaming Categories of ADB Projects.²⁷ A Gender Action Plan is not required, but proactive features for the Project include:

- (i) incorporating gender sensitive design in bridge, approach roads, and administrative buildings, including separate toilets and rest areas for men and women, adequate lighting for pedestrians and necessary surveillance equipment to monitor public areas, especially to ensure the safety of women;
- (ii) conducting grassroots road safety and safe mobility campaigns involving the participation of women with the target of 30% as trained facilitators and 50% as beneficiaries;
- (iii) providing all project affected communities and all contractors’ personnel with STI awareness training before and during construction with a target of 50% participation rate for women and poor households; and
- (iv) prioritizing the employment of women by contractors.

66. The PMAE will include a Social Development and Gender Specialist who will ensure that the proactive features set out in paragraph 58 (i) above are incorporated in the physical infrastructure designs. The NGO will be responsible for conducting road safety awareness building programs. These programs will include raising awareness in communities on the creation of a safe environment and the gender sensitive measures and support services which are available. The Social Development and Gender Specialist will help in developing culturally appropriate materials and content for this component of the road safety campaign and will work on this in close collaboration with the NGO. The NGO will focus on utilizing the training of trainers’ model to ensure sustainability of training. A special effort will be made to train women as trainers.

67. Provisions are included in the bidding documents for the civil works contractors to ensure that all applicable labor laws will be complied including not employing child labor for construction; encouraging employment of the poor, particularly women; and not differentiating wages between men and women for work of equal value. The above measures will be implemented by the civil works contractors or NGO and monitored by PMAE.

B. Health

68. BSRDCL shall ensure that civil works contractors provide adequately for the health and safety of construction workers and further ensure that bidding documents include measures on how contractors will address this, including an information and awareness raising campaign for construction workers on sexually transmitted diseases, HIV/AIDS, and human trafficking. For affected villages, the NGO will undertake awareness building sessions in HIV/AIDS, basic hygiene and human trafficking. Such awareness building sessions will be conducted separately for men and women to address gender specific issues. PMAE will conduct monitoring.

²⁷ <http://www.adb.org/documents/guidelines-gender-mainstreaming-categories-adb-projects>

C. Labor

69. The State and BSRDCL will ensure that Works contracts under the Project follow all applicable labor laws of the Government and the State and that these further include provisions to the effect that contractors; (i) carry out HIV/AIDS awareness programs for labor and disseminate information at work sites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include clauses for termination in case of any breach of the stated provisions by the contractors.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

A. Project Design and Monitoring Framework

Impact the Project is Aligned with: Mobility and accessibility within India, and connectivity with its neighboring countries improved (India's 12 th five year plan, 2012-2017) ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome Transport connectivity across the Ganges River between north and south Bihar improved	By 2021: a. 392,000 average daily vehicle-km used in the first full year of operation (2015 baseline: NA) b. Year-round road access for Raghapur Diara river island (2015 baseline: NA) c. 1.4 million tons of cross-border cargo facilitated in the first full year of operation (2015 baseline: NA)	a–c. Post-implementation measurement reports by BSRDCL as approved by the state government	Improvements to complementary national and state highways delayed
Outputs 1. New Ganga Bridge and integrated approach roadway network constructed 2. Bridge operation and management capacity enhanced	By 2020: 1a. 9.8 km of road bridge structure built 1b. 10 km of approach viaduct and embankment built 1c. 3 km of existing national highway widened 1d. Tolling and service facilities built 1e. 5-year performance-based maintenance period started By 2018: 2a. Operation management plan for the Bihar New Ganga Bridge prepared 2b. Model maintenance manual for other existing major bridges in the state developed 2c. Satisfactory evaluation of knowledge transfer in international best practices	1a–e. Monitoring reports and completion report by BSRDCL as endorsed by the state government 2a. Operation management plan 2b. Model maintenance manual 2c. Retrospective evaluation of training participants by BSRDCL	Unpredicted river flow and soil conditions delay construction Major turnover in key BSRDCL staff during implementation
Key Activities with Milestones			
1. New Ganga Bridge and integrated approach roadway constructed 1.1 Procurement of main works package by February 2016 1.2 Selection of consultants for project management and authority engineer by April 2016 1.3 Land acquisition and resettlement completed by December 2017 1.4 Construction works completed by December 2020			

2. Bridge operation and management capacity enhanced

2.1 TA consultant selection by January 2017

2.2 Prepare operations management plan for the Bihar New Ganga Bridge by December 2018

2.3 Prepare model maintenance manual for other existing major bridges by December 2018

2.4 Train managers and technical staff by December 2018

Inputs

ADB: \$500,000,000 (loan) and \$900,000 (technical assistance grant)

Government of Bihar: \$215,000,000

Assumptions for Partner Financing

Not applicable.

ADB = Asian Development Bank, BSRDCL = Bihar State Road Development Corporation Limited, km = kilometer, NA = not applicable, TA = technical assistance.

^a Government of India, Planning Commission. 2013. *Twelfth Five Year Plan, 2012–2017 Economic Sectors*. Volume II. New Delhi.

Source: Asian Development Bank.

B. Monitoring

70. **Project performance monitoring:** The achievement of the project performance targets will be assessed following the design and monitoring framework. BSRDCL, assisted by the Project Management and Authority Engineer Team will establish a project performance management system. A project completion report will be submitted within 3 months or such later date as ADB may agree for the purpose of physical completion of the project, providing detailed evaluation of the progress of implementation, costs, consultant performance, social and economic impact, and other details as requested by ADB.

71. **Compliance monitoring:** Compliance with covenants will be monitored through ADB's Project Administration Missions – including project inception mission to discuss and confirm the timetable for compliance with the loan covenants; project review missions to review the borrower's compliance with particular loan covenants and, where there is any noncompliance or delay, discuss proposed remedial measures with the Government; and mid-term review mission if necessary to review covenants to assess whether they are still relevant or need to be changed, or waived due to changing circumstances.

72. **Safeguards monitoring:** Compliance with safeguard requirements will be monitored internally by designated BSRDC officers and externally by the PMAE for social safeguards and the EMES for environment safeguards. BSRDC shall ensure compliance with the ADB's SPS, Government's rules and regulations and all the related documents agreed upon with ADB such as EIA, EMP, and RP. Compliance of the project with these documents will be reviewed by ADB review missions.

- (i) **Environment Safeguard Monitoring.** Monthly reports on implementation of the mitigation measures on site will be maintained by the contractor. Based on these records and weekly spot checks by the PMAE Environmental Specialist, monitoring reports will be compiled on a quarterly basis. These quarterly monitoring reports will be submitted for review and approval by BSRDCL and further submission to ADB for disclosure on the ADB website. If there are any changes in the design or alignment or unanticipated environmental impacts, the EMP will be updated to account for any additional or new environmental impacts.

Further the need for revising the EIA report during project construction will also be reviewed and confirmed in discussion with ADB. The External Monitor will prepare semi-annual monitoring reports during project construction and annual monitoring reports during project operation for three years for review and approval by BSRDCL for further submission to ADB for disclosure on the ADB website.

- (ii) **Social Safeguard Monitoring.** The PIU Safeguards Focal Person will be responsible for undertaking internal monitoring of the project. The PMAE Resettlement Specialist will undertake external monitoring. Semi-annual monitoring reports will be submitted to ADB for review and disclosure on the ADB website. For gender and social dimensions monitoring, compliance will be monitored by PMAE.
- (iii) **Gender and Development.** For gender and social dimensions monitoring, compliance will be monitored by PMAE.

C. Evaluation

73. As necessary, special loan administration missions and a midterm review mission will be fielded, under which any changes in scope or implementation arrangement may be required to ensure achievement of project objectives. BSRDCL will monitor project implementation in accordance with the schedule and time-bound milestones, and keep ADB informed of any significant deviations that may result in the milestones not being met.

D. Reporting

74. The BSRDCL will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions; (c) updated procurement plan as appropriate and (d) updated implementation plan for next 12 months; and (iii) a project completion report within 3 months or such later date as ADB may agree for the purpose of physical completion of the project. To ensure projects continue to be both viable and sustainable, project accounts and the executing agency AFSs, together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

75. Salient information regarding the project, including scope, general progress status, beneficiaries, invitation for bid and consultant recruitment notices, will be provided to the general public. The information will be made available and updated through the official website of BSRDCL. The safeguard documents i.e. EIA, EMPs, and RP will be posted on ADB's website. BSRDCL will provide relevant information, including information from the above documents in a timely manner, in an accessible place and in a form and languages understandable to the displaced people and other stakeholders including through their website. If the displaced people are illiterate other appropriate communication methods will have to be used. The resettlement implementation NGO will play a key role in facilitating ongoing consultation and information disclosure with affected people.

76. ADB's communication strategy is summarized below.

Documents for Disclosure

Project Document	Means of Communications	Frequency	Audience
Project Information Document (PID)	ADB website	Initial PID no later than 30 calendar days of approval of the concept paper; quarterly updates afterwards	General Public
Design and Monitoring Framework (DMF)	ADB website	draft DMF after fact-finding mission	General Public
EIA	ADB website and BSRDCL website	120 days prior to ADB management approval	General Public, project-affected people in particular
Resettlement Plan	ADB website and BSRDCL website	Post fact-finding mission	General Public, project-affected people in particular
Summary Poverty Reduction and Social Strategy (SPRSS)	ADB website	post fact-finding mission	General Public, project-affected people in particular
Legal Agreements	ADB website	no later than 14 days of Board approval of the project	General Public
Project Administration Manual	ADB website	After loan negotiations	General Public
Social and Environment Monitoring Reports	ADB website	Semi-annually for social and quarterly for environment	General Public

X. ANTICORRUPTION POLICY

77. The Government, GOB and BSRDCL are advised of ADB's Anticorruption Policy (1998, as amended to date).²⁸ Consistent with its commitment to good governance, accountability and transparency, implementation of the Project shall adhere to ADB's Anticorruption Policy. ADB reserves the right to review and examine, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. In this regard, investigation of government officials, if any, would be requested by ADB to be undertaken by the government.

78. To support these efforts, relevant provisions of ADB's Anticorruption Policy are included in the bidding documents. In particular, all contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the State and BSRDCL and all contractors, suppliers, consultants, and other service providers as they relate to the Project. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contract under the project.²⁹

79. ADB's Anticorruption Policy designates the Office of Anticorruption and Integrity as the point of contact to report allegations of fraud or corruption among ADB-financed projects or its staff. Office of Anticorruption and Integrity is responsible for all matters related to allegations of fraud and corruption. For a more detailed explanation refer to the Anticorruption Policy and Procedures. Anyone coming across evidence of corruption associated with the Project may contact the Anticorruption Unit by telephone, facsimile, mail, or email at the following numbers/addresses:

by email at integrity@adb.org or anticorruption@adb.org

by phone at +63 2 632 5004

by fax to +6326362152

by mail at the following address (Please mark correspondence Strictly Confidential):

Office of Anticorruption and Integrity
Asian Development Bank
6 ADB Avenue Mandaluyong City
1550 Metro Manila, Philippines

80. BSRDCL's website will provide updated, detailed information on project implementation. For example, it will include procurement-related information, such as the list of participating bidders, name of the winning bidder, basic details on bidding procedures adopted, amount of contract awarded, and the list of goods and/or services procured.

²⁸ Available at: <http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf>

²⁹ ADB's Integrity Office web site is available at: <http://www.adb.org/integrity/unit.asp>

XI. ACCOUNTABILITY MECHANISM

81. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.³⁰

³⁰ For further information see: <http://www.adb.org/Accountability-Mechanism/default.asp>.

XII. RECORD OF PAM CHANGES

82. All revisions/updates during course of implementation should be recorded and retained under this Section to provide a chronological history of changes to implemented arrangements recorded in this PAM.

Rev.	Date	Description of Revisions
1		
2		

XIII. ATTACHMENTS

Attachment A: Procurement Plan
Attachment B: Outline Terms of Reference for Consulting Services

Attachment A: Procurement Plan

Basic Data

Project Name	Bihar New Ganga Bridge Project
Project Number	48373
Approval Number	to be assigned
Country	India
Executing Agency	State of Bihar through BSRDCL
Project Procurement Classification	A
Procurement Risk	Low
Project Financing Amount	\$ 500 million
Project Closing Date	December 31, 2025
Date of First Procurement Plan	December 18, 2015
Date of This Procurement Plan	December 18, 2015

A. Process Thresholds, Review, and 18-Month Procurement Plan

1. Project Procurement Thresholds

Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works		
Method	Threshold	Comments
International Competitive Bidding (ICB) for Works	\$40,000,000 and more	
International Competitive Bidding (ICB) for Goods	\$10,000,000 and more	
National Competitive Bidding (NCB) for Works	Less than \$40,000,000	
National Competitive Bidding (NCB) for Goods	Less than \$10,000,000	
Shopping for Works	Less than \$100,000	
Shopping for Goods	Less than \$100,000	

Consulting Services	
Method	Comments
Quality and Cost Based Selection (QCBS)	
Quality Based Selection (QBS)	Applicable if NGO is shortlisted

2. Goods and Works Contracts Estimated to Cost \$ 1 Million or More

The following table lists goods and works contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

None.

3. Consulting Services Contracts Estimated to Cost \$100,000 or More

The following table lists consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Recruitment Value	Recruitment Method	Review	Advertisement Date	Type of Proposal	Comments
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								(quarter/year)
CS-01	Project Management and Authority Engineer	\$ 15.14 million	QCBS	Prior	Q3/2015	Full	International 90:10	
CS-02	External Monitoring for Environmental Safeguard	\$ 980,000	QCBS	Prior	Q4/2015	Simplified	National 80:20	

4. Goods and Works Contracts Estimated to Cost Less than \$1 Million and Consulting Services Contracts Less than \$100,000 (Small Value Contracts)

The following table groups smaller-value goods, works, and consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

None.

B. Indicative List of Packages Required Under the Project

The following table provides an indicative list of all procurement (goods, works and consulting services) over the life of the project. Contracts financed by the Borrower and others should also be indicated, with an appropriate notation in the comments section.

None.

C. List of Awarded and On-going, and Completed Contracts

The following tables list the awarded and on-going contracts, and completed contracts.

1. Awarded and On-going Contracts

Package Number	General Description	Estimated Value	Awarded Contract Value	Procurement Method	Advertisement Date (quarter/year)	Date of ADB Approval of Contract Award	Comments
CW-01	Main Bridge and Approach Works	\$505 million	\$490 million	ICB	Q2/2013	January 13, 2016	Joint Venture Daewoo Engineering and Construction Company, and Larsen & Toubro

2. Completed Contracts

None.

D. Non-ADB Financing

The following table lists goods, works and consulting services contracts over the life of the project, financed by Non-ADB sources.

None.

Attachment B: Outline Terms of Reference for Consulting Services

Project Management and Authority Engineer IND (P48373): Bihar New Ganga Bridge Project

A. Background and Objectives

1. India has applied for financing from the Asian Development Bank (ADB) for the Bihar New Ganga Bridge Project (the project) and intends to apply a portion of proceeds to engage a firm of international consultants (the consultant) to carry out implementation support and authority engineering services. The State Government of Bihar acting through Bihar State Road Development Corporation Limited (BSRDCL) will be the executing agency.
2. The project is to construct a new six lane extradosed cable bridge over river Ganga near Kachchi Dargah in District Patna on NH-30 to near Bidupur in District Vaishali on NH-103, (Bihar). The 22.76 kilometers long alignment includes 9.76 Km long main bridge, and approach viaduct and roads. The main works contract will be structured in engineering, procurement, and construction (EPC), largely based on the model EPC agreement, and duly amended for use by ADB.³¹ BSRDCL will be designated as the “Authority” (or “Employer” as the case may be).
3. The main objective of the consulting services is to support BSRDCL to implement the project, as required under the ADB loan, and encompass (i) providing overall project management support which include developing and monitoring project implementation schedule with milestones and critical path analysis, and preparing progress reports as required for management of the project and reporting to ADB, (ii) monitoring the implementation of safeguards in accordance with ADB’s Safeguard Policy Statement, (iii) ensuring implementation of the Environmental Management Plan (EMP) and other measures related to environmental protection in accordance with ADB's Safeguard Policy Statement, (iv) enhancing road safety measures, and (v) discharging the functions and duties of an Authority’s Engineer.

B. Scope of Services

4. The scope of services is described below.

Component 1: Overall Project Management

- Task (01) Provide project management services throughout design, procurement, construction, and commissioning stages. The consultant is to maintain and update the project schedule throughout the project, and undertake project performance management system in the format acceptable by the Employer and ADB, which consists of (1) preparing in the initial stage a project performance management system, in accordance with the ADB's project design and monitoring framework, to monitor (i) the progress of the overall project implementation, and (ii) the development impact of the project; and (2) collecting/updating the project performance indicator benchmarks.

³¹ The Agreement (including references to Clauses and Articles) substantially conforms with the “Model EPC Agreement” at <http://www.morth.nic.in/writereaddata/linkimages/Model%20EPC%20document-0989722812.pdf>

Component 2: Social Safeguard Implementation and Monitoring

- Task (02) Ensure implementation of Resettlement Plans (RPs) in accordance with ADB's Safeguard Policy Statement (2009) and other related policies such as the Public Communications Policy (2012) and the right to fair Compensation and Transparency in land acquisition, Rehabilitation and Resettlement Act, 2013 of the Government of India. The consultant will ensure payment of compensation to people affected by the project prior to hand-over of the site to the contractor. Prepare the due-diligence reports on resettlement implementation as needed for processing of subsequent tranches under the MFF. Provide monthly and quarterly reports on resettlement implementation, including close monitoring of resettlement implementation of Indigenous Peoples, and provide updates on the schedule and financial aspects of resettlement to the team. Monitor and provide guidance to the work of the NGOs for resettlement implementation engaged by BSRDCL and monitor the resettlement implementation at the project sites and provide training, if required, to the BSRDCL staff.
- Task (03) Act as the external monitor for the project, tasks include: (i) develop specific monitoring indicators for undertaking monitoring of RP; (ii) review results of internal monitoring and verify claims through random checking by adopting suitable sampling method at the field level to assess whether land acquisition/resettlement objectives have been generally met; (iii) Involve the affected people and community groups in assessing the impact of land acquisition for monitoring and evaluation purposes; (iv) Evaluate and assess the adequacy of compensation given to the DPs and the livelihood opportunities and incomes as well as the quality of life of DPs of project-induced changes; and (v) evaluate and assess the adequacy and effectiveness of the consultative process with DPs, particularly those vulnerable, including the adequacy and effectiveness of grievance procedures and legal redress available to the displaced persons, and dissemination of information about these. Lastly, ensuring the implementation of the social and gender relevant features included in the design of the project, including monitoring of HIV and human trafficking community awareness activities, as well as compliance of core labor standards by civil works contractors. External monitoring report is to be submitted to ADB on a semi-annual basis.

Component 3: Environmental Monitoring

- Task (04) Ensure implementation of the Environmental Management Plan (EMP) and other measures related to environmental protection as given in the EIA report and in accordance with ADB's Safeguard Policy Statement (2009). Update the EMP and EIA report as necessary and advise BSRDCL and the contractor in the event of un-anticipated impacts. Provide monthly and quarterly reports on EMP implementation and provide updates on the schedule and financial aspects to the team. Provide necessary support, on coordination and monitoring of environment safeguards to BSRDCL staff.
- Task (05) Monitor implementation of the EMP by the contractor and ensure compliance with the environmental safeguard requirements of civil works contracts. Provide training and technical advice including on-site advice to the contractors as found necessary. Review and confirm that the EMP implementation records are

maintained by the contractor. Prepare **quarterly** environmental monitoring reports based on these records and on-site spot checks carried out and submit to BSRDCL.

Component 4: Road Safety

- Task (06) Conduct road safety audits with use of ADB's Road Safety Audit for Road Project; An Operational Tool Kit or similar procedures acceptable to ADB. The following will be carried out:
- a) conduct pre-audit meetings with BSRDCL and the contractor's design team to review project information and drawings;
 - b) conduct office safety review of detailed designs combined with mandatory field visits to the project roads conducted both during daytime and nighttime, together with representatives of local field offices of BSRDCL, and other representatives (e.g., police) as appropriate;
 - c) conduct office road safety audit analysis and preparing concise Road Safety Audit Reports for the project with the list of road safety issues identified, highway risk for each issue assessed, and specific countermeasures proposed to be incorporated into detailed designs;
 - d) present findings and recommendations to BSRDCL and detailed design team; and
 - e) checking the revised detailed designs to ensure that measures to address road safety issues, as endorsed by BSRDCL, are incorporated in detailed designs; and preparation of provisions for managing road safety aspects appropriately during construction to be included in all bidding documents
- Task (07) Conduct awareness programs to concerned MORTH officers, supervision consultants, and contract staff. Involve local community, including women, in safety awareness activities.

Component 5: Authority Engineering Service

- Task (08) Discharge the functions and duties of an Authority's Engineer as prescribed.

1 Scope

- 1.1 These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the expected EPC Agreement dated (the "Agreement"), which has been entered into between the [Bihar State Road Development Corporation Ltd. (BSRDCL), RCD, Central Mechanical Workshop Campus, Near Airport, Sheikhpura, Patna, Bihar-800014] (the "Authority") and (the "Contractor") for the construction of the Six lane suspension cable Green field Road Bridge over river Ganga from Kacchi Dargah on NH-30 to Bidupur in District Vaishali on NH-103 in the State of Bihar on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR (footnote 1).
- 1.2 The TOR shall apply to construction and maintenance of the Greenfield Six Lane Extra dosed Road Bridge and its approaches.

2 Definitions and interpretation

- 2.1 The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.
- 2.2 References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.
- 2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3 General

- 3.1 The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- 3.2 The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:
- a) any Time Extension;
 - b) any additional cost to be paid by the Authority to the Contractor;
 - c) the Termination Payment; or
 - d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).
- 3.3 The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.
- 3.4 The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.
- 3.5 The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.
- 3.6 In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4 Construction Period

- 4.1 During the Construction Period, the Authority's Engineer shall review the Drawings

furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

- 4.2 The Authority's Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- 4.3 The Authority's Engineer shall review the quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty-one) days stating the modifications, if any required thereto.
- 4.4 The Authority's Engineer shall complete the review of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- 4.5 The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Greenfield Six Lane Extra dosed Road Bridge and its approaches for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- 4.6 The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.
- 4.7 The Authority's Engineer shall inspect the Construction Works and the Greenfield Six Lane Extra dosed Road Bridge and its approaches and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- 4.8 The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- 4.9 For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or other

- than Indian code but prior approval of Authority or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.
- 4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
 - 4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
 - 4.12 In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.
 - 4.13 The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Greenfield Six Lane Extra dosed Road Bridge and its approaches, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
 - 4.14 In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Greenfield Six Lane Extra dosed Road Bridge and its approaches is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
 - 4.15 The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.
 - 4.16 Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
 - 4.17 In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.
 - 4.18 The Authority's Engineer shall carry out, or cause to be carried out, all the Tests

specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provision of Article 12 and Schedule-K.

5 Maintenance Period

- 5.1 The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- 5.2 The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.
- 5.3 The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Greenfield Six Lane Extra dosed Road Bridge and its approaches is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.
- 5.4 In respect of any defect or deficiency referred to in Paragraph 3 of Schedule-E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.
- 5.5 The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway(including six lane bridge approaches) for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6 Determination of costs and time

- 6.1 The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.
- 6.2 The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.
- 6.3 The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7 Payments

- 7.1 The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (d).

7.2 Authority's Engineer shall

- a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and
- b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

7.3 The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

7.4 The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8 Other duties and functions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9 Miscellaneous

9.1 A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

9.2 The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Greenfield Six Lane Extra dosed Road Bridge and its approaches as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Greenfield Six Lane Extra dosed Road Bridge and its approaches and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

9.4 The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

9.5 The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

C. Implementation Arrangements

5. The consulting services will be implemented by an international consulting firm. An association with a suitable domestic consultant is encouraged to compliment consultant's local knowledge and experience. The consulting services will be required from 2015 to 2018 (construction) and from 2019 to 2023 (performance based maintenance). The inputs of international and national experts are summarized in table 1.

Table 1: Summary of Experts Required

International Key Staff	Person-months	National Key Staff	Person-months
Lead Bridge Engineer (Team Leader)	58 ^[1]	Senior Bridge Design Engineer	24
Senior Bridge Structural Engineer	36	Senior Highway Design Engineer	24
Senior Highway & Road Safety Expert	24	Resident Engineer (Bridges)	108 ^[2]
Senior Cable Engineer	18	Resident Engineer (Highway)	48
Senior Contract Specialist	12	Senior Hydrologist	18
		Senior Geotechnical and Materials Expert	24
		Senior Quantity Surveyor	48
		Senior Construction Safety Engineer	24
		Environmental Specialist	48
		Biodiversity Specialist	24
		Resettlement Specialist	36
		Social Development and Gender Specialist	16
		Subtotal (National Key Staff)	442
		National Sub-professional ^[3]	
		Assistant Resident Engineer (Bridge) 1	48
		Assistant Resident Engineer (Bridge) 2	48
		Assistant Resident Engineer (Highway)	48
		Assistant Resident Engineer (Quality)	48
		Assistant Bridge Engineer 1	48
		Assistant Bridge Engineer 2	48
		Assistant Bridge Engineer 3	48
		Assistant Bridge Engineer 4	48
		Assistant Bridge Engineer 5 (O&M)	60
		Assistant Highway Engineer	108 ^[2]
		Assistant Material Engineer 1	48
		Assistant Material Engineer 2	48
		Assistant Material Engineer 3 (O&M)	60
		Survey Engineer 1	48
		Survey Engineer 2	48
		HTMS/T&T Expert	10
		Quantity Surveyor	108 ^[2]
		CAD Engineer	48
		Lab Technician 1	48
		Lab Technician 2	48
		Lab Technician 3	48
		Lab Technician 4	48
		Subtotal (National Sub-professional)	1,162
Total (International)	148	Total (National) ^[4]	1,604

[1] 48 person-months during construction period and 10 person-months intermittent during 5 year performance maintenance period.

[2] 48 person-months during construction period and 60 person-months during 5 year performance maintenance period.

[3] CVs of national sub-professional staff are not required in the proposal, and will not be evaluated. Suitable staff acceptable to BSRDCL shall be proposed during implementation.

[4] Excluding contract administrative support staff (to be included in FIN-4 Breakdown of Other Expenses): Office Manager (108 person-months), Computer Operators (4 persons each 48 person-months during construction + 1 person each 60 person-months during O&M), Steno (48 person-months during construction), Accountant (48 person-months during construction), Cashier (48 person-months during construction), Photocopy Machine Operators (4 persons each 48 person-months during construction), Guards (4 persons each 48 person-months during construction + 2 persons each 60 person-months during O&M), and Office Service Persons (3 persons each 48 person-months during construction + 2 persons each 60 person-months during O&M). CVs of administrative staff are not required in the proposal.

6. The preferred qualification requirements are in Table 2.

Table 2: Preferred Qualification Requirements

Experts	Education	Essential Experience		
		Total Professional Experience	Relevant Experience	Experience in Similar Capacity
International				
Lead Bridge Engineer (Team Leader)	Graduate in Civil Engineering	Min. 20 years	Min. 15 years in design and supervision of bridges and min. 5 years as team leader	Design and supervision of at least two nos. extradosed or cable stayed or suspension bridge of min. span length 100 m and min. length of bridge 1 KM.
Senior Bridge Structural Engineer	Graduate in Civil Engineering	Min. 20 years	Min. 15 years in design of bridges	Supervision of at least two nos. extradosed or cable stayed or suspension bridge of min. span length 100 m and min. length of bridge 1 KM.
Senior Highway & Road Safety Expert	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in highway design projects	4-lane or 6 lane highway design for min. length 40 KM.
Senior Contract Specialist	Graduate in Related Field	Min. 15 years	Min. 10 years' experience in transport infrastructure projects	Contract Specialist in Highway/Bridge projects at least 2 projects on EPC/BOT/PPP/item rate contract.
Senior Cable Engineer	Graduate in Civil Engineering	Min. 20 years	Min. 15 years in design of cable stayed bridges	Design of at least two nos. cable stayed bridge of min. span length 100 m and min. length of bridge 1 KM.
National				
Senior Bridge Design Engineer	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in bridge design projects	Design of at least one nos. extradosed or cable stayed or suspension bridge of min. span length 100 m and min. length of bridge 500 m..
Senior Highway Design Engineer	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in highway design projects	Design of 4 lane or more highway projects including bridges, preferably funded by WB or ADB or JICA (Minimum length 40 km.).
Resident Engineer (Bridges)	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in bridge design and supervision projects	Bridge projects supervision (at least 2 nos.) of min. length 1 KM, preferably funded by WB or ADB or JICA.
Resident Engineer (Highway)	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in highway design and supervision projects	4 lane or more highway supervision projects including bridges, preferably funded by WB or ADB or JICA. Min. length of highway supervised 40 KM.
Senior Hydrologist	Graduate in Civil Engineering or related specialization	Min. 15 years	Min. 10 years' experience in transport projects	Transport infrastructure bridge projects on Gangetic plain (at least two projects of min length 1 KM).
Senior Geotechnical and Materials Expert	Graduate in Civil Engineering or Material Engineering	Min. 15 years	Min. 10 years' experience in highway and bridge projects	Material or geotechnical engineer for 4/6 lane highway and bridge projects preferably funded by WB or ADB or JICA.
Senior Quantity Surveyor	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in highway and bridge projects	4 lane or more highway and bridge projects preferably funded by WB or ADB or JICA.
Senior Construction Safety Engineer	Graduate in Civil Engineering	Min. 15 years	Min. 10 years' experience in highway and bridge projects	4 lane or more highway and bridge projects preferably funded by WB or ADB or JICA.
Environmental Specialist	Graduate in Engineering with specialization in Environment	Min. 15 years	Min. 10 years' experience in supervising environmental management and monitoring plans implementation of ODA transport projects	Environmental specialist in at least 1 major bridge construction projects preferably funded by WB or ADB or JICA.
Biodiversity Specialist	Graduate in biology, zoology or	Min. 15 years	Min. 10 years' experience in implementing freshwater wildlife	Biodiversity Specialist in at least 1 dolphin and/or migratory birds

Experts	Education	Essential Experience		
		Total Professional Experience	Relevant Experience	Experience in Similar Capacity
	related degree specializing in Wildlife Conservation		conservation programs	conservation project.
Resettlement Specialist	Graduate in Social Science	Min. 15 years	Min. 10 years' experience on highway projects funded by external donor, preferably funded by WB or ADB.	Resettlement Specialist for at least two road projects, preferably funded by WB or ADB or JICA.
Social Development and Gender Specialist	Graduate in Social Science	Min. 15 years	Min. 10 years' experience, including projects with external donor, preferably funded by WB or ADB, and strong experience in gender related issues	Social Development Specialist for at least one road or bridge project, preferably funded by WB or ADB or.

D. Reports, Deliverables, and Time Schedule

7. The consultant shall prepare and submit periodic progress reports listed in Table 3 (5 copies for BSRDCL and 2 copies for ADB).

Table 3: Report Requirements

Report	Description/Technical Accomplishments	Timeframe
Inception Report	Initial findings, project schedule, staff mobilization schedule, and recommendations if any.	1.00 month from the commencement date
Monthly Progress Reports	Brief details of the work carried out during the previous month (all components), the problems encountered or anticipated, together with the steps taken or recommendations for their correction, and financial and physical progress to date.	Monthly by the 10th day of each month following the inception report
Quarterly Progress Report	In accordance with ADB's format: I. Introduction II. Project purpose III. Implementation progress IV. Compliance with covenants V. Major project issues and problems Attachment 1 Project Data Sheet Attachment 2 Status of Utilization Table Attachment 3 Project Summary Attachment 4a Status on Social Safeguard Attachment 4b Status on Environment Safeguard Attachment 4c Status on GESI Action Plan Attachment 5 Status on Procurement Plan Attachment 6 Status on Ongoing Contracts Attachment 7 Monthly Disbursement Status Attachment 8 Status on Agreed Actions with Review Mission Attachment 9 Status of Compliance with Loan Covenants	Quarterly By the 10 th day of each calendar quarter
Quarterly Environmental Monitoring Report	Implementation progress of environment safeguards requirements as given in the EIA and EMP. One consolidated report on monitoring of EMP and biodiversity related activities will be required.	Quarterly starting from the from the commencement date
Semi-annual Social Safeguard Monitoring Report	Implementation progress of social safeguard requirements as given in the RP.	Semi-annually starting from the from the commencement date

Report	Description/Technical Accomplishments	Timeframe
Project Completion Report	In accordance with ADB's format.	3 months from the completion of the construction.

E. Data, Local Services, Personnel, and Facilities to be provided by BSRDCL

8. BSRDCL will provide access to site, data, survey reports, and other relevant records and information.

Outline Terms of Reference for Consulting Services

External Monitoring for Environmental Safeguard IND (P48373): Bihar New Ganga Bridge Project

A. Background and Objectives

1. India has applied for financing from the Asian Development Bank (ADB) for the Bihar New Ganga Bridge Project (the project) and intends to apply a portion of proceeds to engage a consulting firm (the consultant) to carry out external monitoring services for Environmental Safeguards. The State Government of Bihar acting through Bihar State Road Development Corporation Limited (BSRDCL) will be the executing agency. The project is to construct a new six lane extradosed cable bridge over river Ganga near Kachchi Dargah in District Patna on NH-30 to near Bidupur in District Vaishali on NH-103, (Bihar). The 22.76 kilometers long alignment includes 9.76 Km long main bridge, and approach viaduct and roads. The main civil works contract for engineering, procurement, and construction (EPC) is being procured, and a firm of international consultants is being selected to carry out implementation support and authority engineering services.

2. The main objective of the external monitor is to provide technical guidance and monitor implementation and effectiveness of the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMOP) and implement the Biodiversity Conservation Plan (BCP). The external monitoring agency will regularly appraise ADB and BSRDCL on the effectivity of the mitigation measures and practices and if inadequate recommend additional measures or studies. A consulting firm or Non-Governmental Organization (NGO) will be recruited in accordance with ADB's Guidelines on the Use of Consultants, and selected in accordance with ADB's Quality and Cost-Based Selection (QCBS - Simplified Technical Proposal) with a quality to cost ratio of 80:20.

B. Scope of Services

3. The consulting services will be implemented from 2016 to 2022 (approximately 7 years). The inputs of national specialists required are summarized in Table 1.

Table 1: Summary of Consulting Services Requirement

National Consultant	Person months	Key qualification	Experience
Ecological Expert	33 over 7 years (6 per year during construction for 4 years, and 3 per year during operation for 3 years)	Minimum of a Master's Degree in Biodiversity Conservation or Aquatic Ecosystem Management and related subjects	Minimum of 7 years of working experience in biodiversity conservation activities in critical habitat areas involving aquatic ecosystems
Environmental Specialist	27 over 7 years (6 per year during construction for 4 years, and 1 per year during operation for 3 years)	Minimum of a Master's Degree in Environmental Assessment (EIA) or Environmental Engineering or related subjects	Minimum of 7 years of working experience in implementing environment safeguard and related activities for road and/or bridge projects
Sub-professional staff (to be included under the out-of-pocket expenses): Assistant Ecologist 1 (24 person-months – 6 months per year during construction) Assistant Ecologist 2 (24 person-months – 6 months per year during construction) The CVs of sub-professional staff are not required in the proposal, and will not be evaluated. Suitable staff acceptable to BSRDCL shall be proposed during implementation. The preferred qualification consists of (a)			

Bachelor degree in science, botany or zoology or related subjects, and (b) minimum of 5 years working experience in biodiversity surveys and conservation activities preferably in aquatic ecosystems.

4. **Ecological Expert** (national, 33 person-months):

- (a) Review the Environmental Impact Assessment (EIA) report prepared for the project to understand the background of the conservation issues and proposed project activities.
- (b) Review proposed design and activities of the EPC contractors that will have potential significant adverse impacts on local biodiversity to include but not limited to the following:
 - Location and spacing of the piers to avoid the loss of key terrestrial and benthic habitats
 - Construction schedule and avoid or minimize disturbance to terrestrial and aquatic wildlife
 - Decision on method of construction and technology to minimize noise and vibration from foundation construction
 - Dredging Management Plan prepared by the EPC Contractor
 - Supplementary environmental impact assessment conducted by the EPC contractor as more detailed information on the method of bridge construction, type of equipment to be deployed, location of the borrow and dredging sites, location of camp sites, river training works, traffic re-routing, and disruption of navigation
 - Construction protocols of the EPC Contractor during gangetic dolphin and other wildlife migration periods
 - River training works and impact on wildlife
- (c) Review the BCP proposed in the EIA report and update it to include more site specific details, make the plan more effective and account for any design updates within the project.
- (d) Implement the activities proposed under the BCP.
- (e) Prepare semi-annual monitoring reports on implementation of the BCP and monitoring of biodiversity related activities implemented by the PMAE for submission to BSRDCL and ADB during project construction. These semi-annual reports will be disclosed on the ADB website.
- (f) After completion of the construction works continue monitoring the effectiveness of the activities implemented under the BCP for 3 years during project implementation and prepare annual monitoring reports for submission to BSRDCL and ADB.
- (g) To facilitate easier monitoring of the effectiveness of the biodiversity conservation activities, identify and procure necessary equipment such as camera traps, GPS tracking devices etc. and use them for monitoring during project operations.
- (h) Attend inter-governmental, ADB Missions, and other stakeholders meetings as instructed by the BSRDCL.
- (i) Coordinate and work closely with the Environmental Specialist under the External Monitoring team, the PMAE, BSRDCL and other relevant stakeholders

5. **Environmental Specialist** (national, 27 person-months):

- (a) Review the EIA reports (including the EMP and EMOP) prepared for the project to understand the environmental issues in the project area and mitigation and monitoring requirements of the project.

- (b) Review proposed design and activities of the EPC contractors that will have potential significant adverse impacts on local biodiversity to include but not limited to the following:
- Design and assess the effectivity of the Construction Risk Assessment Workshop (CRAW) and Health and Safety (leaders) Awareness Course to be implemented by the EPC Contractor
 - Provide oversight on the monthly Health, Safety, and Environment meetings to be conducted by the EPC Contractor and provide review and assessment to BSRDCL and ADB
 - Review and deliberate with the BSRDCL the hydrology study of the EPC Contractor on the adequacy and needed bridge design considerations
 - Decision on method of construction and technology to minimize noise and vibration from foundation construction
 - Review Dredging Management Plan prepared by the EPC Contractor and advice the BSRDCL on design and construction implications
 - Review supplementary environmental impact assessments conducted by the EPC contractor as more detailed information on the method of bridge construction, type of equipment to be deployed, location of the borrow and dredging sites, location of camp sites, river training works, traffic re-routing, and disruption of navigation
 - Review the river training and streambank stabilization works particularly at the diara on its impact on the hydrology and advice BSRDCL on the adequacy of countermeasures
 - Review and advice the BSRDCL of the EPC contractor proposals on management of construction wastes, traffic control plan, plantation and vegetation management, noise and vibration management, and site restoration and clean up plans.
- (c) Review the EMOP and ensure that the location and timing of checking/testing all environmental parameters are in accordance with the site conditions. Assess the results of ambient and emission/effluent monitoring and advice the BSRDCL on adequacy of mitigation measures to ensure compliance to relevant standards. Advise/support the contractor in taking remedial actions if any of the test results are not within the required limits
- (d) Prepare semi-annual Environmental Monitoring reports based on monitoring site visits and discussions with the PMAE for submission to BSRDCL and ADB during project construction. These semi-annual monitoring reports will be disclosed on the ADB website.
- (e) Based on the traffic data collected under the project, monitor the GHG emissions generated from the traffic for a minimum of three years during project operation following the approach used in the EIA report.
- (f) Attend inter-governmental, ADB Missions, and other stakeholders meetings as instructed by the BSRDCL.
- (g) After completion of the construction works, continue monitoring activities on an annual basis for at least 3 months (one month per year) during project implementation to confirm no residual adverse impacts occur and ensure stability of mitigation measures on slope stabilization, erosion control, effective borrow area and waste disposal sites closure, survival of plantation, cleaning up of camps and temporary storage, and restoration of affected utilities and community properties that may have been affected during decommissioning.
- (j) During project implementation prepare annual monitoring reports for submission to BSRDCL and ADB.

(h) Coordinate and work closely with the Environmental Specialist under the External Monitoring team, the PMAE, BSRDCL and other relevant stakeholders.

C. Data, Local Services, Personnel, and Facilities to be provided by BSRDCL

6. BSRDCL will provide access to site, data, survey reports, and other relevant records and information. BSRDCL will provide office space if required.

Outline Terms of Reference for Consulting Services

NGO to Implement the Resettlement Plan IND (P48373): Bihar New Ganga Bridge Project

The terms of reference is provided in the Resettlement Plan.
This is to be financed entirely by the State Government of Bihar.

Outline Terms of Reference for Consulting Services

Attached TA to Bihar New Ganga Bridge Project CDTA IND: Strengthening Bridge Operation, Management, and Maintenance

A. Background and Objectives

1. India has requested capacity development technical assistance (TA) from the Asian Development Bank (ADB) to accompany the proposed Bihar New Ganga Bridge (the project). The project is to construct a new six lane extradosed cable bridge over river Ganga near Kachchi Dargah in District Patna on NH-30 to near Bidupur in District Vaishali on NH-103, (Bihar). The 22.76 kilometers long alignment includes 9.76 Km long main bridge, and approach viaduct and roads. The main civil works contract for engineering, procurement, and construction (EPC) is being procured, and includes 5-year post construction performance based maintenance.

2. The objective of the TA is to enhance existing institutional capacity necessary to effectively operate and manage the new Ganga Bridge and other major bridges in the state. The Government of Bihar acting through Bihar State Road Development Corporation Limited (BSRDCL) will be the executing agency. The key outputs and activities involve (i) preparing an operation management plan for the new Ganga Bridge that covers comprehensively all relevant aspects, including administration and organization, user services and quality, inspection, and maintenance procedures; (ii) developing a model maintenance manual for major bridges in about four selected districts, which can be replicated for other districts in the state and which includes conducting condition surveys, prioritizing maintenance requirements, preparing cost estimates, and formulating a rolling work plan and budget; and (iii) learning international best practices, including on-the-job training of managers and technical staff during the above TA activities, in-house technical workshops, and overseas training, including case studies and observations.

B. Scope of Services

3. The scope of services is described below.

Task (01) Prepare a ready-to-use Operation Management Plan for the proposed project (Bihar New Ganga Bridge) that covers comprehensively all pertinent aspects, including administration, organization, budget and finance, toll collection, user services and quality, inspection and maintenance procedures.

Task (02) Develop an actual Maintenance Manual for major bridges in around four selected districts that can be replicated as model for other districts in the state, which include conducting inspection and condition surveys, prioritizing maintenance requirements, preparing cost estimates, and formulating rolling work plan and budget.

Task (03) Carry out on-the-job training of managers and technical staff during Task (01) and Task (02), conduct in-house technical workshops and seminars on international best practices, and facilitate practical observation trips within India and outside India.

C. Implementation Arrangements

4. The consulting services will be implemented by an international consulting firm. An association with a suitable domestic consultant is encouraged to compliment consultant's local knowledge and experience. The consulting services will be carried out over about 9 calendar months. The inputs of international and national experts are summarized in Table 1.

Table 1: Summary of Experts Required

Area of Expertise	Duration (person-months)
A. International	
1. Bridge Maintenance Specialist (Team Leader)	9.00
2. Bridge Operation and Management Specialist	2.00
3. Cable Stay Bridge Maintenance Specialist	2.00
Subtotal (A)	13.00
B. National	
1. Bridge Engineering and Maintenance Specialist	9.00
2. Bridge Operation and Management Expert	6.00
3. Bridge Engineer	9.00
4. Financial Analyst	1.00
Subtotal (B) ^[1]	25.00
Total (A+B)	38.00

[1] Excluding sub-professional support staff (to be included in FIN-4 Breakdown of Other Expenses): Assistant Bridge Engineer (9 person-months), Office Secretary (9 person-months), and Office Cleaner (9 person-months). CVs of sub-professional staff are not required in the proposal

D. Reports, Deliverables, and Time Schedule

5. The consultant will submit the reports listed in the Table 3, in English, to the government (four copies) and ADB (two copies). The final report will also be submitted on CD-ROM.

Table 3: Report Requirements

Description and/or Technical Accomplishments	Submission Deadline (months after commencement)
Inception Report	1.5
Draft Final Report	7.0
(i) Operation Management Plan for Bihar New Ganga Bridge	
(ii) Model Maintenance Manual for Major Bridges	
Final Report	9.0

E. Data, Local Services, Personnel, and Facilities to be provided by the Government

6. BSRDCL will provide the consultant with the following:
- (i) office space including furniture and utilities;
 - (ii) access to data, records, and other information required to perform the assigned tasks; and
 - (iii) counterpart staff and engineers to coordinate with the consultant team.