

# Environmental and Social Monitoring Report

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For the period covered April to September 2016  
Project Number: 43253-023  
September 2016

## IND: Karnataka Integrated and Sustainable Water Resources Management Investment Program – Project 1

Prepared by the Karnataka Neeravari Nigam Limited for the State Government of Karnataka for the Asian Development Bank.

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**KARNATAK NEERAVARI NIGAM LTD**

**KARNATAKA INTEGRATED AND SUSTAINABLE  
WATER RESOURCES MANAGEMENT  
INVESTMENT PROGRAM**

**ADB LOAN No. 0085-IND/LOAN No. 3172**

**CONTRACT No. PSC-1**

**FOR**

**PROJECT SUPPORT CONSULTANT (PSC)**

**GONDI IRRIGATION SUBPROJECT**

**Safeguard Monitoring Report**



**September 2016**



**SMEC**

**SMEC International Pty Ltd, Australia  
in association with SMEC (India) Pvt Ltd**

## DOCUMENTS/REPORT CONTROL FORM

<b>Report Name</b>	Gondhi Safeguards Monitoring Report
<b>Project Name:</b>	Karnataka Integrated and Sustainable Water Resources Management Investment Program- Consultancy Services for Project Support Consultant (PSC)
<b>Project Number:</b>	5061164
<b>Report for:</b>	Karnataka Neeravari Nigam Ltd (KNNL)

### REVISION HISTORY

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
1	30 Sept 2016	AR/DR	AR/KK	KK

### ISSUE REGISTER

Distribution List	Date Issued	Number of Copies
KNNL:	30 Sept 2016	10
SMEC Staff:		
Associate (K. K. Gupta):	30 Sept 2016	1
Office Library (Shimoga):	30 Sept 2016	1
SMEC Project File:	30 Sept 2016	1

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## ACRONYMS & ABBREVIATIONS

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ADB	Asian Development Bank
ASI	Archaeological Survey of India
CPCB	Central Pollution Control Board
EA	Executing Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMMP	Environmental Management and Monitoring Plan
GoI	Government of India
GoK	Government of Karnataka
HWHAMA	Hampi World Heritage Area Management Authority
IA	Implementing Agency
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
KNNL	Karnataka Neeravari Nigam Limited
KSPCB	Karnataka State Pollution Control Board
MFF	Multitranchise Financing Facility
MoEFCC	Ministry of Environment, Forests and Climate Change
NP	National Park
OM	Operations Manual
PA	Protected area
PIU	Project Implementation Unit
PMU	Project Management Unit
PSC	Project Support Consultants
PUC	Pollution under Control
REA	Rapid Environmental Assessment Checklist
SEIAA	State Environment Impact Assessment Authority
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
SPS	Safeguard Policy Statement
UNESCO	United Nations Educational Scientific and Cultural Organisation
WALMI	Water and Land Management Institute
WLS	Wildlife Sanctuary



## EXECUTIVE SUMMARY

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This report is the first report on environmental and social safeguards compliance of the Modernization of Gandhi Irrigation System in Bhadravathi Taluk, Shimoga District, Karnataka Project. It covers the period from April to September 2016. The project is being financed by Asian Development Bank and expected to be completed by May 2019 at a cost of Rs. 212 Crore.

Karnataka Neeravari Nigam Limited (KNNL) is the Executing Agency for the Project. The sole civil works contract package under the project was awarded to RPP Infra Projects Limited (RPP) in February 2016. Snowy Mountain Engineering Corporation (SMEC) is supporting KNNL as a Project Support Consultant (PSC) on the project. As of September 2016, total physical and financial accomplishment are about 8% and 10%, respectively.

Upon selection of the Contractor, RPP has submitted an EMP and followed it up with a CEMP that outlines the overall system under which the EMP shall be implemented by the Contractor. During the last six months, RPP has ensured that labourers and workers' campsites have access to water supply and sanitation services and firewood and LPG cylinders for cooking purposes. However, both the EMP and CEMP submitted by RPP does not provide for an action plan to address the various environmental and social issues which have been identified in the PPTA.

The PSC has had discussions with the Contractor's representatives on these issues and this Safeguard Monitoring Report provides guidelines on the kind of activities that the Contractor needs to carry out to be in compliance with the loan covenants to ensure that the Contractor is complying with the proposed mitigation measures described in the Environmental Management Plan (EMP) and the contract specifications.

At this time, the construction at the sites have been stopped because of the ongoing monsoon season. Hence, prior to the start of the next construction season, the Contractor has to ensure that action plan for addressing each of the identified environmental and social issues are developed and awareness raised amongst its workers and sub-contractors to ensure its implementation.

# 1 INTRODUCTION

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## 1.1 Project Background

The Karnataka Integrated and Sustainable Water Resources Management Investment Program (KISWRMIP) is proposed to be implemented with the assistance of Asian Development Bank (ADB). The program aims to enhance security of water resources through modernisation of existing irrigation projects/schemes, improved water resources management in the selected river basins and other associated infrastructure activities.

KISWRMIP is a multi-tranche financing facility (MFF) program and proposed to be executed in a period of seven years from 2014 to 2020 in two Tranches with the aim of modernization of irrigation infrastructure on three irrigation subprojects within the Tungabhadra (K-8) sub-basin. Tranche-1 envisages modernization of Gondi irrigation system whereas Tranche-2 envisages modernization of Vijayanagara and Tungabhadra Left Bank canal systems and all associated infrastructure including flow measurement & Telemetry System supply and installation, strengthening asset management and main system operation and maintenance (O&M) and capacity building of WUCS (Water User Cooperative Societies).

The Modernization of the Gondi Irrigation System is one of the components under Tranche-1 and consists of modernisation of channels and the associated infrastructure in the Gondi Irrigation System.

The Gondi Irrigation System is located in the Bhadravati Taluk of Shivamogga District. The Gondi Anicut is built across River Bhadra located about 14.50km downstream of the Bhadra Reservoir and 11.56km from Bhadravati Town. It is situated at a latitude 13°46' N and longitude 75° 41' E. There are two main canals originating from Gondi anicut one each from Left Bank and Right Bank. Left bank canal is 14.5 km long with 20 DPOs for an atchkat of 212 Ha and full potential is created under this canal. The discharge required in the canal is 0.56 cumecs (20 cusecs). Right bank canal is 74.40 Km long with 16 distributaries and 130 DPOs to cater an atchkat of 4388 Ha. The Discharge required in the canal is 7.50 cumecs (265 cusecs) in unlined condition. The Gondi Anicut canal system is unlined.

The Gross Command Area (GCA) is 5060 Ha, Cultivable Command Area (CCA) is 4600 Ha and sanctioned atchkat is 4465 Ha. The Gondi Irrigation System was constructed in between 1916 and 1954. It lies within the larger and more recent Bhadra irrigation system but has its own supply from the Gondi anicut. The system has deteriorated and water is no longer able to pass along the whole length of the right main canal resulting in the tail area of the Gondi system being dependent on return flows from the Bhadra system. This is, at best, an unreliable source of water and will reduce in the future as the Bhadra system is managed more efficiently. Hence, the project on modernization of the Gondi Irrigation System has been taken up under ADB funding.

Based on the Project Preparation Technical Assistance (PPTA) (ADB TA 7954-IND) Report, the following modernization activities have been taken up for the Gondi Irrigation System:

- Repairs to the Gondhi anicut and canal head works;
- Improvement of main canals and distributaries including provision of concrete canal lining to suit future water delivery requirements and upgrading canal access roads. Lining may be a combination of slip-formed channel and large precast units in order to minimize the duration of canal closures;
- Repair / replacement of all canal structures including bridges and crossings, drainage inlets and relieving weirs, pipe outlets and provision of new structures such as cross regulators where necessary to support the future operational objectives. Ramps into canals for laundry and animal drinking will be provided;

- Possible modification of current on-line storage tanks and where feasible to become activity managed off-line storage and enhancement of existing off-line tanks for more pro-active management. Modification options and impacts will be assessed during detailed planning and design;
- Command area development works comprising lined channels, low-pressure gravity supplied pipe distribution where technically feasible and drainage where required;
- Provision of electronic flow measurement and telemetry at about 20 locations on the main canal and drainage system and flow measurement with recorders at all outlets;
- Capacity development of system operations staff and water users to enable them to effectively use the flow measurement system and provide a more efficient and equitable water distribution service more closely aligned with the farmers' needs;
- Agricultural extension and on-farm water management training to equip the farmers with the skills to use water more efficiently;
- Develop managed conjunctive use of canal water, water stored in tanks and pumped groundwater and undertake small pilots of pressurised irrigation using gravity supply from the main canal with possible inter-linking to existing drip irrigation that uses groundwater.

In line with the requirements of the ADB Safeguard Policy 2009, an Initial Environmental Examination (IEE) for the project on Modernization of the Gondi Irrigation System was carried out as part of the PPTA. The IEE identified that the environmental impacts occur during the construction activities as listed below:

- Clearance of vegetation along the canal rights of way to provide access and working space for the construction activities;
- Materials generated during excavation where necessary within the existing canals. The total excavation volume is estimated to be about 250,000m<sup>3</sup>;
- Filling of about 350,000m<sup>3</sup> to restore the canal cross section and access track. Fill material will either be suitable material from the excavation or from borrow areas;
- Gravel surfacing of canal roads using material from suitable quarries or borrow areas;
- Concrete lining either using mechanised paving equipment, precast concrete units or hand placed concrete. Concrete for paving equipment would be supplied by ready-mixed concrete but concrete for hand-placed lining will probably be mixed on site. Precast units would be stockpiled on site for a brief period before installation;
- Reconstruction of canal structures using reinforced concrete;
- Provision of either concrete field channels or pipes within the command area which will require temporary access over fields.
- The logistics associated with the construction work include extensive movement of trucks carrying soil, gravel for roads and either ready-mixed concrete or materials for concrete. Potentially there could be about 100,000 round trip truck movements depending on the truck size;
- The canals under modernisation do not pass through or immediately adjoin forest. The Gondi Anicut and Gondi left bank canal at the anicut is within 1 km of a minor forest (sandalwood plantation) and 6 km of a reserved forest (and wildlife reserve) on the left side of the Bhadra reservoir, with the Bhadra Left Bank canal and settlements in-between. The Gondi Anicut and Right Bank Canal near the anicut are 2 km from a minor/State forest with settlements in between. It is 11 to 12 km from the Wildlife and Tiger Reserve with the Bhadra Right Bank canal and settlements in-between. Elsewhere the canal is more than 2.5 km from reserved forest with the Bhadra Right Bank canal and settlements in-between;
- Modernisation works for each site will occur just once and activity at any one location will last a few days. Passing traffic will increase for most of that closure period. Overall modernisation

is expected to take place in 1 or 2 canal closure periods each year (mid May – mid July or December) when the canals are normally empty;

- It is expected that about 213,000 m<sup>3</sup> of material will be excavated from the canal. The excavated material is expected to be either used for construction purposes or disposed on adjoining fields.

Accordingly, the IEE recommended that the Modernization of the Gondi Irrigation System be implemented on the condition that the Environmental Management and Monitoring Plan provided in the IEE are adhered to and complied with fully by the Project Proponent for all phases of the project.

The objective of the implementation of the Environmental Management and Monitoring Plan is to reduce or even negate the negative impacts arising from the modernization of the Gondi Irrigation System project.

As part the EMMP, it is required for the Project Proponent to prepare Monitoring Reports at regular intervals and submit the same to the relevant agencies. This Environmental Safeguard Monitoring Report has been submitted to reflect the progress achieved in the implementation of the EMMP since the selection of the Contractor to implement the Modernization of the Gondi Irrigation System Project.

## 1.2 Executing Agencies

### 1.2.1 Project Proponent

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The Chief Engineer

Project Implementation Office

Upper Tunga Project Zone

Shivamogga

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Website: [www.knlnindia.com](http://www.knlnindia.com)

### 1.2.2 The Contractor

RPP Infra Projects Limited

Registered Office at:

SF No. 454, Raghupathynaiken Palayam, Railway Colony (Post),

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Email: [ao@rppi.com](mailto:ao@rppi.com)

Website: [www.rppi.com](http://www.rppi.com)

## 1.3 General Project Features

The overall objective of the project is to modernise the irrigation infrastructure of a 4,600 ha Gondhi System so that a fully functioning irrigation system is left in place and WUCS that are independent self-sustaining entities capable of fulfilling their responsibilities including irrigation management; equitable distribution of water to farmers; O&M of minor canal system and collection of irrigation water charges; and, capable of interacting with service agencies including KNNL / CADA, Agriculture Department, Horticulture Department and other Departments to ensure that they receive necessary services.

The goal is to significantly improve water use efficiency coupled with an increase in agricultural productivity which in turn is expected to substantially improve the income of farmers. The project shall also address the fact that the Gondhi canal has, for many years, received supplementary water as return flows from the adjacent Bhadra canal system but this source of water is diminishing as that system becomes better managed. Also, project shall pilot alternative distribution systems and shall have a fully-functioning WUCSs within the implementation period.

The four major project components include:

- Modernization of the Bhadra Canal Control and Gondhi Command Area;
- Improved O&M at all levels of the system;
- Strengthening of KNNL and CADA System Management;
- WUCS and Agricultural Development.

Specific interventions include:

- Repairs to the Gondhi anicut and canal headworks.
- Improvement of main canals and distributaries including provision of concrete canal lining and upgrading of canal access roads.
- Repair / replacement of all canal structures including bridges and crossings, drainage inlets and relieving weirs, pipe outlets and provision of new structures such as cross regulators. Ramps into canals for laundry and animal drinking will be provided.
- Modification of current on-line storage tanks where feasible to become actively managed off-line storage and enhancement of existing off-line tanks.
- Where feasible, remodelling of the drainage inflow and relieving weir arrangement to avoid water (and associated sediment) entering the main canals unless required.
- Managed conjunctive use of canal water, water stored in tanks and groundwater where possible. Small pilots of gravity pressurised irrigation from the main canal.
- CAD works comprising lined canals, low-pressure gravity supplied pipe distribution and improved drainage;
- Provision of electronic flow measurement with telemetry at 20 locations on the main canal and drainage system and flow measurements at all outlets. Electronic flow measurement and control systems will also be provided for the Bhadra canal system and selected locations on other irrigation schemes in the K-8 sub-basin;
- Capacity development of system operations staff and water users;
- Strengthening of WUCS for effective water management, agriculture and minor system O&M;
- Agricultural extension and on-farm water management training. Proposed agricultural interventions to support DPR implementation are to address (i) soil fertility (ii) irrigation water savings and IWRM (iii) Cropping patterns and intensification (iv) Farm mechanisation (v) Chemicals and Pest Management (vi) Agricultural extension and communications (vii) Research and demonstration.

## 1.4 Project Implementation Schedule

The project is being implemented over the period January 2016 to May 2019.

## 1.5 Schedule of Implementation of EMMP

The EMMP implementation follows the Project Implementation Schedule and consists of three phases viz., pre-construction, construction and operational phases.

## 2 IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

### 2.1 Physical Progress of Works

Period: April – September 2016

Major works carried out include:

- Establishment of the Workers' Campsites;
- Establishment of Concrete Batching Plant;
- Desilting works;
- Installation of canal lining and related structures; and
- Construction of Distribution structures;

Table 1 and Table 2 provides the status of the major works as on date on Gondi Irrigation Subproject.

**Table 1: Physical Progress of Works as on date**

Sl. No.	Name Of Structure	Total Structure	Completed	Progress
<b>Left BANK CANAL Lining</b>		<b>14.735 km</b>	<b>1.40 km</b>	
1	Cart Bridge	7	5	0
2	Pipe Culvert	9	1	4
3	Inlet	19	7	0
4	Pipe Outlet	20	12	0
5	Relieving Weir	9	2	0
6	Sopanam & Cattle Ramp	10	0	0
	<b>Total</b>	<b>74</b>	<b>27</b>	<b>4</b>
<b>RIGHT BANK CANAL Lining</b>		<b>74.238 km</b>		
1	Inlet	39	0	0
2	Cart Bridge	57	4	1
3	Sopanam & Cattle Ramp	79	4	1
4	Direct Pipe Outlet	130	0	0
5	Relieving Weir	22	0	0
6	Escape Sluice	8	0	0
7	Distributary Sluice	12	0	0
8	Pipe Outlet	4	3	0
9	Drops	9	0	0

Sl. No.	Name Of Structure	Total Structure	Completed	Progress
10	Pipe Culvert	29	2	0
	<b>Total</b>	<b>389</b>	<b>13</b>	<b>2</b>

**Table 2: Gondhi structural details**

Sl. No.	Name of Structure	Total Structure	Progress
1	Distributor Lining	26.00 km	Still Not Started
2	Distributor Structure	212 No's	Still Not Started
3	Watchman Quarters		Still Not Started
4	Repair works(EE Office)		Work In Progress
5	Anicut Repair works		Still Not Started
6	Aqueduct	3 No's	1 Progress

## 2.2 Evaluation of Environmental Management and Monitoring Plan Implementation – Pre-Construction Phase

Upon selection, the Contractor, RPP Infra Projects Limited (hereinafter referred to as RPP) signed an agreement with KNNL dated 26 February 2016 to implement the Gondhi Irrigation System modernization project. KNNL had included the mandatory requirements on adhering to environmental safeguards in the Contractor's contract. Accordingly, the Environmental Management Plan (EMP) was submitted by RPP to the KNNL on 23 May 2016. The EMP was shared with the PSC on 03 June 2016.

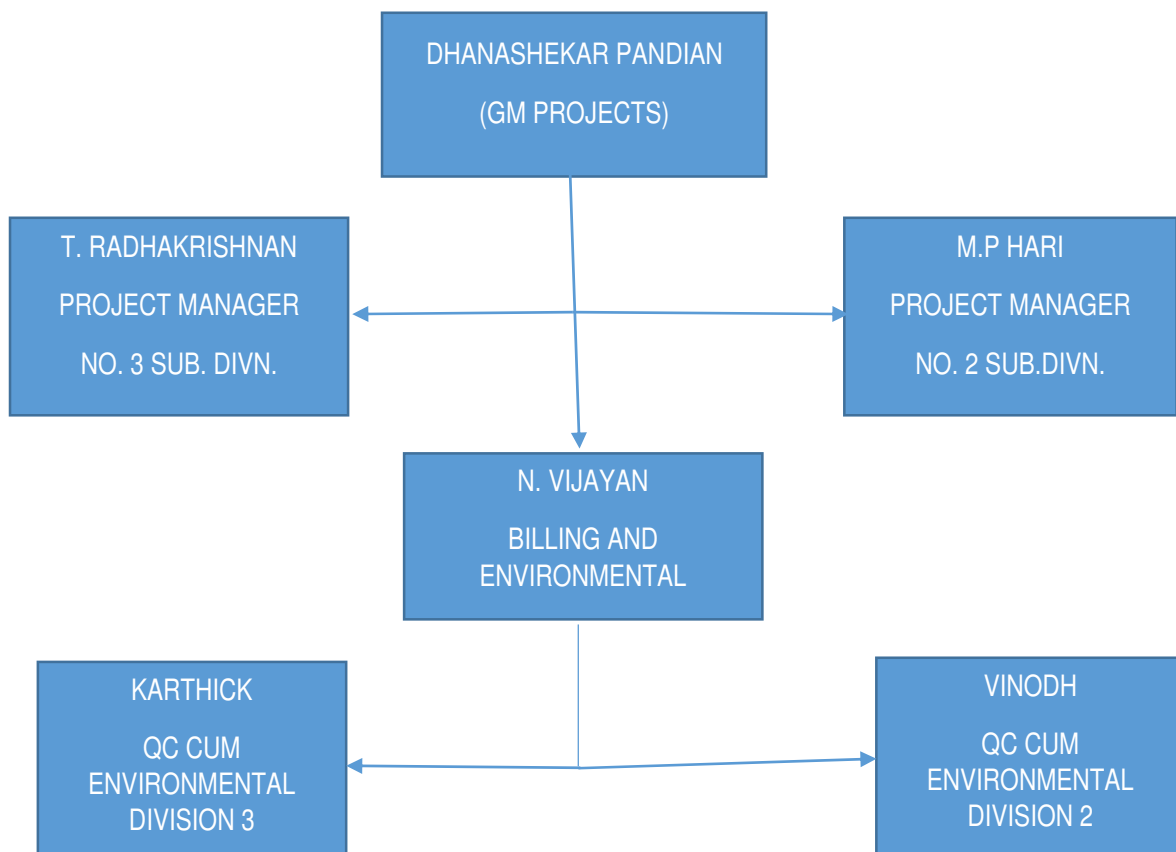
The Consultant conducted an evaluation of the EMP submitted by the Contractor. It was noted that Contractor's EMP identified major environmental issues, mitigation actions and agencies responsible for addressing the issues which were in-line with the EMP presented in the PPTA. However, the EMP submitted by the Contractor did not detail the Plan of Actions that the Contractor would implement in order to ensure that the mitigation actions are adhered to and the environmental issues are addressed adequately. Additionally, the identification of specific person responsible for implementation of the EMP was not done.

The Consultant had a meeting with the Contractor's representatives at the Contractor's Site Office on 28 June 2016 and recommended the following:

- The need to re-submit a modified EMP that reflected the plan of actions that the Contractor would carry out in order to adhere to the EMP prepared under the PPTA;
- Record and provide information on all baseline measurement of noise at the construction site
- Record and provide information on the baseline status of the site identified for quarries and borrow pits;
- Record and provide information on the baseline status of the tree survey and the identification of the trees to be cut at the construction sites;
- Provide information on the approvals obtained for locating the Campsite, Ready-Mix-Concrete Batching Plant, for utilising the village roads for truck travel and for disposal of excavated material in public or private lands.

Subsequently, a second meeting was held with the Contractor’s representatives at the KNNL Executive Engineer office on 23 Aug. 2016 wherein the Consultant reiterated the actions to be taken by the Contractor to comply with the environmental safeguards requirements under the Contract and the need to submit a modified EMP immediately. Thereafter, the Contractor submitted a modified EMP on 30 Aug. 2016 which has been once again reviewed by the Consultant.

The modified EMP called the Construction Environment Management Plan (CEMP) submitted by the Contractor on 30 Aug 2016 is general in nature and does not cover the specific plan of actions that the Contractor needs to carryout in order to fulfil the role as stipulated in the Contract. However, the CEMP identifies the personnel responsible for implementing the EMP at the construction sites. The organizational chart presented by the Contractor is reproduced in **Figure 1**.



**Figure 1: Contractor’s Organization Chart for implementing EMP**

### 2.3 Evaluation of EMMP Implementation - Construction Phase – Role of Contractor

The list of environmental issues for which the Contractor is responsible for has been listed in the IEE prepared under the PPTA. Accordingly, the Contractor has detailed the plan of actions that the Contractor would be carrying out to comply with the environmental safeguards guidelines stipulated under the funding for the project. However, the Contractor’s Plan does not identify the specific activities that need to be carried out to mitigate the environmental impacts from the project. Hence, the Consultant has suggested the activities that need to be carried out along with the action list that the Construction Contractor has to adhere to in order to meet the requirements of the EMP. The details are provided in **Table 3**.



**Table 3: List of environmental issues to be covered in the Contractor’s EMP**

Environmental Issue identified in the PPTA for which the Contractor is responsible for	Mitigation Action to be implemented	Suggested Activities of Contractor for the Mitigation Action	Action List
Water Logging or Aquifer degradation due to project activities	Identify and manage quarries such that they cause minimum damage, if any to surface and groundwater systems and ensure that during quarrying there is minimum, if any, damage to aquifers and surface water systems.	<p>Source material from approved quarries;</p> <p>Keep a record of all approvals;</p> <p>Undertake periodic inspection of quarry sites for its compliance;</p> <p>Keep record of all incidents at the quarry site.</p>	<p>The CEMP does not specify the actions to be taken by the Contractor.</p> <p>Contractor should prepare a modified CEMP and re-submit.</p> <p>Contractor should submit the approvals to KNNL.</p> <p>Contractor should submit inspection report every month.</p>
Cutting of Trees	Requires Contractor to consult with the Forest Department to select the appropriate species and carry out the necessary plantation activities.	<p>Conduct survey of trees along the construction path including pathway used for equipment transport;</p> <p>Consult local community on trees of importance to the community;</p> <p>Select open land for planting of trees;</p> <p>Seek approval of the local community for use of identified land for tree planting;</p>	<p>The CEMP does not specify the actions to be taken by the Contractor.</p> <p>Contractor should prepare a modified CEMP and re-submit;</p> <p>An inventory of trees to be cut should be provided;</p> <p>All approvals should be provided upon-demand.</p>

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
		Seek Forest Department approval for the species to be utilised for tree planting.	
Reduction in habitat for local flora and fauna	Scheduling of work to be done to minimise human-animal conflict by identifying possible animal corridors and taking up appropriate mitigation actions.	Map the animal corridor areas near the construction sites;  Discuss with Forest Department if any animal corridor is identified and develop a plan of action accordingly	Share details of the mitigation plan implementation.
Damage to Infrastructure	Implementation of a plan of action to ensure that all infrastructure are maintained in their original state.	Record baseline information on the condition of all land and other infrastructure used during construction;  Take corrective measures at the end of the construction period at each of the construction related sites.	Share the baseline information and action taken information at the end of the construction activity at each of the construction sites.
Workers / Labour Camps and facilities	Implementation of a plan of action for ensuring good living conditions for the workers / labourers working at the project site.	Record the facilities that have been provided to the workers / labourers at each of the construction sites.	Share the information on the facilities provided to the workers / labourers at each of the construction sites.

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
Conflict with labour camp for resources	Implementation of a Stakeholder Consultation Plan for avoiding conflict between migrant labour and local populations.	<p>Conduct awareness workshops for migrant labourers;</p> <p>Resolve any incidences as a matter of priority through appropriate consultations;</p> <p>Record the information on any incidences</p>	Share the information on conflict redressal mechanism on a monthly basis.
Chance finding of archaeological sites	Implementation of a plan of action for dealing with situation arising out of chance finding of archaeological sites.	Contractor should intimate the District Collectorate on any chance finding of archaeological sites.	Shall update and share information on a monthly basis for all construction sites.
Pollution from Construction activities	Implementation of a plan of action to reduce pollution from construction activities.	<p>Air pollution from movement of trucks from batching plant should be dealt with by sprinkling water on roads leading to the main road;</p> <p>Contractor should obtain Road Worthiness Certificate and Non-Polluting Vehicle Certificate from relevant agencies of the government for the vehicles used during the project period;</p>	Updates on action taken by the Contractor shall be provided on a monthly basis;

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
		<p>Contractor should limit air and noise pollution from vehicle and equipment by carrying out regular maintenance;</p> <p>Contractor should provide ear plugs at construction sites where noise is expected to be higher than normal;</p>	
<p>Accidents and Health concerns of local population</p>	<p>Implementation of a plan of action to eliminate accidents and address health concerns of local population arising from construction activities including migrant labour.</p>	<p>Contractor should install appropriate sign boards in the local language to warn the local residents of the truck and vehicle movements in the populated areas;</p> <p>Contractor should hold sensitization workshops for the local residents on the temporary utilisation of the roads during the construction period and spell out the accident prevention mechanism that has been taken;</p> <p>Regular health check-ups of all workers and labourers should be carried out;</p>	<p>Updates on action taken by the Contractor shall be provided on a monthly basis;</p>

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
<p>Compaction of soil / soil erosion for access to various sites and quarries such as metal quarries for aggregate, murrum quarries and sand mining areas</p>	<p>Rehabilitation Plan for restoring the construction / quarry sites after work completion should be developed and adhered to.</p>	<p>Record baseline condition of the construction / quarry site;</p> <p>Construction / Quarry Site Restoration Plan should be developed for each site and adhered to prior to closure.</p>	<p>Contractor shall submit separate Construction / Quarry Site Restoration Plans for all locations including Batching Plant, Construction and Labour Campsites;</p> <p>Information on the implementation of the Restoration Plans shall be shared on a regular basis;</p>
<p>Impact on local fisheries and fish spawning and aquatic fauna</p>	<p>Construction activity to be scheduled such that the impact on local fisheries and fish spawning is minimized.</p>	<p>Contractor should identify sites that are utilised for fisheries and fish spawning.</p> <p>Action Plan should be prepared and implemented for such sites in discussion with the Fisheries Department.</p>	<p>Updates on action taken by the Contractor shall be provided;</p>
<p>Disturbance to local population</p>	<p>Construction activity to be scheduled such that there is minimum disturbance to local population.</p>	<p>Contractor should hold sensitization workshops for the local residents on construction activities near the habitations;</p> <p>Contractor should schedule the construction activity in</p>	<p>Updates on action taken by the Contractor shall be provided;</p>

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
		consultation with local population;	
Reduced access to sites for local population, construction sites or material procurement sites.	Construction activity and movement of vehicles to be scheduled such that there is minimum disturbance to the movement of local population.	<p>Contractor should hold sensitization workshops for the local residents on construction activities near the habitations;</p> <p>Contractor should schedule construction activity in consultation with local population;</p>	Updates on action taken by the Contractor shall be provided;
Sand Mining and possible change in river course and river scouring	Contractor to ensure that excess sand mining is not done and should rehabilitate sand mining area after work is completed.	<p>Contractor should identify the sand mining area and provide details of the volume to be mined and share it with appropriate agency;</p> <p>Baseline condition of the sand mining area should be recorded;</p> <p>Contractor should obtain the necessary approvals, if required, prior to starting sand mining at the identified location;</p> <p>Contractor should carry out the necessary rehabilitation activities</p>	Regular updates on action taken by the Contractor shall be provided;

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
		<p>after the sand mining is completed;</p> <p>Contractor should generate the closure report for each sand mining site.</p>	
<p>Water logging from poor site planning and management</p>	<p>Contractor to implement proper site planning and management to prevent water logging.</p>	<p>Baseline information on drainage management at the construction areas should be recorded by the Contractor for each of the construction sites;</p> <p>Contractor should identify and carryout the necessary activities to prevent water logging;</p> <p>Contractor should generate the closure report for each construction site.</p>	<p>Regular updates on action taken by the Contractor shall be provided;</p>
<p>Erosion due to sand and murrum mining and material procurement methods</p>	<p>Contractor to implement a plan of action to prevent erosion.</p>	<p>Baseline condition of the sand mining and murrum mining areas should be recorded;</p> <p>Contractor should identify and carryout the necessary rehabilitation activities after the mining is</p>	<p>Regular updates on action taken by the Contractor shall be provided;</p>

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Suggested Activities of Contractor for the Mitigation Action</b>	<b>Action List</b>
		<p>completed to prevent erosion;</p> <p>Contractor should generate the closure report for each sand and murrum mining site.</p>	
<p>Disturbance to wild life species due to construction and material procurement activities.</p>	<p>Contractor to schedule activities and prevent disturbance to wild life activities</p>	<p>Contractor should make an assessment of the wild life activities near the construction sites;</p> <p>Contractor should schedule the construction activities such that the activities do not disturb wildlife activities;</p>	<p>Regular updates on action taken by the Contractor shall be provided;</p>
<p>Occupational safety and health hazards</p>	<p>Contractor to take up adequate measure to ensure occupational safety and prevent health hazards.</p>	<p>Contractor should prepare an Occupational Safety and Health Plan to address all the health and safety issues faced by the labourers and workers working on the project;</p> <p>Contractor should hold an awareness workshop for the labourers and workers on the occupational safety and health issues;</p>	<p>Regular updates on action taken by the Contractor shall be provided;</p>



Environmental Issue identified in the PPTA for which the Contractor is responsible for	Mitigation Action to be implemented	Suggested Activities of Contractor for the Mitigation Action	Action List
		<p>Contractor should provide the necessary materials including first-aid kits to tackle all occupational health and safety issues faced by the labourers / workers during the construction activities;</p> <p>Contractor should keep a record of all incidences pertaining to occupational health and safety;</p>	

The assessment on the Contractor's action on the various environmental issues for which the Contractor is responsible for is provided in **Table 4**.

**Table 4: Assessment of the Contractor's Performance in EMP Implementation during the period April – September 2016**

Environmental Issue identified in the PPTA for which the Contractor is responsible for	Observation Status	Remarks
Water Logging or Aquifer degradation due to project activities	<p>No water logging was reported at any of the construction sites during the site visits conducted by the Consultant</p> <p>Sanitation facilities at both the campsites and construction sites are adequate.</p>	<p>The Contractor has been instructed to keep a log book on the water logging incidences including photographs of such events;</p> <p>The Contractor has provided the sanitation facilities and both campsites and construction sites. The Contractor has been instructed to ensure that the labourers / workers use these facilities and the facilities maintained in an exemplary manner.</p>

Environmental Issue identified in the PPTA for which the Contractor is responsible for	Observation Status	Remarks
Cutting of Trees	Requires Contractor to consult with the Forest Department to select the appropriate species and carry out the necessary plantation activities.	<p>The Contractor has been instructed to conduct survey of trees along the construction path including pathway used for equipment transport.</p> <p>At Hollehonnur construction site, one of the trees that was utilised for temple rituals was cut. Hence, the contractor has been instructed to replant the same species at a location that is acceptable to the local population.</p> <p>Also, the Contractor has been instructed to henceforth consult with the local community on trees of importance to the community and take decision on tree cutting accordingly. A record of such decision making should be maintained.</p>
Reduction in habitat for local flora and fauna	Scheduling of work to be done to minimise human-animal conflict by identifying possible animal corridors and taking up appropriate mitigation actions.	The Contractor has been instructed to discuss with Forest Department if any animal corridor exists in the construction areas and develop an Action Plan accordingly. A record of such decision making should be maintained.
Damage to Infrastructure	Implementation of a plan of action to ensure that all infrastructure are maintained in their original state.	The Contractor has been instructed to record baseline information on the condition of all land and other infrastructure used during construction and take corrective measures at the end of the construction period at each of the construction related sites. A record of such decision making should be maintained.

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Observation Status</b>	<b>Remarks</b>
Workers / Labour Camps and facilities	Implementation of a plan of action for ensuring good living conditions for the workers / labourers working at the project site.	The Contractor has provided adequate water and sanitation facilities at the Workers / Labour Camps. Additionally, the Contractor has provided fire-wood for cooking purposes to the workers' families so as to avoid the cutting of the trees near to the labourers' camps. At the Workers Camp, LPG cylinders are provided for cooking purposes. The Contractor has been instructed to keep a record of all the facilities provided.
Conflict with labour camp for resources	Implementation of a Stakeholder Consultation Plan for avoiding conflict between migrant labour and local populations.	The Contractor has been instructed to conduct an awareness workshop for the migrant labourers. It is a positive sign that the Contractor has distributed fire wood to the labourers for cooking purposes which would help conflict with the local population for resources. The Contractor has been instructed to keep a record of all initiatives and incidences of conflict between migrant labour and local population and use all resources to resolve such conflicts.
Chance finding of archaeological sites	Implementation of a plan of action for dealing with situation arising out of chance finding of archaeological sites.	The Contractor has been instructed to interact with the District Collectorate on any chance finding of archaeological sites and follow applicable guidelines for such sites.
Pollution from Construction activities	Implementation of a plan of action to reduce pollution from construction activities.	The Contractor has been instructed to develop and implement an action plan for preventing pollution of air, water and land. As of now, the Contractor has provided adequate sanitation facilities at the Labour / Workers Campsites. Such facilities should be provided throughout the contract period. Hence, the Contractor has been advised to be a record of such initiatives.

Environmental Issue identified in the PPTA for which the Contractor is responsible for	Observation Status	Remarks
Accidents and Health concerns of local population	Implementation of a plan of action to eliminate accidents and address health concerns of local population arising from construction activities including migrant labour.	<p>The Contractor has been instructed to install appropriate sign boards in the local language near the construction site to prevent any accidents. Also, the Contractor has been advised to hold sensitization workshops for the local residents on the temporary utilisation of the roads during the construction period and spell out the accident prevention mechanism that has been taken. A record of all such initiatives have to be maintained by the Contractor.</p> <p>Regular health check-ups of all workers and labourers should be carried out;</p>
Compaction of soil / soil erosion for access to various sites and quarries such as metal quarries for aggregate, murrum quarries and sand mining areas	Rehabilitation Plan for restoring the construction / quarry sites after work completion should be developed and adhered to.	The Contractor has been instructed to work with the Quarry owners to develop and implement a Construction / Quarry Site Restoration Plan and keep a record of the initiatives taken.
Impact on local fisheries and fish spawning and aquatic fauna	Construction activity to be scheduled such that the impact on local fisheries and fish spawning is minimized.	The Contractor has been instructed to develop and implement a Fisheries Action Plan in discussions with Fisheries Department and keep a record of such initiatives.
Disturbance to local population	Construction activity to be scheduled such that there is minimum disturbance to local population.	The Contractor has been instructed to hold sensitization workshops for the local residents on construction activities near the habitations and develop a construction schedule accordingly. A record of such initiatives should be kept by the Contractor.

<b>Environmental Issue identified in the PPTA for which the Contractor is responsible for</b>	<b>Observation Status</b>	<b>Remarks</b>
Reduced access to sites for local population, construction sites or material procurement sites.	Construction activity and movement of vehicles to be scheduled such that there is minimum disturbance to the movement of local population.	The Contractor has been instructed to hold sensitization workshops for the local residents on construction activities near the habitations and instruct on the health and safety issues surrounding such activities. A record of such initiatives should be kept by the Contractor.
Sand Mining and possible change in river course and river scouring	Contractor to ensure that excess sand mining is not done and should rehabilitate sand mining area after work is completed.	The Contractor should prepare a Sand Mining Plan and have it approved by appropriate authorities and thereafter implement the approved Sand Mining Plan. The Contractor should keep a record on such initiatives.
Water logging from poor site planning and management	Contractor to implement proper site planning and management to prevent water logging.	The Contractor has been instructed to develop and implement a site management plan to prevent water logging. A record of such initiatives need to be maintained by the Contractor.
Erosion due to sand and murrum mining and material procurement methods	Contractor to implement a plan of action to prevent erosion.	The Contractor has been instructed to develop and implement a site management plan to prevent erosion. A record of such initiatives need to be maintained by the Contractor.
Disturbance to wild life species due to construction and material procurement activities.	Contractor to schedule activities and prevent disturbance to wild life activities	The Contractor should develop and implement a Wildlife Management Plan in discussions with the Forest Department. A record of such initiatives should be maintained.
Occupational safety and health hazards	Contractor to take up adequate measure to ensure occupational safety and prevent health hazards.	The Contractor should prepare and implement an Occupational Safety and Health Plan and keep a record of all

Environmental Issue identified in the PPTA for which the Contractor is responsible for	Observation Status	Remarks
		incidences pertaining to occupational health and safety.

## 2.4 Evaluation of EMP Implementation - Role of Other Institutions

The PPTA also defines the role of the institutions such as KNNL, AC-IWRM and other agencies in implementing the Environmental Management Plan. The actions taken on those mitigation actions by the different agencies are provided in **Table 5**.

**Table 5: Assessment of the Role of Other Institutions in EMP Implementation during the period April – September 2016**

Environmental Issue identified in the PPTA for which the Institutions are responsible for	Mitigation Action to be implemented	Project Responsible Authorities	Action List
Reduced environmental flows due to increased efficiency	Overall assessment of appropriate water needs for each sector, including environmental flows.	AC-IWRM and River Basin Plans	Action taken shall be updated upon receipt of information from the agencies.
Water Logging or Aquifer degradation due to project activities	<p>Development of appropriate drainage structures and management measures, on-farm land management;</p> <p>Work with farmers to identify appropriate cropping patterns and agri-chemical usage given existing soils and drainage conditions</p> <p>Identify and manage quarries such that they cause minimum damage, if any to surface and groundwater systems and ensure that during quarrying there is minimum, if</p>	PMU Command Area Development (CAD) and Institutions Cells, WUCS and Agricultural Extension Sub-Project	Action taken shall be updated upon receipt of information from the agencies.

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	any, damage to aquifers and surface water systems.		
Water quality degradation due to existing agricultural activities – agrichemicals and land management practices	Education to farmers in improved agricultural practices and use of agri-chemicals, on-farm land management practices.	PMU CAD and Institutions Cells, WUCS and Agricultural Extension Sub-Project	The agencies are expected to take up this task once all the WUCS are formed and construction gets completed.
Increased soil-toxicity, reduction in soil quality, soil exhaustion and erosion	Education to farmers in improved agricultural practices and use of agri-chemicals, on-farm land management practices.	PMU CAD and Institutions Cells, WUCS and Agricultural Extension Sub-Project	The agencies are expected to take up this task once all the WUCS are formed and construction gets completed.
Lowering groundwater table	Identify appropriate groundwater management and conjunctive use plans and local level regulation systems based upon local aquifer needs	AC-IWRM's IWRM Plans, PMU CAD and Institutions cells	Action taken shall be updated upon receipt of information from the agencies.
Cutting of Trees	<p>Ensure design reduces need to cut trees;</p> <p>For all trees cut / removed, plantation should be in the ratio of 3 planted for every one cut. All plantation activities should consist of appropriate species for the area to be planted, in consultation with the Forest Department and also after understanding the local ecological needs. Include in project budget. Need to include in</p>	PMU CAD and Institutions Cells	Action taken shall be updated upon receipt of information from the agencies.

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	<p>the construction contractor's contract.</p> <p>Ensure required permission is taken from Tree Officer as identified in the Karnataka Preservation of Trees Act, 1976 prior to any tree cutting activity.</p>		
Reduction in habitat for local flora and fauna	<p>Ensure all plantation activities are based upon the local fauna and flora needs, with no invasive species planted;</p> <p>Identify possible animal corridors and identify possible actions to reduce conflict - such as scheduling work in any corridors to minimise conflict;</p> <p>Ensure alien species or those inappropriate to the area are not planted in any animal corridor or fly path area;</p> <p>Identify appropriate local species for any firewood plantations;</p> <p>All construction activities should be included in the construction contractor's clauses.</p>	PMU CAD and Institutions Cells	Action taken shall be updated upon receipt of information from the agencies.
Human-Animal Conflict	Where possible identify appropriate cropping pattern, considering possible animal raid	PMU CAD and Institutions Cells	Action taken shall be updated upon receipt of



<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	<p>issues. Discuss with Forest Department;</p> <p>Avoid any activity in animal corridors during migratory season and do not create any permanent structure to obstruct it.</p>		<p>information from the agencies.</p>
<p>Reduced fodder and grazing lands</p>	<p>Identify areas which are specifically for grazing in the area and through community management ensure that they are not encroached upon or overgrazed;</p> <p>Identify appropriate agencies, such as the Animal Husbandry Department to help with improving fodder availability and reduction in open grazing;</p> <p>Implementation of locally identified issues through guidance from PMU</p>	<p>PMU CAD and Institutions Cells, and AC-IWRM's IWRM Plans</p>	<p>Action taken shall be updated upon receipt of information from the agencies.</p>
<p>Chance finding of an archaeologically or culturally important site</p>	<p>The EMP should include in the event such sites are encountered, all work that may be underway or planned in the area should be stopped and discussed with the District Commissioner before further action.</p> <p>Ensure that the construction company and the supervising consultants have an understanding</p>	<p>PMU Institutions Cell</p>	<p>Action taken shall be updated upon receipt of information from the agencies.</p>

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	<p>of the archaeological concerns of the area</p> <p>Ensure that any important archaeological area is well identified and demarcated and that required actions are specified in a detailed management and mitigation plan so that no damage takes place to it.</p>		
<p>Reduced aesthetics due to quarries on river bed, hills etc.</p>	<p>Rehabilitation of all sites must be undertaken once work is completed and plans developed well in advance of construction activities. Include rehabilitation requirements in the construction company contract to ensure it is taken up and appropriate budget should be made for the activity</p> <p>Avoid any quarrying work in an aesthetically important/significant place</p> <p>During design phase, once sites are identified, ensure budget to rehabilitate sites are allocated and remediation actions included in EMP.</p> <p>All construction related activities should be included in the construction contractor's contract as clauses, including material procurement.</p>	<p>PMU Irrigation and Institutions Cells.</p>	<p>Action taken shall be updated upon receipt of information from the agencies.</p>

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
Loss of local agri-biodiversity	<p>Identify methods of preserving and cultivating local agricultural species and cultivators;</p> <p>Work towards breed improvement of local agricultural species and possible methods to improve income from the sale of produce of local agri-biodiversity</p>		Action taken shall be updated upon receipt of information from the agencies.
Conflict with local fisheries	<p>Do not undertake any construction/quarrying activities in areas where local fish populations are important. In case unavoidable, identify methods to reduce impact after discussion with local population and also consider ways to compensate for loss;</p> <p>Consider and include fish passages at anicuts</p>	PMU Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.
Reduced access to water for domestic, livestock and other purposes from canal system due to design changes and increased water use efficiencies	Identify water needs for different users and in consultation with them develop appropriate design changes to ensure access to identified groups at required places	PMU Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.
Disruption of traffic routes due to siting of infrastructure	Identify any landing and other sites along the planned infrastructure site. Where possible consider design changes to ensure there are no problems faced by the local population;	PMU CAD and Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.

Environmental Issue identified in the PPTA for which the Institutions are responsible for	Mitigation Action to be implemented	Project Responsible Authorities	Action List
	Where not possible in consultation with the local population create alternate facilities.		
Increase in agricultural waste such as agrichemical waste	<p>Undertake farm management education for farmers to ensure that they know how to dispose agrichemical waste in most appropriate way;</p> <p>Explore with KVK's, Agriculture Department, local agri-chemical shops and agri-chemical companies on the possibilities of a buy-back system for agrichemical containers etc.</p>	PMU CAD and Institutions Cell, WUCS and Agricultural Extension Sub-Project	The agencies are expected to take up this task once all the WUCS are formed and construction gets completed.
Increased vector habitats and diseases	<p>Ensure adequate drainage needs are identified, designed and their maintenance is also identified;</p> <p>If required, develop extra drainage plans for various structures to ensure there is no waterlogging</p>	PMU CAD and Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.
Reduction in food supplements – fish and wild berries	<p>Identify any use of lands where structure is planned, or fishing areas and consider how best to take into account people's needs;</p> <p>Through an IWRM approach identify various needs of lands not presently occupied by agriculture and ensure that these uses are accounted for any land use and</p>	PMU Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	management plan developed for the area		
Increase in agri-industrial wastes from local factories	Review waste management processes and prepare better plans as required	PMU Institutions Cell and State Pollution Control Board	Action taken shall be updated upon receipt of information from the agencies.
<b>PROJECT OPERATION</b>			
Increased agricultural waste in water and water bodies	Ensure through farmer's education that waste is not disposed in water bodies and appropriate waste disposal systems are found and used	PSC Environmental Specialist with WUCS Service Support Teams	This activity shall be taken up after all the WUCS are formed and prior to commencement of the operational phase of the project.
Increased agrichemicals in surface and ground water systems, and reduced quality of return flows	Farmers education on proper use and management of agri-chemicals, including their waste  Ensuring a farmer-friendly method for disposal of agri-chemical waste, as identified during project design	PSC Environmental Specialist with WUCS Service Support Teams	This activity shall be taken up after all the WUCS are formed and prior to commencement of the operational phase of the project.
Waterlogging and reduced drainage	Identify appropriate cleaning and maintenance of drainage system, including disposal of waste removed.	PMU CAD and Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	<p>Improved agriculture practices – understanding plant needs and use of irrigation water as required through improved understanding of the system;</p> <p>Identify appropriate systems for the management of drains and disposal of silt</p> <p>Ensure there is a budget for the management of drains and the budget is spent on it</p>		
<p>Soil degradation due to poor on-farm management, intensive agriculture, soil exhaustion and soil toxicity due to chemical usage and lack of knowledge among farmers</p>	<p>Identify appropriate soil management and soil testing systems and educate farmers on it.</p> <p>Ensure that farmers remember through repeated information sharing on good agriculture and soil management practices</p>	<p>PMU CAD and Institutions Cell</p>	<p>This activity shall be taken up after all the WUCS are formed and prior to commencement of the operational phase of the project.</p>
<p>Change and degradation of wetlands due to waste dumping and expansion of agricultural lands</p>	<p>Identify important wetlands and identify land use and condition</p> <p>Through the IWRM activities identify appropriate land management and conservation methods, and work with farmers to educate and ensure that wetlands are not degraded</p>	<p>PMU Cells, SST and PSC Environmental Specialist</p>	<p>This activity shall be taken up after all the WUCS are formed and prior to commencement of the operational phase of the project.</p>

Environmental Issue identified in the PPTA for which the Institutions are responsible for	Mitigation Action to be implemented	Project Responsible Authorities	Action List
	Work with farmers to identify appropriate land management and waste management systems at the village level		
Reduced and degradation of habitats for species – both aquatic and terrestrial species	<p>Work through a community system to identify wetlands, other habitats and local environmental assets</p> <p>Work with local community to ensure that cultivation is not extended into areas environmental assets</p> <p>Educate community on management of soil and agri-chemical usage</p> <p>Demarcate all areas though an IWRM plan for conservation and limitation of areas for agriculture.</p>	PMU Institutions Cell and AC-IWRM's IWRM Plans	Action taken shall be updated upon receipt of information from the agencies.
Increased aquatic weeds	<p>Ensure appropriate drainage management to keep the canals and drains silt free and not allowing the disposal of any waste</p> <p>Work with farmers through farmer's education system to ensure appropriate application of agri-chemicals, including fertilizers</p>	PMU Irrigation and Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.

<b>Environmental Issue identified in the PPTA for which the Institutions are responsible for</b>	<b>Mitigation Action to be implemented</b>	<b>Project Responsible Authorities</b>	<b>Action List</b>
	Educate farmers on proper soil management and testing		
O&M waste – spoils from drainage system and canals	<p>Identify appropriate waste management system for drain cleaning</p> <p>Weeds can be used, in consultation with farmers, for manure. Therefore, if farmers are interested a system for their use and disposal on farmlands at the time that drains are cleaned should be undertaken.</p>	PMU Irrigation and Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.
Increased toxicity in environment and for people with more agrichemical packages being reused	<p>Farmer education on appropriate management of agri-chemical packaging.</p> <p>Where possible consider a buy-back system for agri-chemical packages by the agri-chemical companies</p>	PMU Institutions Cell	Action taken shall be updated upon receipt of information from the agencies.
Non-point source pollution of waterways	<p>Work with and educate farmers on the best management of agri-chemicals</p> <p>Consider options for improving quality of NPS runoff</p>	PMU Institutions and CAD Cell, AC-IWRM Studies	Action taken shall be updated upon receipt of information from the agencies.
Multi-objective use of tanks and off line storages	<p>Consult with users, study existing and planned uses and consider options for best management of the tank areas recognising their multiple uses</p>	PMU Institutions Cell, AC-IWRM's IWRM Plans	Action taken shall be updated upon receipt of information from the agencies.



Environmental Issue identified in the PPTA for which the Institutions are responsible for	Mitigation Action to be implemented	Project Responsible Authorities	Action List
Increase waste from fields due to micro-irrigation system	Educate farmers on best management of systems to be used, where to get good quality material that does not break down and spoil fast, its maintenance and proper disposal of waste	PMU Irrigation and Institutions Cells  WUCS and agricultural extension sub-project	This activity shall be taken up after all the WUCS are formed and prior to commencement of the operational phase of the project.

## 2.5 Environmental Monitoring Plan

The EMP provided in the PPTA provides a Monitoring Plan to be followed by various agencies in order to ensure that the agencies adhere to the requirements specified in the EMP and mitigate the environmental impacts arising from the project. These activities have been identified in **Table 6** and the progress achieved upto September 2016 is provided in the last column.

**Table 6: Implementation of Environmental Monitoring Plan**

Parameter	Monitoring Frequency	Actions	Responsible Authority	Actions this Period
<b>PROJECT CONSTRUCTION</b>				
Noise	Baseline and Monthly during construction	Establish pre-construction baseline;  Identify habitations close to construction site or wild life area, if any	Construction Contractor	No action taken. The Contractor has been instructed to take up this activity at all construction and camp sites on a regular basis.
Site for Quarries and borrow pits	Baseline and Final Check after construction is complete	Photographic baseline for restoration of site and final check after construction and restoration is complete	Construction Contractor	The Contractor has been instructed to get the information from the Quarry owners and keep a record of the initiatives taken by the quarry owners to ensure restoration of the quarry and borrow pit sites.

Parameter	Monitoring Frequency	Actions	Responsible Authority	Actions this Period
Removal of vegetative cover and trees	Baseline and Final Check prior to final payment	Vegetative and Tree Survey to be conducted;  Replantation Plan to be developed and implemented	Construction Contractor in consultation with PMU and Forest Department	The Contractor has been instructed to ensure that vegetative and tree surveys are conducted and a replantation plan develop and implemented in consultation with the Forest Department, if necessary.
Waste Management at sites	Random at sites but report compiled monthly at sites	Develop and implement waste management plan at sites	Construction Contractor	Liquid waste management has been put in place at both the labourers' and workers' campsites. The Contractor has been instructed to ensure effective maintenance of the same so that all facilities are in usable condition during the project / construction period.
Site Management	Monthly for duration of work	To ensure all required facilities are available at campsites and construction sites including those related to health and safety of labourers, workers and local community who are impacted by construction activity	Construction Contractor	The Contractor has provided for water and sanitation facilities at the labourers' and workers' campsites. Also, the labourers are provided with firewood for cooking purposes so as to avoid conflict with local community on the use of local firewood resources.

Parameter	Monitoring Frequency	Actions	Responsible Authority	Actions this Period
Site Restoration	Baseline and Final Check prior to final payment	Develop and implement site restoration plan;	Construction Contractor	The information shall be updated upon completion of work at each of the construction sites.
<b>PROJECT OPERATION</b>				
IPMN Implementation	Bi-Annual	Review progress of knowledge and use of IPMN by farmers and access to required facilities	PMU CAD and Institutional Cells, WUCS and Extension Workers	This activity shall be taken up after the construction is completed and operation of the modernized system commences
Water Quality	Annually	Baseline and later annually for a 5-year period	PMU CAD and Institutional Cells, WUCS and Extension Workers	This activity shall be taken up after the construction is completed and operation of the modernized system commences

## 2.6 Social Safeguard Issues

The PPTA identifies a couple of social safeguard issues primarily concerning resettlement and indigenous people issues that requires the selected Contractor to carry out certain activities that would address the issues effectively. Additional social safeguard issues concerning Health and HIV Aids and Gender and Social dimensions have been identified by the Consultant and these have been identified in **Table 7**.

**Table 7: Assessment of Social Safeguard Implementation by the Contractor**

Social Safeguard issues identified in the PPTA for which the Contractor is responsible for	Observation and Status	Remarks
Resettlement	The system rehabilitation and modernization is unlikely to involve any need for land acquisition or resettlement and rehabilitation. In the rare event that this is needed, the Contractor has been instructed to inform KNNL and decision taken in consultation with the authorities.	The Contractor should keep track of the incidences of any resettlement issues.
Indigenous Population	The system rehabilitation and modernization is unlikely to negatively impact the indigenous population. In the rare event that an impact is noticed, the Contractor has been instructed to inform KNNL and decision taken in consultation with the authorities.	The Contractor should keep track of the incidences of any indigenous people's issues.
Health and HIV/AIDS	<p>The Contractor has been instructed to periodically conduct awareness workshops on HIV/AIDS using the services of a Local Medical Officer who shall explain the risk of sexually transmitted diseases on periodic basis.</p> <p>The Contractor has been instructed to conduct regular health check-up of its labourers and workers to ensure their general health condition.</p> <p>The Contractor has been instructed to periodically conduct awareness workshops on Human Trafficking issues so as to ensure safety of the labourers and workers' families.</p>	<p>The Contractor should maintain records of all awareness workshops and health clinics that has been conducted for the labourers' and workers.</p> <p>Such reports needs to be maintained for periodical checking</p>

In addition to the Contractor, other agencies such as KNNL, PMU, and CADA have a role to play in ensuring that the social safeguard issues are addressed effectively during the project period. These issues are discussed in **Table 8**.

**Table 8: Assessment of Social Safeguard Implementation by other agencies**

Social Safeguard issues identified in the PPTA	Observation and Status	Remarks
Resettlement	The system rehabilitation and modernization is unlikely to involve any need for land acquisition or resettlement and rehabilitation. However, KNNL has to ensure that the R&R issues, if any are addressed prior to handing over the site to the Contractor.	KNNL should keep track of the incidences of any resettlement issues.
Indigenous Population	The system rehabilitation and modernization is unlikely to negatively impact the indigenous population. However, KNNL, PMU and CADA has to ensure that during construction and operation of the system, the interests of the indigenous population is protected.	The Contractor should keep track of the incidences of any indigenous people's issues.  CADA should ensure that the WUCS safeguard the interests of all indigenous population during the CAD works and operational stages.
Gender and social dimension	It is expected that KNNL should carry out meaningful consultations that are gender inclusive and responsive with various institutions primarily the Contractor and the WUCS on an ongoing basis throughout the project cycle.	This activity needs to be carried out on a quarterly basis and monitored

### 3 CONCLUSIONS

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This report is the first report on environmental and social safeguards compliance of the Modernization of Gandhi Irrigation System in Bhadravathi Taluk, Shimoga District, Karnataka Project. It covers the period from April to September 2016. The project is being financed by Asian Development Bank and expected to be completed by May 2019 at a cost of Rs. 212 Crore.

Karnataka Neeravari Nigam Limited (KNNL) is the Executing Agency for the Project. The sole civil works contract package under the project was awarded to RPP Infra Projects Limited (RPP) in February 2016. Snowy Mountain Engineering Corporation (SMEC) is supporting KNNL as a Project Support Consultant (PSC) on the project. As of September 2016, total physical and financial accomplishment are about 8% and 10%, respectively.

Upon selection of the Contractor, RPP has submitted an EMP and followed it up with a CEMP that outlines the overall system under which the EMP shall be implemented by the Contractor. During the last six months, RPP has ensured that labourers and workers' campsites have access to water supply and sanitation services and firewood and LPG cylinders for cooking purposes. However, both the EMP and CEMP submitted by RPP does not provide for an action plan to address the various environmental and social issues which have been identified in the PPTA.

The PSC has had discussions with the Contractor's representatives on these issues and this Safeguard Monitoring Report provides guidelines on the kind of activities that the Contractor needs to carry out to be in compliance with the loan covenants to ensure that the Contractor is complying with the proposed mitigation measures described in the Environmental Management Plan (EMP) and the contract specifications.

At this time, the construction at the sites have been stopped because of the ongoing monsoon season. Hence, prior to the start of the next construction season, the Contractor has to ensure that action plan for addressing each of the identified environmental and social issues are developed and awareness raised amongst its workers and sub-contractors to ensure its implementation.

## 4 PHOTOGRAPHS OF THE VARIOUS ENVIRONMENTAL RELATED ACTIVITIES CARRIED OUT BY THE PSC

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**Photo 1: Environmental and Social Safeguard Issues being covered by the PSC at the Construction Management and Quality Control Workshop held at Shivamogga on February 27, 2016**



**Photo 2: Meeting of the PSC with the RPP's Officials on June 28, 2016. At this meeting, the PSC explained the various safeguard issues with the Contractor**



**Photo 3: Make-shift Labourer's Quarters provided by the Contractor with Water and Sanitation Facilities**



**Photo 4: Temporary Shelters provided by the Contractor for labourers to utilise during either a break or temporary halt in construction triggered by natural events – Photographs taken on June 28, 2016**





**Photo 5: PSC Staff at the construction site to inspect the Silt Disposal Practices of the Contractor – Photograph taken on June 28, 2016**



**Photo 6: Close-up View of the Disposal of Silt as currently practised by the Contractor – Photograph taken on June 28, 2016**