

# **BIDDING DOCUMENT**

**Improvement of Water Supply System in Gaya  
Municipal Corporation – Package GA/WS/01**

**October 2016**

# **Volume–III**

# Section 6 – Employer’s Requirements:

## Annexure – 2: Resettlement Plan

**October 2016**

**IND: Bihar Urban Development Investment Program–  
Gaya Water Supply Subproject (Phase-1)**

Tube Well Refurbishment, Laying of Rising/ Transmission Mains, Construction of New and Renovation of Water Storage Reservoirs, Laying of Water Distribution Pipelines and Arrangement of Metered House Connection at all the DMAs

Prepared by the Bihar Urban Infrastructure Development Corporation Ltd. (BUIDCO), Urban Development Department, Government of Bihar for the Asian Development Bank

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## CURRENCYEQUIVALENTS

(as of xxxxx2015)

Currency unit	–	Indian rupees (Re/Rs)
Re 1.00	=	\$ xx.xx
\$ 1.00	=	Rs x.xxx

## ABBREVIATIONS

ADB	–	Asian Development Bank
AH	–	affected household
AP	–	affected person
BPL	–	below poverty line
BUIDCO	–	Bihar Urban Infrastructure Development Corporation
CPR	–	common property resource
DSC	–	design supervision consultants
EA	–	executing agency
FGD	–	focus group discussion
FHH	–	female headed household
GMC	–	Gaya Municipal Corporation
GoI	–	Government of India
GRC	–	grievance redressal committee
GLSR	–	ground level service reservoir
HH	–	household
INR	–	Indian National Rupee
IP	–	indigenous peoples
LA	–	land acquisition
LARR	–	Land Acquisition, Rehabilitation and Resettlement (Act)
MoUD	–	Ministry of Urban Development
NGO	–	non-government organization
NRRP	–	National Resettlement and Rehabilitation Policy
OHT	–	overhead tank
PHED	–	Public Health Engineering Department
PMC	–	project management consultant
RP	–	resettlement plan
SC	–	schedule caste
ST	–	schedule tribe
TOR	–	terms of reference
WHH	–	woman headed household

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## EXECUTIVE SUMMARY

1. **Background.**The Bihar Urban Development Investment Program (BUDIP) envisages improved urban environment and living conditions in targeted urban areas in the state of Bihar. It will: (i) improve and expand urban infrastructure and services in urban areas; and (ii) strengthen urban institutional, management, and the financing capacity of institutions, including urban local bodies (ULBs). Urban infrastructure and services improvement covering rehabilitation, improvement and expansion is proposed in the following sectors (i) water supply, and (ii) sewerage and sanitation. ADB has agreed to co-finance implementation of certain components of the state's road map in the cities of Bhagalpur and Gaya. BUDIP is funded by ADB under its multi-tranche financing facility (MFF). An urban water supply subproject for Gaya is proposed under Project 2 of the MFF.

2. **Subproject Description.** The proposed subproject components for Gaya water supply include: (i) refurbishment of existing tubewells (29 no.s); (ii) refurbishment of existing pumphouses (16 no.s) and site stores (3 no.s), demolition of dilapidated pump houses and construction of new ones (5 no.s), and construction of new pump houses (4 no.s); (iii) construction of new overhead tanks (6 no.) and new ground level service reservoirs (3 no.); (iv) laying of new transmission mains (16.55 km) and distribution mains (18.56 km); (v) laying of water supply distribution pipelines (446 km) and integration of existing distribution network (72 km), construction of valve chambers (1083 no.s); and (vi) provision of house service connections (92000); (vii) provision of 200 public standposts in poor areas; and (viii) construction of citizen service centres cum service offices at two locations.

3. **Resettlement Plan.** This RP is prepared based on the detailed engineering design and as per the Detailed Project Report (DPR) prepared for Gaya water supply project I proposed for funding by ADB using a multitranche financing facility (MFF).

#### 4. **Scope of Land Acquisition and Resettlement.**

5. Proposed subproject components require 11094 sq m land, of which sites that have been finalized/selected measure 9498 sq m, all belonging to government. <sup>1</sup> Of the identified sites, 5388 sq m belongs to Government of Bihar, 5010 sq m to Forest Department, Government of Bihar and 84 sq m to Gaya Municipal Corporation. In case of forest land, land for land, as per required procedure, has been followed. In case of sites yet to be finalized, alternatives such as land donation by a temple trust for the proposed OHT at Kharkhura close to the settlement to be served, and alternative government land available at a distance of 1.7 – 5 km from the settlement, are under consideration. Space for 6 proposed customer service centres is proposed to be identified on commencement of DMA work, on government land, within government buildings or in rented space.

6. Efforts have been made to avoid or minimize resettlement impact through careful design of the major portion of pipe alignments for water supply distribution and rising mains through available government land and existing public road right of way (RoW), avoidance of land acquisition and selection of sites and alignment alternatives with none/less resettlement impact. The RP for GWSP I identifies both permanent and temporary impacts and their mitigation measures. Identified impacts include loss of private residential structures (8, of which 7 structures are facing 100% loss and 1 faces 50% loss), loss of government quarter (1, belonging to GMC) relocation impact (8 households), permanent partial and significant (13%) loss of income to 2

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<sup>1</sup>A site for OHT at Kharkhura (900 sq m) and for citizen service centres (600 sq m) are yet to be identified.

encroachers and 2 sharecroppers from loss of encroached government land, potential crop loss on encroached government land to 4 affected persons, and temporary loss of income to hawkers and vendors on main pipe alignments (30 APs), near a pump house (3 APs) and estimated potential temporary income loss to 426 hawkers and vendors. Of APs facing permanent losses, 10 are vulnerable. Of APs facing temporary losses, 146 are vulnerable. The RP proposed compensation to affected persons based on the entitlement matrix prepared for the project. Mitigation and inclusion measures are also included in the RP cost (INR.6.7 million) Potential losses that can be avoided/mitigated e.g. potential loss of livelihood to pump operators employed by GMC during phase of operation by contractor, disruptions in water supply to localities through proper scheduling of work and temporary arrangements for water supply, avoidance of impact to businesses where possible, provision of planks for access to shops and businesses and traffic management plans to avoid disruption, are identified.

6. **Categorisation.**The subproject is classified as Category B in accordance with ADB's Safeguard Policy Statement (SPS). ADB's SPS covers both temporary and permanent impacts to both titled and non-titled persons, and includes both physical and economic displacement.

7. **Consultation and Disclosure.** Goals and objectives of the project have been disclosed to stakeholders (beneficiaries, affected persons, stakeholder agencies) through workshops and focus group discussions at various points in time. A program of continuous consultation and disclosure is proposed.

7. **Institutional Setup.** The Urban Development and Housing Department, Government of Bihar is the executing agency for the project. The Bihar Urban Infrastructure Development Corporation (BUIDCo) is the implementing agency. The Program Management Unit (PMU) at BUIDCo is staffed with an Environmental and Social Management Coordinator (ESMC), who has overall responsibility for safeguards compliance and implementation of RP. PIU field offices have been set up in each town to manage implementation of subprojects. Project Management Consultants and Design Supervision Consultants are engaged to facilitate the planning and implementation of the subproject, each having social safeguards personnel for all RP planning and implementation activities including internal monitoring and reporting.

8. **Resettlement Budget and Financing Plan.**The resettlement cost estimate for the Gaya Water Supply Project I is INR 7.06 million.

## I. PROJECT DESCRIPTION

### A. Introduction

1. The Bihar Urban Development Investment Program (BUDIP) envisages improved urban environment and living conditions in targeted urban areas in the state of Bihar. It will: (i) improve and expand urban infrastructure and services in urban areas (including slum areas); and (ii) strengthen urban institutional, management, and the financing capacity of institutions, including those of urban local bodies (ULBs). Urban infrastructure and services improvement covering rehabilitation, improvement and expansion is proposed in the following sectors (i) water supply, and (ii) sewerage and sanitation. ADB has agreed to co-finance implementation of certain components of the state's road map in the cities of Bhagalpur and Gaya. BUDIP is funded by ADB under its multi-tranche financing facility (MFF). The expected impact of BUDIP is increased economic growth potential, reduced poverty, and reduced imbalances between Bihar - one of the poorer and less developed states in India, and the rest of the country. The expected outcomes of the Investment Program will be an improved urban environment and living conditions for the residents of the BUDIP cities by 2020. Based on considerations of economic justification, absorptive capacity of the implementing agencies and sustainability, sub-projects have been identified in each city in the priority infrastructure sectors.

2. An urban water supply subproject for Gaya is proposed under Project 2 of BUDIP. This Resettlement Plan (RP) is prepared for the Gaya Water Supply Project (GWSP) I, proposed under tranche 2 of the MFF for BUDIP. The RP is prepared on the basis of the Detailed Project Report (DPR) prepared for GWSP I. The subproject is classified as "Category B" for Involuntary Resettlement (IR) impact as per ADB's Safeguard Policy Statement (SPS), 2009. The RP will be updated and reconfirmed for final IR impacts after finalisation of all sites and completion of detailed measurement surveys.<sup>2</sup> The final RP will be reviewed and disclosed on IA and ADB websites. No civil works contracts package should be awarded and started before the completion of final RP implementation for the said package. The IA is responsible to hand over the project land/site to the contractor free of encumbrance.

### B. Proposed Subproject Components

3. Proposed subproject components for Gaya water supply under Project 2 include: (i) refurbishment of existing tubewells (29 no.s); (ii) refurbishment of existing pumphouses (16 no.s) and site stores (3 no.s), demolition of dilapidated pump houses and construction of new ones (5 no.s), and construction of new pump houses (4 no.s); (iii) construction of new (6 no.) overhead tanks (OHT) and new (3 no.) ground level service reservoirs (GLSR); (iv) laying of new transmission mains (16.55 km) and distribution mains (18.56 km), and integration of existing 8.45 km rising mains; (v) laying of water supply distribution pipelines (446 km) and integration of existing distribution network (72 km), construction of valve chambers (1083 no.s); (vi) provision of house service connections (92000); (vii) provision of 200 public standposts in poor areas; and (viii) customer service centres (CSC), minimum 1 CSC per 15000 connections, including one central CSC. In addition, procurement and installation of bulk flow meters, generators and pumpsets are proposed.

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<sup>2</sup> Detailed measurement survey will be jointly conducted by safeguards personnel of project implementation unit, consultants and contractors prior to implementation at each site/stretch of alignment. RP for different sites/stretches will be prepared and submitted to ADB for approval; prior payment of compensation to permanent and/or temporarily impacted persons is mandatory before start of civil work at each site/alignment stretch. DSC and contractor will be responsible for conduct of DMS and DSC will update RPs prior to implementation.



4. Measures to avoid and minimize private land acquisition and involuntary resettlement impacts include identification of government land for construction of 8 no. of reservoirs, and for all proposed new/refurbished facilities such as tubewells and pump houses. Alternative sites (2 each) for OHT IDs 3, 5 and 16 were considered and sites owned by government having no IR impacts, selected at Delha, Budva Mahadev and Bhusunda.<sup>3</sup>For the proposed OHT at Joda Masjid (OHT ID 1), potential permanent livelihood impact is avoided by finding a technical solution (deepening of pond to maintain volume of water) that protects livelihoods.<sup>4</sup>

5. Assessment of impact of alternate pipe alignments for the rising mains to Delha OHT led to selection of an alternative alignment with no impact. Table 1 presents a comparison of impacts of alternative alignments of rising mains to Delha OHT, where temporary income loss as well as permanent structure loss and potential relocation were avoided.

**Table 1: Assessment of alternative alignments for rising mains**

OHT	Pipe route	Length in Km	Summary of impacts (No. and types of APs, types of losses)	Remarks
Delha				
Alternative 1	Lakanpura Vishnu Pad, Chand Choraha, Ram Sagar Road, Jaiprakash Jharna, Railway crossing, delha Pariya road, Delha Thana Dania Bagicha	7 Kms	32 APs: Fruit and vegetable vendors, eatery shops, fancy stores etc. Potential temporary income loss during pipe laying work Four temporary mud houses (structure loss) and relocation of 4 households anticipated	Dropped, to avoid assessed impacts.
Alternative 2	Waris Nagar, Ramshila Mod, Cotton mill Mod, Bagaeshwari Pumping Station, Railway Crossing, khurkhura School, Delha old pumping station, Raja Baba Kothi, Delha Pariy Road, delha Thana, Dhanian Bagicha	7 Kms	Nil	Selected alternative.

Source: Transect walk and field survey, 2015.

6. Night work in congested commercial areas, traffic management during pipe laying work, ensuring access to shops and businesses by providing pedestrian access through planks, assistance to mobile hawkers and vendors and those with moveable, temporary structures to

<sup>3</sup> The proposed OHT (ID 14) around Kharkhura Raja Kothi is the only OHT for which land is yet to be finalized. The project is considering 3 alternatives: (a) Alternative 1, vacant land belonging to a temple trust is closest to the settlement to be served and therefore most suitable, and may involve land donation by the trust, which is at an advanced stage of discussion; (b) Alternate 2, government land near Surya Mandir, is >5 km away from the settlement to be served; and (c) Alternate 3, government land at Delha (where another OHT - ID 16) is already proposed, at a distance of 1.7 km from the settlement to be served, for which NOC for additional land required will have to be obtained from GoB. In case of alternate 1, third party oversight of the process of donation will be required. TOR for third party is provided in [Appendix 7](#) of the RP.

<sup>4</sup> The site for OHT at Joda Masjid is proposed partly on the bank of Gangi Pond and partly on reclaimed land of the said pond, which is leased out by the Fisheries Department to the Manpur Prakhand Matsyajeve Sahyog Samiti (a cooperative) for pisciculture and water chestnut cultivation. Members of one family (family of Mr. Yogendra Das, Secretary of the Samiti) are involved in the above-mentioned economic activities. Through dialogue with the stakeholders (Fisheries Department and the lessee family), it was agreed that potential permanent loss of income to the lessee (and to the Department) could be avoided through deepening of the said pond at the southern end, ensuring that the same volume of water available at present, is maintained in the pond. In addition (though permanent impact is avoided), the contractor will prioritise employment of willing and able family members for construction related work at the Gangi pond site. The estimated period of OHT construction is 21 months and temporary disruption during deepening and filling of pond is not likely to exceed 1 week. The contract will have a clause to ensure that the family is accorded such priority in employment at the site during construction.

shift to (and back from) nearby locations where they can continue with their economic activities, is proposed. Where excavation close to properties / residences cannot be avoided, simple mitigation measures such as provision of planks are proposed as per available guidelines in EMP and best practice. Timely information will be provided to the public about potential negative impacts and mitigation measures, including grievance redress procedures and time taken for the same, prior to start of project implementation.

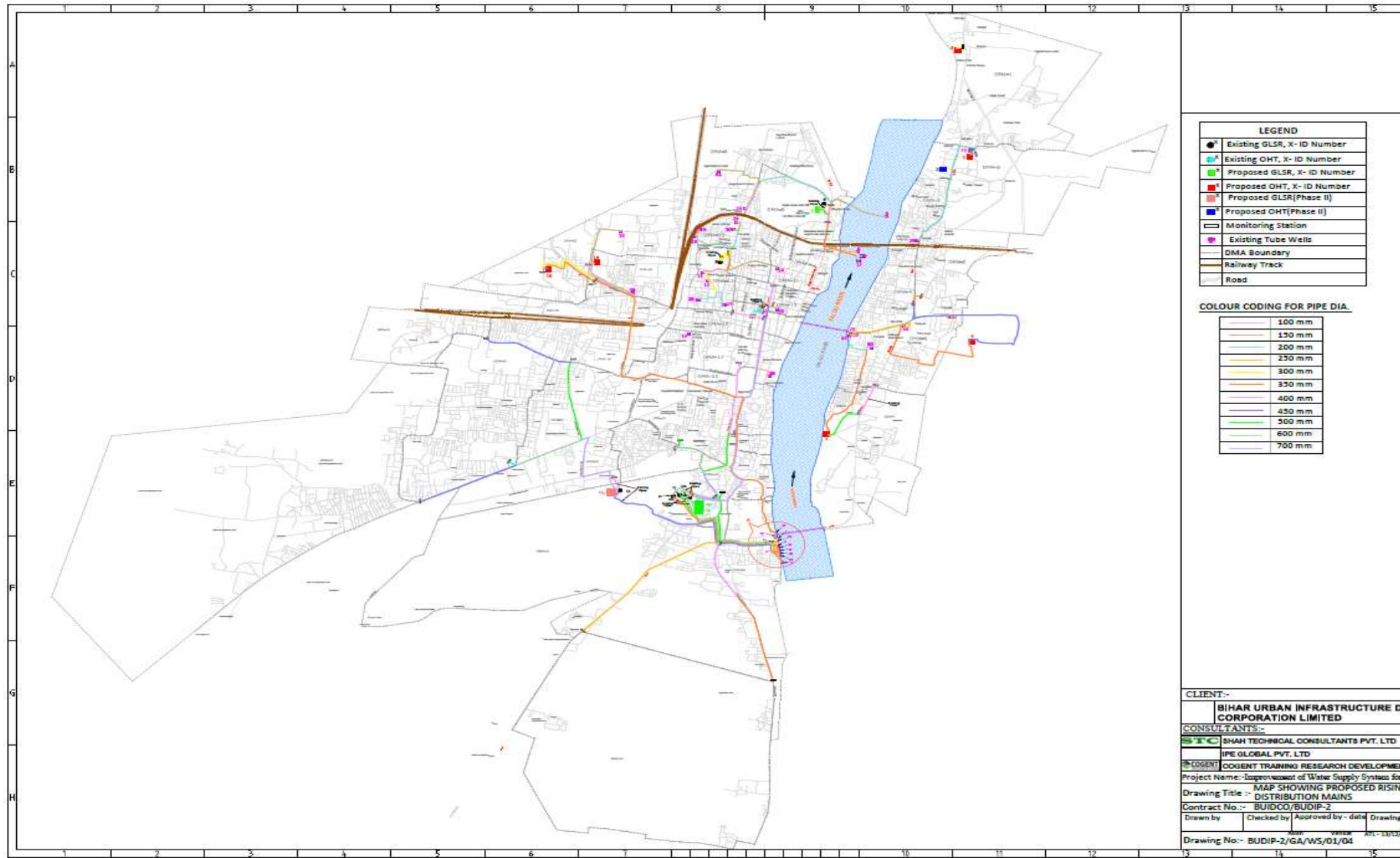
### **C. Objectives of the Resettlement Plan**

7. This Resettlement Plan (RP) is prepared for investments proposed for subproject components of Gaya water supply, under Project 2. It addresses the IR impacts of the proposed subproject components and is consistent with the agreed Resettlement Framework and ADB's SPS 2009.

8. This RP is prepared in accordance with ADB SPS requirements for IR Category B projects and to meet the following objectives:

- (i) to describe the identified scope and extent of land acquisition and involuntary resettlement impacts as a result of identified project components, and address them through appropriate recommendations and mitigation measures in the RP;
- (ii) to present the socio-economic profile of the population in the project area, identify social impacts, including impacts on the poor and vulnerable, and the needs and priorities of different sections of the population, including women, poor and vulnerable;
- (iii) to describe the likely economic impacts and identified livelihood risks of the proposed project components;
- (iv) to describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation;
- (v) to establish a framework for grievance redressal for affected persons (APs) that is appropriate to the local context, in consultation with stakeholders;
- (vi) to describe the applicable national and local legal framework for the project, and define the IR policy principles applicable to the project;
- (vii) to define entitlements of affected persons, and assistance and benefits available under the project;
- (viii) to present a budget for resettlement and define institutional arrangements, implementation responsibilities and implementation schedule for resettlement implementation; and
- (ix)** to describe the monitoring mechanism that will be used to monitor resettlement plan implementation

Figure 1. Map of Gaya depicting proposed water supply subproject components



**Figure 2: Google Earth maps depicting proposed water supply facilities under Gaya Water Supply Project (GWSP)**

**2.1 Locations of Proposed Tubewells and Pumping Stations in Gaya area (western bank of Falgu)**



**2.2 Locations of Proposed OHTs in Gaya and Manpur areas under GWSP**



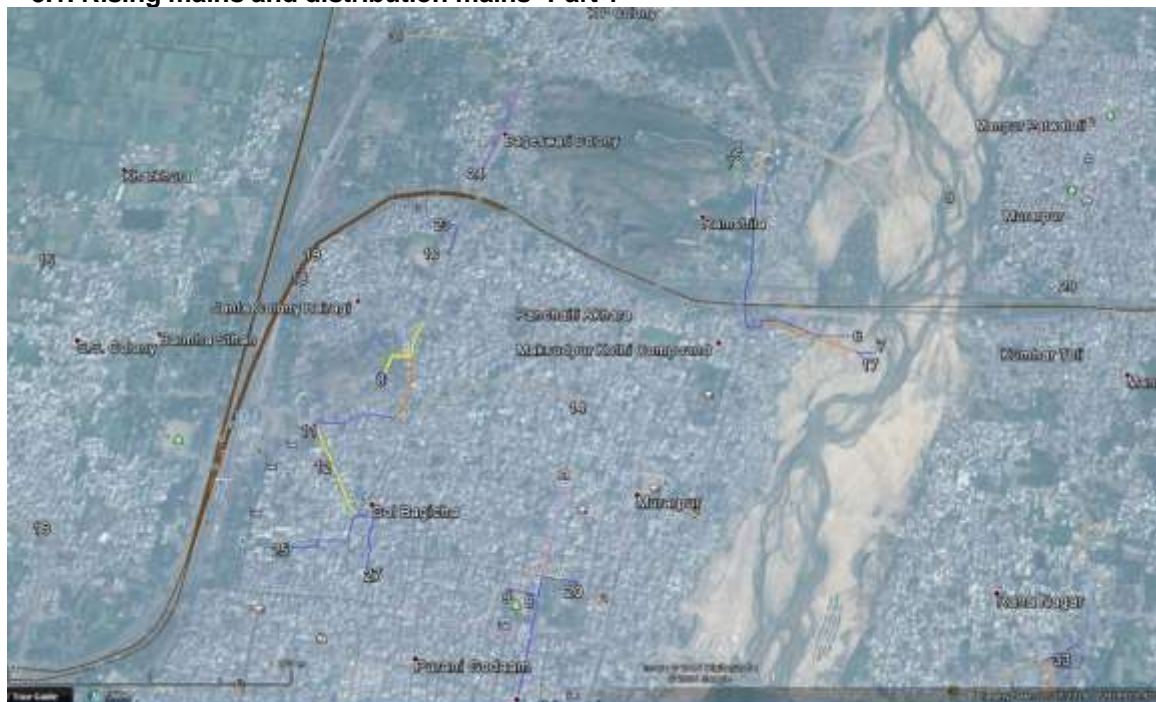


## 2.3 Google Earth map depicting GWSP facility locations - Overhead tanks, Ground Level Service Reservoirs, Tubewells and Pumping Stations



**Note:** Red denotes tubewell and pumping station locations, yellow denotes new OHT/GLSR proposed, and white denotes refurbishment of existing OHT/GLSR

**Figure 3: Google Earth Maps depicting rising mains and distribution mains alignments**  
**3.1. Rising mains and distribution mains- Part 1**



**3.2. Rising mains and distribution mains - Part 2**

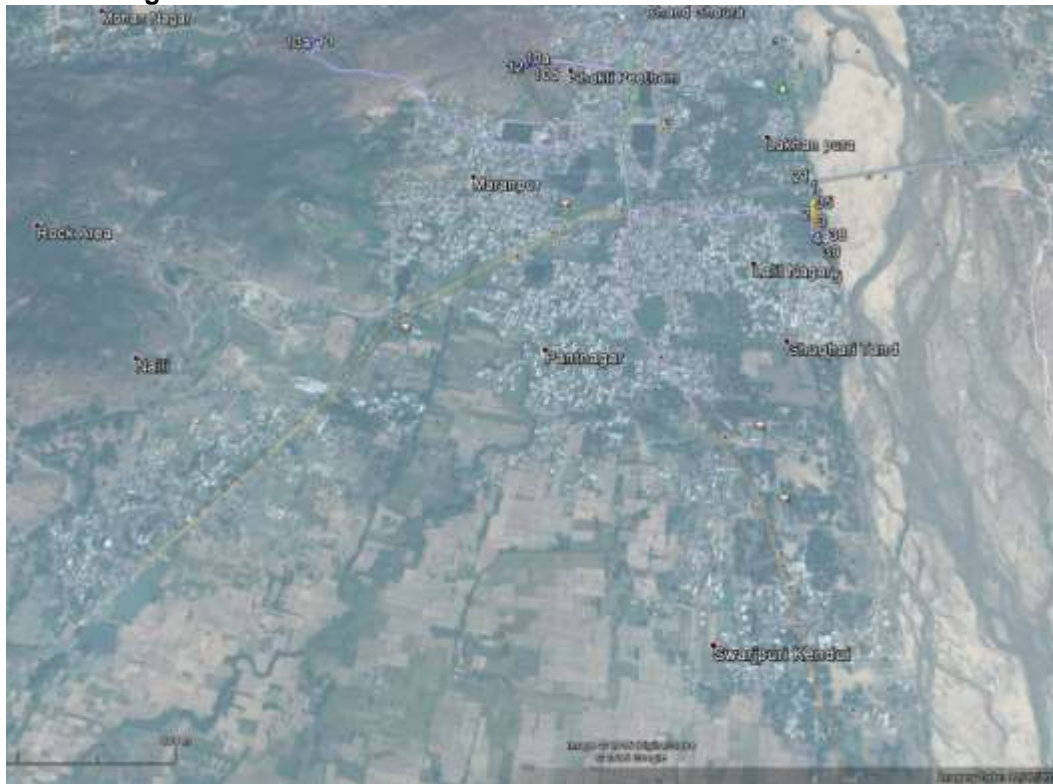


**3.3. Rising mains and distribution mains - Part 3**
















### 3.4. Rising mains and distribution mains - Part 4



### Legend

#### COLOUR CODING FOR PIPE DIA.

	100 mm
	150 mm
	200 mm
	250 mm
	300 mm
	350 mm
	400 mm
	450 mm
	500 mm
	600 mm
	700 mm

## II. SCOPE OF LAND ACQUISITION AND RESETTLEMENT

### A. Land acquisition and involuntary resettlement

9. The scope of land acquisition and resettlement is identified based on field visits to the identified subproject sites and alignments. Proposed interventions and their potential IR impacts are presented sub-project component-wise, in **Appendix 1**. Site for OHT at Kharkhura Raja Kothi area has not been finalised yet (*footnote 2*); and locations of 6 customer service centres including a central CSC are proposed to be identified post-commencement of DMA work. Estimation of temporary impacts along distribution lines is based on transect walks and not on detailed measurement surveys, as the exact alignment of pipes (e.g. left/right hand side of each road) on each road is not yet known. Hence, IR impact assessment is not yet undertaken for these components and will be included in the updated RP (*footnote 1*), prior to implementation.

10. Land requirement for new OHTs, GLSRs and pumphouses was estimated as 10494 sq m. Estimated land requirement for 6 customer service centres is 600 sq m (over and above land requirement for components mentioned above), which are proposed to be located on government land, or within existing government buildings, or in rented space.

11. Land available at identified sites where new facilities are proposed (not taking into account existing water supply facility sites where refurbishment or demolition/reconstruction is proposed) under GWSP1 is 9498 sq m. Of this, 4488 sq m land required for new OHTs belongs to Government of Bihar, 5010 sq m land required for new GLSRs belongs to Forest Department and 84 sq m land required for 4 new pump houses belongs to GMC. All identified sites and alignments for subproject components, barring the Kharkhura OHT site yet to be finalised (paragraph 7), are owned by government, hence no land acquisition is envisaged for identified sites and alignments.<sup>5</sup>

12. Permanent relocation impact is identified for 8 squatter households (displacing 44 persons) at Ramshilla GLSR site (owned by Forest Department), of which 7 households will be affected by structure loss.<sup>6</sup> Another household at Ramshila GLSR site will face partial structure loss alone, without relocation impact.<sup>7</sup> All 9 affected households are vulnerable.<sup>8</sup> For proposed new GLSRs at Brahmyoni (Forest Department land), adequate vacant land is available. The new tanks will be constructed (over an envisaged construction period of 21 months) and commissioned before refurbishment work on existing tanks is taken up, to avoid disruption in water supply to consumers served by the existing GLSRs.<sup>9</sup> The contractor will be required to

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<sup>5</sup>A directive from the Chief Secretary, Government of Bihar (GoB) to various government departments owning land required for the project was issued, requiring them to provide land for the project (Annexure to Appendix 9, Due Diligence Report). As a follow-up to the same, land ownership documents and maps for sites other than those owned by GMC have been obtained by the project; NOC from the Deputy Commissioner's office for GoB land parcels is awaited.

<sup>6</sup> Eight of the nine affected residential structures inhabited by squatter households were constructed by them, one is a municipal quarter/government structure, which is being used by a household.

<sup>7</sup> Household of Mr. Vimlesh Kumar is assessed to face 40% structure loss and would prefer to remain at the present location.

<sup>8</sup> Ramshila has an existing defunct GLSR, hence water supply to existing consumers will not be affected as a result of construction activity at the site.

<sup>9</sup> For Forest Department land required at Ramshilla Hills and Brahmyoni, the Forest Department as owner had issued a conditional NOC, requiring GMC to provide 0.70 hectares of land for forest land at these locations. Government land (vacant land, not under any use, away from the city) has been identified for the purpose by the Office of the Deputy Commissioner and a letter seeking the Forest Department's acceptance of the proposal issued (Annexure to



schedule work at Brahmayoni site accordingly; a contract clause specifying the same will be included.

13. Refurbishment of existing GLSRs at Murli Hills and Azad Park is assessed to lead to potential disruption in water supply to existing consumers. This is proposed to be mitigated by setting up of a direct pumping system from tubewells to the existing distribution system (which is estimated to require 5 days each to set up at each location). The contractor will be required to schedule setting up of the direct pumping systems prior to commencement of work related to refurbishment of tanks to avoid/mitigate water supply disruption to existing consumers; this requirement for scheduling of work will be included in the contract.

14. All proposed OHTs for which land has been identified, are on government land:

- (i) The OHT at Mastalipur is proposed on government land, which is encroached by adjoining two private landowners,<sup>10</sup> who have given their land and the encroached government site to two sharecroppers for agricultural cultivation. Impacts to the two encroachers/adjacent landowners and the two sharecroppers is anticipated in the form of potential crop loss (1 season), which can be avoided if sufficient notice is given.<sup>11</sup> Timely intimation to the encroachers and sharecroppers prior to construction as per the entitlement matrix is proposed to help avoid crop loss. One of the sharecroppers (Mr. Kailash Manjhi) belongs to a vulnerable household.
- (ii) The proposed OHT at Joda Masjid is envisaged to require partial filling/reclamation of land from part of Gangi pond (government land), created through sand mining and now being used for pisciculture and cultivation of water chestnuts. The southern end of the pond is proposed to be partly filled; the remaining part of the pond will continue to be available for pisciculture/cultivation. Disturbance to economic activity during the construction period will be avoided by cordoning off the area required for OHT construction from the rest of the pond. The pond will be deepened on its shallow southern tip to ensure that the total volume of water available for cultivation remains the same and livelihoods are not permanently impacted. Potential permanent livelihood impacts to a scheduled caste family that has formed a cooperative for the purpose of lease and are presently engaged in economic activities mentioned above at the pond site, are thus proposed to be avoided. Execution of earth work for excavation and filling of the tank, anticipated for maximum of 1 week will be undertaken in the lean season (summer) for pisciculture and water chestnut cultivation, to avoid any temporary impacts to livelihood.<sup>12,13</sup>
- (iii) OHTs at Budva Mahadev, Delha and Bhusunda are proposed on vacant

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Appendix 9, Due Diligence Report). NOC from Forest Department for construction of water supply facilities at the two sites and signifying acceptance of the land for land offered, is recently received (Appendix 9).

<sup>10</sup> Mr. SS Pandey and Mr. KD Pandey, who are brothers.

<sup>11</sup> Two seasonal crops, paddy and wheat are produced on the encroached government land. The encroachers (adjacent landowners) and sharecroppers presently share the produce as per their informal agreement.

<sup>12</sup> Mr. Yogendra Das, head of the household and Secretary of the cooperative, was consulted. Members of Mr. Das' household are involved in pisciculture and water chestnut cultivation at Gangi pond. The estimated value of fish production from the entire pond is Rs. 50000 per annum. Mr. Das agrees that economic activity can continue as before if the project ensures that the volume of water in the pond remains the same. Earth work at the site (excavation and filling of pond) is not expected to require more than 1 week. Timely notice (1 month in advance, followed by reminder 1 week in advance) will be given and DSC and PIU will ensure that excavation and filling work is undertaken only in the lean season, which must be identified by members of the cooperative.

<sup>13</sup> Consultations have been held with key representatives of the cooperative (Manpur Prakhand Matsyajeeve Sahyog Samiti) and the Fisheries Department, during which the proposed solution (deepening of the pond to ensure that the volume of water remains the same) was indicated as acceptable by the cooperative.

government land, which is not under any use.No IR impacts are anticipated.

15. Four new pump houses are proposed on available vacant land at Dandibagh, an existing water supply facility site of GMC. No IR impacts are anticipated for the same.

16. Efforts have been made in detailed design to avoid or minimize resettlement impact through careful design of pipe alignments for water supply distribution mains and rising mains through available government land and existing public road right of way (*paragraph 5*).

17. All new alignments for rising mains (16.55 km) and existing rising mains (8.45 km) to OHT and GLSR sites have been visited (walk-throughs/drive-through conducted), on the basis of which temporary IR impacts are anticipated. Laying of rising mains is anticipated to involve shifting of 130 mobile hawkers and vendors (who will be assisted to shift to nearby locations where space is available, and who are not anticipated to face economic loss), and 14 vendors with temporary structures, who are anticipated to face loss of income for 3 days each. Only night work is proposed along congested stretches of rising mains, in particular, the alignment from Buniyadganj via Manpur Market to Joda Masjid OHT.<sup>14</sup>Rising main alignments with no IR impact have been identified where possible, e.g. the second tubewell linked to Joda Masjid OHT from Falgu River via Manpur Alipur Road crossing; as well as rising mains from different tubewells to OHTs at Bhusunda, Delha, Budva Mahadeo and Azad Park. Existing rising mains to Murli Hills OHT are proposed to be used, hence no IR impacts are anticipated for the same.

18. Laying of distribution mains (18.56 km) is expected to involve shifting of 46 mobile hawkers (who are not anticipated to face income loss) and 13 vendors with temporary structures, who are expected to suffer income loss for 3 days each.

19. Potential impacts of 446 km of distribution lines are assessed through transect walks and business surveys for sample stretches of proposed pipe alignments, as temporary livelihood impacts for an estimated 426 vendors with moveable structures, for a period of three days each.<sup>15</sup> Mobile vendors as well as those with moveable structures will be assisted to shift to nearby places during the period of pipelaying, where they will be able to continue with their business until they are assisted to move back, when pipelaying for the stretch is completed.<sup>16</sup> Where businesses are unable to or are not required to shift, access will be ensured by the contractor by avoiding excavation of adjacent footpaths and/or by providing planks for pedestrian access. Excavation for each stretch will be limited to the length of pipe that can be laid overnight and excavated trenches in congested areas will be filled by morning, to minimize the period of disruption. Potential disruptions at pipe crossings at congested, commercial areas are to be mitigated by undertaking night work and minimizing the construction period.<sup>17</sup> At national highway and railway crossings, trenchless technology is proposed to be used.

20. Valve chambers will be constructed within the excavated trenches for pipeline RoW along existing government roads/land. Monitoring stations (32 no.s) are proposed in small steel

<sup>14</sup> Hawkers and vendors along this alignment are located on drains/nalas, hence not required to shift due to pipe-laying work as the alignment will not pass under their spaces. In order to avoid impacts to shops and businesses in Manpur Market (permanent structures) as well as to traffic, night work is proposed.

<sup>15</sup> The estimate is obtained from transect walks on representative road stretches/pipe alignments. The exact number of affected persons will be determined through conduct of the detailed measurement survey/census survey on each pipe alignment, prior to construction/implementation.

<sup>16</sup> Mobile hawkers will not be affected as they will be able to shift to nearby locations to continue plying their trade.

<sup>17</sup> Busy crossings in commercial areas where night works are proposed include Peer Mansur Chowk, Kotwali Chowk, Godawari Chowk, Chand Chouraha Chowk, Manpur Chowk, Koyri Bari Nadra Ganj, Gaya College, Godawari Mod, Deya Sthan, Chand Chauraha Narayan Chauraha.

cabinets which will be installed at the extreme edge of government road shoulders/over drains, by constructing a platform.

21. Potential disruption of water supply to presently connected households during integration of the existing distribution system (72 km) will be avoided by ensuring that such work is undertaken at night or non-supply hours.

22. Assessed impacts of proposed pump houses and tubewells are given below:

- (i) Potential livelihood impacts to pump operators (43no.) who are presently working as daily wage employees of GMCat existing pump house sites are to be avoided.<sup>18</sup>The impacts are assessed as (a) potential permanent impacts to livelihoods, which are possible if the contractor decides to terminate the services of the pump operators who are daily wage employees of GMC, during the operation and maintenance period, and (b) no income loss to pump operators during proposed demolition and reconstruction of 5 pump houses and proposed refurbishment of 16 pumphouses is anticipated, as the pumps will continue to be operational during construction period (outside the affected structure) to ensure water supply to connected households. During the operation phase of the refurbished/constructed pump houses, the contractor will be required to give preference to affected pump operators for employment. A preferential contract clause will be included, to this effect.
- (ii) Field visits to each of the pump houses confirmed potential temporary livelihood impacts at one location alone. One of the 5 pump houses proposed for demolition and reconstruction - Hata Godown, is envisaged to have potential temporary IR impacts to 3 businesses, of which 2 small shops can be easily shifted to nearby locations, can continue with their business during construction, and are anticipated to face maximum of 3 days of income loss.<sup>19</sup> One elderly lady, food-seller and head of a female-headed household, is likely to lose her regular clientele and income during the period of construction (envisaged as 30 days) as there is no suitable place nearby where she can shift.
- (iv) Potential disruption in water supply to existing consumers in 9 large residential clusters during refurbishment of existing tubewells, is anticipated for a period of 7 days per tubewell. This will be mitigated through scheduling of work by the contractor and water supply through tankers to affected localities.
- (v) Potential temporary disruption in water supply to areas/households served by the existing system due to refurbishment of existing pump houses, demolition of dilapidated pump houses and construction of new pump houses at the same locations, will be avoided, as pumps will continue to be operated during the construction period.
- (iv) Potential temporary impacts such as disruption of academic activities in government schools where tubewells are proposed,<sup>20</sup> will be avoided by ensuring that construction takes place during holidays/non-school hours and there is no indiscriminate storage of material on school sites, hampering access for children or staff.

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<sup>18</sup> List of pump operators is provided in Appendix 9. Three positions are presently vacant and are likely to be filled soon. The person employed by GMC to the vacant position will be entitled to livelihood protection measures outlined in this RP.

<sup>19</sup> Vulnerability status of APs to be confirmed by DSC during detailed measurement survey.

<sup>20</sup> Government schools where refurbishment of tubewell or pumphouse is proposed, include: (i) Rajakiya Kanya Prathamik Vidyalaya, Kharkhura, (ii) Prathamik Vidyalaya Lakhanpura; and (iii) Rajaiya Uchcha Madhyamik Vidyalaya, Buniyadganj. This RP proposes free water supply and sewerage connections to the three schools and refurbishment of existing school toilets, to ensure that children who attend the school (mostly from low income or lower middle income families) and staff are included in project benefits.

23. It is assessed that minimum of 6 customer service centres (CSC) will be required to cater to 15000 connections each. The location of each CSC, including a central CSC is proposed to be identified, post commencement of DMA work. CSCs are proposed to be located on government land or within existing government buildings or rented space. The updated RP will assess IR impacts, post-identification of CSC locations.

24. Subproject components and their potential land acquisition and resettlement impacts is presented in Table 2.

25. Estimated resettlement impacts of identified sites/alignments for proposed interventions under GWSPI, based on field visits and survey are presented in Table 2.

**Table 2: Summary of Resettlement Impacts**

S. No.	Details	Affected persons (No.) /affected land area (sq. m)	Remarks
1	Permanent land acquisition (identified sites)	None	Site for OHT at Kharkhura Rajakothi (900 sq m) not yet finalised.
2.	Permanent relocation impact (non-titleholders)	8 households 44 persons	Squatters at Ramshilla Hills; all vulnerable households. Of 9 affected households at Ramshila Hills, 1 household facing partial structure loss, will not suffer relocation impact.
3.	Permanent impact: structure loss	8 residential structures	8 squatter households at Ramshilla Hills live in houses they have constructed. 1 household facing relocate on is a squatter in a municipal quarter, hence does not face structure loss.
3a	Total loss of structure (100%)	7 residential structures	
3b	Partial loss of structure (40%)	1 residential structure	Mr. Vimlesh Prasad, at Ramshilla Hills GLSR site.
4.	Potential temporary impacts to hawkers and vendors		
4a.	Potential temporary impact of water supply distribution pipelines: income loss	426 vendors	Along distribution lines; assessed on the basis of transect walk
4b.	Potential temporary impact of distribution pipelines to BPL and FHH	150 vendors (35%)	Income loss for 3 days each anticipated.
4c.	Temporary income loss (rising mains, distribution mains, pump houses)	33vendors	Income loss for 3 days each anticipated for 29 APs. Income loss for about 35 days anticipated for 1 FHH and BPL AP.
4d.	Potential temporary impact of main pipelines to vulnerable persons	11 APs	
5.	Permanent income loss	4 APs	At Mastalipur OHT site, partial income loss to 2 encroachers and 2 sharecroppers anticipated. Potential livelihood impacts to be avoided for 43 pump operators, and members of 1 SC household at Joda Masjid through mitigation measures suggested in RP.
6.	Potential crop loss (for 1 season)	4 persons (2 encroachers and 2 sharecroppers)	At Mastalipur OHT site. Impact can be avoided through provision of adequate notice as per EM. 1 season's crop loss considered in the event of failure to provide such notice.

7.	Affected IP	None	-
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26. Through implementation of the Environmental Management Plan (EMP), contractors are required to maintain access to shops to avoid and limit the disturbance to the extent possible, and implement mitigation measures specified in their contracts, which will be monitored by the design supervision consultants and PIU.<sup>21</sup> Temporary economic impacts to businesses along the pipe routes will be avoided and/or mitigated through careful planning of the timing of implementation of works on congested commercial roads (night works will be proposed for congested area), good traffic management planning and implementation,<sup>22</sup> and maintaining access to shops during the construction period as outlined in the EMP.<sup>23</sup>

27. The following mitigation measures are proposed to avoid and/or mitigate temporary impacts to businesses and residents during linear works: (i) provision of advance notice to community, (ii) conducting awareness campaigns on the proposed project, its benefits, potential temporary impacts and mitigation measures, grievance redress mechanism, etc., (iii) maintaining access by providing planks and leaving spaces to avoid disturbance to residents and businesses, (iv) managing traffic flows as per the traffic management plan prepared by the contractor in coordination with local authorities and communities, (v) undertaking pipe-laying work at night along congested commercial stretches and limiting the amount of time of open trenches, (vi) placing details of telephone hotlines and contact information of PIU offices in signages in visible places, (vii) providing assistance to mobile vendors and hawkers to shift to alternative nearby locations. These measures will be enforced through the contract, which will have these as clauses.

## B. Indigenous Peoples

No adverse impacts to indigenous peoples are anticipated, as all selected sites are within or close to the urban limits of Gaya, and none fall in scheduled areas/traditional enclaves of scheduled tribes (ST). In the identification of sites for subproject components, care was taken to ensure that no IP/ST will be permanently affected.

## III. SOCIO-ECONOMIC INFORMATION AND PROFILE

### A. Profile of Affected Persons

28. Profile of affected persons (AP) facing permanent relocation impacts and / or structure loss is presented in Table 3, while the profile of APs facing potential permanent livelihood impacts is presented in Table 4. All households at Ramshila Hills OHT site are vulnerable, meeting 3 or more vulnerability criteria applicable to local context; a total of 51 persons belonging to the 9 households are affected.<sup>24</sup> Of those facing permanent, partial (13%) and

<sup>21</sup> The Design Supervision Consultant (DSC) will be responsible for construction supervision.

<sup>22</sup> Traffic management plans will be developed by the Contractor (approved by the DSC) for congested road segments during the implementation period.

<sup>23</sup> To ensure disturbance is minimized to the extent possible, contractors will be required to expedite works at night in business areas, provide pedestrian planks across trenches, manage traffic flows, minimize construction period etc.

<sup>24</sup> The PPTA Report for BUDIP identified the following vulnerability criteria in the context of Bihar: (1) households belonging to most backward communities; (2) head of household is a woman; (3) head of household is illiterate; (4) head of household is a daily wage labourer, (5) below poverty line household; and (6) household lives in a kutcha house. ADB's Facility Administration Manual quotes the PPTA stating that "more vulnerable" households are those that meet 5 or more of the above-mentioned vulnerability criteria. Implicit in the definition is that households

significant livelihood impacts (2 encroachers and 2 sharecroppers at Mastalipur OHT site), one of the sharecroppers is vulnerable.

29. Tables 5 and 6 present socio-economic profiles of temporarily affected persons at Hata Godown pump house, and due to pipelaying activity, respectively. One elderly head of female-headed household and below poverty line at Hata Godown is likely to face temporary income loss for the period of construction of 30-35 days. On average, 35% of those who face temporary income loss are vulnerable (Table 6).

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meeting fewer criteria are also vulnerable, albeit to a lesser degree, and need additional support/assistance. All APs at Ramshila Hills and one sharecropper at Mastalipur are identified as vulnerable.

**Table 3: Socio-economic Profile of Affected Persons facing Structure Loss and / or Relocation Impact  
(Ramshila Hills OHT site)**

Sl. No.	Name of AP	Size (sq ft) and use of affected property (sq m)	Cost of affected property as per BCD SOR	Estimated market price of affected property	% of property lost at the location	Total private land holdings of AP (at the location and other places)	Income sources of HH	Total HH income per month	Whether vulnerable	HH size	Type of house	Asset ownership	Remarks
1	Battu Paswan	15x17 Residential	103146.00	NA (GMC Property)	100%	None	Rickshaw pulling and wage labour work	2500	Yes	5	Semi-pucca Structure Wall-Bricks, Cement, Floor cemented and roof tin shade	GMC	Relocation impact. Structure owned by GMC, hence not eligible for compensation against structure loss..
2	Krishna Prasad	15x18 Residential	79228.00	87151.00	100%	None	Rickshaw pulling and wage labour work	3000	Yes	7	Kutcha structure (Wall-stone and mud, mud floor, and roof – tin)	Private	Relocation impact and 100% structure loss.
3	Nageswar Prasad	15x23 Residential	101246.00	111371.00	100%	None	Rickshaw pulling and wage labour work	2500	Yes	5	Kutcha structure (Wall-stone and mud, mud floor and roof – tiled/ <i>khaprel</i> )	Private	Relocation impact and 100% structure loss.
4	Tulsi Prasad	34x20 Residential	199554.00	219509.00	100%	None	Rickshaw pulling and wage labour work	3000	Yes	6	Kutcha structure (Wall-stone and mud, mud floor and roof – tiled/ <i>khaprel</i> )	Private	Relocation impact and 100% structure loss.
5	Promod Prasad	20X22 Residential	129108.00	142019.00	100%	None	<i>Thela</i> (cart) pulling and wage labor work	3500	Yes	7	Kutcha structure (Wall-stone and mud, mud floor and roof – tin)	Private	Relocation impact and 100% structure loss.
6	Pappu Pratap	14x12 Residential	42267.00	46494.00	100%	None	Wage labor work	3000	Yes	4	Kutcha structure (Wall-stone and mud, mud floor and roof – tiled/ <i>khaprel</i> )	Private	Relocation impact and 100% structure loss.
7	Vimlesh Kumar	18x15 (approx. 50%)	109198.00 (50%)	120118.00	50%	None	Labor work	3500	Yes	6	Pucca Structure (Wall with brick and mud floor)	Private	50% structure loss. Remaining unaffected area

Sl. No.	Name of AP	Size (sq ft) and use of affected property (sq m)	Cost of affected property as per BCD SOR	Estimated market price of affected property	% of property lost at the location	Total private land holdings of AP (at the location and other places)	Income sources of HH	Total HH income per month	Whether vulnerable	HH size	Type of house	Asset ownership	Remarks
		Residential (remaining area: 19x15)									and no roof)		(19mx15m) is where the family lives. Loss of front portion of house; residual area will be viable. No relocation impact. AP would prefer to remain at same location
8	Sonu Kumar	10X12 Residential	35223.00	38745.00	100%	None	Labor work	5000	Yes	6	Kutcha structure (Wall-brick, mud floor and no roof)	Private	Relocation impact and 100% structure loss
9	Chandan Kumar	10x12 Residential	35223.00	38745.00	100%	None	Rickshaw puller	3000	Yes	4	Kutcha structure (Wall-brick, mud floor and no roof)	Private	Relocation impact and 100% structure loss

Source: Socio-economic survey of affected persons, 2014.

Note: 1. Mr. Vimlesh Kumar belongs to Khatri/General Caste, while all the other APs listed above belong to Chandravanshi Kahar (OBC) community. A majority of population (51%) in the state of Bihar belongs to OBC community, hence members are not socially segregated/ostracized.

2. Mr. Vimlesh Kumar's remaining structure (19x15 sq ft) is the place where the family resides. The affected part is the outer portion of the house. The remaining unit will still be adequate for the family to stay. The project will provide assistance to repair the remaining structure, to ensure it is viable.



**Table 4: Socio-economic Profile of Affected Persons facing permanent partial livelihood impact (Mastalipur OHT site)**

S. No.	Name of AP	Community	Total land holdings (private land and encroached land) at the location	Encroached parcel/holding at the location	Percentage of encroached land to total land at the location*	Details of crops cultivated at the location including individual share per annum (Rs.)	Estimated value of crops grown on encroached land per annum	Income sources of HH	Total HH income per month	Whether BPL	Type of house	Asset ownership	Remarks
<b>Adjacent landowners/encroachers (government land)</b>													
1	Shri S.S. Pandey	Brahmin	31 Katta at the location, of which legal title held for 27 katta	4 Katta	13%	Rice -40 qtl Wheat- 16 Qtl Value – Rs.116800	Rs. 15184	Agriculture at the location as well as 6 acres taken on lease from a private landowner (2 sons) Jobs (2 sons)	20000	N	Semi-pakka	Private	Literate. Elderly person, dependent on sons Five sons, of whom one is dependent on others. Sons and grandchildren are all educated
2	Shri Krishna Dev Pandey	Brahmin	31 Katta at the location, of which legal title held for 27 katta	4 Katta	13%	Rice -40 qtl Wheat- 16 Qtl Value – Rs.116800	Rs. 15184	Agriculture and priesthood (self); Electrician (son)	25000	N	Semi Pakka	Private	Literate 1 son is an electrician, another is in university. 1 widowed daughter and 1 disabled daughter stay with him
<b>Sharecroppers (placed by adjacent landowners)</b>													
3	Shri Kailash Manjhi	Schedule d castet	None owned; 31 katta cultivated as sharecropper	4 Katta	13%	Rice -3 Qtl Wheat-3 Qtl Rs. 12000	Rs.1560	Agriculture and government pension (self)	15,000	No	Semi-pacca	Not applicable	Literate (VII standard); sons sent to school, married daughters were not educated. Only 1 dependent (wife); children have independent income sources.
4	Sri Vijay Sao	Schedule d casste	None owned, 31 Katta cultivated as sharecropper	4 Katta	13%	Rice -3 Qtl Wheat-3 Qtl Rs. 12000	Rs.1560	Agriculture and daily wage labour (self)	6,000	Yes	Kachcha	Not applicable	Illiterate; with school-going children. Household size=6

**\*Note:**

1. Encroached government land on which sharecropping is presently practiced by the adjacent landowners and sharecroppers placed by them, will be affected. Hence, one-time potential crop loss (1 season) is possible. In addition, potential permanent livelihood impact (reduced income per annum by 13%) is assessed for each of the above APs. This annual reduction in income is not likely to affect the two adjacent landowners (Mr. SS Pandey and Mr. KD Pandey) and one sharecropper (Shri Kailash Manjhi) greatly, as they either have additional sources of income, or, multiple earning members in the family, and are above poverty line. However, Mr. Vijay Sao, sharecropper and assessed to be below poverty line, will be adversely affected.
2. The urban poverty line in Bihar (as per Rangarajan Committee, Government of India) per capita per month in 2011-12 was Rs. 1229.3. (Government of India, Planning Commission, *Report of the Expert Group to Review the Methodology for Measurement of Poverty*, June 2014, New Delhi). On adjusting for inflation, urban poverty line in Bihar is estimated as Rs. 1494 in 2015-16.
3. Potential permanent livelihood impacts to 43 pump operators employed as daily wage earners by GMC, are proposed to be avoided through provision in the contract for their continued employment as pump operator during the operation and maintenance period, should they wish to do so.



**Table 5: Socio-economic profile of temporarily affected persons (Hata Godown Pump House site)**

S. No.	Name	Type of business	Assessed Impact Duration	Loss	Stated profit / month	No. of dependents	Whether vulnerable	Remarks
1	Ms. Shanti Devi	Food seller: selling Litti Choka and Sattu	Temporary (30-35 days)	Vending space; temporary income loss	5500	4	Yes	Squatter on government land. Illiterate, FHH and BPL. Has been unable to afford to set up structure or buy handcart. No suitable space available nearby, hence potential loss of regular clientele and income possible during construction period of 30-35 days.
2	Suresh Prasad	Local food eatery- Litti shop	Temporary (3 days)	Temporary income loss	9000	5	No	Squatter on government land. Literate, with educated family members. Can shift temporary shop nearby and continue with business, and shift back once construction completed.
3	Chandan Kumar	Tea shop	Temporary (3 days).	Temporary income loss	9000	None, single young person	No	Same as above

Source: Survey and consultation with affected persons, Hatagodown pumphouse, 2014

Note: BPL=below poverty line; FHH=female headed household.

**Table 6: Summary Profile of Temporarily Affected Persons (rising mains and distribution mains)**

S. No.	Description	Profile
1	Components	Laying of rising mains, distribution mains, distribution lines
2	Total no. of temporarily affected persons	27
3	No. of vulnerable APs	10
4	Types of business	Fruit, vegetable, food vendors, sellers of items of daily use, cycle repair and other small businesses
5	Type of structure	Moveable structures, mostly bamboo with tarpaulin, or, wooden kiosks ( <i>gumtis</i> )
6	Assessed impact duration	Temporary (3 days each); Can shift temporary shop nearby and continue with business; and shift back when pipelaying completed.
7	Loss	Temporary income loss due to shifting of business t
8	Stated average profit / day (Rs.)	155
9	Stated profit per day (range, in Rs.)	140-465

Source: Transect walk and socio-economic survey of temporarily impacted persons, 2015.

Note: 1. The majority of small businesspersons (hawkers and vendors) belong to Other Backward Caste (OBC) category; other dominant groups include Scheduled Castes, including Mahadalits.

30. Detailed profile of temporarily affected persons facing livelihood loss due to rising mains and distribution mains pipe-laying activity is presented in Appendix 6.<sup>25</sup>The profile of temporarily affected persons is based on 100% survey of potentially affected businesses along rising mains and distribution mains alignments and at pump house sites. Reconnaissance surveys of distribution network pipelines proposed in the project coverage area revealed that detailed measurement survey / survey of businesses would be required prior to implementation along each road stretch/pipeline RoW.

#### **IV. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION**

##### **A. Public Consultation**

31. The RP was prepared in consultation with stakeholders including beneficiaries/local people, people living around project sites within and outside GMC limits, affected persons and their representatives, staff of schools where facilities are proposed, local youth and women, ward councilors, Mayor, Deputy Mayor, city manager and engineers of line departments and concerned government departments. A sub-project level stakeholder's consultation workshop was conducted on 06 December 2013. Key stakeholders who participated at the workshop included elected representatives and functionaries of GMC and various government agencies. Consultations and focus group discussions (FGDs) were conducted to seek feedback from local people (497 persons, of which 32% were women) on the proposed development interventions, perceived impacts and mitigation measures and their participation. Socio-economic and inventory of loss surveys and consultations with affected persons facing permanent and temporary impacts also helped understand AP perspectives and propose mitigation measures specific to each type of loss. The summary of consultations is presented in Appendix 9 of the RP.

##### **C. Information Disclosure**

32. Information dissemination and disclosure has been a continuous process since the beginning of the program. The approved RF and RP will be placed in the office of GMC; District Magistrate's Office, and city libraries. The DSC and PIU will continue consultations, information dissemination, and disclosure. A strategy for continued consultation and participation is in the RF. The finalized/approved RP will also be disclosed in ADB's website, as well as state government, local government (GMC), PMU (BUIDCO) and PIU websites. Project information will be continually disseminated through disclosure of resettlement planning documents, as and when updated. Information on compensation, entitlements and resettlement planning and management principles adopted for the subproject will be made available in the local language (Hindi) and the same will be distributed to APs. The consultation process will be continuous, through the project cycle.

##### **D. Continued Consultation and Participation**

33. The PIU/DSC will extend and expand the consultation and disclosure process during the construction period. The project management consultants will conduct training of contractors (engineers as well as safeguards personnel), PIU and DSC staff, and with the support of DSC and PIU, conduct a public awareness campaign during project implementation. A consultation and participation plan (CPP) is prepared for the project; PIU will be assisted by DSC to ensure that the communities in project areas are fully aware of project activities at all stages of

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<sup>25</sup> The methodology for estimation of temporary impacts is presented in Appendix 6.

construction. Community groups will be consulted and made aware of the civil works and project activities, anticipated impacts and mitigation measures, grievance redress process and contact details of PIU personnel prior to construction.

## V. GRIEVANCE REDRESS MECHANISM

### A. Common Grievance Redress Mechanism

34. A common Grievance Redress Mechanism (GRM) will be put in place to redress social, environmental or any other project and/or subproject related grievances. The GRM described below has been developed in consultation with stakeholders, including affected persons and NGOs.<sup>26</sup> Customer Service Centres (CSC) proposed in each town, including a central CSC will serve as the focal points for registration of grievances. The APs will also be encouraged to lodge their complaints through phone or email or post and seek a complaint registration number either through the CSCs or directly, through the project grievance redress cell at PIU.

35. The Grievance Redress Mechanism provides an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project. A Grievance Redress Cell will be established at PIU; the social safeguards officer of PIU, supported by the social safeguards expert and social mobilisers of DSC will be responsible for conducting periodic community meetings with affected communities to understand their concerns and help them through the process of grievance redressal including translating the complaints into Hindi or English from the local language, recording and registering grievances of non-literate affected persons and explaining the process of grievance redress mechanism. All expedient and minor grievances will be resolved at project level; should the PIU fail to resolve any grievance within the stipulated time period, the PMU will be consulted and suggested actions by PMU taken by PIU with DSC support, within specified time. PIU will also be responsible for follow-through for each grievance, periodic information dissemination to complainants on the status of their grievance and recording their feedback (satisfaction/dissatisfaction and suggestions).

36. The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. All grievances – major or minor, will be registered. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from the PIU supported by DSC will try to successfully resolve them. In case of larger issues, they will seek the advice and assistance of the PMU. Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the City Level Committee/Grievance Redress Committee.<sup>27</sup>

37. City Level committees will be set up to monitor project implementation in each town. In its role as a Grievance Redress Committee (GRC), the CLC will meet every month (if there are pending, registered grievances), determine the merit of each grievance, and resolve grievances within specified time upon receiving the complaint-failing which the grievance will be addressed by the state-level Project Steering Committee (PSC). The PSC will resolve escalated/unresolved grievances received. Grievances related to land acquisition, rehabilitation

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<sup>26</sup>The draft Grievance Redress Process has been circulated and discussed with the following Bihar-based NGOs and research institutes working on environment, social and gender issues, for comments: Asian Development Research Institute, Participatory Research in Asia, Nav Manas Kalyan Samiti and Taru Mitra.

<sup>27</sup>. Grievances related to award of compensation can be addressed by the district collector's office and court of law.

and resettlement remaining unresolved by PSC will be referred by affected persons to the State Land Acquisition, Rehabilitation and Resettlement Authority, if constituted during the project period in the state, or, to appropriate courts of law.<sup>28</sup> The multi-tier GRM for the project is outlined below (Figure 6), each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required. The GRC will continue to function throughout the project duration. The PMU has issued a notification to tranche 1 and 2 project towns to establish the respective city level GRCs, with details of composition, process of grievance redress to be followed, time limit for grievance redress at each level, etc. Appendix 3 provides a copy of the GRM notification issued in local language, which also specifies the time taken at each stage of the process.<sup>29</sup>

38. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB India Resident Mission (INRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

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<sup>28</sup> The land acquisition, rehabilitation and resettlement authority is required to be set up in every state as per LARR Act, 2013. The authority is not in place in Bihar yet. Until such time that the authority is constituted in the state, aggrieved parties will be able to directly approach the courts of law at any stage.

<sup>29</sup> A maximum time period of 90 days is allocated for project level grievance redress, 60 days for the GRC/CLC and 90 days for the PSC, in BUIDCO's resolution on project grievance redress process dated 27 May, 2015 (Appendix 3).

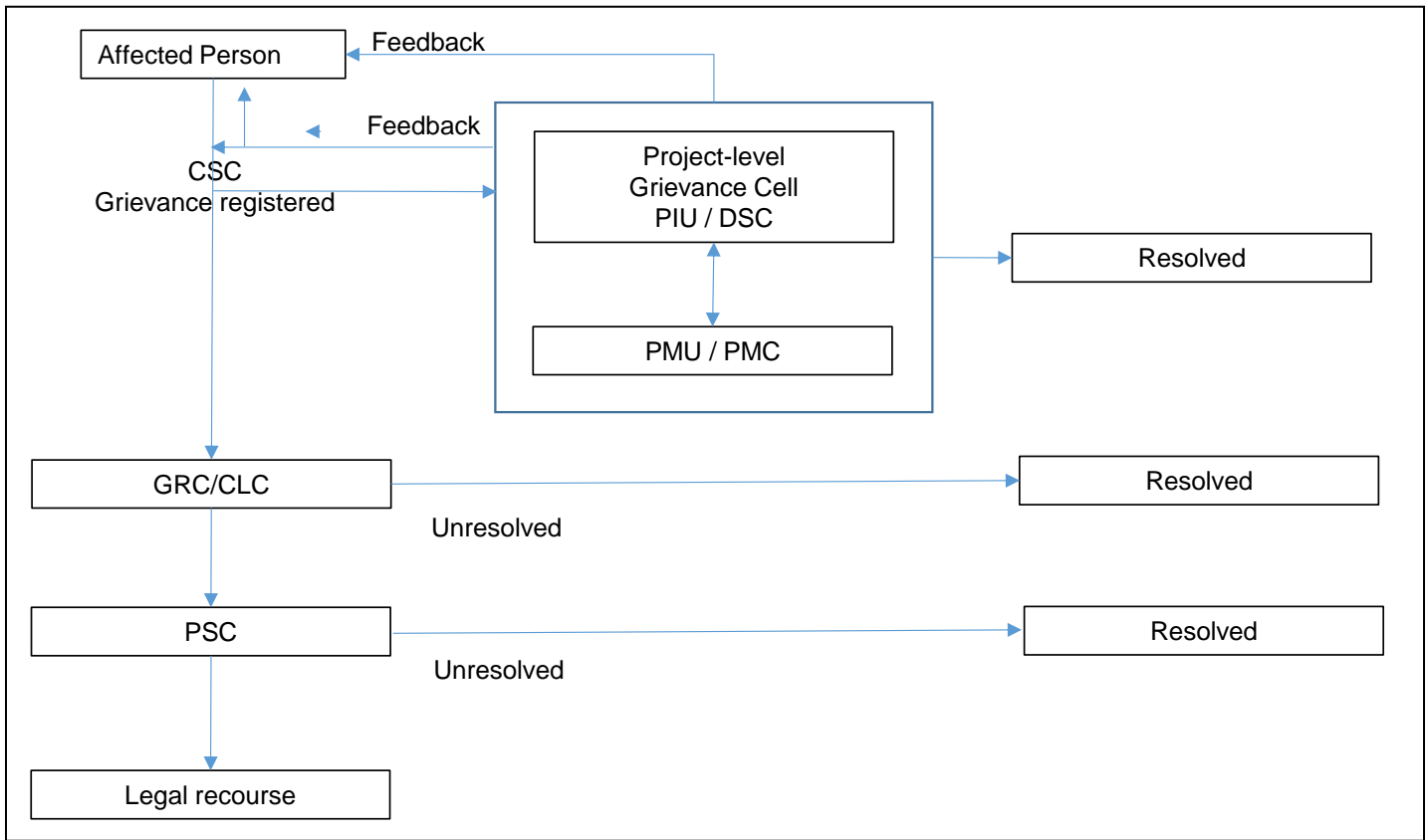


Figure 6: Project Grievance Redress Mechanism

CLC=city level committee,CSC=customer service center, GRC=grievance redress committee; GRM=grievance redress mechanism, , PIU= project implementation unit, PMU =project management unit, PSC=project steering committee.

## **B. Composition of GRC and PSC**

39. The CLC, acting as GRC will have District Magistrate (Chairperson), Mayor, Municipal Commissioner, Head, PIU (Convener), and City Level Heads of relevant departments (such as BRJP, Road Construction Department, PHED, Electricity Board, State Pollution Control Board, Police, etc. and departments such as Forest Department, Railways etc.); Chairpersons of the concerned Municipal Corporation's Standing Committee; ULB officials including Municipal Engineer, Town Planning Officer, Medical and Health Officer; representatives from the affected village *panchayat* and / or community, if any, eminent citizens, CBOs and NGOs. The GRC/CLC must have a minimum of two women members. In case of any indigenous people impacts in future subprojects, the GRC/CLC must have representation of the affected indigenous people community, including at least one female indigenous person, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.

40. The PSC will include the Minister for Urban Development (Chairperson), State Chief Secretary (Vice Chairperson), and Ministers, Directors and/or representatives of other relevant government ministries and departments, e.g., Finance, Planning, PHED, Roads, BRJP, etc., Mayors of respective municipal corporations and the project director (Member Secretary and Convener) as members.

## **C. Areas of Jurisdiction**

41. The areas of jurisdiction of the GRC, headed by the District Magistrate will be (i) all locations or sites within the district where subproject facilities are proposed, or (ii) their areas of influence within the District. The PSC will have jurisdictional authority across the state (i.e., areas of influence of subproject facilities beyond district boundaries, if any).

## **D. Consultation Arrangements**

42. This will include regular group meetings and discussions, at least twice during resettlement plan preparation, with affected persons by the social safeguards personnel of DSC and PIU. During the first year of RP implementation, such meetings will take place on a quarterly basis, while in subsequent years; these meetings will be held at least twice a year. The consultation arrangement thus envisaged is intended to address both general and/or specific individual grievances through a participatory approach. Besides, the consultative process is meant to be flexible to provide timely mitigation of grievances of the APs. The most complex cases will be dealt with through one-to-one consultation with particular APs by a host of actors comprising social safeguard expert of DSC and Resettlement Officer, PIU, with the support of PMU and PMC as and when required. DSC will be responsible for ensuring that non-literate affected persons and/or vulnerable affected persons are assisted to understand the grievance redress process as well as for encouraging them to register complaints and follow-up with relevant authorities at different stages in the process.

## **E. Recordkeeping**

Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome will be kept by PIU (with the support of CSCs and DSC) and submitted to PMC.



## E. Information dissemination methods of the GRM.

43. The PIU, assisted by DSC will be responsible for information dissemination to affected persons on grievance redressal procedure. ULB-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the consultation and participation plan. Public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated. The PIU environment and social safeguard officers will be assisted by design and supervision consultant (DSC) safeguards specialists with information/collateral/awareness material etc. and in conducting project awareness campaigns. The campaign will ensure that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per project Resettlement Framework including who to contact and when, where/ how to register grievance, various stages of grievance redress process, time likely to be taken for redressal of minor and major grievances, etc. Grievances received and responses provided will be documented and reported back to the affected persons. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU and PIU offices, ULB/concerned local panchayat notice boards and on the web, as well as reported in the semi-annual environmental monitoring reports to be submitted to ADB. A Sample Grievance Registration Form has been attached in Appendix 3.

44. **Periodic review and documentation of lessons learned.** The PMU safeguard officers will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the PIU's ability to prevent and address grievances.

45. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates. The grievance redress process is shown in Figure 5.

## VI. POLICY AND LEGAL FRAMEWORK

46. The policy framework and entitlements for the project are based on applicable laws and regulations of the national and state government, ADB's Safeguards Policy Statement 2009; and the agreed Resettlement Framework.

47. **ADB Safeguards Policy Statement (2009).** are (i) compensation to replace lost assets, livelihood, and income; (ii) assistance for relocation, including provision of relocation sites with appropriate facilities and services; and (iii) assistance for rehabilitation to achieve at least the same standard of living with the project as without it. In addition, the absence of legal title to land should not be a bar to compensation. ADB SPS requires payment of compensation prior to actual loss.

48. **Government of India and Government of Bihar Laws and Policies.** The applicable legal and policy frameworks of the government, include: The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act; 2013, and state law: the Bihar Land Acquisition and Resettlement and Rehabilitation Policy, 2007.

49. The Resettlement Framework specifies that in case of discrepancy between the policies of ADB and the government, ADB policy will prevail.

50. Based on these, the core involuntary resettlement principles applicable are: (i) land acquisition, and other involuntary resettlement impacts will be avoided or minimized exploring all viable alternative subproject designs; (ii) where unavoidable, time-bound Resettlement Plans will be prepared and APs will be assisted in improving or at least regaining their pre-program standard of living; (iii) consultation with APs on compensation, disclosure of resettlement information to APs, and participation of affected persons in planning and implementing subprojects will be ensured; (iv) vulnerable groups will be provided special assistance; (v) payment of compensation to APs including non-titled persons (e.g., informal dwellers/squatters, and encroachers) for acquired assets at replacement rates; (vi) payment of compensation and resettlement assistance prior to the contractor taking physical acquisition of the land and prior to the commencement of any construction activities; (vii) provision of income restoration and rehabilitation; and (viii) establishment of appropriate grievance redress mechanisms.

51. Policy framework and entitlements are discussed in detail in the Resettlement Framework. **Appendix 4** to this RP provides a comparison of national, state and ADB policies and identifies how the Resettlement Framework addresses gaps in present policies.

## VII. ENTITLEMENTS, ASSISTANCE AND BENEFITS

### A. Types of Losses and Affected Person (AP) Category

52. The anticipated types of losses due to the Gaya water supply sub-project components under project 2 are (i) loss of residential structures; (ii) physical relocation of non-titled, poor and vulnerable persons; (iii) potential income loss to encroachers and sharecroppers; (iv) potential temporary income loss to hawkers and vendors with moveable structures, including poor and vulnerable persons; (v) crop loss to encroachers on government land (adjacent land owners) and sharecroppers, of whom one is identified as poor and vulnerable.

53. According to ADB SPS 2009 in the context of involuntary resettlement, affected persons (APs) are those who are physically relocated –i.e., lose residential land, or shelter and/or economically displaced (loss of productive land, structures, assets, access to assets, income sources, or means of livelihood). The absence of formal and legal title to the land does not bar the affected person from receipt of compensation and resettlement assistance from the project. Vulnerable APs are eligible for additional compensation and assistance and are to be accorded priority in employment in project related construction activities.

54. Detailed Measurement Surveys (DMS) and Inventory of Loss Surveys have been conducted for project sites and rising and distribution mains alignments. These surveys remain to be conducted before implementation at each stretch of distribution pipeline and will determine the total number of temporarily affected persons along the distribution line.<sup>30</sup> Eligibility for compensation will be the date of start of the DMS prior to commencement of civil works in sections ready for construction. The DSC will con

<sup>30</sup>The Detailed Measurement Survey (DMS) will establish the number of affected persons (AP)/businesses along each proposed pipe/road stretch with potential impacts. It will collect only essential information for determining entitlements. A rapid survey will be conducted using an instrument similar to the one used for business surveys during transect walks for this RP (refer Appendix 3 for a survey form template for the DMS). The DMS will gather personal information on the AP, type of business, type of structure, number of persons employed, income and profits per day, vulnerability, if any of the owner or employees, and will record the type of distress likely.

duct DMS and inventory of loss survey of APs along the relevant sections where transect walks reveal any impacts (**Appendix 5 and 6**). The date of DMS survey will serve as the cut-off date for eligibility. Hawkers or businesses whose settle in the affected areas after the cut-off date will not be eligible for compensation. They will, however be given sufficient advance notice (at least 30 days), and assisted to vacate premises and dismantle affected structures prior to project implementation. Contractors will provide shifting assistance to hawkers/vendors requiring help. Information regarding the cut-off date for eligibility to all types of compensation will be documented and disseminated throughout the project area.

## **B. Entitlements**

55. The entitlement matrix (Table 7) summarizes the types of possible losses and corresponding entitlements in accordance with ADB and government policies, based on the principle of replacement cost. In addition to the estimated permanent impacts and potential temporary impacts, the entitlement matrix safeguards unforeseen impacts.

56. In accordance with the entitlement matrix for the project, all displaced households and persons will be entitled to a combination of compensation packages and resettlement assistance, depending on the nature of ownership rights on lost assets, scope of the impacts including socioeconomic vulnerability of the displaced persons, and measures to support livelihood restoration if livelihood impacts are envisaged. The entitlement matrix for the subproject based on the above policies is in Table 7.

## **C. Relocation**

57. Of the 9 squatter households on government land affected by loss of structure constructed / occupied by them at Ramshilla Hills, 8 who face 100% loss of occupied structure will require to be relocated and 1 household facing 50% loss of structure would prefer not to relocate. All 8 households requiring relocation are assessed to be poor and vulnerable households. Of the 8, one household staying in a staff quarter of GMC is an unauthorized occupant, has not constructed the structure, hence will not incur structure loss, but will require to be relocated and is eligible for relocation assistance.

58. Affected persons facing loss of residential structures, including encroachers and squatters will be required to relocate (8 households with 44 members) and as per EM, will be entitled to the following: (1) 60 days advance notice to remove their assets, meant to minimize damage / loss and ensure that they incur none or minimal livelihood disruption; (2) cash compensation for affected structures or part thereof at replacement value computed on the basis of the latest prevailing basic schedule of rates (BSR) in the state without depreciation; (3) right to salvage material from the affected structure, at no cost; (4) a lumpsum shifting assistance of Rs. 20,000, to be provided in two instalments of Rs. 10,000 each (initially, before the household relocates to temporary legal rental accommodation, and later, when it relocates to legal rental accommodation of its choice, post job placement in project operation work); and (5) cash assistance towards rental subsidy. The rental subsidy will continue until such time that placement of 1 member of displaced household in project operation work takes place,<sup>31</sup> which will enable the household to access affordable, legal rental housing.<sup>32</sup>

<sup>31</sup> As per available estimates in the DPR for GWSP I, 60 new unskilled or semi-skilled labour jobs will be generated at the operation phase of the project.

<sup>32</sup> Market survey in the locality confirms that rental housing in the vicinity is available for Rs. 1500-1600 per month, hence the budgeted amount of Rs. 1800 is deemed adequate for the time period over which it is spread. The RP budgets rental subsidy for a period of 21 months, as by this time, major works such as source works, transmission

59. Since all households to be relocated are vulnerable, they are entitled to additional assistance, including: (1) one-time lumpsum assistance of Rs. 36,000 (12 months subsistence allowance) per household; (2) priority placement in project construction activities; (3) an additional 25% of resettlement benefits to which they are entitled, for SC/ST households relocated outside the district, along with a one-time resettlement entitlement of Rs. 50,000 as per provisions of the RFCTLARR; and (4) training and placement in project operation work for 1 member of poor/vulnerable household. In the event that no member of a physically/economically displaced poor/vulnerable household opts for a project operation related job,<sup>33</sup>the RP/EM provides for skill training, income generation assistance and initial capital of INR 40,000

60. Written assurance from IA will be required, stating that all displaced poor/vulnerable households will be accorded priority for training and placement in project operation related jobs, if desired by them, and that government will pay the rental subsidy until such time that they are placed in such jobs and therefore in a position to access affordable, legal rental housing.<sup>34</sup> Meaningful consultations will be conducted with the affected families; minutes of such consultations will be carefully and accurately prepared, and their agreement for (a) the temporary housing arrangements until they can get access to legal rental housing and (b) willingness to take the jobs offered (to ensure they can afford to rent adequate housing for their family) by the project, recorded.<sup>35</sup>

61. The project (PIU and DSC) will provide assistance to APs facing relocation, to find suitable temporary rental housing in the vicinity (preferably close to each other, so that social networks are maintained and it is easy to track rehabilitation activities and status of the households), before demolition/relocation. In addition, they will also provide assistance to relocated persons to apply for benefits under available government land or housing schemes for the poor.

62. PIU and DSC safeguards personnel will be responsible for maintaining contact with each displaced poor/vulnerable household, throughout the project implementation period, to ensure that their socio-economic and housing status is monitored and they are enabled to attain the anticipated rehabilitation outcome of improved standard of living.

#### **D. Livelihood protection and Income Restoration**

63. The RP proposes the following measures for livelihood protection and income restoration:

64. Potential livelihood loss to GMC's pump operators working on job card / daily wages will be avoided. The contract will have a clause requiring the contractor to give priority in employing GMC pump operators during the period of operation.<sup>36</sup>

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mains, storage reservoirs, and significant proportion of DMA works are scheduled for completion, hence operation related jobs are expected to be available. One member of each relocated household will be assured a project operation related job if desired, as soon as it is available, at which time the household is expected to be in a position to afford legal rental housing.

<sup>33</sup> Statement of each household on preferred employment option to be recorded and added to updated RP.

<sup>34</sup> The written assurance from IA to this effect will be added to the updated Due Diligence Report (Appendix 9 to this RP).

<sup>35</sup> The minutes, participant lists and pictures of the consultations with the APs of Ramshilla Hills site will be included in the updated RP/DDR.

<sup>36</sup> Seven consultation meetings were held with pump operators at: (i) Dandi Bagh; (ii) Panchayati Akhara; (iii) Gurudwara-Nigam Store-Pilgrim Hospital-Azad Park-Khadi Gramodyog, Central School; (iv) Piteshwar-Delha; (v) Manpur-Vishnupad-Bageswari Powerganj-Janta Colony 1; (vi) Bageshwari Paschim; and (vii) Hata Godown. It was learnt that GMC has employed the pump operators as daily wage labour, at a salary of Rs. 7500 per month. The

65. Permanent and partial loss of income (13%) for 2 encroachers and 2 sharecroppers on government land at Mastalipur OHT site is anticipated. Of these, 1 sharecropper is categorized as vulnerable. Affected persons facing livelihood/income loss will be eligible for (a) priority and preference for employment opportunity in project construction work, if desired by them; (b) vocational training and skill improvement options as per choice, for 1 member of each affected family at Rs, 20,000 per family; (3) Additional cash assistance at prevailing minimum wage rate for a period of three months, to enable the household to meet living expenses during the period of training and transport costs to the training venue, OR, purchase of income generating assets up to Rs. 40,000, the cost of which will be decided on a case to case basis.

66. Assistance provided to physically and economically displaced vulnerable persons will include support during project construction period as well as in the post-project operation phase, in the form of: (1) priority and preference in project related construction work; and (2) training and project-related jobs at operation stage, which will ensure that they earn at least the minimum wage, expected to enable access to adequate legal and affordable rental housing.

67. In the event that a household does not prefer a project related job, skill training and assistance for purchase of income generating assets as well as initial capital to start a business shall be provided to one member of the household, if so desired.

68. Temporary loss of income to hawkers and vendors with moveable structures (30 vendors along rising mains and distribution mains alignments, 3 vendors near Hata Godown pump house, and 426 vendors along distribution pipe alignments) is anticipated. Temporarily affected persons are eligible for: (1) 30 days advance notice regarding construction activities, including duration and type of disruption; (2) cash assistance based on minimum wage for loss of income for the period of disruption; (3) in the event that construction activities involve disruption for a month or more, provision for alternative sites for hawkers for continued economic activities. If it is not possible to provide such space, allowance based on minimum wage rate for vulnerable households for 1 month or the actual period of disruption, whichever is more.

69. Preferential employment in project-related work will be offered to local people, with priority to vulnerable persons. APs will be provided two reminders (after the 30 day advance notice), 7 days and 1 day before construction to ensure none or minimal disruption in livelihood. If required, they will also be assisted to temporarily shift for continued economic activity; for example, they will be assisted to shift to the other side of the road where there is no construction and then assisted to shift back, post-construction. Ensuring there is no income or access loss during sub-project construction is the responsibility of contractors. Consistent with the Environmental Management Plan, contractors will ensure access is maintained by making sure that space is left for access between mounds of soil, walkways and metal sheets provided to maintain access across trenches for people and vehicles where required, increased workforce is available to finish work in areas with impacts on access, timing of works is such that it reduces disruption during business hours and periods of peak business activities e.g. festivals, phased construction schedule is followed and work undertaken on one segment at a time and one side of a road at a time. Compensation and assistance to APs must be provided prior to start of civil works.

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operators expressed concern whether they would lose their jobs during the period of operation by the contractor. They were assured by the social safeguards team that their jobs would be protected and that the contractor would be required to employ them, if they so desired. All the pump operators met indicated that they would prefer to continue with their present profession.

## E. Procedures for assistance

70. **Permanently affected persons.** The following steps are envisaged (to be conducted by PIU and DSC):

**Step 1.** Conduct meaningful consultations with APs, disseminate information on entitlements, collect information on bank accounts, record their training and livelihood related preferences and special needs, if any;

**Step 2:** For APs facing relocation, record agreement to shift to temporary rental housing in the vicinity and to legal rental housing of their choice once livelihood support provided;

**Step 3:** Provide assistance to open bank accounts for APs, if they don't have one;

**Step 4:**After selection of all sites, detailed designs and surveys are complete, assess/reassess losses/costs(prior to payment of compensation)to ensure compensation at present market price/replacement cost. Update the Resettlement Plan and DDR and send to ADB for review and approval.

**Step 5:** PIU SSO will distribute identity cards to affected persons, with cards reflecting poverty (whether BPL)/vulnerability (whether vulnerable)

**Step 6:**Identification of temporary rental accommodation, prior to demolition/relocation, in consultation with APs and in close proximity to ensure maintenance of social networks and protect their livelihoods

**Step 7.**Provision of 60 days advance notice to remove assets;

**Step 8:** Payment of compensation / assistance / allowances provided from the project.

**Step 9:** Assistance to relocate to temporary rental accommodation, if and as required.

**Step 10:** Inform APs regarding proposed date of demolition, to enable them to salvage material.

**Step 11.** Provide assistance to APs and coordinate with contractor to find project-related construction work for APs.

**Step 12.** Ensure timely payment of rental subsidy.

**Step 13:** Provide assistance to APs (1 member of each affected household) to avail training and project operation-related job placement, or, training and starting of new line of work, as per their preference/entitlement.

**Step 14:** Payment of second shifting allowance (for shift from temporary rental accommodation to legal rental housing of APs' choice)

**Step 15:** Conduct of AP socio-economic status and satisfaction surveys.

In case no relocation involved for some APs, all steps other than those related to relocation to be followed for them. PIU to keep accounts, record of affected persons, amounts paid, and receipts record for accounting purposes and submit copies of records, and results of AP surveys to PMU, as and when undertaken. Project Manager to closely monitor these activities.

71. **Temporarily affected persons.** The following steps are envisaged:

**Step1.** Conduct public awareness and information dissemination prior to construction works (through PIU and DSC)

**Step2.** DSC and the contractor(s) to identify alignments/sites which will experience temporary livelihood impacts.

**Step3:** The DSC safeguards

specialist will then (a) conduct a transect walk jointly with the PIU social safeguards officer (SSO) and contractor; to determine the extent / nature of impacts on identified roads where economic impacts are likely. Such walks will establish the need for Detailed Measurement Surveys on each road

stretch; (b) conduct a detailed measurement and inventory of losses survey based on detailed designs and final alignment to identify potential impacts; to establish the number of affected persons (AP) / businesses along each proposed water pipe alignment / road stretch / sites and potential impacts and enable an inventory of losses.; (c) update the Resettlement Plan (identifying potential losses), and (d) send the updated Resettlement Plan to ADB for review and approval after detailed designs and surveys are complete.

**Step4:** The PIU

SSO will distribute identity cards to affected persons, including those facing income losses and those requiring assistance, and vulnerable APs.

**Step5.** Affected persons can then access the compensation / assistance / allowances provided from the project.

**Step6.** PMU to pay compensation / assistance / allowances prior to displacement in sections ready for construction (as required). Project Manager to closely monitor these activities.

**Step7.** PIU to keep accounts, record of affected persons, amounts paid, and receipts record for accounting purposes and submit copies of records to PMU.

72. **Vendor**

**Assistance.**

Vendors requiring temporary shifting assistance during construction period will be notified in advance and assisted to shift to alternative locations to continue their trade with limited disruption. They will be allowed to return to their original location after construction is declared complete. Vendor assistance will involve the following steps:

**Step1.** Identification of impacted vendors through detailed measurement and inventory of losses surveys based on detailed design, by DSC social safeguards expert.

**Step2.** Notify vendors at least 30 days in advance, followed by a reminder 7 days and again, 24 hours in advance. Consult with local Vendor Associations, if they exist.

**Step3.** Identify alternative locations nearby for affected vendors to continue business.

**Step4.** Assistance by contractor (provision of labour) to shift to new location. In case of any income disruption during this time, compensation for lost income to be paid by the project through PIU. Payment of additional compensation to vulnerable APs, if period of disruption is 30 days or more.

**Step5.** Assistance by contractor to return to original location after construction works complete.

**Table 7: Entitlement Matrix**

S. No	Type of loss	Application	Definition of entitled person	Compensation policy	Implementation issues	Responsible agency	Sites where applicable
1	Loss of residential structure	Residential structure and other assets	Encroachers, squatters	<ol style="list-style-type: none"> <li>1. Encroachers/squatters will be notified and given 60 days advance notice to remove their assets.</li> <li>2. Compensation for affected structures or part thereof at replacement value calculated as per the latest prevailing basic schedule of rates (BSR) without depreciation; Cash compensation for repair of partially affected structure.</li> <li>3. Right to salvage material from the demolished structure at no cost.</li> <li>4. A lump sum shifting assistance of Rs10000 will be provided, each time affected household is required to relocate.</li> <li>5. Cash assistance towards rental subsidy for a period of time until alternate means of access to housing available.</li> <li>6. Additional compensation for vulnerable squatter households (item # 3)</li> </ol>	<ul style="list-style-type: none"> <li>• Vulnerable households will be identified during the census conducted by the DSC.</li> </ul>	The DSC will verify the extent of impacts through a 100% survey of AHs determine assistance, verify and identify vulnerable households.	Ramshila, main pipeline alignments
2	Loss trees and crops	Standing crops and trees	Encroachers/ squatters	<ol style="list-style-type: none"> <li>1. Encroachers and squatters will be notified and given 60 days advance notice to remove trees and 6 months' notice to harvest seasonal crops and fruit trees.</li> <li>2. Compensation will be given for standing crops/ trees planted by non- titleholders.</li> </ol>	<ul style="list-style-type: none"> <li>• Harvesting prior to acquisition will be accommodated to the extent possible</li> <li>• Work schedules will avoid harvest season.</li> <li>• Market value of trees/crops has to be determined.</li> <li>• Vulnerable households will be identified and provided assistance as required</li> </ul>	DSC in consultation with Agriculture/Forest Department officials or with experts in the respective fields.	Mastalipur



S. No	Type of loss	Application	Definition of entitled person	Compensation policy	Implementation issues	Responsible agency	Sites where applicable
3	Impacts on vulnerable Aps	All impacts	Vulnerable APs <sup>37</sup>	<ol style="list-style-type: none"> <li>1. In case of total loss of private land and a total dependency on agriculture, land-for-land compensation, if signified by the affected persons.</li> <li>2. Additional one-time lump sum assistance of Rs 36,000 (calculated for 12 months subsistence allowance) per vulnerable family will be paid. This will be over and above the other assistance given in this framework.</li> <li>3. Vulnerable households will be given priority in employment in project construction activities.</li> <li>4. All Scheduled Castes and Scheduled Tribes relocated outside the district will be provided an additional 25% of the resettlement benefits to which they are entitled along with a onetime resettlement entitlement of Rs 50,000 per the provisions of the RFCTLARRA.</li> <li>5. Provision for project operation related training and employment, OR, skill training for displaced vulnerable persons, including assistance for purchase of income generating assets and initial capital of INR 40,000/-</li> </ol>	<ul style="list-style-type: none"> <li>• Vulnerable households will be identified during the census conducted/supervised by the DSC.</li> <li>• If land-for-land is offered, ownership in the name of original landowner(s).</li> </ul>	The DSC will verify the extent of impacts through a 100% surveys of AHs determine assistance, verify and identify vulnerable households.	Ramshila Mastalipur Pipe alignments
4	Loss of livelihood/	Livelihood	Owner/tenants and leaseholders	1. In case of loss of livelihood (total income loss from major source):	<ul style="list-style-type: none"> <li>• Vulnerable households will be</li> </ul>	The DSC will verify the extent of	5

<sup>37</sup> The following vulnerability criteria are identified in the context of Bihar: (1) households belonging to most backward communities; (2) head of household is a woman; (3) head of household is illiterate; (4) head of household is a daily wage labourer, (5) below poverty line household; (6) household with disabled family members; and (6) household living in a kutchra house. ADB's Facility Administration Manual states that "more vulnerable" households are those that meet 5 or more of the above-mentioned vulnerability criteria. Implicit in the definition is that households meeting fewer criteria are also vulnerable, albeit to a lesser degree, and are require additional support/assistance

S. No	Type of loss	Application	Definition of entitled person	Compensation policy	Implementation issues	Responsible agency	Sites where applicable
	income source		/sharecroppers (whether having written tenancy/leased documents or not)	<p>Choice of annuity or employment – the following options are to be provided:</p> <p>(a) where jobs are created through the project, 'after providing suitable training and skill development in the required field, make provision for employment at a rate not lower than the minimum wages provided for in any other law for the time being in force, to at least one member per affected family in the project or arrange for a job in such other project as may be required; or (b) onetime payment of Rs.5,00,000 per affected family; or (c) annuity policies that shall pay not less than Rs.2000.00 per month per family for twenty years, with appropriate indexation to the Consumer Price Index for Agricultural Labourers.</p> <p>2. In case of total loss/partial loss of income: Preference for employment opportunity for Affected Persons in the project construction work, if so desired by them.</p> <p>Training would be provided for income generating vocational training and skill improvement options based on the choice of the affected person at Rs 20,000<sup>38</sup> per family. This cost would be directly paid by the project to the training institute OR purchase of income generating assets up to Rs.40, 000<sup>39</sup>.</p>	identified during the census conducted by the DSC.	impacts through a 100% survey of AHs determine assistance, verify and identify vulnerable households.	

<sup>38</sup> The Vocational Training Programme by the Industrial Training Institutes provides training on a number of trades, under the Directorate general of Employment and Trade, Ministry of Labour and Employment, GOI. Additional cash assistance will be provided during the training period to make up for income loss of working members. The additional cash assistance will be calculated based on prevailing minimum wage rates for semi-skilled labor in urban Bihar for three months

<sup>39</sup> This is an estimate. The income generating asset will be skill related. However the assets will be decided on a case to case basis.

S. No	Type of loss	Application	Definition of entitled person	Compensation policy	Implementation issues	Responsible agency	Sites where applicable
5	Temporary disruption of livelihood	Commercial and agricultural activities	Legal titleholders, tenants, leaseholders, sharecroppers, employees, hawkers or vendors.	<ol style="list-style-type: none"> <li>1. 30 days advance notice regarding construction activities, including duration and type of disruption.</li> <li>2. Cash assistance based on the minimum wage for the loss of income/livelihood for the period of disruption</li> <li>3. For construction/other activities involving disruption for a period of a month or more, provision of alternative sites for hawkers and vendors for continued economic activities. If not possible, additional allowance based on minimum wage rate for vulnerable households for 1 month or the actual period of disruption whichever is more.</li> </ol>	<ul style="list-style-type: none"> <li>• During construction, the PIU will identify alternative temporary sites to the extent possible, for vendors and hawkers to continue economic activity.</li> <li>• PIU will ensure civil works will be phased to minimize disruption through construction scheduling in co-ordination with the contractors and the DSC</li> </ul>	Alternative locations, if any will be identified for the said duration of disruption.	Pipelaying activity (distribution pipes, rising mains and distribution mains)
5	Any other loss not identified	-	-	<ol style="list-style-type: none"> <li>1. Any unanticipated impacts of the project will be documented and mitigated based on the spirit of the principles agreed upon in this Resettlement Framework and the RFCTLARRA</li> <li>2. Unanticipated involuntary impacts will be documented and mitigated based on the principles provided in the ADB IR Policy.</li> </ol>	-	The DSC will ascertain the nature and extent of such loss. The PMU with PIU support, will finalize the entitlements in line with ADB IR policy.	

## VIII. COMPENSATION MECHANISM

73. Affected residential structures will be compensated at replacement cost. Crop loss, if unavoidable, will be compensated at replacement cost. If land acquisition is entailed for any of the yet unidentified sites, compensation will be at replacement cost. The project will also ensure that any loss or damage to any private properties during construction work will be compensated at full replacement cost. Similarly, temporary loss of income will be compensated at replacement cost. The principle for determining valuation and compensation for assets, incomes, and livelihoods is replacing the loss of affected assets and restoring the loss of income and workdays experienced by the displaced persons as detailed below. Titleholders and non-titleholders are both entitled to compensation as per the agreed RF of BUDIP.

### A. Replacement Value for Immovable Property

74. Replacement value for immovable property will be determined as follows:

- (i) **Land.** Compensation at replacement cost / market price (excluding land transfer charges) to be determined by Valuation Committee appointed for the project, and will be based on a market survey in the surrounding area of concerned land parcel.
- (ii) **Structure.** Compensation at replacement cost / market price of materials used (without considering depreciation) and labour cost to be determined by Valuation Committee for the project using the latest SOR and market prices of materials and labour.
- (iii) **Crop losses.** Compensation for crops based on market price of produce to be determined by an expert from the Agriculture Department, Government of Bihar.

### B. Valuation of Other Assets

75. Compensation for the assets attached with land or structures such as (wells, irrigation units, electricity or water connections etc.) will be based on replacement cost, estimated through market surveys/service providers. Displaced persons will have the right to salvage all movable assets attached with land.

76. Apart from compensation for land, trees, crops, structures and other assets, assistance for loss of income and livelihood, will also be paid to the DPs as per Entitlement Matrix. All compensation and resettlement assistances will be paid to the entitled DPs prior to commencement of civil works. If any loan taken on affected land/properties remains unadjusted, the balance amount of loan will be deducted from the total compensation.

## IX. RESETTLEMENT BUDGET AND FINANCING PLAN

### A. Resettlement Costs

77. The resettlement cost estimate (Table 8) includes compensation for structure loss and relocation, compensation for temporary income loss to vendors, crop loss, potential loss of income, additional compensation for vulnerable households, mitigation cost (refurbished or new toilets and/or compound wall as required and free water connections to donor educational institutions), consultation, grievance redress and awareness generation cost, and capacity building / training costs. The state government will bear all RP costs related to compensation and mitigation and will be responsible for releasing the funds for resettlement in a timely manner. The estimated total resettlement cost for the subproject is INR 7.06 million. The resettlement cost items and estimates

are outlined in Table 8.

**Table 8: Resettlement Cost**

	Compensation for type of loss	Quantity	Days	Unit rate	Total amount	Remarks
1	<b>Residential structures</b>					
	<b>Fully affected</b>					
	Kutchra	7			684034	Based on BCD SOR 2014, adjusted for inflation
	<b>Partially affected</b>					
	Pucca	1			120118	Based on BCD SOR 2014, adjusted for inflation
	Cash compensation for repair of partially affected structure		LS		30000	
2	<b>Relocation</b>					
	Shifting assistance	8	LS	20000	160000	Rs. 10000 to be paid before temporary relocation to rental accommodation (first time); and additional Rs. 10000 after job placement, if/when household relocates (second time) to legal rental housing of its own choice.
	Cash assistance: Rental subsidy for period until alternate accommodation available	8		37800	302400	House rent @Rs. 1800 per month, based on market survey in the locality; period of 21 months considered for RP budget. Rental subsidy to be given until such time that training and placement in project operation related job to DP is undertaken.
3	<b>Loss of livelihood (permanent, &gt;10% per annum)</b>					
	Vocational training/additional cash assistance	4		20000	80000	Households facing economic displacement, including vulnerable household. 3 months vocational training envisaged. Additional cash assistance to cover potential income loss during training period and transport cost to training venue. In case training is not opted for, cash assistance for income generating assets upto Rs. 40000 will be provided. Poor/vulnerable household will have the option of choosing between (a) project related operation job, or, (b) vocational training, additional cash assistance during training period, purchase of income generating asset and initial capital.
	Additional cash assistance during training period	4		19266	77064	
4	<b>Temporary disruption of livelihood</b>					
	Hawkers and vendors along pipe alignments and pump house	459	3 days	247	340119	
5	<b>Crop loss (1 season)</b>					
	Provisional sum for compensation against crop loss to 2 adjacent landowners	2		7600	15200	To be paid in the event adequate notice not given.
	Provisional sum for compensation against crop loss to 2 sharecroppers	2		800	1600	To be paid in the event adequate notice not given.
6	<b>Vulnerable APs</b>					
	<b>Permanent impacts</b>					
	Vocational training/additional cash assistance	8		20000	160000	Displaced vulnerable households not receiving this assistance under any other head.
	Assistance for purchase of income generating assets and initial capital	9		40000	360000	Same as above.
	Additional assistance for vulnerable households	10		36000	360000	To be paid over and above other benefits to all affected or displaced vulnerable households.

	<b>Temporary impacts</b>					
	Provisional sum for vulnerable APs facing temporary income loss for 1 month or more, if alternative sites not available	150	30 days	247	1111500	145 (35%) estimated vulnerable APs along pipe alignments and 1 vulnerable AP at pump house
7	<b>Mitigation/inclusion measures</b>					
	Mini water tank with public taps for community at site outside GMC	1		400000	400000	Mastalipur; settlement of poor households near proposed OHT site does not have adequate access to basic services.
	Supply of water through tankers	9		70000	630000	9 large residential clusters likely to be affected during refurbishment of tubewells for a period of 7 days each. Supply through 10 tankers per day of disruption will be required to the affected areas.
	Water and sewerage connections, refurbishment of school toilets, provision of syntex tanks for water storage	3		75000	225000	Government schools where refurbishment of tubewells or pumphouses proposed
8	<b>Other</b>					
	Provisional sum: land transfer costs (taxes, duties)		LS	500000	500000	In case of land donation to project for site(s) yet to be finalized
	Provisional sum: third party costs		LS	15000	15000	Third party witness, in case of land donation
	Grievance redress		LS	250000	250000	
	Consultation with APs		LS	100000	100000	
	Awareness generation		LS	200000	200000	
9	Detailed measurement survey and census survey for RP updation		LS	300000	300000	
	<b>Total</b>				<b>6,422,035</b>	
	<b>Contingency</b>		<b>10%</b>		<b>642,203.50</b>	
	<b>Grand Total</b>	<b>INR</b>			<b>7,064,239</b>	

**Note:**

- (a) Provisional sums provided in the above table for land transfer and third party costs will not be required if land donation process is not adopted for OHT at Kharkhura and government land is finalised.
- (b) Results of DMS surveys conducted for all identified OHT, GLSR, pumphouse and tubewell sites and rising main and distribution main alignments are used for assessment of impacts and costs in table above.
- (c) Provisional sum for temporary impacts including those to vulnerable APs for distribution system are estimated on the basis of transect walks and the 2015 minimum wage rate in Bihar (<http://www.paycheck.in/main/salary/minimumwages/bihar>) and will be finalized on completion of detailed measurement surveys for each stretch of pipeline during RP updation at implementation stage.

**X. IMPLEMENTATION ARRANGEMENTS**

78. **Executing agency.** The Urban Development and Housing Department, Government of Bihar is the executing agency for the project, which will receive strategic directions from the state-level steering committee.

**A. Program Management Unit.**

79. The Urban Development and Housing Department, Government of Bihar is the executing agency for the project, which will receive strategic directions from the state-level steering committee.

80. The Bihar Urban Infrastructure Development Corporation (BUIDCo) is the implementing agency, based in Patna. The Program Management Unit (PMU) at BUIDCo is staffed with a

Program Director (PD), Additional Project Director (APD), Technical Head, Electromechanic Engineer, Finance Officer, an Environmental and Social Management Coordinator (ESMC), a Capacity Building and Institutional Support officer and administrative staff. PIU field offices have been set up in each town to manage implementation of subprojects.<sup>40</sup> The PMU has complete authority, budget and powers to implement all aspects of the project, in accordance with the agreed Framework Financing Agreement and Facility Administration Manual for BUDIP.

81. The ESMC, PMU will be assisted by the PMC. The Resettlement and Gender Specialist of PMC will prepare resettlement plans and social monitoring reports, and provide advice on policy reforms. The PMU will endorse resettlement plans prepared by the PMC and will have financing and monitoring responsibilities. Hence, ESMC will endorse/submit periodic monitoring reports received from PMC to the Program Director, PMU who will then submit the same to ADB. The monitoring report will focus on the progress of implementation of the resettlement plan/framework, issues encountered and measures adopted, follow-up actions required, if any as well as status of compliance with relevant loan covenants. The PMU will seek state government's clearance for submission and disclosure of the environmental and social monitoring report to ADB.

82. PMU will also coordinate with national and state level agencies to resolve inter-departmental issues, if any and obtain necessary clearances and NOCs from different departments. ESMC will also monitor physical and non-physical activities under the investment plan and monitor implementation of safeguards plans and guide the PIU at town level as and when necessary, regarding safeguards implementation. The PMU, with support from PIU field offices and DSC social safeguards team will ensure mitigation of negative social impacts due to the subproject, if any. The ESMC will oversee implementation of the resettlement framework and resettlement plan by the PIU, supported by DSC.

83. The ESMC at the PMU will be responsible for monitoring of safeguards compliance and gender action plan. He/she will be assisted by DSC in conduct of any surveys required for monitoring and by PMC in preparation of periodic monitoring reports.

84. The capacity building and institutional support officer at PMU will be responsible for coordinating and implementing activities required for capacity building and training at various levels, setting up of the GRM, gender sensitization training and training on safeguards policy to all institutional stakeholders (government officers and consultants), coordination of awareness generation activities, including awareness on grievance redress process. The PMC will support the officer in all these activities and social safeguards expert and social mobilisers of DSC will support CBISO in field level activities.

85. The PMU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. In addition, requirements in the RP related to scheduling of works/activities to avoid/mitigate impacts, contract clauses related to priority employment in construction activities as well as operation and maintenance for affected persons/potentially

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<sup>40</sup>the PIU (central) and PMU, originally proposed under the Facility Administration Manual, have been merged with the PMU in BUIDCO, based on GoB's request, with the sole responsibility of implementing the program. The PIU field offices in Gaya and Bhagalpur are extended arms of the PMU.

affected persons will be included in the contract by PMU, with the support of PMC.

### **B. Project Implementation Unit.**

86. The PIU field office in Gaya is an extended arm of the PMU, reporting to the APD and PD to coordinate and assist the PMU in implementing the program at field level. It is headed by an Executive Engineer, based in Gaya. The PIU is meant to work in close coordination with DSC and GMC. It is staffed with a senior water supply engineer, a senior sewerage engineer, an accountant, a social safeguards, PR and institutional development officer (to be appointed) and an environmental officer.

87. The social safeguards PR and institutional development officer (SSPRIDO) of PIUs is responsible for day-to-day implementation and monitoring of the resettlement plan and gender action plan. The officer will coordinate implementation of training and capacity building, awareness generation, public outreach program and grievance redress at town level. The officer will undertake field visits and meetings with affected persons and beneficiaries and record observations throughout the construction period to ensure that safeguards and mitigation measures are provided as intended. The PIU through the DSC social safeguards team comprising DSC social safeguards expert (SSE) and social mobilisers will ensure that affected persons receive entitlements and benefits due to them. The PIU will be responsible for implementing and monitoring safeguards compliance activities, public relations and outreach activities, grievance redress (as described in a preceding section), gender mainstreaming and community participation activities. It will coordinate with local agencies for obtaining ROW clearances and no objection certificates (NOC), and with PMU for NOCs to be obtained at state level. The PIU social safeguards officer will be involved in detailed measurement surveys, and socio-economic surveys of affected persons to determine and recommend compensation, required for RP updation and approval by PMU and ADB. The PIU SSPRIDO will prepare progress reports with respect to resettlement plan preparation. The social mobilisers of DSC will support the PIU at field level in implementation and monitoring of the resettlement plan.

### **C. Program Management Consultant**

88. The PMC will have an environment safeguards specialist and a resettlement and gender specialist. The PMC safeguards specialists will assist the PMU and PIUs to implement and manage safeguards requirements and to ensure policy compliance of the project. Responsibilities of the resettlement and gender specialist related to preparation of resettlement plans and gender action plans and monitoring of their implementation have been described above (paragraph 67). The resettlement and gender specialist will implement the capacity building program for PMU, PIUs, project staff and contractors involved in project implementation on (a) ADB SPS (2009) and approved RF, (b) National law on involuntary resettlement and other relevant regulations (c) core labor standards, (d) support PMU on the project's GRM, gender action plan, consultation and participation plan, and ongoing consultations.

### **D. Design Supervision Consultant**

89. The DSC will have a Social Safeguards Expert, who will be supported by social mobilisers at field level. The TORs of the DSC SSE and social mobilisers is provided in the Project Administration Manual.

**Table 9: Institutional Roles and Responsibilities for Safeguards Implementation**

Activities	Agency Responsible
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<b>Activities</b>	<b>Agency Responsible</b>
<b>Sub-project Initiation Stage</b>	
Finalization of sites for sub-projects	PMU/PIU with DSC support
Obtaining NOCs for each site, as required	PMU/PIU
Clearance and disclosure of updated safeguard documents on website, municipal notice boards and to affected people Disclosure of sub-project details	PMU/PMC PIU/DSC
Meetings with APs and communities	PIU/DSC
Formation of Valuation Committee	PMU
RP Preparation/Updation Stage	SIPMIU/DSMC
Conducting Detailed Measurement Survey and Census of all APs	PIU/DSC
Computation of entitlements	PIU/DSC
Conducting FGDs/ meetings / workshops during SIA surveys, recording of preferences and priorities of APs (e.g. related to relocation, training etc.)	PIU/DSC
Computation of Replacement Values of lost land/properties/lost income	VC/PIU/DSC
Categorization of APs for finalizing entitlements	PMU/PIU/DSC
Formulating compensation and rehabilitation measures	PMU/PIU
Disclosure of final entitlements and rehabilitation packages to APs	PIU/DSC
Approval of RP	PMU/ADB
<b>Implementation Stage</b>	
Payment of compensation	PMU/PIU
Taking possession of land	PIU
Implementation of mitigation and rehabilitation measures	PIU/DSC/Contractor,
Consultations with APs during rehabilitation activities	DSC/PIU
Grievance redressal	PIU/PMU/GRC
Internal monitoring	PMU/PMC

## **A. Capacity Building**

90. The safeguards personnel of the project consultants (PMC, DSC), and other key project related staff of PMU and PIUs, will be oriented and trained by ADB on ADB safeguards policy and the approved project RF; RP preparation and updation process; monitoring, reporting and disclosure requirements, roles of different stakeholders in safeguards implementation and GRM, envisaged consultation and participation process, reporting and monitoring requirements, core labour standards for contractors, handling issues in social inclusion, potential conflict resolution, typical implementation issues, and lessons learnt in safeguards implementation in other ADB funded water supply projects. The key focus area of the training program will be ADB resettlement policy and principles and the training will focus on the differences between the provisions of the ADB policy and Gol/GoB laws, as the awareness of these differences and the need to follow the provisions of ADB policy are critical for successful implementation of RPs.

91. The PMC will be responsible for development of a training program based on a capacity assessment of target participants (contractor(s), DSC field staff, PIU) and for implementation of the training program to build capabilities on resettlement policy, planning, mitigation measures and safeguards. Basic principles of resettlement planning, avoidance of IR impacts and minimisation measures with an emphasis on protection of the poor and vulnerable, access to project information and benefits by APs, grievance redress process and its importance, and monitoring shall be covered in the training. Training on IR and gender issues shall not only be given to social

safeguards personnel of project consultants, PMU and PIUs but also to design and supervision engineers and contractors' personnel.

92. Typical modules will be (i) sensitisation to social safeguards, gender and vulnerability issues, (ii) resettlement planning and typical issues in implementation, (iii) introduction to social safeguards policy, including ADB policy, GRM, entitlements, compensation and social safeguards monitoring requirements and mitigation measures; (iv) monitoring and reporting on RP implementation, including monitoring methods and tools (v) core labour standards, including equal pay for equal work etc. The suggested outline of the training program is presented in Table 10.

**Table 10: Indicative Capacity Building and Training Program**

Description	Contents	Schedule	Participants	Tentative Schedule
<b>Program 1</b> Orientation Workshop	<b>Module 1 – Orientation</b> ADB Safeguard Policy Statement Government of India policy Government of Bihar policy <b>Module 2 – Social/Environmental Assessment and Resettlement Planning/IEE Process</b> ADB policy and process, identification of impacts and mitigation measures, RP/IEE preparation, implementation, and monitoring requirements. Incorporation of safeguards and gender into project design and contracts, with particular reference to water supply projects	1 day	PMU/PIU/DSC	Prior to start of implementation
<b>Program 2</b> Workshop for Contractors and Supervisory staff	IR/environmental issues during construction Implementation of RP/IEE Monitoring of RP/IEE implementation Reporting Requirements	1 day	PMU, PIU, DSC & Contractors	Prior to start of implementation
<b>Program 3</b> Experiences and Best Practices Sharing	Experience sharing on RP/IEE and Implementation – Issues and Challenges - Best Practices followed - Exposure visit to best practice cases of ADB funded water supply projects in India	Half day, on a regular basis  1 trip	PMU PIU DSC Contractors  PMU, PIU, DSC safeguards personnel	Semi-annual; throughout project cycle.  One-time

## XI. IMPLEMENTATION SCHEDULE

93. All the compensation and assistance as per EM will be completed prior to the start of the civil work at each specific site / stretch. All entitlements are to be paid prior to displacement. Written confirmation is required to be sent by the PMU to ADB stating that all compensation has been paid to APs. Construction work can begin only in sites / sections where compensation has been paid.

The RP implementation schedule is presented in Table 11.

## **XII. MONITORING AND REPORTING**

94. RP implementation will be closely monitored to provide effective basis for assessing resettlement progress and identifying potential difficulties and problems. Monitoring will be undertaken by the PMU ESMC. Monitoring will involve administrative monitoring to ensure that implementation is on schedule and problems are dealt with on a timely basis; socio-economic monitoring during and after any resettlement impact utilizing baseline information established through the detailed measurement/census survey of APs proposed during RP updatation, and overall monitoring. Monthly progress reports reporting status of RP implementation will be prepared by PIU assisted by DSC, and consolidated by the PMU ESMC with the assistance of PMC social safeguards specialist. The EA will submit semi-annual monitoring reports to ADB for review and post all safeguard monitoring reports on ADB and MoUD website. The PMU/EA will submit semi-annual monitoring reports to ADB for review and post all safeguard monitoring reports on ADB and MoUD website. A sample monitoring template is given in **Appendix 8**.

Table 11: Implementation Schedule

	2015				2016				2017	2018	
	Sep	Oct	Nov	Dec	Q1	Q2	Q3	Q4			
Appoint Social Safeguards Officer at PIU Gaya											
Setting up of GRC in Gaya											
Briefing of PIU on grievance redress cell functions/responsibilities, and CLC on GRC functions											
Finalise project sites and related agreements, as applicable (OHT and CSCs)											
Appoint third party to oversee land donation process, if applicable; obtain third party certification											
Conduct/complete detailed measurement surveys, census and socio-economic surveys and issuance of ID cards											
Conduct Due Diligence for RP updating: Obtain NOCs, signed land donation agreements as applicable, pay stamp duty and registration fees for project sites as required, obtain land transfer documents											
Identify Vulnerable APs, if any*											
Update draft RP to reflect surveys, consultations, design changes, and due diligence results											
Consultations and disclosure, awareness generation											
Review and approval (ADB)											
Training/capacity building of PIU safeguards officer and engineers, DSC safeguards and supervision (field level) personnel and contractors' personnel											
Issue notice to affected persons											
Relocation related assistance											
Skill training as required											
Assistance to APs to get project-related construction work											
Payment of compensation											
Handover of land to contractors											
Start of civil works											
Internal monitoring, including surveys of APs on entitlements, satisfaction surveys											
Repair/reconstruction of affected facilities, structures, utilities, if any											
Assistance to APs/potential APs to get project operations related work											

Immediately, in consultation with other depart

### APPENDIX 1: PROPOSED SUB-PROJECT COMPONENTS AND THEIR INVOLUNTARY RESETTLEMENT IMPACTS STATUS

S. No.	Components	Nos.	Dia (m m)	Capacity (ML /cum/ hr)	Length (m/KM)	IR Impacts	IP Impacts	Remarks/Proposed mitigation measures (compensation, additional support, skill training etc.)
1	Refurbishment of tubewells	29		20-220		Refurbishment of existing 29 tubewells at various locations is expected to require 15 days each. There is no additional land requirement for refurbishment work. IR impacts are limited to potential disruption in water supply to consumers.	None	Works will be scheduled in such a way that disruption in water supply is minimized. Tanker supply is proposed in the event that supply is disrupted.
2	Refurbishment of existing service reservoirs					Refurbishment of existing tanks is anticipated to require 3 months each.		
2.1	GLSR-Ramshila Hills	1		0.227 ML		Ramshila Hill has a defunct existing tank, hence there is no supply to consumers at present. Refurbishment of the existing tank is not anticipated to have any IR impacts.		
2.2	GLSR-Murli Hills	1		1.630 ML		Potential IR impacts are limited to disruption in water supply during the period of refurbishment, which will be mitigated by setting up of a temporary arrangement for direct pumping from tubewells .		Setting up of a direct pumping system from tubewells to the existing distribution system (which is estimated to require 5 days to set up). The contractor will be required to schedule setting up of the direct pumping systems prior to commencement of work related to refurbishment of tanks to avoid/mitigate water supply disruption to existing consumers; this requirement for scheduling of work will be included in the contract.
2.3	GLSR-Brahmyoni Hills	1		1.816 ML		New tanks at Brahmayoni will be constructed (18 months) and commissioned before refurbishment work starts, hence no IR impacts anticipated..		Scheduling of works at the site by contractor.
2.4	GLSR-Brahmyoni Hills	1		1.816 ML				
2.5	GLSR-Brahmyoni Hills	1		3.632 ML				
2.6	GLSR-Brahmyoni Hills	1		3.632 ML				
2.7	ELSR-Azad Park	1		0.454 ML		Potential IR impacts are limited to disruption in water supply during the period of refurbishment, which will be mitigated by setting up of a temporary arrangement for direct pumping from tubewells .		Setting up of a direct pumping system from tubewells to the existing distribution system (which is estimated to require 5 days to set up). The contractor will be required to schedule setting up of the direct pumping systems prior to commencement of work related to refurbishment of tanks to avoid/mitigate water supply disruption to existing

							consumers; this requirement for scheduling of work will be included in the contract.
<b>3.</b>	<b>REFURBISHMENT OF EXISTING PUMP HOUSES AND SITE STORES</b>						
	Refurbishment of existing pump houses	16				Pumps will continue to function even when repairs to pump houses are under way. No disruption in water supply or IR impacts anticipated.	Temporary arrangements will be made by the contractor at to ensure that pumps continue to function throughout the period of refurbishment.
	Refurbishment of existing site stores	3				No IR impact anticipated as work will be undertaken at existing site stores.	
<b>4.</b>	<b>DEMOLITION OF DELAPITATED PUMP HOUSE &amp; CONSTRUCTION OF NEW PUMP HOUSE</b>						
	Demolition of dilapidated pump house and construction of new pump house	5				<p>New pump houses will be constructed in the same site where dilapidated pump house demolished. There will be no additional land requirements. No impacts to livelihoods of pump operators (daily wage earners) anticipated during civil works as pumps will continue to be operated throughout the construction period.</p> <p>Field visits revealed potential temporary IR impacts to 3 businesses at Hata Godown pump house, one of the 5 pump houses proposed for demolition and reconstruction. Of the affected businesses, 2 small shops (wooden/moveable structures) can be easily shifted to nearby locations, can continue with their business during construction. One of the APs facing temporary loss at the site is an elderly lady, a food-seller and head of a female-headed household, who may lose her income during the period of construction (envisaged as 30 days) as there is no suitable place nearby where she can shift.</p>	Compensation for income loss to affected hawkers and vendors at minimum wage rate, with additional compensation for vulnerable person as per entitlement matrix.
	Construction of new pump house	4				Proposed at Dandibagh on GMC land. Vacant, unused land belonging to GMC is available. No IR impact anticipated.	

5	<b>TRANSMISSION / RISING MAINS, VALVES, SPECIALS AND APPURTENANCES ETC.</b>				<b>16.55 Km (new); 8.45 Km (existing)</b>	Work related to integration of existing rising mains will be undertaken at night.		
5.1	<b>TRANSMISSION/RISING MAINS</b>							
5.1.1	<b>OHT at Mastalipur, South of Manpur Circle Office</b>							
	Rising main from tube-well at Mufassil Thana to OHT Mastalipur no. 33		250		261 m	Pipeline will pass through GoB (Thana/Police Department) land, government road RoWs (Department of Roads) and government irrigation canal bund RoW. In order to reach the OHT site, the last leg of the pipe will cross the canal. No permanent IR impacts anticipated as the alignment is through government land/road/bund/canal RoWs. Temporary impacts to 3 vendors anticipated in the alignment stretch from Manpur bridge Kirloskar pump house to Khijarsarai Chowk. Impacts to traffic and shops and businesses will be avoided by undertaking night work in congested commercial areas.	None	Compensation for temporary income loss at minimum wage rate as per EM. Only night work proposed in congested, commercial areas to avoid loss of livelihood and traffic disruption. Contractor will be required to maintain access to shops / businesses by providing planks, if any excavation remains at daytime. Contractor to provide proper signages and traffic management plans, in consultation with traffic police.
	Rising from tube well at Manpur to OHT at Mastalipur-no. 28		250		613 m			
	Combined rising main for above two		350		1731 m			
5.1.2	<b>OHT at Bhusunda</b>						None	
	Khadigramodyog Lakhibagh - no.30		200		81 m	Pipeline from new TW will be within the OHT site; hence no IR impacts anticipated. The pipeline from 2 existing tubewells to Bhusunda OHT will follow government road RoW and will also pass through government land in Bhusunda. No permanent IR impacts anticipated; temporary impacts during construction to be avoided/mitigated.	None	Night work through congested commercial streets; provision of planks for access to shops, if required; proper signages and traffic management plans
	Kirl 3, Near Bridge-no.34		200		355 m			
	Combined Discharge of 2nos		350		1310 m			
5.1.5	<b>OHT at Kharkhura Raja Kothi</b>							
	Kharkhura no. 15		150		704 m	Not known; site not finalized. Land donation with third party oversight is under discussion/consideration. Technical feasibility of alternatives - government land at Surya Mandir and Delha, located at a distance of 5 km and 1.7 km respectively from the settlement to be served, is also being examined. IR impacts to be assessed in updated RP, post site finalization.		
	Delha - no. 16		150		763 m			
	Combined Discharge of 15 & 16		250		50 m			
5.1.6	<b>OHT at Joda Masjid</b>							
	Manpur - Buniyidiganj - no. 29		200		1712 m	Hawkers and vendors along this alignment		Night work proposed to avoid impacts to

	Kirl 1, Joda Masjid- no. 32		150		10 m	are located on drains/nalas, hence not required to shift due to pipe-laying work as the alignment will not pass under their spaces. In order to avoid impacts to shops and businesses in Manpur Market (permanent structures) as well as to traffic, night work is proposed.		businesses in Manpur Market.
	Combined Discharge of 2nos		300		40 m			
5.1.7	<b>GLSR at Ramshila</b>							
	Panchayati Akhara No. 2		200		62 m	Pipe alignments will be through Forest Department land along existing pipe RoWs, and along government road RoWs and GMC land. Temporary impacts to traffic anticipated; temporary income loss to 6 vendors with temporary structures along this alignment (Panchayati Akhara to Ramshila section and Bageshwari Pashchim to Ramila section) anticipated, for a period of 3 days each.  Potential impact/damage to 2 houses near rising mains alignment (not on the alignment, hence not affected) to be avoided by the contractor.	None	Payment of compensation for temporary income loss as per EM provisions. Night work through congested commercial streets; provision of planks for access to shops, if required; proper signages and traffic management plans.
	Panchayati Akhara No. 3		200		58 m			
	Combined Discharge of 2 & 3		350		309 m			
	Panchayati Akhara No. 1		250		315 m			
	Combined discharge of 1,2,3		350		566 m			
	Bageshwari Pachim 24		100		396 m			
	Bageswari - Cotton mill Thana 31		150		596 m			
	Combined Discharge of 31&24		200		948 m			
	Dhobighat - no. 9		150		690 m			
	Combined Discharge of 9,24 & 31		250		140 m			
	Combined Discharge of 6 nos.		400		126 m			
5.1.8	<b>Existing GLSRs (4 Nos.) and proposed GLSRs (2 Nos.) at Brahmyoni</b>							
	Dandibagh TW 1 (Existing pipe line)		300		90 m	Pipe alignment will be along existing rising mains, through Forest Department land, government road RoWs and GMC land. Alignment through Forest Department land is free of structures/encroachments. Temporary income loss to 5 hawkers and vendors with moveable structures anticipated along this alignment (Dandibagh to Brahmayoni), for a period of 3 days each. Impacts to traffic to be avoided/mitigated.	None	Payment of compensation for temporary income loss as per EM provisions. Night work through congested commercial streets and for integration of existing pipes; provision of planks for access to shops, if required; and proper signages and traffic management plans -
	Dandibagh TW 4 (Existing pipe line)		300		98 m			
	Dandibagh TW 5(Existing pipe line)		350		255 m			
	Visnupad 21		150		10 m			
	Bypass 22		200		67 m			
	Combined Discharge 1,4 & 5 (Existing pipe line)		600		1542 m			
	Dandibagh TW 2 (Existing pipe line)		450		1509 m			
	Dandibagh TW 3 (Existing pipe line)		350		1606 m			
5.1.9	<b>Existing GLSR at Sringthan</b>							



	Kirloskar (Existing pipe line)-no.36		250	50 m	Pipe alignment will be along existing rising mains, through Forest Department land, government road RoWs and GMC land. Temporary impacts to traffic to be mitigated. Temporary impacts to shops and businesses to be avoided through night work.	None	Night work through congested commercial streets and for integration of existing pipes; provision of planks for access to shops, if required; proper signages and traffic management plans.
	Kirloskar (Existing pipe line)-no.37		250	53 m			
	Kirloskar (Existing pipe line)-no.38		250	750 m			
	Kirloskar (Existing pipe line)-no.39		150	85 m			
	Com dis of 36,37,38,39 (Existing pipe line)		450	76 m			
	Kirloskar (Existing pipe line)-no.35		250	60 m			
	Combined discharge of 5 nos (Existing pipe line)		450	2382 m			
5.1.10	<b>Existing OHT at Azad Park</b>						
	Kauvasthan-26		100	1030 m	Proposed alignment will avoid two vendors with movable structures (bamboo and tarpaulin structures etc.) present near the boundary of Azad Park. Detailed measurement survey yet to be conducted.		Careful selection of final stretch of alignment leading to Azad Park OHT to avoid potential temporary impacts to vendors.
	Pilgrim Hospital- 20		100	179 m			
	Combined discharge of 20 & 26		100	23 m			
	Azad Park-8		100	10 m			
	Combined discharge of 3 nos.		200	69 m			
5.1.11	<b>Existing GLSR at Muraihills</b>						
	Janata Colony 1		100	10 m	Pipelines to be laid through Forest Department land, government road RoWs and government land. No IR impacts anticipated as existing rising mains proposed to be used/integrated with proposed water supply system.	None	Night work through congested commercial streets; provision of planks for access to shops, if required; proper signages and traffic management plans
	Janata Colony 2		100	88 m			
	Combined Discharge of 1&2		200	470m			
	Central School		150	53 m			
	Bairagi Powerganj		150	153 m			
	Combined discharge of 10 & 23		200	236 m			
	combined discharge of 4 nos		300	121 m			
	Hata Godown		200	248 m			
	Pitamaheshwar		200	300 m			
	Combined discharge of 25&27		300	192 m			
	Gurudwara		100	10 m			
	Combined discharge of 12, 25&27		300	115 m			
	Nigam Store		100	10 m			
	Combined Discharge of		350	273 m			

	11,12,25,27						
	New Godown		150		613 m		
	Combined discharge of 5 nos		300		198 m		
	Combined discharge of all 9 nos		350		136 m		
5.2	Brick Masonry Valve Chamber	82				Valve chambers will be constructed within the excavated trenches for pipeline RoW, along existing government roads. Impacts (temporary) and mitigation measures will be same as those envisaged for pipe networks. No permanent IR impacts anticipated.	None Contractor will have to ensure access through simple measures such as provision of planks as per EMP provisions, which will be specified in the contract document.
6	DISTRIBUTION MAINS, VALVES, SPECIALS AND APPURTENANCES ETC.						
6.1	DISTRIBUTION MAINS						
6.1.1	OHT at Mastalipur, South of Manpur Circle Office						
	Distribution main from OHT Mastalipur to Junction		450		2200 m	Pipeline alignment will traverse the adjacent GoB canal, GoB canal bund, road RoWs (Department of Road, GoB). Temporary impacts to 4 vendors with moveable structures (Mastalipur OHT to Kiharsarai Chowk) anticipated during construction, for a period of 3 days each.	None Payment of compensation for loss of income at minimum wage rate. Only night work proposed in congested, commercial areas to avoid further loss to businesses. Contractor will be required to maintain access to shops / businesses by providing planks, if any excavation remains at daytime. Contractor to provide proper signages and traffic management plans, in consultation with traffic police.
	Junction to DMA – 4		350		6 m		
	Junction to DMA – 5		350		190 m		
6.1.2	OHT at Bhusunda						
	Distribution main from OHT Bhusunda to Junction		500		456 m	Pipe alignment will traverse existing government road RoWs. Potential impacts to businesses can/will be avoided. No IR impacts anticipated.	None
	Junction to DMA – 6		400		475 m		
	Junction to DMA – 7		400		13 m		
6.1.3	OHT at Budhva Mahadev (in lieu of Gauri Shankar)						

	Distribution main from Budva Mahadev OHT to monitoring station DMA - 1	300	40 m	Distribution main alignment will be through vacant government plots and government road RoWs. Temporary impacts during construction can be avoided. No IR impacts anticipated.	None	-
6.1.4	<b>OHT at Delha (Dhaniya Bagicha)</b>					
	Distribution main from OHT at Delha Tank to Junction	450	40 m	Pipeline proposed along government (Department of Roads, GoB) road RoWs and kutchra road near OHT site. Temporary impact on access to residences beyond the site – households will have to use existing, alternate route. Potential temporary impacts on traffic to be avoided/mitigated.	None	Signages and traffic management plan prepared in consultation with traffic police
	Junction to DMA 30	300	733 m			
	Junction to DMA 28	350	33 m			
6.1.5	<b>OHT at Kharkhura Raja Kothi</b>					
	Distribution main from OHT at Kharkhura to monitoring station - DMA 29	400	493 m	Not known; site not finalized hence alignment not known.		
6.1.6	<b>OHT at Joda Masjid</b>					
	Distribution main from OHT at Joda Masjid to Junction	500	40 m	Pipe alignment will follow existing government road RoWs belonging to Department of Roads, GoB. Temporary impacts to traffic anticipated; temporary income loss to shops and businesses to be avoided.		Night work through congested commercial streets; provision of planks for access to shops, if required; proper signages and traffic management plans
	Junction to DMA 2	400	14 m			
	Junction to DMA 3	450	325 m			
6.1.7	<b>GLSR at Ramshila</b>					
	Distribution mains from Ramshila to Junction	500	126 m	Pipe alignments will be through Forest Department land along existing pipe RoWs, and along government road RoWs. Temporary impacts to traffic anticipated; temporary livelihood loss to shops and businesses to be avoided through careful selection of alignment.	None	Same as above
	Junction to DMA 8	400	182 m			
	Junction to DMA 9	400	6 m			
6.1.8	<b>GLSRs at Brahmyoni</b>					
	Distribution main from GLSRs at Brahmayoni to Junction DMA-11	400	302 m	Pipe alignments proposed along existing pipeline RoWs on Forest Department land and existing government road RoWs. Temporary income loss to 1 vendor in the alignment section from Brahmayoni to DM office anticipated, for a period of 3 days. Temporary impacts to traffic and shops/businesses to be avoided/mitigated.	None	Payment of compensation against temporary income loss. Night work through congested commercial streets; provision of planks for access to shops, if required; proper signages and traffic management plans
	Junction to DMA 13 part-2	300	44 m			
	From tank to Junction	700	848 m			
	Junction to DMA 14	400	5 m			

	From tank to junction		500		713 m		
	From tank to junction		600		540 m		
	Junction to DMA 21		450		6 m		
	Junction to DMA 22		400		92 m		
	Junction to DMA 23		400		6 m		
	Junction to DMA 17		400		986 m		
	From Tank to Junction		600		406 m		
	Junction to DMA 24		500		135 m		
	Junction to DMA 25		350		13 m		
			200		6 m		
	Junction to DMA 26		450		5 m		
	From Tank to Junction		250		1980 m		
	Junction to DMA 27		350		2045 m		
6.1. 11	<b>Existing GLSR at Muraihills</b>						
	Distribution mains from Murlu Hills to Junction		500		136 m	Pipe alignments through Forest Department land and along government road RoWs. Temporary impacts to traffic anticipated; temporary income loss to shops and businesses to be avoided through careful selection of alignment.	None
	Junction to DMA 10		400		123 m		
	Junction to DMA 12		400		131 m		
6.1. 12	<b>Existing OHT at Azad Park</b>						
	Distribution main from OHT to monitoring station DMA 13 part-1		350		249 m	Temporary income loss to 4vendors with moveable anticipated, for a period of 3 days.	None
6.1. 13	<b>Existing GLSR at Shrigsthan</b>						
	Distribution main from OHT to Junction		700		1996 m	Pipe alignments proposed along existing pipeline RoWs on Forest Department land and existing government road RoWs. Temporary impacts to 7 vendors with moveable structures (Shringasthan to Sikiria Mod) anticipated. Temporary impacts to traffic to be avoided/mitigated.	Compensation for temporary income loss at minimum wage rate. Night work along congested stretches. Provision of planks for access to shops, if required; proper signages and traffic management plans
	Junction to DMA 15		450		1014 m		
	Junction to DMA 16		400		5 m		
	Junction to DMA 18		450		1175 m		
	Junction to DMA 19		400		5 m		
	Junction to DMA 20		400		222 m		
<b>6.2</b>	<b>Distribution network</b>				518 Km		

	Existing network length				72 Km	72 KM of existing pipelines to be integrated into the system. No IR impact anticipated as night work proposed.		Night work and work during non supply hours is proposed to avoid disruption in water supply to existing consumers as well as impacts to traffic. Proper and visible signages to be provided during night work, to avoid impacts to traffic.
	Proposed network length				446 Km	446 Km new pipelines are proposed along existing road RoWs. Transect walks indicate potential temporary income loss to 426 hawkers and vendors with moveable structures, for a period of 3 days each. Traffic disruptions to be mitigated.	None	Payment of compensation for temporary income loss. Mitigation through provision of information to public on potential disruption. Contractor will have to ensure access through simple measures such as provision of planks as per EMP provisions, which will be specified in the contract document. Night work and work in small stretches (max of 100 m) in congested commercial areas. In purely residential areas, night work to be avoided to avoid disturbance to public. Proper signages for regulation of traffic required.
6.3	Brick Masonry Valve Chamber	1083				Valve chambers will be constructed within the excavated trenches for pipeline RoW, along existing government roads. Impacts (temporary) and mitigation measures will be same as those envisaged for pipe networks. No permanent IR impacts anticipated.	None	Contractor will have to ensure access through simple measures such as provision of planks as per EMP provisions, which will be specified in the contract document.
7	CONSTRUCTION OF NEW RESERVIORS	6+3						
7.1	RCC Over Head Service Reservoirs (OHTs)							
7.1.1	OHT at Mastalipur (ID:4)	1		2.00 ML		Government of Bihar land (total GoB land in the area = 16,915.87 sqm, of which 900 sqm area required for OHT). Encroached by adjoining private landowners, who are practicing sharecropping (2 seasons) on the land. Affected persons include 2 encroachers/adjacent landowners and 2 sharecroppers. Crop loss to be avoided by providing prior intimation, and compensated if such intimation cannot be provided in time. Estimated market price of crops grown on concerned land is about Rs. 30,000, shared between 2 encroachers and sharecroppers based on informal agreement. One sharecropper belongs to vulnerable category. Potential permanent partial loss of income for encroachers and sharecroppers who have been cultivating the land. Measurement and	None	NOC is under process from Revenue Department. Crop loss to be avoided by providing advance notice as per EM. Compensation for loss as per EM.

						demarcation of site undertaken. NOC from DC not received.		
7.1.2	OHT at Bhusunda (ID:5)	1		2.15 ML		Government of Bihar land; 9 acres handed over to Dept. of Art, Culture and Youth (DACY). OHT proposed in North West corner of proposed site for stadium handed over to the DACY; measurement and demarcation of plot undertaken. Vacant land not under any use available. Directive from Chief Secretary, Govt. of Bihar to provide land at this location received on 8 Dec 2014 (copy enclosed). Consultation with district administration and municipal corporation held on 20 Nov 2014 and 10 Jan 2015. NOC from DC not received. No IR impacts anticipated.	None	NOC is under process from Revenue Department.-Consultation with DACY was held and they were apprised on the proposed project and agreed to give consent and took note for their proposal/design would be in sync, to avoid any issues in future. Letter recording DACY's consent is under process.
7.1.3	OHT at Budhva Mahadev (ID:3)	1		1.00 ML		Alternate location to OHT at Gauri Dhankar. Government of Bihar land behind Budva Mahadev temple. Vacant land, no cultivation or encroachment.	None	Land records and NOC is Under Process from Revenue Department
7.1.4	OHT Behind Delha PS (ID:16)	1		2.15 ML		Government of Bihar land (total GoB land available in the area = 18049 sq m). OHT and 1 new tubewell proposed at the site (South East of banyan tree). Vacant land, no cultivation or encroachment; kutcha access road. Presently, the land is used for open defecation by nearby residents.	None	Land records and NOC is under process from Revenue Department. Encouragement for Construction of Individual Household Toilet ( IHHT) under Swach Bharat Scheme.
7.1.5	OHT at Kharkhura Raja kothi (ID:14)	1		1.50 ML		Site not yet finalized. IR impacts to be assessed during RP updation.		

7.1.6	OHT at Joda Masjid (ID:1)	1		2.15 ML	<p>Government land. Part of the land has been mined for sand, creating a pond. Total area of pond and land = 4694.36 sq m; of this, 572 sq m of land on the bank is vacant and encroachment free. There are existing tubewells/pump houses on the bank, near the proposed vacant site on the bank.</p> <p>It is proposed to fill Southern part of the pond (Gangi pond) and build on 30 x 30 m (900 sq m) site comprising land available on bank and filled up part of pond. The pond (along with other ponds at Manpur) has been leased out by the Fisheries Department for pisciculture and cultivation of water chestnut, to a cooperative (Manpur Prakhand Matsyajeeve Sahyog Samiti) for the period 2012-19. The major part of the pond will continue to be available for existing uses. In order to avoid permanent impact to the livelihoods of persons engaged in fish/water chestnut cultivation, it is proposed to deepen the pond at southern tip to ensure that the volume of water available for cultivation remains the same.</p> <p>Disruption of livelihood activities during the earth work period (1 week) to be avoided by undertaking such work in the lean season when there is no activity, to be identified in consultation with cooperative members.</p> <p>Consultation held with representatives of the cooperative, including Mr. Yogendra Das, Secretary of Samiti, who have indicated that the proposed solution to avoid potential permanent livelihood impacts (excavation/deepening of pond) is acceptable to them.</p>	<p>NOC is under process from Revenue Department.</p> <p>RP recommends earth work during lean season for fish/water chestnut cultivation, when there is no economic activity at the pond (to be identified in consultation with the cooperative), to avoid temporary income loss. It also recommends deepening of pond to compensate for filling up at another end, to ensure that volume of water available for cultivation remains the same and permanent impacts avoided.</p>
7.2	<b>RCC Ground Level Service Reservoirs (GLSRs)</b>					

7.2.1	GLSR at Ramshila Hills (ID: 7)	1		2.60 ML	<p>On land adjacent to existing GLSR, part of which is vacant and part encroached. Land belongs to Dept. of Forest, GoB. Nine residential structures are affected; 8 are 100% affected and 1 is 50% affected, hence 8 households will be required to relocate. One affected structure is a GMC quarter for caretaker / pump operator of existing GLSR and does not belong to the unauthorized household living in it.</p> <p>The remaining affected structures were constructed by the squatters. Based on socio-economic survey, all 9 households are vulnerable as they meet 3-6 vulnerability criteria adopted for the project. Affected persons (9 households with 50 members) would prefer to move up and settle on the same hill, where space is available. Socio-economic and inventory of loss survey conducted.</p>	None	<p>Forest Department has given conditional approval (FRA-2006) land for forest land .</p> <p>Encroacher in GMC quarter will be eligible for shifting allowance and special assistance for vulnerable.</p> <p>Households facing relocation will be eligible for relocation compensation as per EM, and special assistance for vulnerable.</p>
7.2.2	GLSRs at Brahmyoni Hills (ID: 10a & 10b)	2		4.64 ML (Each)	Dept. of Forest, GoB land. Adequate vacant, unused land available for new tanks. No IR impacts envisaged.		Forest Department has given conditional approval (FRA-2006) Land for forest land .
10	<b>MONITORING STATION:</b>	32			All monitoring stations are proposed in small steel cabinets which will be installed on the extreme edge of government road shoulders/over drains, by constructing a platform. No IR impacts anticipated.		
11	<b>OPERATING OFFICE CUM CUSTOMER SERVICE CENTER CUM SERVICE OFFICE</b>	6			Six customer service centres are proposed and will require 600 sq m area. CSCs are proposed to be located on government land, within government buildings or rented premises. Sites/buildings are not yet identified / finalized. Updated RP to assess IR impacts, if any.	None	-



## APPENDIX 2: DRAFT PROJECT INFORMATION DISCLOSURE LEAFLET

### A. Background

The Bihar Urban Development Investment Program (BUDIP) envisages improved urban environment and living conditions in targeted urban areas in the state of Bihar. It will: (i) improve and expand urban infrastructure and services in urban areas; and (ii) strengthen urban institutional, management, and the financing capacity of institutions, including urban local bodies (ULBs). Urban infrastructure and services improvement covering rehabilitation, improvement and expansion is proposed in the following sectors (i) water supply, and (ii) sewerage and sanitation. ADB has agreed to co-finance implementation of certain components of the state's road map in the cities of Bhagalpur and Gaya. BUDIP is funded by ADB under its multi-tranche financing facility (MFF). An urban water supply subproject for Gaya is proposed under Project 2 of the MFF.

This leaflet provides a description of the GWSP I subproject components proposed under the second round of funding from ADB, aimed at improving the current situation of Gaya in terms of an improved, integrated water supply management system.

### B. Subproject description

The proposed subproject components for Gaya water supply include: (i) refurbishment of existing tubewells (29 no.s); (ii) refurbishment of existing pumphouses (16 no.s) and site stores (3 no.s), demolition of dilapidated pump houses and construction of new ones (5 no.s), and construction of new pump houses (4 no.s); (iii) construction of new overhead tanks (6 no.) and new ground level service reservoirs (3 no.); (iv) laying of new transmission/rising mains (16.55 km) and distribution mains (18.56 km), and integration of existing 8.45 km rising mains; (v) laying of water supply distribution pipelines (446 km) and integration of existing distribution network (72 km), construction of valve chambers (1083 no.s); and (vi) provision of house service connections (92000); (vii) provision of 200 public standposts in poor areas; and (viii) construction of citizen service centres cum service offices at two locations.

### C. Resettlement Plan: Policy and Principles

A Resettlement Plan (RP) has been prepared for Gaya water supply project I, based on ADB's Safeguard Policy Statement 2009, and applicable Government of India law, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013 and applicable state laws of Mizoram.

### D. Involuntary Resettlement impact

Proposed subproject components require 11094 sq m land, of which sites that have been finalized/selected measure 9498 sq m, all belonging to government.<sup>41</sup> Of the identified sites, 5388 sq m belongs to Government of Bihar, 5010 sq m to Forest Department, Government of Bihar and 84 sq m to Gaya Municipal Corporation. In case of forest land, land for land, as per required procedure, has been followed. Efforts have been made to avoid or minimize resettlement impact through careful design. The RP for GWSP I identifies both permanent and temporary impacts and their mitigation measures. Identified impacts include loss of private residential structures (8, of which 7 structures are facing 100% loss and 1 faces 50% loss), loss of government quarter (1, belonging to GMC) relocation impact (8 households), permanent partial

<sup>41</sup>A site for OHT at Kharkhura (900 sq m) and for citizen service centres (600 sq m) are yet to be identified.

and significant (13%) loss of income to 2 encroachers and 2 sharecroppers from loss of encroached government land, potential crop loss on encroached government land to 4 affected persons, and temporary loss of income to hawkers and vendors on main pipe alignments (30 APs), near a pump house (3 APs) and estimated potential temporary income loss to 426 hawkers and vendors. Potential losses that can be avoided/mitigated e.g. potential loss of livelihood to pump operators employed by GMC during phase of operation by contractor, disruptions in water supply to localities through proper scheduling of work and temporary arrangements for water supply, avoidance of impact to businesses where possible, provision of planks for access to shops and businesses and traffic management plans to avoid disruption, are identified.

### **E. Entitlement and Compensation**

Since all land identified for the project is government owned, no land acquisition is anticipated. However, as per the entitlement matrix in the Resettlement Framework for BUDIP, displaced persons, if any, are entitled to a combination of compensation packages and resettlement assistance, depending on the nature of ownership rights on lost assets, scope of impacts including socio-economic vulnerability of the displaced persons, and measures to support livelihood restoration, if any livelihood impacts are envisaged. The displaced persons will be entitled to (i) replacement cost of affected structures or assets, compensation for loss of income at the replacement value in case of temporary income loss and livelihood restoration / upgrading measures in case of permanent income loss; (ii) special assistance for vulnerable households including priority in project related construction work. Affected persons including titled and non-titled will be eligible for compensation as defined in the Entitlement Matrix for the project. A budgetary provision of INR 7.06 million for RP implementation is made. Cost of mitigation and inclusion measures e.g. supply of water through tankers in areas facing water supply disruption, provision of water supply and sanitation facilities in schools where facilities are proposed, and provision of mini water tank at site outside GMC where facility proposed, are included in the RP budget.

### **F. Institutional Arrangement**

The Urban Development and Housing Department, Government of Bihar is the executing agency for the project. The Bihar Urban Infrastructure Development Corporation (BUIDCo) is the implementing agency. The Program Management Unit (PMU) at BUIDCo is staffed with an Environmental and Social Management Coordinator (ESMC), who has overall responsibility for safeguards compliance and implementation of RP. PIU field offices have been set up in each town to manage implementation of subprojects. Project Management Consultants and Design Supervision Consultants are engaged to facilitate the planning and implementation of the subproject, each having social safeguards personnel for all RP planning and implementation activities including internal monitoring and reporting.

### **G. Grievance Redress Mechanism (GRM)**

Grievances of affected persons will first be brought to the attention of the PIU. Grievances not redressed by the PIU in consultation with PMU will be brought to the Grievance Redress Committee (GRC) set up to monitor project implementation. Complaints can be lodged at customer service centres, GMC offices, or PIU office. The GRC is chaired by the district magistrate and has representatives from GMC, state government agencies and civil society. The GRC will determine the merit of each grievance, and resolve grievances. Grievance not redressed by the GRC will be referred to the Project Steering Committee. The DSC will assist PIU to keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The social

safeguards PR and institutional development officer of PIU will be the focal person for facilitating the grievance redress. TheGRC will continue to function throughout the project duration.

#### H. Contact details

<b>Organisation</b>	<b>Name</b>	<b>Position</b>	<b>Address and phone numbers</b>
<b>Contractor</b>		<b>Safeguard supervisor</b>	
<b>DSC</b>		<b>Social mobiliser</b>	
<b>DSC</b>		<b>Social Safeguard Expertt</b>	
<b>PIU</b>		<b>Social safeguard PR and institutional development officer</b>	

**APPENDIX 3: GRIEVANCE REDRESS PROCEDURE**  
**3 A: Copy of notification to set up GRC issued by BUIDCo, in Hindi.**  
**Description of the same is provided in the RP)**

**बिहार सरकार**  
**नगर विकास एवं आवास विभाग।**

- : संकल्प : -

बिहार राज्य अंतर्गत जलापूर्ति तथा सिवरेज योजनाओं के निर्माण हेतु बिहार शहरी विकास इन्वेस्टमेंट प्रोग्राम (BUDIP) - Loan No. 2861 - IND के तहत एशियन डेवलपमेंट बैंक (ADB) द्वारा ऋण उपलब्ध कराया जा रहा है। इस लोन प्रोग्राम के अंतर्गत भागलपुर एवं गया शहर के लिए जलापूर्ति तथा सिवरेज योजनाओं का कार्यान्वयन कराये जाने का प्रस्ताव है। इन योजनाओं के लिए बिहार शहरी आधारभूत संरचना विकास निगम लिमिटेड (बुडको) को प्रोजेक्ट मैनेजमेंट यूनिट तथा कार्यान्वयन एजेंसी घोषित किया गया है।

2. एशियन डेवलपमेंट बैंक (ADB) सम्पोजित योजनाओं के कार्यान्वयन के लिए ADB के मार्गदर्शिका में दिये गये प्रावधान के आलोक में शहर स्तर पर एक शिकायत निवारण तंत्र (जी०आर०एम०) का गठन किया जाता है।

3. नगर विकास एवं आवास विभाग एवं बिहार शहरी आधारभूत संरचना विकास निगम लिमिटेड (BUIDCo) द्वारा एशियन डेवलपमेंट बैंक (ADB) सम्पोजित BUDIP के अंतर्गत योजनाओं के लिए निम्नानुसार त्रिस्तरीय शिकायत निवारण तंत्र (जी०आर०एम०) स्थापित किया जाता है। शिकायत प्रथम स्तर पर प्राप्त की जायेगी। यदि नागरिक प्रथम स्तर पर संतुष्ट नहीं होते हैं तो वे द्वितीय एवं तत्पश्चात् तृतीय स्तर पर आवेदन कर सकेंगे। शिकायत का निष्पादन निम्नानुसार वर्णित अवधि में किया जाना है:-

स्तर	समिति	निष्पादन की अवधि
प्रथम	योजना प्रबंधन ईकाई (Project Management Unit)	शिकायत पत्र प्राप्ति के 90 दिनों के अंदर
द्वितीय	शहर स्तर समितियां (Town Committee)	60 दिनों के अंदर
तृतीय	कार्यक्रम संचालन समिति (Steering Committee)	90 दिनों के अंदर

4. जी०आर०एम० अंतर्गत गठित एशियन डेवलपमेंट बैंक सम्पोजित योजनाओं के कार्यान्वयन में प्राप्त शिकायतों का निष्पादन करेगी।

ह०/-


**प्रधान सचिव,**

नगर विकास एवं आवास विभाग।

ज्ञापांक - 1615/BUIDCo.

दिनांक - 27/05/2015.

प्रतिलिपि- आप्त सचिव, विकास आयुक्त, बिहार/प्रधान सचिव, वित्त विभाग/प्रधान सचिव/सचिव, योजना एवं विकास विभाग/प्रधान सचिव/सचिव, नगर विकास एवं आवास विभाग/प्रबंध निदेशक, बुडको/समी सदस्य को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।



**प्रधान सचिव,**

नगर विकास एवं आवास विभाग।

ए-बी-सी-डी संबंधित - बिहार शहरी विकास निवेश कार्यक्रम अंतर्गत योजनाओं के लिए जन शिकायत विचारण तंत्र की स्थापना।

#### अधिसूचना के लिए नोट

##### शिकायत निवारण तंत्र ( जी.आर.एम )

जी.आर.एम कार्यक्रम से संबंधित प्रभावित व्यक्ति (ए.पी.)व्यक्तियों की शिकायतों को प्राप्त करने एवं निवारण हेतु सुविधाजनक बनाने के लिए एक सुनकर मंच प्रदान करेगा। सामाजिक, पर्यावरण या किसी अन्य परियोजना / उप परियोजना से संबंधित शिकायतों हेतु एक ही एकीकृत शिकायत निवारण तंत्र ( जी.आर.एम ) की व्यवस्था होगी। प्रत्येक पुनर्वास योजना (आर.पी.) स्थानीय लोगों हेतु योजना (आई.पी.पी) और प्रारंभिक पर्यावरण परीक्षा (आई.ई.ई.ई.) पर्यावरणीय प्रभाव मूल्यांकन (ई.आई.ए) जिम्मेदार शिकायत निवारण तंत्र का अनुपालन करेगा।

शिकायत निवारण प्रक्रिया: प्रभावित व्यक्ति (ए.पी.)व्यक्तियों के शिकायत / सुझावों को सुझाव पेट्री में डाल कर अथवा फोन या मेल के माध्यम से अवगत कराया जा सकता है (पारुष नमूना संरक्षण)। कार्यान्वयन और सरकारी संगठन के सामुदायिक संपर्क अधिकारी और पी.आई.यू के सुरक्षा अधिकारी (जो सामाजिक मुद्दों और आपसी क्रियान्वयन से संबंधित होंगे), प्रभावित व्यक्ति (ए.पी.)समुदायों को समझाने और शिकायत निवारण प्रक्रिया में उन्हें मदद करने हेतु आवर्ती सामयिक समुदायिक बैठकों के आयोजन करने हेतु जिम्मेदार होंगे (साथ ही साथ शिकायतों का स्थानीय बोली / भाषा से अनुवाद करना, गैर - साक्षर प्रभावित व्यक्ति (ए.पी.)व्यक्तियों के शिकायतों को दर्ज एवं पंजीकृत करना एवं शिकायत निवारण की प्रक्रिया को समझाना)।

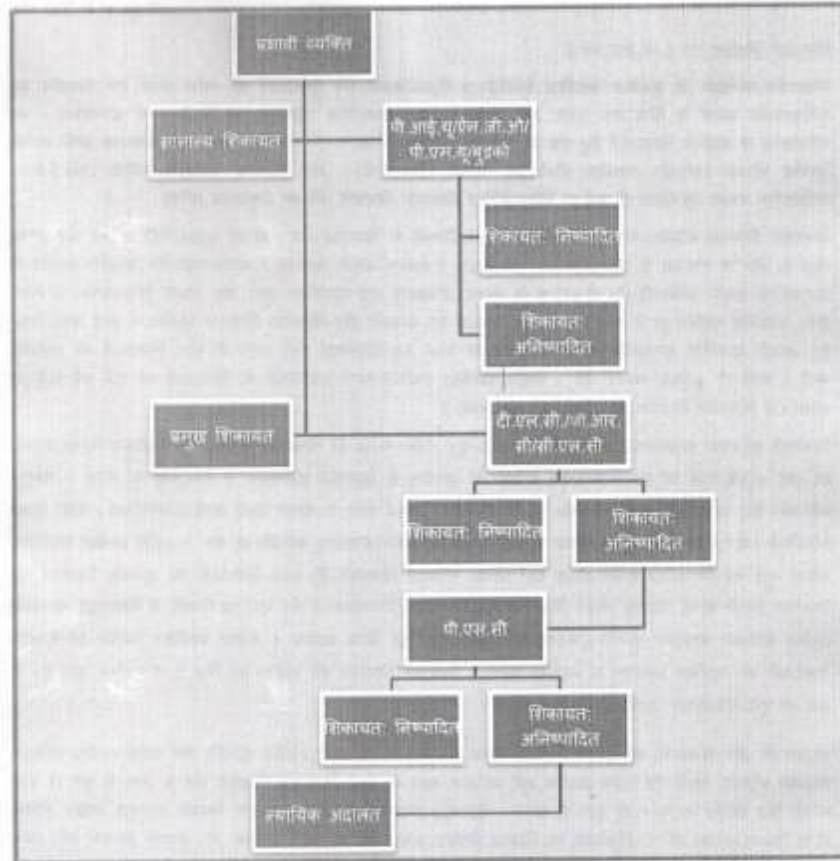
शिकायतें सर्वप्रथम कार्यान्वयन एन.जी.ओ / पी.आई.यू / पी.एम.यू की शिकायत प्रकोष्ठ<sup>1</sup> में पंजीकृत किया जाएगा, जो छोटे - बड़े मुद्दों को हल करेगा। इस प्रक्रिया के माध्यम से शिकायत पंजीकरण के तीन माह के भीतर निराकरण नहीं होने पर, परियोजना के कार्यान्वयन की निगरानी हेतु प्रत्येक शहर में गठित शहरी स्तरीय समितियों / सिटी लेवल समितियों (सी.एस.सी) को सूचित किया जाएगा। एक शिकायत निवारण समिति के रूप में शहरी स्तरीय समितियों तबित मुद्दों को निष्पादित करेगी (यदि वहाँ तबित पंजीकृत शिकायतें हैं) यथा शिकायतों का योग्यता निर्धारण एवं शिकायत प्राप्ति के दो माह के अन्दर शिकायतों का निष्पादन; निष्पादन ना कर पाने पर स्थिति में शिकायतों को राज्य स्तरीय कार्यक्रम संचालन समिति (पी.एस.सी)<sup>2</sup> द्वारा संबोधित किया जाएगा। अतः प्रभावित व्यक्ति (ए.पी.)लोग शिकायतों को न्यायिक अदालत में संदर्भित करेगी। शिकायत निवारण की प्रक्रिया को चिब 1 में दर्शाया गया है। जी.आर.एम पूर्ण परियोजना अवधि तक कार्य करेगी।

**जी.आर.एम और पी.एस.सी की संरचना:** एडीबी परियोजना हेतु गठित शहरी स्तरीय समिति और राज्य स्तरीय कार्यक्रम संचालन समिति, शहरी एवं राज्य स्तरीय मुद्दों को हल करने के लिए शिकायत निवारण तंत्र के अंग के रूप में कार्य करेगी (इस समिति का गठन दो चुनक है, प्रथम - संलग्न)। संचालन समिति में सदस्य विकास आयुक्त; प्रधान सचिव, वित्त विभाग; प्रधान सचिव, नियोजन एवं विकास विभाग; प्रधान सचिव, शहरी विकास और आवास विभाग; और प्रबंध निदेशक, बुद्धको हैं।

**क्षेत्राधिकार परिसीमा:** जिला दंडाधिकारी के नेतृत्व में जी.आर.एम की क्षेत्राधिकार परिसीमा निम्न होगी; (क) जिलास्तरीय सभी स्थान / निर्माण स्थल जहाँ उप परियोजना सुविधाएं प्रस्तावित हैं, या (ख) जिलास्तरीय प्रभावी क्षेत्रों में।

पी.एस.सी का पराधिकार का क्षेत्र सम्पूर्ण राज्य होगा (अर्थात् जिले की सीमाओं से परे, उप परियोजना सुविधा प्रभावी क्षेत्र, यदि कोई हो)।

1. शिकायत प्रकोष्ठ की स्थापना पुनर्वास / पी.आई.यू कार्यालय में होगी या ऐसे स्थान पर जो प्रभावित व्यक्ति (ए.पी.)समुदायों (यह समुदाय समुदाय / नदी किनारे के समुदायों) के लिए सुलभ स्वरूप में हो।
2. पी.एस.सी कार्यालय / उप परियोजना से संबंधित शिकायतों को व्यापक विचारों के विषय हो, (अर्थात् जहाँ नहीं वह शहर / जिला की परिसीमा तक ही सीमित हो) और पी.एस.सी को अवैधित कर पी.आई.यू तबित वह शहर-स्तरीय शिकायत प्रकोष्ठ में प्राप्त होती हैं। पी.एस.सी कार्यालय में जो एक शिकायत पंजीकरण / शिकायत सेल ( राज्य स्तरीय ) होय जो की किसी अन्य शिकायत के क्षेत्राधिकार परिसीमा का मूल्यांकन करने और एन जी ओ / पी आई यू को शिकायत निष्पादन करने हेतु सलाह देता या निष्पादन हेतु जी.आर.एम को अवैधित करेगा।



टी.एल.सी.: शहरी स्तरीय समिति; इ.एम.एम.सी.: पर्यटन/पर्यावरण एवं समाजिक प्रबंधन समन्वयक; जी.आर.सी.: शिकायत निवारण समिति; एन.जी.ओ.: गैर सरकारी संगठन; पी.एस.सी.: कार्यक्रम संचालन समिति - टी०एल०सी०

**प्रभावित व्यक्तियों:** इस में शामिल होंगे: (क) प्रभावित व्यक्ति (ए.पी.)/व्यक्तियों के साथ समूह बैठक और धर्या, जिसकी अग्रिम घोषणा की जाएगी और कार्यान्वयन प्रभावित व्यक्ति (ए.पी.)/व्यक्तियों की सहमती से मुकदमे दिनांक पर होगा (उनकी उपलब्धता के आधार पर)। इसका संचालन, कार्यान्वयन गैर सरकारी संगठन के सामुदायिक संपर्क अधिकारी (सी.एल.ओ.) और पी.आई.यू. - पी.एम.यू. द्वारा किया जाएगा। सामान्य / आम शिकायतों का समाधान करने के लिए इसका आयोजन आर.पी. कार्यान्वयन के प्रथम वर्ष में कम से कम हर तिमाही पर और तदुपरांत अर्द्धवार्षिक स्तर पर होगा।

(ख) वैयक्तिक परामर्श हेतु एन.जी.ओ. के सी.एल.ओ., पी.एम.यू. के इ.एम.एम.सी. की उपलब्धता हर पखवाड़े की नियत दिन (शिकायतों की संख्या के आधार पर) सुनिश्चित होगी। निरक्षर / नि:शक्त प्रभावित व्यक्ति (ए.पी.)/व्यक्तियों को शिकायत निवारण प्रक्रिया को समझने, शिकायत पंजीकरण, एवं शिकायत निवारण प्रक्रिया के विभिन्न चरणों में अनुवर्ती कार्रवाई में सन्धान और सहयोग सुनिश्चित करने हेतु कार्यान्वयन एन.जी.ओ. जिम्मेदार होगा। सभी प्राप्त

शिकायती का रिकार्ड्स पीआईए/पीएमयू द्वारा रखा जाएगा जिनमें सभी प्रोटोकॉल / स्वीरा यथा शिकायतकर्ता के संपर्क विवरण, शिकायत प्राप्ती की तारीख, शिकायत की प्रकृति, स सम्मत सुधारार्थक कार्रवाई और तिथि ये प्रभावित व्यक्ति (ए.पी.)के एवं उसका प्रभावी तारीख और अंतिम परिणाम उल्लेखित होंगे ।

**जी.आर.एम की सूचना प्रसार के तरीके:** प्रभावित व्यक्ति (ए.पी.) व्यक्तियों के मध्य शिकायत विचारण प्रक्रिया की सूचना प्रसार की जिम्मेदारी कार्यन्वयन एन.जी.ओ. और पी.आई.यू की होगी; यथा किस से संपर्क करना है, और शिकायत दर्ज करने हेतु कब, कहाँ संपर्क करना है, कैसे शिकायत रजिस्टर करना है, शिकायत निवारण प्रक्रिया के विभिन्न चरण, छोटे और बड़े शिकायती के निवारण हेतु सन्यायधी इत्यादि

**शिकायत निष्पादन हेतु लागत:** शिकायती को हान करने में शामिल सभी लागत (बैठकें, प्रामाणों, संधार, रिपोर्टिंग, सूचना के प्रसार) पीएमयू द्वारा वहन किया जाएगा ।

शिकायत संजीकरण कामों का नमूना नीचे संलग्न है ।

#### प्रस्तावित समिति के सदस्य - सारांश

जीआरएम का स्तर	सदस्य	कार्य	समय सीमा
टीयर 1	पीआईए/पीएमयू	प्रभावित व्यक्तियों (ए.पी.) के शिकायत एवं सुझाव तथा परियोजना में संबंधित स्थानीय स्तर के पर्यवेक्षण एवं सामाजिक छोटे - बड़े मुद्दों का निष्पादन करना	शिकायत पत्र प्राप्ती के 90 दिनों के अंदर
2 टीयर	<p>शहर स्तर समितियों (सी.एम.सी) / शहरी समिति / शिकायत निवारण समिति (जी.आर.सी) - शहरी समिति (सी.एम.सी. / जी.आर.सी) का गठन पहले ही ए.डी.बी. परियोजना के अंतर्गत हो चुका है और इसके सदस्य निम्नलिखित हैं</p> <ol style="list-style-type: none"> <li>1. जिला मजिस्ट्रेट (संबंधित जिला) सह अध्यक्ष</li> <li>2. नगर आयुक्त / कार्यकारी अधिकारी सह सदस्य सचिव (संबंधित जिला)</li> <li>3. कार्यपालक अभियंता (संबंधित जिला)</li> <li>4. संबंधित विभागों के प्रतिनिधि (संबंधित जिला)</li> <li>5. संबंधित जिला के एन.जी.ओ. / सी.एस.ओ.</li> </ol>	<ol style="list-style-type: none"> <li>1. ए.डी.बी परियोजना के अंतर्गत गठित शहरी समिति शहरी स्तरिय समिति का शिकायत निवारण हेतु जी.आर.सी. के तौर पर कार्य करेगी</li> <li>2. समिति योजनाओं कि नियमित समीक्षा करेगी एवं छरित कार्यालय हेतु कार्रवाई करेगी।</li> <li>3. शहरी समिति के गठन का पत्र अनुसूचना 1 के रूप में संलग्न है</li> </ol>	60 दिनों के अंदर



1) टीयर	कार्यक्रम संचालन समिति (पी.एस.सी.) - निम्न सदस्य शामिल हैं: 1. विकास आयुक्त, बिहार सह अध्यक्ष 2. प्रधान सचिव - वित्त विभाग, सदस्य 3. प्रधान सचिव - योजना और विकास विभाग, सदस्य 4. प्रधान सचिव - शहरी विकास और आवास विभाग, सदस्य 5. प्रबंध निदेशक - बुधको सह कार्यक्रम निदेशक, ए.डी.बी. परियोजना, सदस्य	1. ए.डी.बी. परियोजना हेतु संचालन समिति का पहले ही गठन हो चुका है (अनुलग्नक 2) 2. परियोजनाओं का निरीक्षण एवं अन्य महत्वपूर्ण निर्णय लेगी।	90 दिनों के अंदर
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### शिकायत पंजीकरण फार्म का नमूना

(हिंदी, में उपलब्ध कराया जाएगा)

बिहार शहरी विकास निवेश कार्यक्रम (BUDIP) परियोजना के कार्यान्वयन से सम्बंधित शिकायतें, सुझाव, प्रश्नों और टिप्पणियों को आमंत्रित करती हैं। हम लोगों से अनुरोध करते हैं कि वे अपना नाम और संपर्क सूत्र कि जानकारी प्रदान कर जिससे कि स्पष्टीकरण एवं जवाब के संबंध में आपसे संपर्क कर सकें।

तारीख		पंजीकरण का स्थान			
संपर्क करने संबंधी जानकारी / व्यक्तिगत विवरण					
नाम		लिंग	पुरुष महिला	आयु	
घर का फास					
शहर					
ज़िला					
फोन नं.					
ई मेल					
शिकायत / सुझाव / टिप्पणी / प्रश्न: नीचे अपनी शिकायत का विवरण ( क्या कौन, क्या, कहाँ और कैसे) का उल्लेख करें: अगर संभव हो / नोट / पत्र के रूप में ही तो कृपया यहाँ टिक करें: हम आपसे टिप्पणी / शिकायत संबंध जानकारी प्रेषित करने हेतु कैसे संपर्क कर सकते हैं।					

कार्यालय उपयोग के लिए

पंजीकृतकर्ता (अधिकृत व्यक्ति का नाम जिन्होंने शिकायत पंजीकृत किया है)	
शिकायत प्राप्त का जरिया:	
<input type="checkbox"/> नोट / पत्र <input type="checkbox"/> ई मेल <input type="checkbox"/> मौखिक / टेलीफोन	
समीक्षक: (अधिकारी का नाम एवं पद)	
नारेवाई कि गयी:	
कि गई नारेवाई को उद्घाटित किया गया:	<input type="checkbox"/> हाँ <input type="checkbox"/> नहीं
प्रकटीकरण का जरिया:	



### APPENDIX 3 B: SAMPLE GRIEVANCE REDRESS FORM

The \_\_\_\_\_ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing \*(CONFIDENTIAL)\* above your name. Thank you.

<b>Date</b>		<b>Place of registration</b>			
<b>Contact Information/Personal Details</b>					
<b>Name</b>		<b>Gender</b>	* Male * Female	<b>Age</b>	
<b>Home Address</b>					
<b>Place</b>					
<b>Phone no.</b>					
<b>E-mail</b>					
<b>Complaint/Suggestion/Comment/Question</b> Please provide the details (who, what, where and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					
<b>How do you want us to reach you for feedback or update on your comment/grievance?</b>					

#### FOR OFFICIAL USE ONLY

<b>Registered by:</b> (Name of Official registering grievance)	
<b>Mode of communication:</b> Note/Letter E-mail Verbal/Telephonic	
<b>Reviewed by:</b> (Names/Positions of Official(s) reviewing grievance)	
<b>Action Taken:</b>	
<b>Whether Action Taken Disclosed:</b>	Yes No
<b>Means of Disclosure:</b>	

**APPENDIX 4: COMPARISON BETWEEN LARR ACT 2013<sup>42</sup> AND ADB SPS 2009**

<b>ADBSPSPolicyPrinciple</b>	<b>LARR Act</b>	<b>Remarks</b>
Involuntary resettlement should be avoided whenever feasible; if unavoidable it should be minimized.	Followed	
Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including gender analysis, specifically related to resettlement impacts and risks.	Followed	
Carry out meaningful consultations with affected persons, host communities, and concerned nongovernment organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the affected persons' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.	Followed	
Improve, or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land-based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.	Followed	
Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.	Followed	
Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.	Followed	
Develop procedures in a transparent, consistent, and equitable manner if land acquisition is through negotiated settlement to ensure that those people who enter into negotiated settlements will maintain the same or better income and livelihood status.	Followed	
Ensure that displaced persons without title to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of non-land assets.	Followed	
Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound	Prepared	The LARR Act refers to the RR scheme

ADB = Asian Development Bank, LARR = Land Acquisition, Rehabilitation and Resettlement, SPS = Safeguard Policy Statement

<sup>42</sup>The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

### APPENDIX 5: SAMPLE FORM FOR INVENTORY OF LOSS SURVEYS

1. Questionnaire N°: .....
2. Date: .....
3. Name of the Subproject: .....
4. Name of the Place (s)/Village / settlement(s): .....
5. Panchayat/Municipality.....
6. District: .....
7. Region: .....
8. Plot No. with details of Khata/Khasra/Khatian:.....
9. Type of loss: 1.Structure Only 2.Land only3. Land & structure  
4. Orchard/Tree 5. Other assets ( please specify)
10. Ownership of the Land   
1. Private 2. Government 3. Religious 4. Community 5. Others
11. Type and Use of Land   
1. Agricultural 2. Grazing 3. Fallow 4. Plantation 5. Barren  
6. Mixed use 7. Residential 8. Commercial 9. Other / No use
12. Irrigation Facilities of Land   
1. Irrigated 2. Un irrigated
13. Area to be Acquired / Affected Land (rakba) .....
14. Total Area of the Land/ Plot (In case a portion of the land/ plot to be acquired/affected) (in sq.m/acre/bigha/kata, specify) .....
15. Total Land Holding (affected + unaffected ) in sq.m  
1. Irrigated: ..... 2. Un-irrigated: .....  
3. Other: ..... 4. Total: .....
16. Status of Ownership   
1. Titleholder 2. Customary Right 3. Trust/NGO land  
4. Encroacher 5. Squatter 6. Other (specify): .....  
Type of Private Ownership  
1. Individual/Single 2. Joint/Shareholders 3. Other (specify): .....
17. Name of the Owner/Occupier (s): .....
18. Father's Name: .....
19. Rate of the Land (Rs./Per Acre)  
1. Market Rate: ..... 2. Government Rate: .....
20. Any of the following people associated with the Land   
A. Agricultural Laborer 1. Yes 2. No  
Total Numbers (If Yes):.....  
Names (If Yes):  
(i).....  
(ii) .....  
B. Tenant/Lessee 1. Yes 2. No   
Total Numbers (If Yes):.....  
Names (If Yes):

(i).....  
 (ii) .....  
 C. Sharecropper 1. Yes 2. No

Total Numbers (If Yes):.....  
 Names (If Yes):  
 (i).....  
 (ii) .....  
 Agricultural Squatters 1. Yes 2. No

Total Numbers (If Yes):.....  
 Names (If Yes):  
 (i).....  
 (ii) .....  
 (iii) .....

21. Number of trees within the affected area

1. Fruit Bearing.....2. Non-fruit Bearing.....3. Timber.....4. Fodder.....Total.....

22. Details of Trees

SI No	Name of Trees	Type of Trees (1. Fruit Bearing, 2 Non-Fruit Bearing, 3. Timber 4. Fodder)	Age of the Trees	Number of Trees	Market price (Rupees)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

23. Which crop do you cultivate in the affected land (start with ascending order as major crop)?

Type of Crops	Total Affected Area under Crop (sq m)	Total Yielding per Crop (Kg) in the affected area



24. How many seasons in a year you cultivate in the affected land

1. One season      2. Two seasons      3. Three Seasons  
 Any structure in the Affected Land      1. Yes.....      2. No.....

25. Area of the affected structure (in square meter / square feet, specify).....

26. Measurement of Affected Structure (sq m / sq ft)

- a) Length .....  
 b) Width .....  
 c) Height .....

d. Number of Storey.....

27. Area of the boundary wall only (in Meter): a) Length .....b) Height .....

28. Area of the Total structure (in Square Meter).....

29. Measurement of Total Structure

- a) Length .....  
 b) Width .....  
 c) Height .....

30. Scale of Impact on structure

- a) 25%    b) 50%      c) 75%      d) 100%

Type of Construction of the Structure

SI N <sup>o</sup>	Particulars	Type of Construction (1). Simple (thatch/sack/bamboo/slats, (2) Earth/clay/sand, (3) Wood, (4) Brick, (5), Concrete, (6) Corrugated iron sheet, (7) Tile, and (8) Other, specify
1	Roof	
2	Floor	
3	Wall	

31. Age of the Structure (in years): .....

32. Market Value of the Structure (in Rs.): .....

33. Use of the Structure (select appropriate code from below)

A. Residential Category

1. House    2. Hut      3. Other (specify).....

B. Commercial Category

4. Shops    5. Hotel    6. Small Eatery    7. Kiosk    8. Farm House  
 9. Petrol Pump    10. Clinic    11. STD Booth  
 12. Workshop    13. Vendors    14. Com. Complex  
 15. Industry    16. Pvt. Office    17. Other (specify).....

C. Mixed Category

18. Residential-cum-Commercial Structure

D. Community Type

19. Community Center    20. Club    21. Trust    22. Memorials  
 23 Other (specify).....

E. Religious Structure

24. Temple    25. Church    26. Mosque    27. Gurudwara    28. Shrines  
 29. Sacred Grove    30. Other (specify).....

F. Government Structure

31. Government Office    32. Hospital/Health Post    33. School  
 34. College    35. Bus Stop    36. Other (specify).....

G. Other Structure

37. Boundary Wall 38. Foundation 39. Cattle Shed  
 40. Other (specify).....

34. Status of the ownership of Structure   
 1. Legal Titleholder 2. Customary Right 3. License from Local Authority  
 4. Encroacher 5. Squatter

35. Any of the following people associated with the Structure?  
 1. Yes 2. No

People associated	Yes/ No	If, yes Please give the number and names.	Lease / rent paid, if yes monthly rent	Employee, if yes. Monthly salary/ wage (INR.) daily rate	Remarks
Tenants					
Employee in residential structure					
Employee in business structure					

**36. Social Category**

1. General 2. Mahadalit 3. SC (other than mahadalit); 4. ST; 5. Others

37. Number of family members Male..... Female..... Total.....

38. Number of family members with following criteria

1. Unmarried Son > 35 years.....2. Unmarried Daughter/Sister > 35 years.....  
 3. Divorcee/Widow.....4. Physically/Mentally Challenged Person .....  
 5. Minor Orphan.....

39. Vulnerability Status of the Household:

- A. Is it a woman headed household with dependent? 1. Yes 2. No   
 B. Is it headed by physically/mentally challenged person? 1. Yes 2. No   
 C. Is it a household Below Poverty Line (BPL) 1. Yes 2. No   
 D. Is it landless? 1. Yes 2. No   
 E. Is it Elderly people without income source? 1. Yes 2. No   
 F. Is it Ethnic Minority Group? 1. Yes 2. No

40. Main Occupation of the Head of the Household (Main Source of Income)

1. Agriculture; 2. Commercial /business; 3. Service Holder; 4. Others (Specify).....

41. Total Annual income of the family from all sources Rs.....

42. Annual income (total turnover) per unit (bigha/kata/acre) from affected land in Rs.\_\_\_\_\_

43. Annual income (total turnover) from affected commercial structure, if applicable in Rs.\_\_\_\_\_

44. Annual cost of operation of the total landholding/business/commercial enterprise in Rs. \_\_\_\_\_ (please include labour cost and operating cost including fertilizer, pesticide, water, electricity, any other cost.)

45. If displaced, do you have additional land to shift? 1. Yes 2. No

46. If yes, how far from the present location (km).....

47. Resettlement/ Relocation Option

1. Self-Relocation 2. Project Assisted Relocation

48. Compensation Option for Land loser

1. Land for land loss 2. Cash for Land loss

49. Compensation Options for Structure loser

1. Structure for structure loss 2. Cash for Structure loss

50. Income Restoration Assistance (fill codes in preferred order)

1. Shifting Allowance; 2. Employment Opportunities in Construction work; 3. Assistance/ Loan from other ongoing development scheme; 4. Training for Vocational activities; 5- Assistance to re-establish lost/affected business, 6. Others (specify ..... )

51. Details of the Affected Persons (Family/Households)

**Family Details**

Sl. N <sup>o</sup>	Name of the Family Member	Relation to Head of the Household #	Age (years)	Sex ##	Occupation *	Marital Status**	Education***
1							
2							
3							
4							
5							
6							
7							
8							

**Code: #** 1. Self-2. Father 3. Mother 4. Husband 5. Wife 6. Son 7. Son in law 8. Daughter in law 9. Grandfather 10. Grandmother 11. Daughter 12. Brother 13. Sister 14 Grandson 15. Granddaughter 16. Uncle 17. Aunty 18.Cousins

**##** 1. Male 2. Female

**\*** 1. Service2. Business3. Agriculture4. Study5. Housewife6. Labour7. Unemployed8. Professional 9. Pensioner10. Government Employee11. Private Employee12 Fisheries13 Infant14 Other

**\*\*** 1. Married2. Unmarried3. Widow4. Widower5. Others

**\*\*\*** 1. Illiterate2. Literate3. Up to primary4. Secondary5. Graduate6. Post Graduate

**(NOTE FOR ENUMERATOR:** All affected persons to be surveyed. If details of tenants / employees are obtained from the owners, such persons will also have to be located and surveyed using applicable fields in the above questionnaire).

## APPENDIX 6: ESTIMATION OF TEMPORARY IMPACTS

### 1. Methodology for estimation of temporary impacts

Transect walks were undertaken for estimation of temporary impacts in representative road sections in areas where water supply pipelines are proposed. Transect walks were conducted using a standard format for recording details at 10m interval and a checklist to gather socio-economic details on Affected Persons.

#### 1(a). Rising mains and distribution mains

Transect walks were conducted by the social safeguard team along with project engineers along the entire (100%) length of proposed pipe alignments for rising mains (16.55 new pipelines and 8.45 km old pipelines) and distribution mains (18.56 km). The project engineer accompanying the social safeguards team for the transect walk indicated the most likely alignment of the main pipelines along each road stretch, based on which potential temporary impact was identified for 100% of the proposed rising mains and distribution mains alignments, for the purpose of draft RP preparation and budget allocation. Information captured through transect walks for rising mains and distribution mains alignments is presented in Table 6.1.

Although the entire stretch of pipeline was surveyed, the exact pipe alignment (based on consideration of existing utilities below ground) is expected to be known before implementation, during detailed measurement surveys (DMS). Hence, this exercise will have to be undertaken again during DMS, prior to implementation, by the DSC and contractor social safeguards personnel. The RP will be updated for actual impacts of rising mains and distribution mains.

#### 1 (b). Distribution network

Transect walks were undertaken jointly by the social safeguards team and project engineer along sample road stretches of 10 km each in high, medium and low density areas. The total length of sample road stretches surveyed was 30 km. Based on the data gathered from transect walks, an average per kilometer potential impact was derived from the survey. The entire proposed distribution network length (446 km) was then classified into high, medium and low density, based on discussions with knowledgeable local engineers in Gaya. Using the per kilometer impacts for high, medium and low density, the potential temporary impact was projected for the entire length of proposed distribution pipelines, classified into high, medium and low density stretches.

For preparation of this RP, sample road/pipeline lengths for distribution network were surveyed. The exact alignment of pipe on each road (left hand side/right hand side, and taking into consideration existing underground utility lines etc.) is likely to be known before implementation. Hence, for detailed measurement surveys to be conducted for RP updation prior to implementation, this exercise will have to be undertaken for the entire 446 km length of pipeline, stretch by stretch, by the DSC and contractor social safeguards personnel. RP for stretches in selected zones will be prepared and approved by ADB and payment of compensation made, prior to implementation in each zone.

The following format is recommended for a survey of businesses to determine income loss during Detailed Measurement Survey. For any other type of loss, the sample format for Inventory of Loss Survey may be used.



**(A) CHECKLIST FOR TRANSECT WALKS - SOCIO-ECONOMIC SURVEY OF AFFECTED BUSINESSES / SAMPLE FORM FOR SURVEY OF BUSINESSES UNDER DETAILED MEASUREMENT SURVEY**

<b>Date of Survey</b>		<b>Serial No.</b>			
Name of road		Address/Location:			
Name of affected person					
Father/Mother's name					
Type of business/hawker					
Status		Owner	Tenant		
		If owner: Titled	Non-titled		
		Mobile	Permanent		
Description of structure					
Since when operating in that location					
Frequency of operation in a week		Daily	2-3 days/week	1 day/week	Half day / Full day
Person(s) employed if any		No.			
Maintenance / Rent		Rs. per annum or month, specify			
Investment (recurring)		Rs./ month			
Average profit per day		Rs.			
Salaries paid to employees (total/month)		Rs./month			
Highest profits recorded in		Hours (AM/PM) _____ Weekend/Weekday (specify days) _____			
Will employee(s) be affected		Yes/No			
Whether any affected person is		BPL/WHH/disabled/backward community/IP/elderly/child worker			
No. of dependents of owner					
No. of dependents of employees					
Whether road RoW used for		Parking/Display of wares/Storage/Other purpose, specify			
Type(s) of distress likely					
Views/Concerns					




Note: BPL=below poverty line; WHH=woman headed household/Chief Wage Earner is a woman; IP=indigenous peoples; RoW=right of way

**Table 6.1 Transect Walk Result (Rising Mains and Distribution Mains)****RISING MAINS TO MASTALIPUR OHT**Area :- Manpur

Rising Mains

From :- Musafill thana and Manpur bridge

To :- Mastlipur OHT

Sr. No.	Name of the affected person	Type of business	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	School Going Children	Caste	Description of structure	Movable / Basket Or Gunny Bags	Photograph
1	Mahesh Prased Gupta	Tea & Sweet Stall	M	300	180	2	BC	Wooden Frame	M	
2	Ranjit	Litti Shop	M	200	120	Nil	BC & One child mentally retarded	Wooden Frame	M	
3	Lalit Halwai	Tea N Litti	M	200	120	Nil	BC	Wooden Frame	M	




## BRAHMYONI RISING MAINS

Area :- Brahmyoni GLSR

Rising Mains ( From Dandi Bagh)

From :- Bypass

To :- Dandi Bagh



Sr. No .	Name of the affected person	Type of busines s	Male/Femal e vendors	Daily incom e (Profit ) Rs.	Daily Profi t	Family Membe r	School Going Childre n	Caste	Description of structure	Movable (M) / Immovabl e (I)	Photograph
1	Md. Shabuddin	Meat Shop	M	400	240	9	6	Minorit y	Wooden Frame	M	
2	Asmin Khaton	Veg	F	300	180	4	2	Minorit y	Wooden Frame	M	
3	Pardeep Kawal	Fish Vendor	M	400	240	10	2	Bc	Wooden Frame	GB	

Area :- Brahmyoni GLSR

Rising Mains ( From Dandi bagh )

From :- Ghugari Taar

To :- Bypass Circle





Sr. No .	Name of the affected person	Type of businesses	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	Family Member	School Going Children	Caste	Description of structure	Movable Str./ Basket Or Gunny Bags	Photograph
1	Md. Latif	Cycle Repairing	M	200	200	6	6	Minority	Wooden Frame	M	
2	Shaukat Ali	Egg Vendor	M	150	100	6	3	Minority	Iron Bench	M	




Area :- Ramshila Hill GLSR

Rising Mains

From :- Panchayati Akhara , Dhobi Ghat &amp; Bagaeshwari pump houses

To :- Ramshila GLSR

Sr. No .	Name of the affected person	Type of businesses	Male/Female vendors	Daily income (Profit) Rs.	Profit/day	Family Member	School Going Children	Caste	Description of structure	Movable/GB	Photograph
										B	
1	Bishwa Prasad Sav	Vegetable Shop	M	300	180	12	4	OBC	Tarpulin and Bamboo	M	
2	Usha Devi	Sweet Shop	F	200	120	4	2	OBC	Wooden Frame	M	
3	Vijay Prasad	Sweet Shop	M	300	180	8	3 ( One blind daughter)	G	Wooden Frame	M	 
4	Anu	Chinese	M	300	180	6	2 & 2	G	Iron Bench	M	




	Kumar Gupta	Food					are not going				
5	Som Nath Kumar	Chinese Food	M	300	180	6	2 are going to school and sister not going	OBC	Iron Bench	M	
6	Kishan Lal	Vegitable Shop	M	300	180	8	2	OBC	Wooden Frame	M	


## Distribution Main

Area :- Manpur

Distribution Mains

From :- Mastlipur OHTTo :- Manpur Chock

Sr. No.	Name of the affected person	Type of businesses	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	School Going Children	Caste	Description of structure	Movable Str./ Basket Or Gunny Bags	Photograph
1	Md Guddn	Chicken Shop	M	800	480	2	Minority	Wooden Frame	M	
2	Md Anwar Kurshi	Chicken Shop	M	1000	600	4	Minority	Wooden Frame	M	
3	Md Umar	Chicken Shop	M	800	480	4	Minority	Wooden Frame	M	





4	Mahendra Pd Sav	Hotel	M	500	300	2	OBC	Shop	M	
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Area :- Gaya college RoadDistribution Mains




From :- Singra Sthan GLSR

To :- Sikaria Mod

Sr. No.	Name of the affected person	Type of business	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	School Going Children	Caste	Description of structure	Movable Str./ Basket Or Gunny Bags	Photograph
1	Mohd. Javad Alam	Khani	M	300	180	2	Miniorty	Iron Frame	M	
2	Vikas Kumar Gupta	fruit shop	M	300	180	2	G	Wooden Frame	M	
3	Promod Kumar Gupta	Tea and snacks	M	300	180	2	G	Wooden Frame	M	
4	Manoj Kumar Bharti	Paan Shop	M	300	200	3	OBC	Wooden Frame	M	

5	Pradeep Kumar Yadav	Cold Drink	M	400	240	1	OBC	Wooden Frame	M	
6	Lattan ji	Sweet Shop	M	200	120	2	OBC	Wooden Frame	M	
7	Ashok Kumar Chandravanshi	Paan Shop	M	300	200	0	OBC	Wooden Frame	M	


Area :- Azad ParkDistribution MainsFrom :- Azad Park OHTTo :- Temple

Sr. No.	Name of the affected person	Type of business	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	School Going Children	Caste	Description of structure	Movable / Basket Or Gunny Bags	Photograph
1	Tulsi Prajapat	chinese food	M	300	180	2	OBC	Trolley	M	
2	Ashok Kumar	Tea stall	M	200	120	2	OBC	trolley	M	
3	Daleep Prasad	Eatry	M	300	180	3	OBC	Trolley	M	

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Area :- Azad Park

Distribution Mains

Sr. No.	Name of the affected person	Type of business	Male/Female vendors	Daily income (Profit) Rs.	Daily Profit	School Going Children	Caste	Description of structure	Movable Str./ Basket Or Gunny Bags	Photograph
1	Shyamjee Prasad	Vegetable Shop	M	300	180	3	OBC	On Mat, with bamboo and tarpaulin	M	

**APPENDIX 7: TOR FOR THIRD PARTY WITNESS TO LAND DONATION**

For any voluntary donation of land, an external independent entity will supervise and document the consultation process and validate the land donation process as per legal requirement.

**TOR for Independent Third Party Witness to Land Donation Process**

An independent third party is sought to be appointed to oversee and certify the process of land donation. The third party shall be briefed about his/her expected role and deliverables by the PMU.

**Eligibility:** The third party shall be a representative of the community (for example, a senior government officer, a leader of the community, a representative of a local NGO/CBO), without any direct interest in the negotiation process, who is acceptable to each of the concerned parties (BUIDCO, GMC and concerned land owner/donor).

**Scope of work:** The role of the third party shall be to ensure a fair and transparent process of donation. The envisaged scope: of work shall entail the following:

- (i) witness and keep a record of meetings held with the concerned parties,
- (ii) ensure there is no coercion involved in land donation,
- (iii) ensure that the preferences and concerns of the land donor related to access, selection of site within lands held, etc. are recorded and any stipulated conditions met,
- (iv) ensure that the land donation agreement is drafted in a fair and transparent manner,
- (v) identify and recommend mitigation measures to land donor, if required,
- (vi) ensure that taxes, stamp duties and registration fees for donated land are borne by government, and
- (vii) submit a certificate as witness to the donation and transfer process.

**Deliverables:** The details of the meetings, and a certificate as witness to the donation process and mitigation measures to donor, if any, shall be submitted by the third party to PMU, PIU and donor in the local language.

**SAMPLE CERTIFICATION FORMATS**

**I. CERTIFICATION OF THIRD PARTY APPOINTMENT**

This is to certify that Mr./Mrs. XXXXXXXXXXXXXXXXXXXX, (profession, designation, address) is appointed as independent third party to certify the process of negotiated purchase of plot no.....area.....donated by XXXXXXXXXXXX (names of owner), who is a signatory to this certificate. It is also placed on record that none of the signatories to this certificate have any objection to appointment of xxxx as third party witness.

Date

Officers BUIDCO/GMC and land donor

\_\_\_\_\_

2.

**II. REPORT/CERTIFICATION OF THIRD PARTY WITNESS**

I, \_\_\_\_\_ of \_\_\_\_\_ (address) certify that I was witness to the process of land donation (details of plot \_\_\_\_\_ from XXXXXXXXXXXX land owners names). I certify that:

1. The process of donation of the said land was transparent; the landowner(s) was/were happy to donate the land for the welfare of the community.
2. No coercion was used in the donation process.
3. Land transfer costs (registration fee and stamp duty) were borne by the government and not by the donor.
4. All concerns expressed by the donor as agreed, were addressed and no pending issues remain.
5. The following mitigation measures were identified and implemented / provided to the donor.
6. Attached are the minutes of meetings held between project proponents and the land donor, which I was witness to.

Signed/

Name

XXXXXXXXXXXXXXXXXXXXXX

Date: \_\_\_\_\_ Place: \_\_\_\_\_

Encl: Minutes of meetings held between land donor and project proponents

### APPENDIX 8: SAMPLE MONITORING TEMPLATE

1. A semi-annual monitoring report shall be prepared on Resettlement Plan implementation and submitted to ADB by the PMC. It will include: (1) **the list of APs**, with compensation, if any due to each and details of compensation paid with signed receipts annexed to the report, socio-economic status and satisfaction levels of APs with the RP implementation process, compensation and mitigation measures; (2) **the list of vulnerable APs** and additional compensation / special protection measures planned/implemented for them; socio-economic status and satisfaction levels of vulnerable APs with the RP implementation process, compensation and mitigation measures; (3) **list of affected common facilities** affected, plan to restore access and/or actions taken to restore access to the same or facilities of equal quality elsewhere; (4) **list of roads for closure** and actions planned / taken to minimize disturbance; (5) **details of consultations held with APs** (with number of participants by gender, issues raised, conclusion / agreement reached, actions required/taken); (6) **details of grievances** registered, redressed, outstanding complaints, minutes of GRM meetings held; (7) **details of information disclosure** and awareness generation activities, levels of awareness among target population and behavior change, if any; and (8) **any other relevant information** showing RP implementation progress. The following checklist may be used for overall monitoring of RP implementation.

S. N.	Resettlement Plan Activities	Completed Y/N	Remarks
<b>A. Pre-Construction Activities and Resettlement Plan Activities</b>			
1	Approval of final Resettlement Plan by ADB prior to contract award		
2	Disclosure of final Resettlement Plan on ADB and EA websites		
3	Circulation of summary RP in two local languages to all stakeholders		
<b>A. Resettlement Plan Implementation</b>			
1	Grievance Redress Cell and Committee established		
2	Entitlements and grievance redress procedure disclosed		
3	Finalization of list of APs, vulnerable APs and compensation/assistance/allowances due		
4	Finalization of list of roads for full or partial closure; mitigation measures proposed		
5	Affected persons received entitlements as per amounts and program specified in RP		
6	Payment of compensation, allowances and assistance (No. of APs)		
7	Arrangements for temporary rental accommodation for APs facing relocation		
8	Additional assistance for vulnerable households given (No. of vulnerable APs)		
9	Livelihood arrangements provided to vulnerable APs		
10	Reinstallation of affected common facilities		
11	Grievances No. of grievances registered No. of grievances redressed Outstanding complaints Disclosure of grievance redress statistics		
12	Consultation, participation and disclosure as per Plan		
<b>C. Monitoring</b>			
1	Survey on socio-economic status of APs (including vulnerable APs) completed and compared with baseline survey results		
2	Survey on satisfaction levels of APs with RP implementation completed		
<b>D. Labor</b>			
1	Implementation of all statutory provisions on labor like health, safety, welfare, sanitation, and working conditions by Contractors. Ensuring no child labour used		
2	Equal pay for equal work for men and women		

NOTE: Where applicable, the information provided in the table should be supported by detailed explanatory report, receipts and other details.

## **APPENDIX 9: DUE DILIGENCE REPORT AND SUMMARY OF CONSULTATIONS FOR GAYA WATER SUPPLY PROJECT I (GWSP I)**

### **A. Scope of this report**

1. This land acquisition and resettlement due diligence report (DDR) is prepared for identified sites and alignments for the proposed Gaya Water Supply Project I (GWSP I), under tranche 2 of the MFF for Bihar Urban Development Investment Program (BUDIP). GWSP I is classified as “Category B” for Involuntary Resettlement (IR) impact as per ADB’s Safeguard Policy Statement (SPS), 2009. This DDR will be updated and reconfirmed after finalisation of all sites and completion of detailed measurement surveys.
2. A due diligence process was conducted to examine the land acquisition and resettlement issues in detail, in line with ADB SPS 2009. This report describes the findings and provides copies of available NOCs, consultations and photographs.
3. Upon project implementation, the Environment and Social Management Coordinator of PMU will be required to undertake a review of this due diligence, prepare a confirmation letter or report documenting any modifications for the subproject and submit to ADB; and receive a ‘no objection’ confirmation from ADB prior to start of construction in the subproject.

### **B. Subproject description**

4. Proposed subproject components for Gaya water supply under Project 2 include: (i) refurbishment of existing tubewells (29 no.s); (ii) refurbishment of existing pumphouses (16 no.s) and site stores (3 no.s), demolition of dilapidated pump houses and construction of new ones (5 no.s), and construction of new pump houses (4 no.s); (iii) construction of new (6 no.) overhead tanks (OHT) and new (3 no.) ground level service reservoirs (GLSR); (iv) laying of new transmission mains (16.55 km) and distribution mains (18.56 km), and integration of existing 8.45 km rising mains; (v) laying of water supply distribution pipelines (446 km) and integration of existing distribution network (72 km), construction of valve chambers (1083 no.s); (vi) provision of house service connections (92000); (vii) provision of 200 public standposts in poor areas; and (viii) customer service centres (CSC), minimum 1 CSC per 15000 connections, including one central CSC. In addition, procurement and installation of bulk flow meters, generators and pumpsets are proposed.

### **C. Outline of field work**

4. This report is prepared on the basis of field inspections of proposed subproject facility locations and road, transmission lines/rising mains, distribution mains alignments that are identified, as well as proposed water supply distribution pipeline alignments. The field visits to identified sites and alignments were complemented by stakeholder consultations and surveys for RP preparation. Information on land ownership was gathered and copies of no objection certificates for proposed sites that have been received, were obtained.



Sl. No.	Date	Location	No. of Participants	Participants	Topics Discussed	Issues Raised
1	Dec 06, 2013	Gaya	62 M – 54 F – 8	<b>GMC-</b> Dy. Mayor, Ward Councilors of Gaya, and City Manager, <b>PMU-</b> PM –PMU and RO, <b>PMC team,</b>	The participants were apprised about the proposed Gaya Water Supply Project.	(I) As of now, the Holding Tax includes water charges. If the water charges are introduced, one will require to pay the metered water charges as well as the holding Tax includes water charges?  (II) The river Phalgu is going barren and all the sewerage waste is discharge in it, what is the plan for sewerage system, will it be incorporated within the GMC Water Supply

**Appendix Table 9.1: Summary of consultations**

				DSC representatives, <b>Other participants</b> Assistant Engineer, J.E, Divisional Engineer, EEE,		Plan? If the water is inducted from the river how it will ensure the quality of water. They also suggested incorporating the rain water harvesting within our plan. (III) There are 7 wards on the other side of the Phalgu River i.e. Manpur Area. Will these areas be also covered in the project? (IV) Water user charges- They expressed their concerns regarding user charges that may be levied  (V) Sustainable source of water intake- they insisted on finding a source that may be able to meet the requirement (VI) Public stand post- modus operandi of setting up and maintenance of the PSPs
2	Dec. 10, 2013	DM-Office , Gaya	5 All male	DM Gaya, City Manager, PMC Team	Gaya Water supply Project	A presentation on GWSP-1 to apprise the DM about the project
3	Dec. 11, 2013	PHED Office Gaya	7 All male	<b>PHED-</b> Exe. Engg. Asstt. Engg. Representative of Kirloskar Group	Gaya Water supply Project	Discussion held on ongoing project being executed by Kirloskar group.
4	Dec. 12, 2013	<b>GMC, Gaya</b>	7 All male	<b>GMC-</b> Deputy Mayor, Municipal Commissioner City Manager Executive Engineer (Water Board) <b>PMC-</b> Bob Baker, Yaser Mohit Kumar	Gaya Water supply Project	Discussions held to assess the existing Grievance redressal system, town committee, assets owned by Gaya Water Board, GMC as well as to how best can the existing Human resources and facilities be utilised in the upcoming Water Project.
5	Jan. 09, 2014	Ward No. 05, Near Murali Hill	23 M -11 F -12	Local residents	Existing water supply system, Proposed water supply project , maintenance of PSPs	Though there is water supply in the vicinity but most often the pressure is not adequate and the supply is erratic. Frequent occurrence of water borne diseases (Diarrhea) has been reported. The participants belonging to SC & OBC category expressed their desire to be covered under the project with the provision of subsidized or no Water user charges for such users. They also want to work as manual laborer under the contractor.
6	Jan. 09, 2014	Ward No. 06, Near Ramshila Hill, Panchayati Akhara	16 M - 9 F - 7	Local residents	Existing water supply system, Proposed water supply project	There is a PSP in the vicinity down the stairs Frequent occurrence of water borne diseases (Diarrhea). The participants belonging to SC & OBC category expressed their desire to work as manual laborer in the project.
7	Jan. 10, 2014	Ward No. 44, Near Mangalagauri Temple, Brahamyoni Hill	12 M - 12 F - 0	Local residents	Existing water supply system, Proposed water supply project	To incorporate provisions <b>to form a citizens group</b> to monitor the implementation of the project in their respective areas
8	Jan. 10, 2014	Ward No. 40, Panchmohal	11 M - 11 F - 0	Local residents	Existing water supply system, Proposed water	Participants opined that during the time of construction/implementation of the project, the Implementing Agency must adopt an all-inclusive approach ensuring that especially poor are not left out.

		la, Near SuryaKund			supply project	
9	Jan. 11, 2014	Ward No. 53 Manpur	16 M – 14 F – 2	Local residents	Existing water supply system, Proposed water supply project	The participants opined <b>to form a citizens group</b> to supervise the implementation of the project in their respective areas Participants stressed <b>more emphasis on a proper drainage system</b> to be put in place before taking up water supply project as water logging is there
10	Jan. 11, 2014	Ward No. 49, Manpur	9 M – 6 F – 3	Local residents	Existing water supply system, Proposed water supply project	Presence of high TDS and Nitrite content in ground water coupled with large number of Hepatitis B patients in Ward No. 49 Manpur Gaya Participants opined that during the time of construction / implementation of the project, the Implementing Agency must ensure that especially poor are not left out. No suggestion for operation stage
11	March 06, 2014	Ward No. 01, Kharkhura Raja Kothi, Delha	10 M – 5 F – 5		Existing water supply system, Proposed water supply project	Participants opined that there is no water supply. There is high demand for uninterrupted water supply for 24x7
12	March 06, 2014	Ward No. 03, Baba Dayalunath Mandir Campus	9 M – 9 F – 0		Gaya Water supply Project	Participants requested for pro poor policy as far as water usage charge / rate fixation is concerned
13	Sep. 03, 2014	GMC, Gaya	9 M-8 F-1	MC, GMC, Gaya Representatives of different sections of GMC Gaya PMC Team		The Newly Appointed Commissioner, Mr. Deore Nilesh Ramchandra was apprised on the Gaya Water Supply Project and its components with special emphasis on Institutional Reforms Issues pertaining to Institutional reforms were discussed with the Heads of Establishment, Water Section and Accounts of the Gaya Municipal Corporation and also with the Line Departments
14	Jan. 10, 2015	Office of the Circle Officer, Manpur Mastallipur	7 All men	Land owners Husband of the Mukhiya	(i) assessment of the type and extent of livelihood loss and the suitable compensation package (ii) identification of direct and indirect beneficiaries (iii) resolution of dispute over the ownership of land (iv) assessment of APs' vulnerability	(i) suitable compensation mechanism (ii) Identification of government land and its demarcation for constructing the OHT. (iii) Re-measurement of the area to fix the ownership rights of different stakeholders.
15	Jan. 17, 2015	Gangi Pond, Near Joda Masjid	3 All men	Secretary of the trust; legal advisor of the trust	(i) assessment of the type and extent of livelihood loss and the suitable	(i) alternative skill building training (ii) suitable compensation mechanism (iii) change of site

					compensation package (ii) identification of direct and indirect beneficiaries	
16	Jan. 22, 2015	Proposed GLSRs at Ramshila and Brahmyon i Hills	4 All male	<b>Forest Department</b> Mr. Ajit Chaudhary (Amin) <b>PMC-</b> Dr. A. Patni (Env. Expert) <b>DSC-</b> Mr. Venkat Mr. A.K. Singh	Forest clearance for the construction of GLSRs and laying of pipelines	The Forest department agreed, in principle , to given no objection certificate and clearance for the construction of the GLSRs.
17	Feb. 23, 2015	<b>Bhusunda</b>	94 Female-33	Local resident	Issue of Social exclusion	Squatters belonging to the most vulnerable social category of SC do not have access to water and sanitation services in their homes. There was high demand intensity for water connection and, preferably, individual toilets. On further probing, women participants agreed to manage and operate community toilets by pooling their own resources.  They expressed their willingness to associate themselves in the civil works. Besides, they are also willing to undertake any skill training that may augment their income.
18	Feb. 24, 2015	<b>Mastallipur</b>	4 All females	Local resident	Issue of Social exclusion	During community consultation in Mastallipur, it was revealed that the inhabitants of the village belonging to the most vulnerable social category of SC do not have access to water and sanitation services in their homes. On further probing, they expressed their willingness to take water connection and build sanitary toilets in their homes.
19	Feb. 25, 2015	<b>Pump House, Janta Colony</b>	8 All females	Local resident	Issue of Social exclusion	A community owned and managed public toilet-cum -washroom needs to be provided to them to ensure environmental health along with safety and dignity to women. The participants agreed in principle, to upkeep the assets, thus created, clean and in order by forming an all women management committee. Ms. Saveeta Devi owns a pig den at Pump house no.-2 while Ms. Gudiya Devi has a shade of tarpaulin. However, they have assured to shift if required.
20	Feb. 25, 2015	<b>Delha Thana</b>	13 Female- 6	Local resident	Issue of Social exclusion	Connected to the main Gaya- Tikari road by a kutcha approach road, the area is mostly inhabited by lower middle or middle class people who have provisions of private bore wells and sanitary toilets in their houses. However, in the absence of a proper drainage system in the area, people allow the wastewater to drain on to the open field, the part of which is the proposed sites of OHTs. At the periphery of the locality, there are around 50 households of SC community who live in temporary kutcha houses and resort to open defecation at the proposed site.
21	Feb. 26, 2015	<b>Brahmyon i Hills</b>	13 Female-9	Local resident	Issue of Social exclusion	They have been living at this place since long. They have bought this piece of land to construct their homes. There is no provision of toilet, thus they resort to open defecation. Some of the hoses do have water connections. There is high demand intensity for potable drinking water facility, individual toilets and drainage facility. Participants were willing to undertake alternate livelihoods opportunities that may be created through Skill development trainings.
22	Feb. 26, 2015	<b>Ramshila Hills</b>	15 Female-12	Local resident	Issue of Social exclusion	Apart from being poor most of them belong to SC. They have been living at this place since long. There is no provision of toilet, thus they resort to open defecation. Hoses don't have water connections. They fetch water from a PSP- owned and operated by the community, or from the Water Tank situated at the base of the hill. They informed that in early 90's, a drive to free the land from encroachment was undertaken but (Late) Mr. Anil Piston, the then Ward Councilor GMC, and Mr. Prem Kumar, local MLA managed to avert.

						Those who are likely to be impacted permanently are willing to move to any other place as suggested by GMC. There is high demand intensity for potable drinking water facility, individual toilets and drainage facility. Participants were willing to undertake alternate livelihoods opportunities that may be created through Skill development trainings.
23	Feb. 27, 2015	<b>Joda Masjid</b>	12 Female-2	Local resident	Issue of Social exclusion	The shallow southern tip of the pond is proposed to be partly filled to enable the construction of OHT. Remaining part of the pond will continue to be available for pisciculture and water chestnut cultivation. In order to restore any conceivable loss of livelihood to the family of the present cultivator, the EMP has proposed to deepen the pond further, especially its shallow southern tip as it will more than adequately compensate for the loss of yield – fish catch and water chestnut.
24	Feb. 27, 2015	<b>GMC, Gaya</b>		Mayor, Dep. Mayor, Ward councilors , PMU , PMC and DSC representatives	MoU with GMC	The matter will be placed in the General Board Meeting of GMC for approval.
25	March 24, 2015	<b>Prathmik Kanya Vidhalaya, Khurkura, Gaya</b>	5 Female-4 Male- 1	School Staff	Renovation / Rehabilitation of pump house in school premises	To carry out the work after school hours etc. to minimise the impact and Tape Water Supply may be provided which will improve sanitation facilities in school, Hygiene habits can be inculcated in the students which will improve the general health of the student. The minor repairing of the existing toilet will help to keep these clean. The lump Sum estimate will be around Rs. 50,000/- ( Maximum)
26	March 24, 2015	Prathmik Vidhyalaya , Lakhenpur a, Manpur, Gaya	7 Female-6 Male- 1	School Staff and Nearby Residents	Renovation / Rehabilitation of pump house in school premises	Tape Water Supply may be provided free of cost which will improve sanitation facilities in school. Hygiene habits can also be inculcated in the students which will improve the general health of the student. The minor repairing of the existing toilet will help to keep these clean. The lump Sum estimate will be around Rs. 50,000/- ( Maximum)
27	7 <sup>th</sup> April, 2015	<b>Mastlipur</b>	11 M- 11	Shopkeepers and vendor's of fruits / vegetable etc.	Rising Main RoW from musafil thana to mastlipur OHT	Discussions held and suggested that only Night work to be carried out in proposed in commercial area to avoid loss of livelihood and traffic congestion on busy roads.
28	8 <sup>th</sup> April, 2015	Joda Maszid	15 M-15	Local Residents	Rising main RoW from Buniyad Ganj TW to Joda Masjid	Discussion on proposed Rising Main RoW. People of the area are not getting regular water supply and they assured to cooperate so that regular water supply is assured and ready to pay the user's charges.
29	8 <sup>th</sup> April, 2015	Delha	12 M-9 F- 3	Local Residents and shopkeepers	Rising main RoW from Baba Dayalunath Temple TW	Discussions held and suggested that only Night work to be carried out in proposed in commercial area to avoid loss of livelihood and traffic congestion on busy roads.
30	9 <sup>th</sup> April, 2015	<b>Ramshila Hills</b>	23 M- 8 F-15	Permanent Affected Family Members	Information on BASERA Scheme of Nagar Nigam and filing application with documents	Convergence with Scheme to provide benefit of the scheme

31	16 <sup>th</sup> April, 2015	Residence of Member Councillor of Ward 5	4 M-3 F-1	DSC staff	Benefit of BASERA Scheme	A recommendation letter written by MC of the area.
32	20 <sup>th</sup> June, 2015	Bhasunda OHT	8 M-8	Local Residents near Gauri Kanya Vidhlaya School	Rising Main RoW from Khadi Gramoudyog TW to OHT site	The Participants belonging to SC and OBC expressed their desire to work as labourer in the project and assured for full support in implementation of the project.
33	20 <sup>th</sup> June, 2015	Bhasunda OHT land of DACY Department, GoB	3	Senior Official of DACY and DSC staff	Information on selected location of OHT at Department's land	The official was informed about the project and the land allocation ( 30 MX30 M) at Bhasunda Mela ground at the bank of Falgu River . The On receiving the NOC , a copy may be sent to them for their reference and record.
34	21 <sup>th</sup> June, 2015	Delha OHT	16 M-9 F-7	Local Residents of Ghugari Tandr	Rising Main RoW from Vishnu pad bypass	Participants were suffering shortage of water supply since long back, they are waiting for early implementation of the project. They expressed desire to work as labourer in the project or getting the livelihood training etc.
35	22 <sup>nd</sup> June, 2015	Ramshila hill GLSR	13 M-11 F-2	Shopkeepers, tea stalls owners, Pujan Samagri shop etc.	Rising Main RoW from Bairagi and Cotton Mill Pump House	Discussions held and suggested that only Night work to be carried out in proposed in commercial area to avoid loss of livelihood and traffic congestion on busy roads.

#### **D. Land availability and resettlement impacts**

8. No involuntary land acquisition is envisaged for proposed subproject components under GWSP I; for all identified sites, government land is selected.
9. Proposed subproject components require 11094 sq m land, of which sites that have been finalized/selected measure 9498 sq m. <sup>43</sup> Of the identified sites, 5388 sq m belongs to Government of Bihar, 5010 sq m to Forest Department, Government of Bihar and 84 sq m to Gaya Municipal Corporation. In case of forest land, land for land, as per required procedure, has been followed. In case of sites yet to be finalized, alternatives such as land donation by a temple trust for the proposed OHT at Kharkhura close to the settlement to be served, and alternative government land available at a distance of 1.7 – 5 km from the settlement, are under consideration. Space for 6 proposed customer service centres is proposed to be identified on commencement of DMA work, on government land, within government buildings or in rented space.
10. Efforts have been made by the engineering team to avoid or minimize resettlement impact through careful design of the major portion of pipe alignments for water supply distribution and rising mains through available government land and existing public road right of way (RoW), avoidance of land acquisition and selection of sites and alignment alternatives with none/less resettlement impact.
11. The Resettlement Plan prepared for GWSP I identifies both permanent and temporary impacts and their mitigation measures. Identified impacts include loss of private residential structures (8, of which 7 structures are facing 100% loss and 1 faces 50% loss), relocation impact (8 households), permanent partial and significant (13%) loss of income to 2 encroachers and 2 sharecroppers from loss of encroached government land, potential crop loss on encroached government land to 4 affected persons, and temporary loss of income to hawkers and vendors on main pipe alignments (30 APs), near a pump house (3 APs) and estimated potential temporary income loss to 426 hawkers and vendors. Of APs facing permanent losses, 10 are vulnerable. Of APs facing temporary losses, 146 are vulnerable. The RP proposed compensation to affected persons based on the entitlement matrix prepared for the project. Mitigation and inclusion measures are also included in the RP cost (INR.6.7 million) Potential losses that can be avoided/mitigated e.g. potential loss of livelihood to pump operators employed by GMC during phase of operation by contractor, disruptions in water supply to localities through proper scheduling of work and temporary arrangements for water supply, avoidance of impact to businesses where possible, provision of planks for access to shops and businesses and traffic management plans to avoid disruption, are identified.

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<sup>43</sup>A site for OHT at Kharkhura (900 sq m) and for citizen service centres (600 sq m) are yet to be identified.

**Appendix Table 9.2: Details of land availability and ownership for sites where new facilities proposed (other than GMC land)**

Sl.No.	Proposed Land location	Proposed Structure	OwnerShip	Type of Land	Land available for Project	Khata No.	Plot No. (Khasra No)	Thana No	Rakba (Total plot area)	Whether khatian (land records) available	Status of Map	Status of NOC
1	Mastalipur	OHT	Bihar Sarkar	Rasta(Pathway)	24x37.5m	120	130	Muffasilganj 315	4.18 Acre	yes	yes	Approval of Chief Secretary for government land at the locations received; due procedure requires NOC from DC, which is under process.
2	Bhusunda	OHT	Bihar Sarkar	Not mentioned	30x30m	76	590	317	13.80 Acre	yes	yes	
3	Budhva Mahadev	OHT	Bihar Sarkar	Parti	30x30m	114	8	249	6.30 Acre	yes	yes	
4	Joda Masjid	OHT	Bihar Sarkar	Gairmajaruwa Aam Pokhar	30 x 30 m	411	1208	250	2.10 Acre	No; page torn off	yes	
5	Delha	OHT	Bihar Sarkar	Gairmajaruwa Aam	30 X 30 m	42	100	183	4.46 Acre	yes	yes	
6	Kharkhura Raja Kothi	OHT	Temple Trust	Brajbhushan Trust	30 X 30 m	5	492 Municipal Plot 5973	1	3.05 Acre	yes	Yes	
7	Ram Shila Hills	GLSR	Forest Deptt	Pahad	24mx40m	Chadar No. 5 (GMC)	1281 Municipal Plot 6203	Pahsi 35	9 Acre	yes	yes	Received
8	Braham Yoni Hills Hills	GLSR	Forest Deptt	Pahad	45mX90m	Chadar No. 78 (GMC)	1438	Madanpur 10	304.94 Acre	yes	yes	Received

Source: Revenue Department, DC Office, Gaya



## E. Conclusions and next steps

12. No land acquisition is envisaged for identified facility locations for GWSP I; all identified sites, which comprise majority (>85%) of land required, belong to government. For all identified sites for facilities proposed on government land other than GMC, NOCs have been applied for. Due process required to obtain forest land was followed, land for land provided to the Forest department and NOC received. Several tasks are required to be undertaken to complete the RP and DDR:

13. The following are tasks to be accomplished *before* ADB's Fact Finding Mission, scheduled in mid-September 2015:

- Site for OHT at Kharkhura to be finalized; if land donation process opted for, appointment of third party and certification by the third party, agreement with donor signed and land transferred to project following due process;
- Finalisation of alignments and measurement surveys of rising mains and distribution mains from/to Kharkhura OHT site; consultation with landowners/concerned government department as applicable;
- Written endorsement from IA that all displaced poor/vulnerable APs at Ramshila Hills APs and Mastalipur will be accorded priority for training and placement in project operation related jobs, if desired by them;
- Written endorsement from IA that for APs facing relocation, temporary rental housing will be identified before demolition/relocation and government will pay rental subsidy until such time that they are placed in project operation jobs;
- Meaningful consultations will be conducted by DSC with the affected families; minutes of such consultations will be carefully and accurately prepared, and their agreement for (a) the temporary housing arrangements until they can get access to legal rental housing and (b) willingness to take the jobs offered (to ensure they can afford to rent adequate housing for their family) by the project, recorded. Minutes, participant lists and pictures of consultations with APs of Ramshilla hills site to be appended to DDR.
- GRM to be established at town level.

14. The following tasks are to be completed, before issue of Work Order to contractor:

- NOCs to be obtained from District Collector/Deputy Commissioner for government land identified for OHTs;
- Consent letter to be obtained from Department of Children and Youth, Government of Bihar, for Bhusunda OHT site;

15. Due diligence report to be updated from time to time by PMU, initiation/completion of due procedures reported, and ADB approval obtained prior to start of construction.

**Annexure 1: Minutes of meeting held under the chairmanship of Chief Secretary (CS), Government of Bihar and approval of sites by CS**

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दिनांक-08.12.14 अपर 300 बजे मुख्य सचिव, बिहार की अध्यक्षता में ADB सम्मोहित भागलपुर एवं गया जलापूर्ति योजनाओं के कार्यान्वयन हेतु भूमि उपलब्धता विषय पर आयोजित बैठक की कार्यवाही

उपस्थित- पदा पंजी के अनुसार

कार्यवाही-

ADB सम्मोहित भागलपुर जलापूर्ति योजना फेज-1, फेज-2 एवं गया जलापूर्ति योजनाओं के कार्यान्वयन हेतु भूमि उपलब्धता के विषय पर सभी संबंधित विभाग के प्रधान सचिव/सचिव से विमर्श के बाद निम्नलिखित निर्णय लिया गया।

#### 1. पब निर्माण विभाग -

- (i) भागलपुर जलापूर्ति योजना फेज - 1 के अन्तर्गत जलमिन्दार निर्माण के लिए पब प्रमडल आदभनुर, भागलपुर कार्यालय परिसर के अंदर 20 X 20 मूखण्ड पर कार्य कराने की स्वीकृति दी गई।
- (ii) विश्ववीरता रोड के समीप पब निर्माण विभाग के मूखण्ड पर भागलपुर जलापूर्ति योजना फेज- II अन्तर्गत 33/33 इन्फ्रीड के सब स्टेशन की स्थापना हेतु 40 X 70 मीटर मूखण्ड पर कार्य कराने की स्वीकृति दी गई।

#### 2. स्वास्थ्य विभाग-

- (i) भागलपुर जलापूर्ति योजना फेज - 1 के अन्तर्गत जलमिन्दार निर्माण के लिए भागलपुर सेक्टर जेल, आनंद नगर कॉलोनी के नजदीक स्वास्थ्य विभाग के मूखण्ड के अंदर 20 X 20 मूखण्ड पर कार्य कराने की स्वीकृति दी गई।
- (ii) भागलपुर जलापूर्ति योजना फेज - 1 के अन्तर्गत जलमिन्दार निर्माण के लिए मेडिकल स्टॉक क्वार्टर सुरकी काल के सामने स्वास्थ्य विभाग के मूखण्ड के अंदर 20 X 20 मूखण्ड पर कार्य कराने की स्वीकृति दी गई।
- (iii) यह निर्देश दिया गया कि WTP के लिए बुडको बैजलियक मूखण्ड की तलाश करें। बैजलियक मूखण्ड की सम्पन्नता नहीं रहने की स्थिति में संबंधित विभाग से भूमि के उपयोग करने के लिए कार्यवाई की जाएगी। चूंकि जमीन भूमि चिकित्सा महाविद्यालय की है और भविष्य में चिकित्सा महाविद्यालय के भवनों के विस्तार की सम्भावना है, जिसमें चिकित्सा महाविद्यालय की भूमि का उपयोग होगा है। प्रधान सचिव, स्वास्थ्य विभाग यह सुनिश्चित कर ले कि भविष्य में मेडिकल कॉलेज के विस्तार के अलावा में WTP के लिए भूमि का NOC देना लभ्य है अथवा नहीं।

*(Handwritten signature)*

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- (iv) गया जलपूर्ति योजना के कार्यान्वयन हेतु चार्ज नं० - 80 भुसुडा (जिला स्टाडियम प्रस्तावित है) मानपुर (ब्लॉक) में 30 x 30 मीटर मूखण्ड उपलब्ध कराने की स्वीकृति दी गई।
- (v) गया जलपूर्ति योजना के कार्यान्वयन हेतु चार्ज नं० - 80, मसालीपुर, मानपुर अधिस कार्यालय के इलाके मानपुर (ब्लॉक) में 30 x 30 मीटर मूखण्ड उपलब्ध कराने की स्वीकृति दी गई।
- (vi) गया जलपूर्ति योजना के कार्यान्वयन हेतु चार्ज नं० - 27, बरगद पेड़ के दक्षिणी तरफ बड़की डेलहा, धनियाँ बगीचा, चंदौरी (ब्लॉक), में 30 x 30 मीटर मूखण्ड उपलब्ध कराने की स्वीकृति दी गई।

सन्वयाद के साथ बैठक समाप्त हुई।

*Signature*  
14.12.24

आपाक- 3990

प्रतिनिधि-

प्रधान सचिव, पंच निर्माण विभाग/प्रधान सचिव, स्वास्थ्य विभाग/प्रधान सचिव, कृषि विभाग/प्रधान सचिव, उद्योग विभाग/प्रधान सचिव, पृथ विभाग/प्रधान सचिव, शिक्षा विभाग/जिलाधिकारी, भागलपुर/जिलाधिकारी, गया।

*Signature*  
14.12.24  
मुख्य सचिव,  
बिहार सरकार

दिनांक- 14.12.24

*Signature*  
16.12.24  
सचिव

नगर विकास एवं आवास विभाग।

Translation

Minutes of the Proceeding of Meeting held on 4.12.2014 under the Chairmanship of chief Secretary, Govt. of Bihar for Land Availability at Bhagalpur and Gaya for implementing the ADB Assisted Water Supply Project

The Municipal Commisioner, Gaya Municipal Corporation attended the meeting as a representative of District Magistrate , Gaya, Appraised that there is no issue for getting the land for the water supply project at Gaya. Following locations were approved/ granted by Chief Secretary in the meeting:

1. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.45, near North of Kirloskar Pump for Joda Maszid OHT.
2. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.48, in the North of Urdu Mohamad Tola near Gauri Shankar Temple for construction of OHT .
3. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.01, Khurkhura Raja Kothi , Chandoti block for construction of OHT .
4. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.50, Bhasunda ( Where Stadium is proposed) in Manpur Block for construction of OHT .
5. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.5,Mastlipur in the west of Manpur Block for construction of OHT .
6. A piece of land measuring 30MX30M have been approved/ granted in Ward. No.27, in the south of Bargad Tree , Badki Delha, Dhania Baghicha , Chandoti Block for construction of OHT
7. There after meeting was adjourned by thank giving by all present in the Meeting

Signed

Chief Secretary  
Govt. of Bihar  
Date- 17/12/14

Letter No. 3990

CC to :- Principal Secretary Road Construction/ Health/ Agriculture/ Udyog/ Home/ Education and DM Bhagalpur/ Gaya

## Annexure 2: Allotment of land at Branhyoni and Ramshila Hills for Gaya Water Supply by Forest Department, GoB

संस्थान/नं./सू. कार/म/ग/ग, गया-823001(पत्रांक/दिनांक- 19.03.2015-22.03.2015/22.03.2015)

पत्रांक- गया-823001, दिनांक-

प्रेषक  
डा0नेसागणि के0,पाण्डव  
वन प्रमण्डल पदाधिकारी,  
गया वन प्रमण्डल, गया

सेवा में,  
मुख्य वन संरक्षक-सह-  
नोडल पदाधिकारी(वन संरक्षण),  
बिहार, पटना।

विषय-  
गया जिलान्तर्गत बुडको द्वारा रामशिला एवं ब्रह्मयोनि पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हेक्टर वन भूमि के वन(संरक्षण) अधिनियम 1980 के तहत अपयोजन हेतु FRA 2006 का प्रमाण पत्र समर्पित करने के संबंध में।

प्रसंग-  
समाहर्ता, गया का पत्रांक-1446/रा0 दिनांक 24.04.2015 एवं आपका ज्ञापक-FC 143 दिनांक 23.03.2015

महाशय,  
उपर्युक्त विषय के संबंध में सूचित करना है, कि गया वन प्रमण्डल के अन्तर्गत गया जिलान्तर्गत बुडको द्वारा रामशिला एवं ब्रह्मयोनि पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हेक्टर वन भूमि के वन(संरक्षण) अधिनियम 1980 के तहत अपयोजन हेतु प्रस्ताव समर्पित की गयी है उक्त प्रस्ताव पर समाहर्ता, गया द्वारा जांचोपरान्त FRA 2006 के तहत प्रमाण पत्र निर्गत किया गया है जिसकी एक प्रति के साथ बैठक की कार्यवाही की छाया प्रति इस पत्र के साथ संलग्न कर भेजा जा रहा है।

अनुलग्नक-यथोक्त।

विश्वासनाजन  
ह0  
वन प्रमण्डल पदाधिकारी  
गया वन प्रमण्डल,गया।

ज्ञापक- दिनांक-  
प्रतिलिपि वन संरक्षक, गया अंचल,गया को प्रमाण पत्र की छाया प्रति इस पत्र के साथ आवश्यक कार्रवाई हेतु भेजी जा रही है।

अनुलग्नक-यथोक्त।

ह0  
वन प्रमण्डल पदाधिकारी  
गया वन प्रमण्डल,गया।

ज्ञापक- 7388 दिनांक- 30/4/2015 -  
प्रतिलिपि श्री दयारांकर मिश्रा, जेनरल मैनेजर(पर्क), बिहार शहरी आधारभूत संरचना विकास निगम लि0(बुडको), 303 तीसरा तल्ला, मौर्या टावर, मौर्यालोक कम्पलेक्स,बुद्ध मार्ग, पटना-800001 को इस कार्यालय के पत्रांक-1768 दिनांक 31.03.2015 तथा मुख्य वन संरक्षक-सह-नोडल पदाधिकारी(वन संरक्षण) बिहार पटना के पत्रांक-FC 143 दिनांक 23.03.2015 सूचनार्थ एवं आवश्यक कार्रवाई हेतु समर्पित। अपने स्तर से निम्नलिखित अभिलेख समर्पित नहीं करने के कारण सैद्धान्तिक स्वीकृति अभी तक अप्राप्त है-

1. अपयोजित होने वाली वन भूमि के समतुल्य गैर वन भूमि चिन्हित कर उसकी विवरणी(मौजा, खाता संख्या, खेसरा तथा GPS Reading उपलब्ध करायी जाय तथा उक्त वन भूमि को पर्यावरण एवं वन विभाग के पक्ष में हस्तान्तरण करने की कार्रवाई किया जाना है।
2. परियोजना में यथा आवश्यक पुर्नवासन(Rehabilitation Plan) योजना समर्पित किया जाय।

अतः अनुरोध है कि वांछित सूचना अविलम्ब इस कार्यालय में समर्पित करने की कृपा की जाय।

वन प्रमण्डल पदाधिकारी

C7/W/11Ann15/Amin Section Page 16

Translation

TO WHOM IT MAY CONCERN

Gaya Forest Division vide letter no. 2388, dated 30/4/2015 ( Copy enclosed) has allotted the forest Land measuring 0.6956 hectare under forest (Conservation) act 1980 to BUIDCo at Ramshila & Brahmyoni Hill, after the investigation by District Magistrate, and issued the certificate of FRA- 2006.

Dr. Naisamani K., I.F.S  
District Forest Officer,  
Gaya forest division, Gaya

**Copy to:** forest conservator, Gaya Block with photocopy of Certificate for necessary action.

: Shree Dayashanker Mishra, General Manager (Work) BUIDCo, 303, Third Floor , Maurya Tower, Mauryalok Complex,

Budha Marg, Patna – 800001 along with Letter No. 1768, dated 31/03/2015 of the this office & Chief Forest conservator – cum- Nodal officer (Forest Conservator) Bihar Patna, Letter No. FC-143, Dated 23/03/2015 for information & necessary action.



Proposal from DC office, Gaya to Forest Department, offering revenue land for forest land

**गया समाहरणालय, गया**  
(जिला राजस्व शाखा)

पत्रांक 2218 /रा0 फोन नं० :- 0831-2222800, 2222900  
दिनांक 7-7-2015 ई०। फैक्स नं० :- 0831-2223581, 2222100  
ई-मेल :- dm-gaya.bih@nic.in

प्रेषक, सहायता, गया।

प्रेषण में, वन प्रमोदल पदाधिकारी, गया वन प्रमोदल, गया।

विषय:- गया जिलान्तर्गत बुढको द्वारा रामश्रीला एवं ब्रह्मगोनी पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हे० वन भूमि के वन संरक्षण अधिनियम 1980 के तहत अपयोजन के समतुल्य गैर वन भूमि का प्रस्ताव उपलब्ध कराने के संबंध में।

प्रसंग:- आपका पत्रांक 1768 दिनांक 31.03.15 एवं प्रबंध निदेशक, बुढको का पत्रांक 1642 दिनांक 30.05.15

सारांश, उपरोक्त विषयक प्रस्ताविक पत्र के आलोक में गया जिलान्तर्गत बुढको द्वारा रामश्रीला एवं ब्रह्मगोनी पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हे० वन भूमि के वन संरक्षण अधिनियम 1980 के तहत अपयोजन के समतुल्य गैर वन भूमि का प्रस्ताव भूमि सुधार वन समाहर्ता, शेराघाटी के पत्रांक 380/भू०/२०१३ दिनांक 04.07.15 के माध्यम से अतुलना सहित प्राप्त हुआ है। प्रस्तावित भूमि विवरण निम्न प्रकार है :-

अंशत	गाँव एवं भागा नं०	खता सं०	खंड सं०	रकबा (एकड़ में)	विस्तृत भूमि
1	2	3	4	5	6
बोकबाजार	बगामार, 230	24	109	01.74	अनाकार बिहार सरकार (पुराने परती)

प्रस्तावित भूमि को वन परिसर पदाधिकारी, बोकबाजार, गया द्वारा स्थल निरीक्षण कर वन रोपण हेतु उपयुक्त बताया गया है तथा प्रस्तावित भूमि का जे०पी०ए०ए० रिजिंग भी दर्ज कर प्रतिवेदन सम्पन्न किया गया है (आप प्रति संलग्न)।

निरिक्त हो कि कार्यालय पत्रांक 1446/रा० दिनांक 24.04.15 द्वारा रामश्रीला एवं ब्रह्मगोनी पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हे० वन भूमि के वन संरक्षण अधिनियम 1980 के तहत अपयोजन संबंधी ए०ए०आ०ए० 2006 प्रपत्र-2 में निर्गत किया जा चुका है।

सूचनाएं एवं आवश्यक कार्रवाई प्रेषित।

विश्वासभाजन  
6/6/17  
सहायता,  
गया।

3134  
9/7/15

The Additional District Magistrate ( Land Improvement) vide letter no. 360/LI/dated 4.7.2015 has given consent to allot 0.6956 hectares of non forest equivalent land against the equivalent forest land under FRA-2006 under section 1980 of forest act given to BUIDCO for Construction of



Ground Level Water Storage Tank ( GLSR) under their Water Supply Project in Gaya at Brahamyoni and Ramshila Hills . The proposed non forest land details with Location, Khata and Khasra no., Racba , nature of land and ownership etc given in letter . The land is found suitable after inspection by Forest officer of the area. ( Copy of letter is enclosed)

District Magistrate  
Gaya

Acceptance of land for land offered by Forest Department

बिहार सरकार  
पर्यावरण एवं वन विभाग,  
**कार्यालय: वन प्रमण्डल पदाधिकारी, गया वन प्रमण्डल, गया।**  
सेवानगर, न्यू करीमगंज, गया-823001(फोन/फैक्स नं० 0631-2220406, मो-7541820902 ई-मेल gmvb@nic.in@gmail.com)

पत्रांक- 4494 गया-823001, दिनांक- 23.7.2015

प्रेषक  
डा०नेसामणि के०,प०,के०  
वन प्रमण्डल पदाधिकारी,  
गया वन प्रमण्डल, गया

सेवा में,  
अपर प्रधान मुख्य वन संरक्षक-साह-  
मोडल पदाधिकारी(वन संरक्षण),  
बिहार, पटना।

विषय-  
गया जिलान्तर्गत बुढको द्वारा रामशीला एवं ब्रह्मयोनि पहाड़ी पर जलापूर्ति परियोजना निर्माण हेतु 0.6956 हेक्टर वन भूमि के वन(संरक्षण) अधिनियम 1980 के तहत अपयोजना का प्रस्ताव।

प्रसंग-  
आपका पत्रांक-FPC 254 दिनांक 15.06.2015, वन संरक्षक, गया अंचल,गया का पत्रांक-858 दिनांक 28.05.2015 एवं इस कार्यालय का पत्रांक-2388 दिनांक 30.04.2015

महाराज,  
उपरोक्त विषयक प्रांतीयक पत्रों के संबंध में कृपिकादार विवरण निम्नवत है-

- अपयोजित होने वाली वन भूमि के समतुल्य गैर वन भूमि मौजा-भागोवार थाना संख्या-230 अंचल-बांकेबाजार जिला गया के खाता संख्या-24 खेसरा संख्या-109 एकदा-1.74 एकड़ भूमि का स्वरूप पुरानी परती, भूमि का स्वामित्व अनाबाद बिहार सरकार है जिसे अपयोजना हेतु प्रस्तावित वन भूमि 0.6956 हे० के समतुल्य गैर वन भूमि वन विभाग के पक्ष में क्षतिपूर्क वृक्षारोपण हेतु हस्तान्तरित होने वाली है। सम्बन्धित, गया का पत्रांक-2218/ख० दिनांक 07.07.2015ई० का छाया प्रति संलग्न है। उक्त गैर वन भूमि क्षतिपूर्क वृक्षारोपण हेतु उपयुक्त है तथा अतिक्रमण से मुक्त है। क्षतिपूर्क वृक्षारोपण का प्रावधान इस पत्र के साथ भेजा जा रहा है। अपयोजित होने वाली गैर वन भूमि का जी०पी०एस० रिडिंग निम्नवत है-

Lat	Long
N- 24.34 338 <sup>0</sup>	E- 084.48 230 <sup>0</sup>
N- 24.34 342 <sup>0</sup>	E- 084.48 225 <sup>0</sup>
N- 24.34 337 <sup>0</sup>	E- 084.48 226 <sup>0</sup>

- जिला पदाधिकारी, गया द्वारा निर्गत वनाधिकार अधिनियम 2006 का प्रमाण पत्र इस कार्यालय को पत्रांक-2388 दिनांक 30.04.2015 द्वारा भवदीय को उपलब्ध करा दिया गया है।
- परियोजना में तथा आवश्यक पुर्नवास(Rehabilitation Plan) योजना प्रबन्ध निदेशक, बुढको द्वारा उनके कार्यालय का शापांक-1645 दिनांक 30.05.2015 द्वारा पुर्नवास योजना भवदीय के कार्यालय में समाहित कर दी गयी है।

अतः अनुरोध है कि उक्त प्रस्ताव का सैद्धान्तिक स्वीकृति प्रदान करने की कृपा करेंगे।

विश्वासभाजन  
वन प्रमण्डल पदाधिकारी  
गया वन प्रमण्डल, गया।

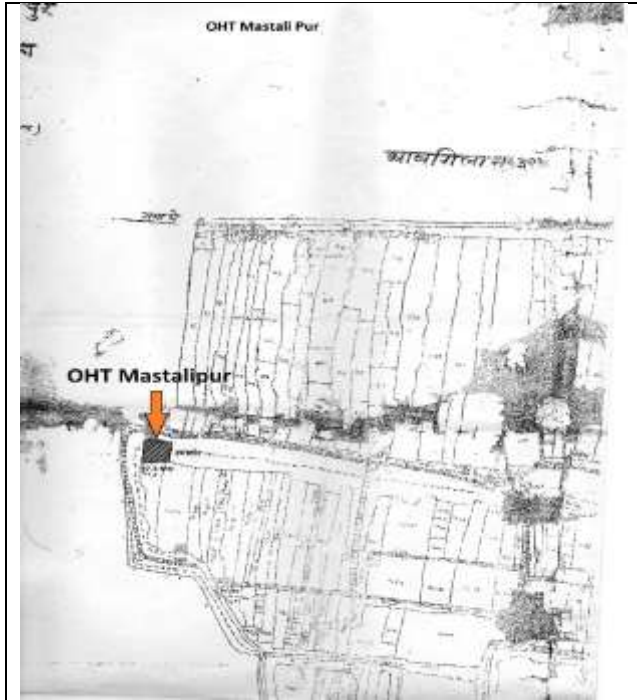
Translation

TO WHOM IT MAY CONCERN

The equivalent non forest land against the forest land measuring 0.6956 hectares for construction of Ground level water storage tank ( GLSR) at Braham Yoni and Ramshila Hills has ownership of Government of Bihar. The proposed land is transferred to forest department for plantation etc. The non forest land is suitable for plantation and free from encroachment. The Rehabilitation plan for land development by plantation has been submitted by Managing Director, BUIDCO, vide letter no. 1645, dated 4.5.2015 to DFO office, Gaya

**LAND RECORDS AND MAPS**

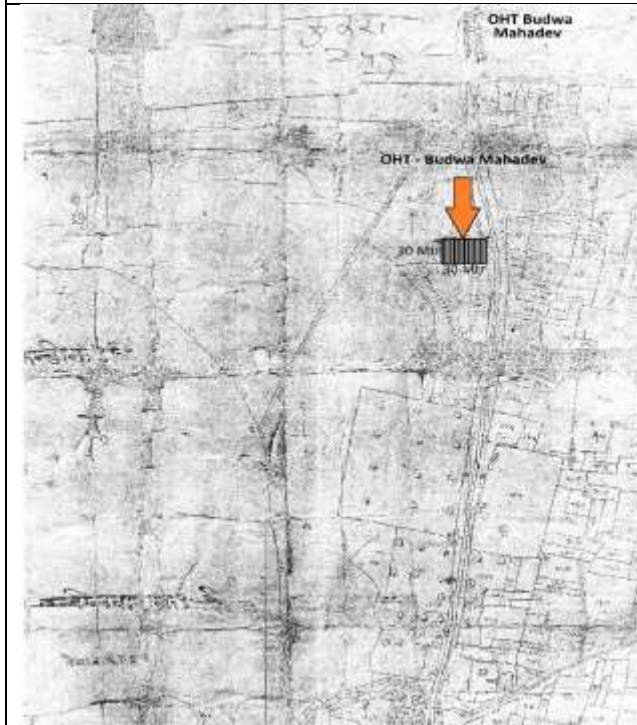
**Gaya Water Supply Project I – Cadastral Maps depicting location and dimensions of OHT & GLSR**



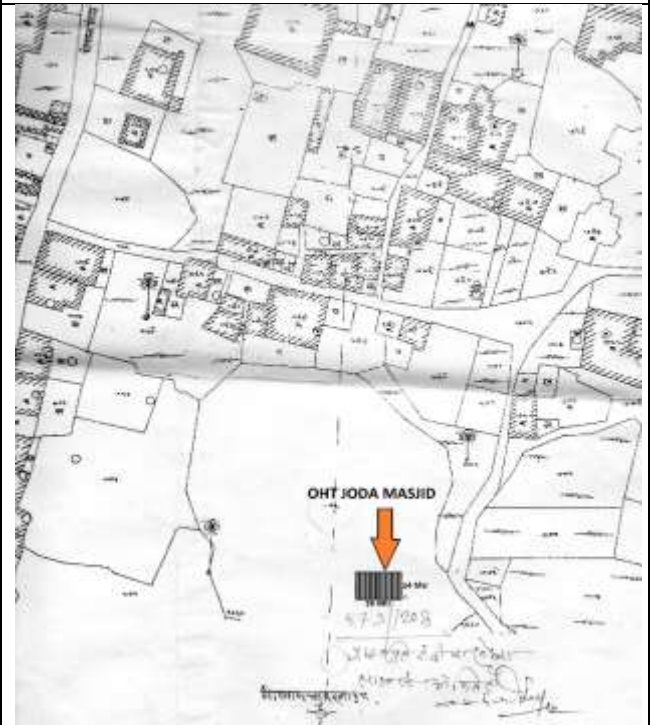
Map marked location and dimension of Mastalipur OHT



Map marked location and dimension of Bhusunda OHT



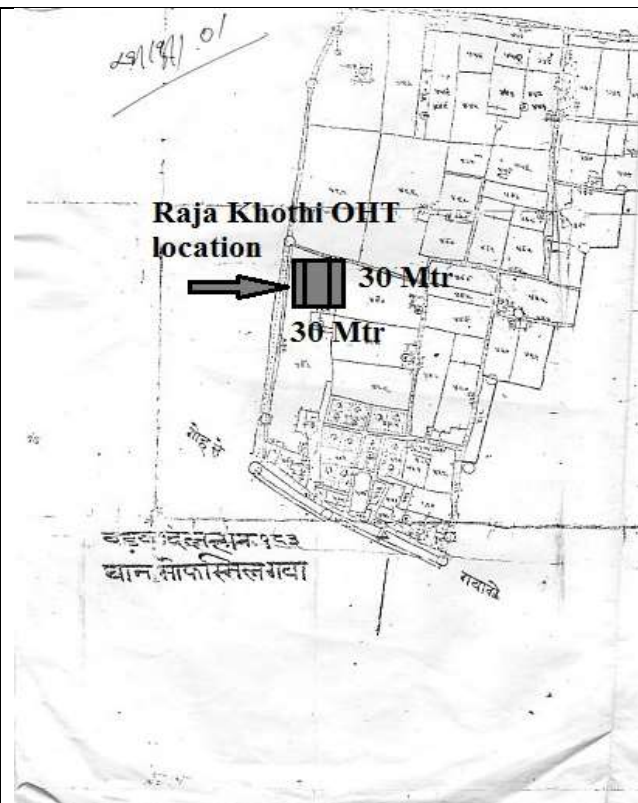
Map marked location and dimension of Budwa Mahadev OHT



Map marked location and dimension of Joda Masjid OHT



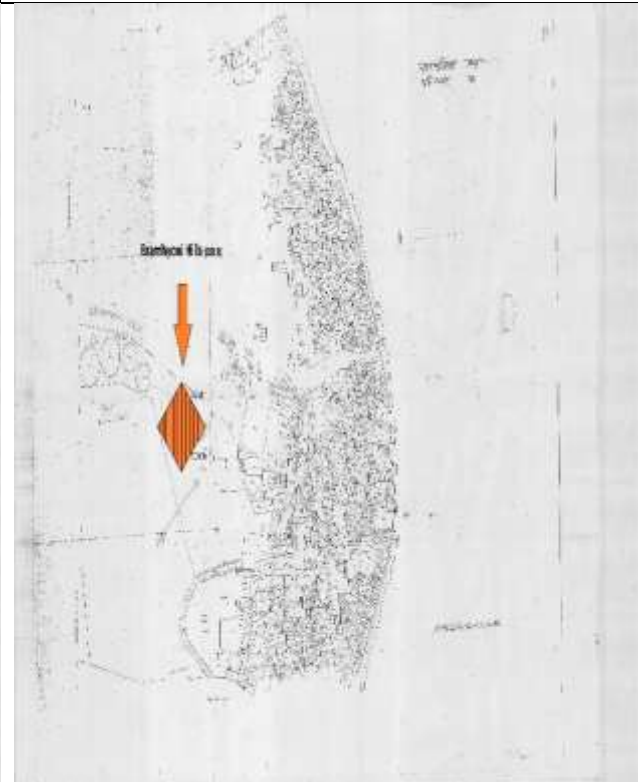
Map marked location and dimension of Delha OHT



Map marked location and dimension of Raja Kothi Kharkhura OHT



Map marked location and dimension of Ramshila Hill GLSR



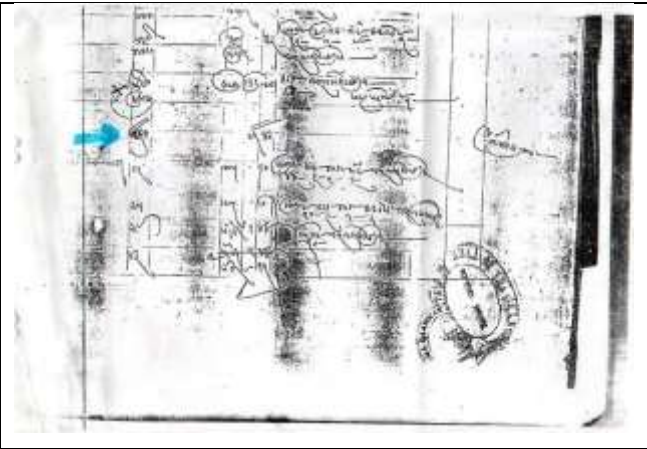
Map marked location and dimension Brahamyoni GLSR



**Gaya Water Supply Project i – Khatiyen, Khata no, Khasra (Plot) no and Ownership of OHT & GLSR land**

ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम
150	उपस्थान एवं अवकाश	150	ख.सं. 16-18	भारत विद्यालय (20)	150	19-20	150	19-20	उपस्थान एवं अवकाश

सेवा के  
 उपस्थान के  
 अधिकार  
 के लिए  
 जारी  
 किया  
 गया  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।



Khatiyen & Ownership Of Mastalipur OHT

Khatiyen & Ownership Of Bhusanda OHT

ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम
151	उपस्थान एवं अवकाश	151	ख.सं. 16-18	भारत विद्यालय (20)	151	19-20	151	19-20	उपस्थान एवं अवकाश

सेवा के  
 उपस्थान के  
 अधिकार  
 के लिए  
 जारी  
 किया  
 गया  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।

ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम	ख.सं.	प्लॉट नं.	ख.सं.	अवकाश का नाम
152	उपस्थान एवं अवकाश	152	ख.सं. 16-18	भारत विद्यालय (20)	152	19-20	152	19-20	उपस्थान एवं अवकाश

सेवा के  
 उपस्थान के  
 अधिकार  
 के लिए  
 जारी  
 किया  
 गया  
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 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।  
 इसके  
 अंतर्गत  
 उपरोक्त  
 अवकाश  
 का नाम  
 है।

Khatiyen & Ownership Of Budva Mahadev OHT

Khatiyen & Ownership Of Joda Masjid OHT

<p>Handwritten document for Delha OHT. It includes a header with the name of the organization, followed by a table with columns for various details. Below the table is a large block of handwritten text in Hindi, likely providing details about the ownership and physical structure of the OHT.</p>		
<p>Khatiyan &amp; Ownership Of Delha OHT</p>	<p>Khatiyan 1 of 4</p>	<p>Khatiyan 2 of 4</p>
<p>Khatiyan 1 of 4</p>	<p>Khatiyan 2 of 4</p>	<p>Khatiyan 3 of 4</p>
<p>Khatiyan 3 of 4</p>	<p>Khatiyan 4 of 4</p>	<p>Khatiyan 1 of 4</p>
<p>Khatiyan &amp; Ownership Of Ramshila Hill GLSR</p>	<p>Khatiyan &amp; Ownership Of Brahmyoni GLSR</p>	<p>Khatiyan 2 of 4</p>
<p>Khatiyan 3 of 4</p>	<p>Khatiyan 4 of 4</p>	<p>Khatiyan 3 of 4</p>

PHOTOGRAPHS

OHT and GLSR locations



Mastalipur OHT location, Figure - 1



Mastalipur OHT location, Figure - 2



Bhusunda OHT location, Figure - 1



Bhusunda OHT location, Figure - 2



Budva Mahadev OHT location, Figure - 1



Budva Mahadev OHT location, Figure - 2





Joda Masjid OHT location, Figure - 1



Joda Masjid OHT location, Figure - 2



Delha OHT location, Figure - 1



Delha OHT location, Figure - 2



Raja Kothi Kharkhura OHT location, Figure - 1



Raja Kothi Kharkhura OHT location Figure - 2



Ramshila Hill GLSR location, Figure – 1



Ramshila Hill GLSR location, Figure - 2



Brahmyoni GLSR location, Figure – 2



Brahmyoni GLSR location, Figure - 2



### Rising Mains

#### Rising Main from Mushafiiil Thana tube well to Mastalipur OHT



figure – 1 Navranga More



figure – 2 Navranga Road



figure – 3 Navranga Road



figure – 4 Navranga Road

#### Rising Main from Khadigramudhyog to Bhusunda Mela OHT



figure – 1 Khadigram udhyog tube well



figure – 2 Mullasahid road



figure – 3 gouri kanya vidhyalay road



figure – 4 Bhusunda Mela

#### Rising Main from falgu river tube well to Budva Mahadev OHT

	
<p>Rising Main from falgu river tube well to Budva Mahadev figure – 1</p>	<p>Rising Main from falgu river tube well to Budva Mahadev figure – 2</p>
	
<p>Rising Main from falgu river tube well to Budva Mahadev figure – 3</p>	<p>Approach Road to Budva Mahadev figure – 4</p>

**Rising Main from falgu river tube well to Joda Masjid OHT**

	
<p>figure – 1 Rising Main from falgu river tube well to Joda</p>	<p>figure – 2 Rising Main from falgu river tube well to Joda</p>
	
<p>figure – 3 Rising Main from falgu river tube well to Joda</p>	<p>figure – 4 Rising Main from falgu river tube well to Joda</p>

**Rising Main from Bairagi tube well to Ramshila hill GLSR**





figure – 1 Bairagi Market



figure – 2 Bairagi road



figure – 3 Bairagi Mata Temple



figure – 4 Ramshila Road

**Rising Mains from Dandibag to Brahamyoni GLSR**



figure – 1 Bypass



figure – 2 Madanpur More



figure – 3 Madanpur More Road



figure – 4 Brahamyoni Hill

**Rising Main from Pita Maheshwar tube well to Azad Park OHT**



figure – 1 Pita Maheshwer Tube Well



figure – 2 G.B. Road












figure – 3 G.B. Road



figure – 4 G.B Road



### Tubewells and Pumphouse locations

		
Azad Park	Bagheshwari Paschim	Central School
		
Manpur Tube Well	Bairagi Power ganj	Dhobi Ghat
		
Hata Godown	Guru Dwara	Janta Colony -1



Janta Colony-2



Khadi Gramoudhyog



Koun Sthan



khurhura



Manpur School, Bairagi Ganj



Delha Tube Well



Nai Godown



Nigam Store



Piligram Hospital



Bypass



Vishnu Pad

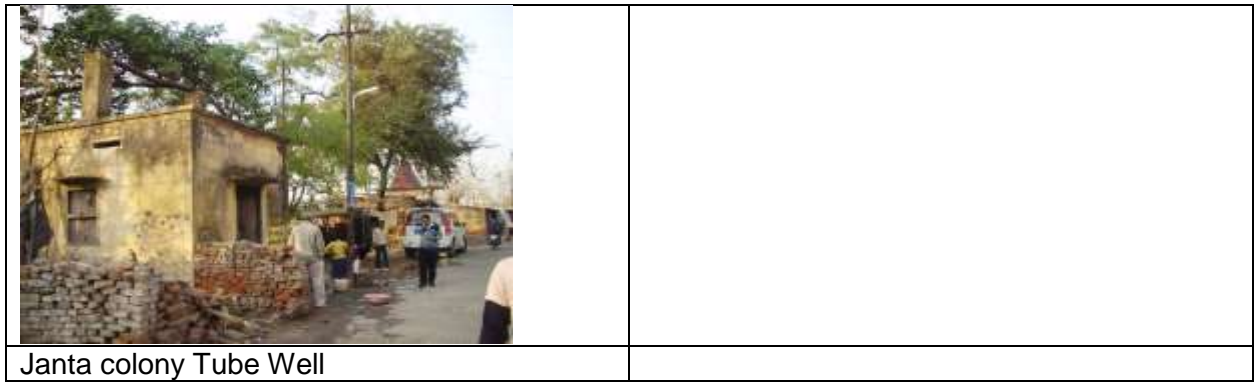


Panchayati Akhara-1



		
<p>Peethamaheshwar</p>	<p>Panchayati Akhara-2</p>	<p>Panchayati Akhara-3</p>
		
<p>Dandi Bagh-1</p>	<p>Dandi Bagh-2</p>	<p>Dandi Bagh-3</p>
		
<p>Dandi Bagh-4</p>	<p>Dandi Bagh-5</p>	

Pump Houses for demolition and construction



### Distribution Mains

#### Distribution Mains from Mastalipur OHT to Manpur Chock



Figure – 1 Mastalipur Road



Figure – 2 Mastalipur Road



Figure – 3 Mastalipur Road



Figure – 4 Manpur Chock

#### Distribution Mains from Bhusunda OHT to Navranga More



Figure – 1 Bhusunda Road



Figure – 2 Bhusunda Road



Figure – 3 Goari Kanya School



Figure – 4 Godown Road



**Distribution Mains from Joda Masjid OHT to concrete road**



Figure – 1 Joda Masjid



Figure – 2 Mastalipur Road

**Distribution Mains from Brahamyoni Hill GLSR to Devasthan**



Figure – 1 Godawari Road



Figure – 2 Godawari More



Figure – 3 Samir Takiya



Figure – 4 Devi Sthan

**Distribution Mains from Braham yoni Hill GLSR to G.B Road**



Figure – 1 Chand Chowraha



Figure – 2 Navadadi Road



Figure – 3 Koiri Bari Road



Figure – 4 Kedarnath Market

**Distribution Mains from Ramshila Hill GLSR to Nagar Nigam**



Figure – 1 Chand Chouraha



Figure – 2 Koiri Bari Road



Figure – 3 Koiri Bary Road



Figure – 4 Zila School

**Distribution Mains from Azad Park OHT to Anandi Mata Temple**












Figure -1 Goal Pathar Road



Figure -2 Goal Pathar Road



### Affected Persons facing permanent impacts Affected persons at Ramshila Hills GLSR site

		
Buttu Paswan	Krishna Prasad	Promod Prasad
		
Tulasi Prasad	Pappu Pratap	Vimlesh Lal Khatri
		
Nageshwar Prasad	Sonu Kumar	Chandan Prasad

**Affected persons at Mastalipur OHT site**

**L-R: Sons (representatives) of Mr. SS Pandey, and Mr. KD Pandey**



**L-R: Mr. KD Pandey, Mr. Vijay Sao and Mr. Kailash Manjhi**





Consultation with APs of Mastalipur OHT site

**Temporarily affected persons at Hata Godown pump house  
(proposed for demolition and construction)**



Shanti Devi



Suresh Kumar



Chandan Kumar

## LIST OF GMC PUMP OPERATORS ON JOB CARD (DAILY WAGES) – LIVELIHOODS TO BE PROTECTED

S.No.	Name of Pump Operator/Details	Pump House
1	Vijay Kumar	Hata Godown
2	Rajeev Ranjan Prasad	Nigam Store
3	Raj Kumar Mandal	Gurudwara
4	Rakesh Kumar	Pachayati Akara -1
5	Angad Kumar	Pachayati Akara -2
6	Pawan Kumar Rai	Pchayati Akara -3
7	Pawan Kumar Srivastava	Pitaeshwar
8	Sanjeev Kumar	Delha
9	Vacant post to be filled by GMC	Kouasthan
10	Amod Prakash	Powerganj Bairagi
11	Dilip Kumar	Central School
12	Gajendra Pratap Singh	Azad Park
13	Sagar Kumar	Bagaeshwari Powerganj
14	Manoj Kumar Verma	Khadi Gramoudhyog, Lakhi Bagh
15	Kumar Vishal	Khadi Gramoudhyog, Lakhi Bagh
16	Krishan Paswan	Janta Colony -1
17	Surendra Kumar	Dhobi Ghat
18	Santosh Kumar	Kouasthan
19	Jai Prakash	Manpur
20	Sanjay Prasad	Piligram Hospital
S.No.	Name of Operator	Posting at Pump House
21	Nand Kishore Kumar	Bagaeshwari Paschim
22	Shiv Kumar	Panchayati Akhara-1

23	Achutanand Prasad	Dandi Bagh
24	Ravi Chandan Singh	Dandi Bagh
25	Herdayesh Kumar Srivastava	Dandi Bagh
26	Sujeet Kumar	Dandi Bagh
27	Mohd. Ajhar Emam	Dandi Bagh
28	Ranjeet Raj	Dandi Bagh
29	Raju Rajak	Dandi Bagh
30	Mohd. Johar Hussain	Dandi Bagh
31	Chandan Kumar	Dandi Bagh
32	Bablu Kumar	Dandi Bagh
33	Mohd. Asraf Allam	Dandi Bagh
34	Nitya Nand Paswan	Dandi Bagh
35	Saroj Kumar	Dandi Bagh
36	Vacant post to be filled by GMC	Dandi Bagh
37	Ganesh Yadav	Dandi Bagh
38	Vacant post to be filled by GMC	Dandi Bagh
39	Chandra Shekar Sharma	Dandi Bagh
40	Rajesh Kumar	Vishnu Pad
41	Sashi Kant Kumar	Dandi Bagh
42	Gaurav Kumar	Dandi Bagh
43	Ajay Kumar Mandal	Dandi Bagh

# Initial Environmental Examination

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**Final**

**October 2016**

**IND: Bihar Urban Development Investment Program  
—Improvement of Water Supply System at Gaya  
(GWSP1 -Phase 1)**

**Tube Well Refurbishment, Laying of Rising/ Transmission Mains,  
Construction of New and Renovation of Water Storage Reservoirs,  
Laying of Water Distribution Pipelines,Arrangement of Metered House  
Connection at all the DMAs and Customer Service center**

Prepared by Urban Development & Housing Department, Govt. of Bihar

## **DISCLAIMER**

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## ABBREVIATIONS

ADB	—	Asian Development Bank
BPLE	----	Bihar Public Land Encroachment Act
BSPCB	--	Bihar State Pollution Control Board,
BUIDCO	----	Bihar Urban Infrastructure Development Corporation
BUDIP	—	Bihar Urban Development Investment Program
C & P	-	Consultation and Participation
CBO	—	Community-based organization
CFE	—	Consent for Establishment
CFO	—	Consent for Operation
CGWB	—	Central Ground Water Board
CITES	---	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	---	Convention on Migratory Species of Wild Animals
CWR	—	Clear water reservoirs
DFO	-	Divisional Forest Officer
DSC	—	Design and Supervision Consultants
EAC	—	Expert Appraisal Committee
EARF	—	Environmental Assessment Resettlement Framework
EIA	—	Environmental Impact Assessment
EMP	—	Environmental Management Plan
EPA	—	Environmental Protection Agency
FAM	---	Facility Administration Memorandum
GLSR	-	Ground Level Storage Reservoir
GMC	-	Gaya Municipal Corporation
GRC	—	Grievance Redress Committee
GSHAP	—	Global Seismic Hazard Assessment Program
H and S	—	Health and safety
IEE	—	Initial Environmental Examination
IUCN	---	International Union for Conservation of Nature and Natural Resources
MFF	—	Multitranches financing facility
MLD	—	Million liters per day
MOEF	—	National Ministry of Environment and Forests
NAAQS	—	National Ambient Air Quality Standards
NGO	—	Nongovernmental organization
NOC	---	No Objection Certificate
RRRP	—	National Resettlement and Rehabilitation Policy
NRW	—	Non-revenue water
O and M	—	Operation and maintenance
OHSA	—	Occupational Health and Safety Administration
OHSR	—	Overhead storage reservoirs
OHT	--	Overhead Tank
OMC	—	Operations and Maintenance Contractors
PHED	—	Public Health Engineering Department
PIU	—	Project Implementation Unit
PMC	-	Project Management Consultant
PMU	—	Project Management Unit
ROW	—	Right of way
SEAC	—	State Environment Assessment Committee
SEIAA	—	State Environment Impact Assessment Authority
SPS	—	Safeguard Policy Statement
STP	—	Sewage treatment plant
TDS	—	Total dissolved solids
TOR	—	Terms of reference
UFW	---	Unaccounted for water
ULB	—	Urban local body

USEPA  
WTP

— United States Environmental Protection Agency  
— Water treatment plant

### **WEIGHTS AND MEASURES**

cm - centimeter  
crore - 100 lac = 10,000,000  
cumec - cubic meter per second  
lac - 100 thousand = 100,000  
Kanal - 505.39 square meter  
km - kilometer  
kph - kilometer per hour  
lpd - liters per day  
m - meter  
m<sup>2</sup> - square meter  
mg/l - milligrams per liter  
mm - millimeter  
MSL - mean sea level  
μ - 10<sup>-6</sup> meter  
μg/m<sup>3</sup> - micrograms per cubic meter

### **NOTE{S}**

In this report, "\$" refers to US dollars.  
"INR" and "₹" refer to Indian rupees



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## EXECUTIVE SUMMARY

1. Urban Development & Housing Department (UDHD), Government of Bihar (GoB) has undertaken “The Bihar Urban Development Investment Program (BUDIP)”, financed by the ADB through Multi- Tranche Financing Facility (MFF). The total estimated cost of the program is about US \$286 millions, out of which maximum \$200 million will be financed by ADB.
2. The Bihar Urban Development Investment Program (BUDIP) is expected to improve the urban environment and living conditions in targeted urban areas. It will: (i) improve and expand urban infrastructure and services in urban areas; and (ii) strengthen urban institutional, management, and the financing capacity of the institutions, including the urban local bodies (ULBs). Initially it was decided that the project will be implemented in four urban areas: Bhagalpur, Darbhanga, Gaya, and Muzaffarpur in the state of Bihar. Later it was decided by Govt. of Bihar to implement the project only at Bhagalpur and Gaya. The improvement in urban infrastructure will include rehabilitation, improvement, and expansion of: (i) water supplies; and (ii) sewerage and sanitation. Due to requirement of huge investment, the Govt. of Bihar have availed external funding assistance in order to address the situation and improve the basic service levels. ADB agreed to co-finance implementation of certain components of the road map in Bihar’s largest towns (other than the state capital Patna), i.e. in Bhagalpur and Gaya.
3. The program is to be implemented in 2 to 3 tranches over a period of 9 years. Each tranche constitutes a separate loan. Tranche 1 of BUDIP (Loan 2861-IND) of amounting US \$58 million is under implementation. **This proposed subproject (GWSP1) of Improvement of Water Supply System of Gaya city under phase I is being prepared for Tranche – 2 (Project-2) financing. Loan agreement will be signed at later stage.** The sub project is item rate contract. There are 2 phases of GWSP1, 1 phase is construction phase of 42 months and other parallel phase of 60 months which cover operation & maintenance and as well as training.
4. The objective of the implementation of sub project is the reduction of current water loss from existing 40% to 20% resulting in net water saving of about 1.79 MLD in the ultimate year 2048.
5. The proposed subproject is expected to have benefit through, (i) Improvement coverage of population by extending distribution system and storage capacity in uncovered areas, (ii) Increase availability of water by augmenting existing water sources, improve operation and maintenance quality of pumping system, and reduce water losses, and (iii) Reduction of water loss by laying of new distribution pipe lines parallel to pipe line laid prior to 1982.
6. The legal framework and principles adopted for addressing environmental issues in the proposed subproject have been guided by the existing legislation and policies of the Government of India, Government of Bihar, Asian Development Bank and the Environmental Assessment and Review Framework (EARF) adopted for the Tranche 2 of BUDIP.
7. Indian laws and the ADB Safeguard Policy Statement (SPS 2009) require that environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels.
8. The subproject comprises of (i) tube Well refurbishment, (ii) laying of rising/ transmission mains, (iii) construction of new and renovation of Water Storage Reservoirs, (iv) laying of water distribution pipelines, (v) arrangement of metered house connection at all the DMAs, (vi) Customer Service Centers. In addition Multi-year operation of the entire water supply system and capacity building/training of Gaya Municipal water Supply staff.

9. Acquisition of forest land will be required for construction of water reservoirs at two locations namely, at Ramshilla hill & Brahmayoni hill both are under protected forest. As per design total forest area requirement for construction of reservoirs is 0.4883 ha and for transmission main (for those reservoirs) is 0.2073 ha. Process has been initiated in the year 2014 for acquisition of forest land. For felling of trees permission will be required from line agency/ Urban Local Body and State Forest Department. For Renovation work on Ramshilla hill, Brahmayoni hill, Murli hill NOC will be required from DFO Gaya. Accordingly proposal submitted to forest department for getting NOC. Some part of the sub-project area is located within and nearby the state protected monuments area like Vishnupad Temple, Ramshilla hills, Brahmayoni hill. As per rules NOC needs to be obtained from State Museum & Archeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar before commencement of construction work. There is no requirement for NOC from ASI, Govt. of India. But in case of chance finds, the protocol should be followed as per mitigation measures addressed in Environmental Management Plan. Process has been initiated in the year 2014 for getting NOC from State Museum & Archeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar

**10. On date 1<sup>st</sup> level conditional forest clearance is obtained from DFO. NOC from State Museum & Archeological Directorate for pipeline and reservoir locations within protected monument area is also obtained.**

11. The design of proposed subproject has taken into consideration the establishment of an efficient water supply system by providing adequate supply of potable water for Gaya city and infrastructure facilities for storage of water in deficient areas. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible thus environmental impacts as being due to the subproject design or location were not significant. However, the temporary (access disruptions) social impacts as per scope of works and due to construction activities are not avoidable. A Resettlement Plan has been developed in accordance with ADB SPS 2009 and Indian laws and regulations.

12. Anticipated impacts during planning stage include impact on sensitive receptors including common property resources due to planning of distribution mains and rising mains. Mitigation has been considered after review of design and modification.

13. As per design proposed construction project involves relocation of nine dwelling units including one Gaya Municipal Corporation (GMC) staff quarter at one project location (Ramshilla hill). Also there will be partial impact on 6 households. Rehabilitation & resettlement issue deals separately under Resettlement Plan.

14. Anticipated impacts during the construction period include temporary disruption of services during augmentation work; temporary access control of roads for laying of pipelines; interference with accesses to properties and businesses due to construction works; risk of accidents associated with vehicular traffic and transport of materials; increased volume of construction vehicles on the roads may lead to increased wear and tear of roads in the vicinity of the subproject sites; and exposure to increased noise, dust, vibrations; hazardous chemicals (oils and lubricants) and waste materials. An Environmental Management Plan (EMP) has been developed to provide specific actions deemed necessary to assist in mitigating the environmental impacts, guide the environmentally-sound execution of the proposed subproject, and ensure efficient lines of communication between the implementing agency, project management unit, and contractors. The EMP also provides a pro-active feasible and practical working tool to enable the measurement and monitoring performance on site.

15. Anticipated impacts during operation and maintenance include improvement in water supply system and healthy environment; significant enhancement in quantity and quality of supplied water to water deficient areas. The improvement of water supply system is expected to give a boost to the overall development of presently water scarce areas and reduced

demand gap. In general, improvement of the water supply system shall provide broader impetus for the redevelopment of the surrounding areas and the Gaya City as a whole.

16. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments and concerns) with regard to the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation. The IEE includes the activities undertaken during project design to engage the stakeholders; and planned information disclosure measures and process for carrying out consultation with affected people and facilitating their participation during project implementation.

17. The subproject's Grievance Redressal Mechanism provides the citizens with a platform for redressal of their grievances and describes the informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

18. Therefore, as per ADB SPS, the subproject is classified as environmental Category B and does not require further Environmental Impact Assessment. As per Indian laws, the proposed subproject does not require an Environmental Clearance.

## I. INTRODUCTION

### A. Purpose of the Report

1. The Bihar Urban Development Investment Program (BUDIP) is expected to improve the urban environment and living conditions in targeted urban areas. It will: (i) improve and expand urban infrastructure and services in urban areas; and (ii) strengthen urban institutional, management, and the financing capacity of the institutions, including the urban local bodies (ULBs). The project will be implemented in 2 urban areas: Bhagalpur and Gaya in the state of Bihar.

2. BUDIP is funded by a Multitranche Financing Facility (MFF) loan from the Asian Development Bank (ADB). The Executing Agency (EA) is the Urban Development & Housing Department (UDHD) of the Government of Bihar (GoB); and the Implementing Agency is the Bihar Urban Infrastructure Development Corporation (BUIDCo) which is the Project Management Unit (PMU) for BUDIP.

3. This Initial Environmental Examination (IEE) has been prepared for the Gaya Water Supply Subproject. The Tranche 2 (phase 1) investments for Gaya comprise for refurbishing of the existing water production facilities, consolidation, renovation, and extension of the pipes work, augmentation of the storage capacities, introduction of tools for monitoring the production and the consumption of water, and last but not least the capacity building of the future operator for ensuring the sustainability of the project.

4. The major objectives of rehabilitation of water supply system in Gaya city are: (i) to implementation of water loss reduction program in all zones, thus reducing the current water loss from existing 40% to 20% resulting in net water saving of about 1.79 MLD in the ultimate year 2048; (ii) to start up with the metered domestic connections in areas of improved water supply; (iii) to improve operational efficiency of the pumping machineries and reduce energy costs as well as operation and maintenance costs in water production; and (iv) to provide water in required quantity as per norms in water deficit areas and provide sufficient piped water supply in uncovered areas. The proposed subproject is expected to have the following benefits:

- Improve coverage of population by extending distribution system in uncovered areas.
- Increase availability of water by augmenting existing water sources, improve operation and maintenance quality of pumping system, and reduce water losses.
- Replace all old distribution pipe lines (by laying of parallel pipeline) laid prior to 1982 for reduction of water loss
- Implement the Utility Monitoring System by Key Performance Indicators which allows clarity in decision making by the management.
- Facilitate people in getting water connections easily to achieve larger coverage of population by water supply.
- Turn illegally connected consumers into customers.
- Implement customer service to monitor and improve consumers' satisfaction by establishing customer service centers and consumer information and education campaigns.

5. The legal framework and principles adopted for addressing environmental issues in the proposed subproject have been guided by the existing legislation and policies of the Government of India, Government of Bihar, Asian Development Bank and the Environmental Assessment Review Framework (EARF) adopted for Tranche 2 of BUDIP. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. According to the SPS, environmental assessment is required for all subprojects under a MFF modality.

6. An environmental assessment using ADB's Rapid Environmental Assessment (REA) through checklist for Water Supply (**Appendix 1**) was conducted for the Augmentation of Water Supply for Gayaphase 1 under the Tranche 2.

7. The subproject comprises of (i) tube Well refurbishment, (ii) laying of rising/transmission mains, (iii) construction of new and renovation of Water Storage Reservoirs, (iv) laying of water distribution pipelines, (v) arrangement of metered house connection at all the DMAs and (vi) Customer Service Centers. In addition Multi-year operation of the entire water supply system and capacity building/training of Gaya Municipal water Supply staff.

8. The sub project is item rate contract. There are 2 phases, 1 phase is construction phase of 42 months and other parallel phase of 60 months which cover operation & maintenance and as well as training.

9. Results of the assessment show that the proposed development is unlikely to cause significant adverse impacts. Thus this Initial Environmental Examination (IEE) report has been prepared in accordance to ADB SPS's requirements for environment **Category B projects**.

10. As per present design proposed construction project involves relocation of nine dwelling units including one Gaya Municipal Corporation (GMC) staff quarter at one project location (Ramshilla hill). Also there will be partial impact on 6 households. Rehabilitation & resettlement issue deals separately under Resettlement Plan.

## **B. Extent of the IEE Study**

11. This IEE report was prepared on the basis of detailed screening and analysis of all environmental parameters, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation as per ADB's Safeguard Policy Statement (SPS, 2009) and Government of India Environmental Impact Assessment (EIA) Notification of 2006.

12. Based on the findings of the IEE, an Environmental management plan (EMP) has been prepared, outlining the specific environmental measures to be adhered during implementation of the sub project. This EMP forms part of the contract document, and shall enable integration of environmental provisions / management measures in the Contract Document.

13. The IEE has been prepared to meet the following objectives:

- (i) to provide critical facts, significant findings, and recommended actions;
- (ii) to present the national and local legal and institutional framework within which the environmental assessment has been carried out;

- (iii) to provide information on the existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence;
- (iv) to assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socio-economic and physical cultural resources in the subproject's area of influence;
- (v) to identify mitigation measures and any residual negative impacts that cannot be mitigated;
- (vi) to describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation;
- (vii) to describe the subproject's grievance redressal mechanism for resolving complaints about environmental performance;
- (viii) to present the set of mitigation measures to be undertaken to avoid, reduce, mitigate or compensate for adverse environmental impacts;
- (ix) to describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and
- (x) to identify who is responsible for carrying out the mitigation and monitoring measures.

## **C. Environmental Regulatory Compliance**

### ***ADB Policy***

14. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB's SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans and loans involving financial intermediaries and private sector loans.

15. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts and are assigned to one of the following four categories:

- (i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- (ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.



- (iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- (iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all Projects will result in insignificant impacts.

16. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

17. **Public Disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders and the general public can provide meaningful inputs into the project design and implementation:

- (i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
- (ii) Final or updated EIA and/or IEE upon receipt; and
- (iii) Environmental Monitoring Reports submitted by PMU during project implementation upon receipt.

18. The above is to meet the requirements of ADB's Public Communication Policy 2011.

#### ***National and State Laws***

19. The implementation of the subprojects will be governed by Government of India (Gol) and State of Bihar environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

20. **EIA Notification.** The Gol EIA Notification of 2006, as amended (replacing the EIA Notification of 1994), sets out the requirement for environmental assessment in India. This states that Environmental Clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts. Category A projects requires Environmental Clearance from the National Ministry of Environment and Forests (MoEF). Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA).

21. The proposed subproject is not listed in the EIA Notification of 2006 "Schedule of Projects Requiring Prior Environmental Clearance" thus EC is not required.

22. **Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments.** Control of water pollution is achieved through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act, 1974. These conditions regulate the quality and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the Project having potential to generate sewage or trade effluent will come under the purview of this Act, its

rules and amendments. Such projects have to obtain Consent to Establish (CTE) under Section 25/26 of the Act from State Pollution Control Board (SPCB) before starting implementation and Consent to Operate (CTO) before commissioning. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies.

23. The proposed subproject is not included in the lists of activities requiring CTE and CTO under the Water Act. Emissions and discharges shall comply with standards notified by the Central Pollution Control Board.

24. **The Air (Prevention and Control of Pollution) Act 1981, amended 1987 and The Air (Prevention and Control of Pollution) Rules, 1982.** The subprojects having potential to emit air pollutants into the atmosphere have to obtain CTE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from SPCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution. The following require CTE and CTO from Bihar Pollution Control Board: (i) diesel generators; and (ii) hot mix plants, wet mix plants, stone crushers etc, if installed for construction. Emissions and discharges shall comply with standards notified by the Central Pollution Control Board.

25. **The Noise Pollution (regulation and control) rules, 2000, as amended.** Since the subproject corridor/ area is located within the city, the construction activity and use of heavy machinery and vehicles may increase the ambient noise levels during the construction phase. It is considered necessary to regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise. The occupier of subprojects have to take measures for abatement of noise pollution ensuring that the existing noise levels do not exceed the standards specified under the Noise Pollution (regulation and control) rules, 2000, as amended.

26. **The Indian Forest Act, 1927; Forest (Conservation) Act, 1980, amended 1988; Forest (Conservation) Rules, 1981 amended 1992 and 2003; and Guidelines for Diversion of Forest Lands for Non-Forest Purpose under the Forest (Conservation) Act, 1980**

27. The Forest (Conservation) Act, 1980 applies to diversion of forest areas and felling of roadside plantations. Depending on the size of the tract to be cleared, clearances are applied for at the following levels of Government:

- Forest land involving up to 5 hectares (ha) will be cleared by the Regional Office of MoEF.
- Forest land involving more than 5 ha and up to 20 ha will be cleared by the Regional Office after referring the case to MoEF.
- Conversion of forest land (i) having density above 0.4 irrespective of the area involved, and, (ii) of more than 20 ha in the plains and 10 ha in the hilly region, irrespective of density, will be cleared by MoEF.

28. The Act requires:

- Compensatory afforestation is compulsory for conversion.
- Afforestation will be done over an equivalent area of non-forest land.

- As far as possible, the non-forest land for compensatory afforestation should be identified contiguous to or in the proximity of Reserved Forest or Protected Forest. If non-forest lands are not available in the same district other non-forest land may be identified elsewhere in the State.
- Where non-forest lands are not available, compensatory afforestation may be carried out over degraded forest twice in extent to the area being diverted.

29. The forest land conversion will follow the “Guidelines for Diversion of Forest Lands for Non-Forest Purpose” under the Act. Restrictions and clearance procedure proposed in the Act applies wholly to the natural forest areas, even in case the protected/designated forest area does not have any vegetation cover.

30. There is requirement of forest land (state protected forest) at Brahmayoni hill and Ramshilla hill area for renovation and construction of new water storage reservoirs. NOC from DFO Gaya will be required for construction work (replacement of water storage reservoirs and construction of additional reservoir) within the forest area. For felling of trees permission will be required from line agency/ Urban Local Body and State Forest Department. As per the provision of forest act compensation i.e. plantation of 3 trees for each tree fell will be followed. During the selection of alignment routes the network designer will screen the subproject areas to find the best alternatives to minimize impacts on trees.

31. 1<sup>st</sup> level of forest clearance is received from Forest Dept. on 24<sup>th</sup> August 2015. Final clearance to be obtained after submission of fees and fulfillment of other conditions (Letter attached as **Appendix 2**)

**32. The Bihar Forest (Amended) Act, 1990 and Bihar Public Land Encroachment Act, 1956 (BPLE)**

33. The Bihar Forest (Amended) Act, 1990 provides that encroachment of forest land is a cognizable and non-bailable offence. If any Forest Officer, not below the rank of the Divisional Forest Officer (DFO), has reasons to believe that forest land has been encroached, the Officer can evict the encroachers and can use all power conferred on a Magistrate under the Bihar Public Land Encroachment Act, 1956. The Indian Forest Act, 1927 provides realization of royalty and compensation for damages of forest produce and forest land from the encroachers.

**34. Ancient Monuments and Archaeological Sites and Remains Rules, 1959. Bihar Ancient Monuments and Archaeological Sites, remains And Art Treasures Act, 1976.**

35. The Rules designate areas within a radius of 100m and 300m from the “protected property” as “protected area” and “controlled area” respectively. No development activity (including mining operations and construction) is permitted in the “protected area” and all development activities likely to damage the protected property are not permitted in the “controlled area” without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.

36. As per state Rules No person, including the owner or occupier of a protected area, shall construct any building within protected area or carry on any mining, quarrying excavating, blasting or any operation of a like nature in such area, or utilize such area or any part thereof in any other manner without the permission of the State Government:

37. Subproject activities within Archaeologically Protected Areas will be avoided. If activities are to be done in the controlled area of protected properties, then the executing and implementing agencies and the line department will have to take the necessary NOC from ASI.

38. Within the Gaya city there is state archeological protected area. Some part of the sub-project area is located within and nearby the state protected monuments area like Vishnupad Temple, Ramshilla hills, Brahmayoni hill. NOC needs to be obtained from State Museum & Archeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar before commencement of construction work. NOC is received from State Museum & Archeological Directorate on 1<sup>st</sup> September 2015 (NOC letter attached as **Appendix 3**).

39. There is no requirement for NOC from archeological Survey of India (ASI), Govt. of India. But in case of chance finds, the protocol should be followed as per mitigation measures addressed in Environmental Management Plan.

### ***International Environmental Agreements***

40. In addition to national and state rules and regulations, international conventions such as the International Union for Conservation of Nature and Natural Resources (IUCN), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species of Wild Animals (CMS), Ramsar Convention on Wetlands of International Importance and Millennium Development Goals are applicable for selection and screening of subprojects under restricted/sensitive areas. India is a party to these conventions.

- **International Union for Conservation of Nature and Natural Resources (IUCN)**

41. The IUCN Red List of Threatened Species (also known as the IUCN Red List or Red Data List), founded in 1963, is a comprehensive inventory of the global conservation status of plant and animal species. The IUCN is an authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List is set upon precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. The aim is to convey the urgency of conservation issues to the public and policy makers, as well as help the international community to try to reduce species extinction.

42. Present Gaya Water supply project is not linked with IUCN conservation issue.

- **Convention on Migratory Species of Wild Animals (CMS)**

43. CMS was adopted in 1979 and entered into force on 1 November 1983. CMS, also known as the Bonn Convention, recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Migratory species that need or would significantly benefit from international cooperation and CMS encourages the Range States to conclude global or regional agreements.

44. Present project is not linked with CMS.

- **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**

45. CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES were first formed, in the 1960s. Annually, international wildlife trade is estimated to be worth billions of dollars and to include hundreds of millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them, including food products, exotic leather goods, wooden musical instruments, timber, tourist curios and medicines. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard these resources for the future. Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation.

46. CITES is not applicable for Gaya water supply project.

- **Ramsar Convention on Wetlands of International Importance 1971**

47. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem.

48. The said Gaya water supply project is not located within Ramsar site.

- **Millennium Development Goals**

49. The Millennium Development Goals (MDGs) were adopted in the General Assembly of the United Nations in the year 2000 by all the countries of the world and the world's leading development institutions. The target date for achieving the MGDs by all the countries has been fixed as 2015. The MGDs are as follows:

- Eradicate extreme hunger and poverty
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV / AIDS malaria and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development

50. Though the MGDs do not directly apply to the project, the mitigation measures while preparing the Environmental Management Plan and will make the project sustainable and can help achieve some of the goals in the regional context.

51. **World bank Environmental, Health, and Safety (EHS) Guidelines - EHS Guidelines for water & sanitation:**(<http://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>)

52. Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Preventive and protective measures should be introduced according to the following order of priority:

- Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc;
- Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc;
- Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.
- Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

53. The application of prevention and control measures to occupational hazards should be based on comprehensive jobsafety or job hazard analyses.

54. The summary of environmental regulations and mandatory requirements for the proposed subproject is shown in **Table 1**.

**Table 1: Applicable Environmental Regulations**

Applicability of Acts/Guidelines	Compliance Criteria
The EIA notification, 2006 (and its subsequent amendments in 2009) provides for categorization of projects into category A and B, based on extent of impact	The sub project is not covered in the ambit of the EIA notification as this is not covered either under Category A or Category B of the notification. As a result, the categorization, and the subsequent environmental assessment and clearance requirements, either from the state or the central Government is not triggered.  Environmental Clearance is not required for the proposed sub project at Gaya
Wild Life (Protection) Act 1972, Amendment Act, 1993 and 2002 and Wildlife (Protection) Rules, 1995	Clearance from state and national wildlife boards, Central Empowered Committee of Hon'ble Supreme Court of India and the State Wildlife Department, as applicable.  The wildlife protection act is not applicable for the proposed subproject.
The Indian Forest Act, 1927; Forest (Conservation) Act, 1980, amended 1988; Forest (Conservation) Rules, 1981 amended 1992 and 2003	Acquisition of forest land will be required for construction of water reservoirs at few locations namely, at Ramshilla hill and Brahmayoni hill, both are under protected forest. For any activity (even for rehabilitation of old reservoirs located in the forest) within the forest area NOC needs to be taken from

Applicability of Acts/Guidelines	Compliance Criteria
	<p>state forest department, before implementation of the project.</p> <p>Murli hill is also under forest area. For any renovation work NOC needs to be taken from DFO Gaya. Clearance from Forest department for cutting of trees, if any.</p> <p>On date status of NOC is depicted in Table 2 below.</p>
<p>Ancient Monuments and Archaeological Sites and Remains Rules, 1959. Bihar Ancient Monuments and Archaeological Sites, remains And Art Treasures Act, 1976 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.</p>	<p>Some part of the sub-project area is located within and nearby the state protected monuments area like Vishnupad Temple, Ramshilla hills, Brahmayoni hill. NOC needs to be obtained from State Museum &amp; Archeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar before commencement of the work. On date status is shown in Table 2 below.</p> <p>There is no requirement of clearance from ASI, Govt. of India</p>
<p>Water (Prevention and control of pollution) Act, 1974, as amended Air (prevention and control of pollution) Act, 1981, as amended and Noise Pollution (Regulation and Control) Rules, 2000, as amended.</p>	<p>Consent to Establish (CTE) and Consent to Operate (CTO) from the Bihar Pollution Control Board for setting up of hot mix plants, wet mix plants, stone crushers and diesel generators (if any).</p> <p>To be obtained by the Contractor, prior to construction.</p>

55. Status and target date for getting all NOC except land allotment (deal separately under resettlement plan) is given in Table below.

**Table 2: Detail of requirement of NOC and status**

Sr. No	NOC/ Department	Purpose	Responsibility	Timeframe
1	State Forest Department	GLSR at Ramshilla hill and Brahmayoni hill	PMU with PMC	1st level of forest clearance received from Forest Dept. on 24 <sup>th</sup> August 2015. Final clearance to be obtained after submission of fees and fulfillment of other conditions (Letter attached as <b>Appendix 2</b> ) <b>Expected completion of entire process by December 2015</b>
2	DFO Gaya	Renovation work on Ramshilla Hill, Brahmayoni Hill, Murli hill	PMU with PMC	Process initiated on 25 <sup>th</sup> March 2015 (Letter attached as <b>Appendix 4</b> )
3	State Museum & Archaeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar-	Construction /Renovation work near Vishnupad Temple, Ramshilla hills, Brahmayoni hill	PMU with PMC	NOC received from State Museum & Archaeological Directorate on 1 <sup>st</sup> September 2015(

				NOC letter attached as <b>Appendix 3)</b>
4	Utilities	Telephone lines, electric poles and wires, water pipe (old) existing within right-of-way (ROW) may be damaged.	Contractor-PIU/DSC	2 months (after commencing of contract and followed by confirmatory survey)
5	Transport Dept.	During construction work Traffic Management Plan	Contractor-PIU/DSC	1 month (As per requirement during implementation of the project)
6	GMC	Entire work in city area	Contractor-PIU/DSC	1 month
7	PHED/PWD	Old pipeline renovation and road cutting during construction	Contractor-PIU/DSC	2 months (before construction)
8	Forest Dept.-DFO Gaya	For tree cutting at Ramshila hill Bramayoni Hill, Budva Mahadev	PMU-PMC	3 months before specific construction. Application will be send after getting complete forest clearance
9	Temple trust	Staircase are used as Access road at Ramshila Hill	PMU-PMC	NOC received on 24 <sup>th</sup> August 2015( <b>Appendix 5)</b>

#### D. Report Structure

56. This Report contains eight (8) sections including this introductory section: (i) Introduction; (ii) Description of the Project; (iii) Description of the Environment; (iv) Anticipated Impacts and Mitigation Measures; (v) Information Disclosure, Consultation and Participation; (vi) Grievance Redressal Mechanism; (vii) Environmental Management Plan; and (viii) Recommendations and Conclusions.

## II. DESCRIPTION OF THE PROJECT

### A. Existing Condition

#### *Water Source*

57. Gaya is the district headquarter city in Gaya District located in the southern part of Bihar State. The city is situated at the banks of River Phalgu. The city is located at an altitude of about 110 meters above the MSL.

58. The water sources of Gaya consist of underground water extracted by tube wells locate on both sides of the River Phalgu, Manpur and Gaya main. The Phalgu River divides Gaya city into two parts, Manpur and Gaya main. There are 39 tube wells in the city at present of which 2 are in standby. Out of these 3 are not commissioned and 2 are not working. The tube wells are in 4 segments, i.e. Manpur side, Dandibagh side, Panchayati Akhara side and within the main city area. The tube wells in Manpur, Dandibagh and Panchayati Akhara area are bored in the bed/bank of river Phalgu and the other tube wells are bored at various locations in the city away from the river bank. The tube wells constructed in Manpur side are pumping directly to distribution system in Manpur area. The

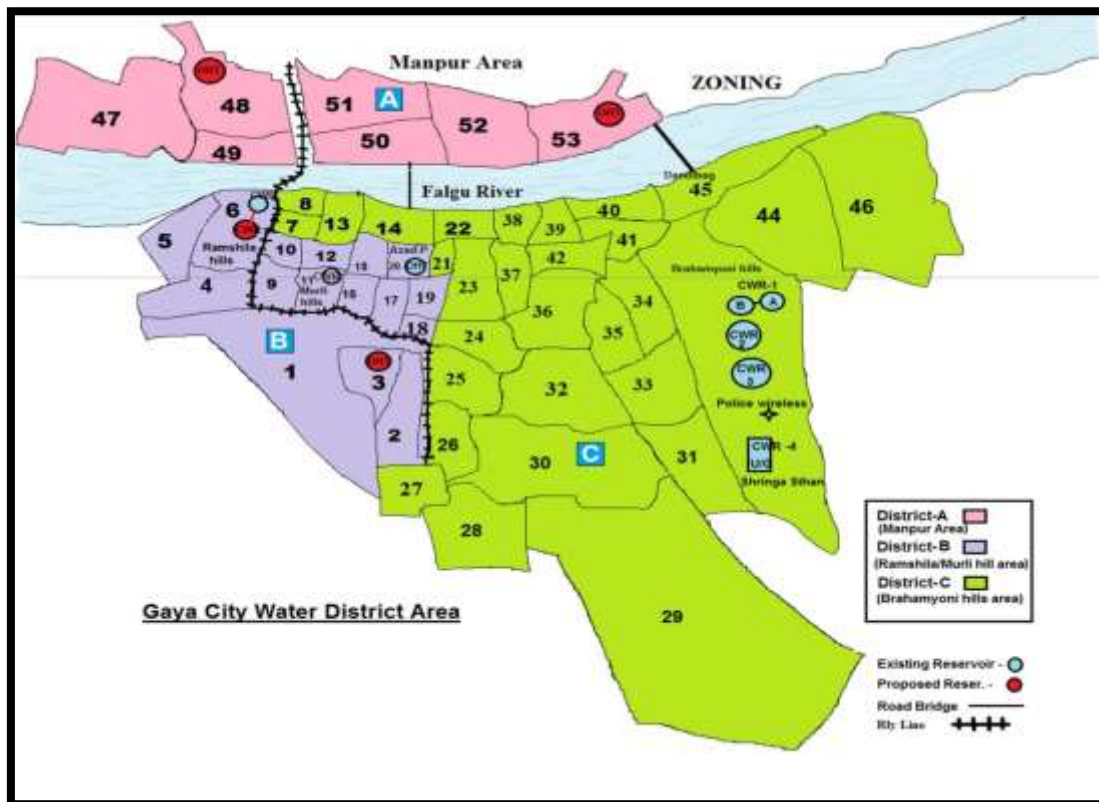


tube wells installed in Dandibagh side are used to pump water to the reservoirs located on Brahmayoni hills. Tube wells installed in Panchayati Akhara are used to pump water to the reservoirs located on Ramshila hills and Murlihills. The tube wells installed in the city area are used to pump water directly to the distribution system.

59. The Design and Supervision Consultant has performed a flow measurement campaign at all tube wells in Gaya and the results indicate that total yield of water from all running tube wells was 61 MLD. It has been assessed that actual water received from the tube wells is very less in comparison to the figure mentioned above due to low voltage, interruption in power supply and old pumping machineries.

60. There is practically no instrumentation available at Tube Wells like electric measuring instruments (ampere meters, volt meters, energy meters, power factor meters etc.), pressure gauges, flow meters, water level measuring instruments etc. In absence of required instrumentation, the present level of production and performance level of electro-mechanical equipment is not known.

61. Water district zone and different wards of Gaya is shown in **Figure 1**.



**Figure 1: Ward wise Gaya city Water District Area**

***Existing Water Distribution System***

62. The existing distribution system is not in conformity with basic engineering practices. Part of it consists of Transmission Mains raising the water to 1 Over Head Tank and 7 Ground Level Reservoirs. The other part is operated by pumping the tube wells water directly into the distribution network. For this portion no storage capacities are available.

### Transmission/ Rising Mains

63. There are three Cast Iron rising mains 350 mm, 50 mm and 600 mm of 3 km length each from Dandibagh to Brahmayoni Hills reservoirs. One more DI rising main 450 mm of 3.1 km length has been laid recently under the augmentation project under 12th Finance Commission program.

### Water Storage Reservoir

64. At present 7 ground level reservoirs and 1 overhead reservoir (OHT) exist in the main city area. The total capacity of the reservoirs comes to 17,706 KL.

**Table3: Existing Storage Reservoirs**

No.	ID	Location/Name	Type of storage	Capacity [m <sup>3</sup> ]	Staging	Present condition
1	7	Ramshila Hills	GLSR	227	No	50+ years old Needs replacement
2	9	Murli Hills	GLSR	1630	No	50+ years old. Roof and inside wall in very bad condition
3	10	Azad Park	OHT	454	12.2 m	Needs slight repair from inside
4	11a	Brahmayoni	GLSR	1816	No	70+ years old. Roof and inside wall in very bad condition
5	11b	Brahmayoni	GLSR	1816	No	70+ years old. Roof and inside wall in very bad condition
6	12	Brahmayoni	GLSR	3632	No	Needs slight repair from inside
7	13	Brahmayoni	GLSR	3632	No	Needs slight repair from inside
8	14	Shringh Sthan	GLSR	4540	No	Although recently constructed, it leaks from various places

GLSR: Ground Level Storage Reservoirs, OHT: Overhead Tank

Note: The ID corresponds to the marking on the Drawing mentioned above

Source:DPRfor Gaya water supply

65. The reservoirs constructed on Ramshila hills, Murli hills and overhead tank at Azad Park are not functional at present as these tanks are not being fed due to inadequate capacity of the pumping plants or of the transmission mains and the water is being supplied through direct pumping into the distribution network.

### Distribution Network

66. The **Table 4** summarizes the length of the existing distribution network sorted by diameter. It shows that at present length of total distribution

**Table 4: Existing Distribution Network Data**

Description	Length [km]	Dia. [mm]	Length [m]
<b>PHED</b>		100	39684
		150	16422
		200	15788
		250	2050
		300	981
		350	2140
		400	5235
	85	450	2594
			Sub-Total
<b>Before 1982</b>		50	436
		63	3930
		75	10952

Description	Length [km]	Dia. [mm]	Length [m]
		100	8065
		125	9166
		150	12790
		175	2633
		200	6986
		225	253
		250	3811
		300	2728
		400	2325
	65	600	645
		Sub-Total	64722= Approx. 65 km
<b>Total</b>	<b>150</b>		<b>149616 = Approx. 150 km</b>

67. There is no zoning in the existing distribution system. All areas connected to one reservoir are served in one go. Similarly distribution system directly fed from TWs is also supplied simultaneously. There is practically no chlorination system for disinfection of water supplied. The chlorination system wherever provided is either not functioning or highly undependable resulting in a high health risk. It has to be mentioned at this stage that part of the pipelines laid under PHED have not been handed over to GMC but are presently in use. After completion of project pipeline will be transferred to GMC. GMC will be the owner and PHED will execute any work on behalf of GMC.

68. At present there are 1074 Public Stand Posts in the city which are being used by people not connected with individual connections for drinking purposes. Not all are functional and the number of households using them has been collected from the wards counselors. After completion of the project all stand post will be transferred to GMC.

#### **Consumers' Connections**

69. There are around 12500 registered consumers in the town. However, there is large number of unauthorised and unidentified consumers connected to the distribution system. According to the information collected from Wards Counselors the total number of connections is about 29000. There is no metering of water supplied to consumers and no water billing system. Water charges are levied as part of the Holding Tax on properties by the GMC.

#### ***Recent and Ongoing Construction Work***

70. Government of India sanctioned a project under 12th Finance Commission program to augment water supply of the town in the year 2007. This project involved construction of battery of Tube Wells on the bank of river Phalgu near Dandibagh and also in various parts of the town to increase water production by 16 MLD and provide distribution system for the newly developed areas like Manpur, AP Colony, etc. The work on this project is being executed by Public Health Engineering Department of GoB on behalf of Gaya Municipal Corporation (GMC) and is in advanced stage of completion. The highlights of the works as communicated by PHED are as follows:

- Transformers – Out of total 5 installed 3 are complete

- 8 nos. of tube wells – Completed
- 8 nos. of Pump houses – Completed
- Pumps and motors – 8 nos. provided, 1 currently working
- Rising Mains – laying of 2500m completed
- Gravity Mains – laying of 3433m out of total 4000m completed, the works of Sluice Valves and sluice valve chambers are 50% complete
- Service reservoir – Completed
- Distribution Network – Out of proposed total 59335 m the length laid is 47966 m. Large portion of the total length laid was not commissioned to GMC.

71. Gaya water supply system, particularly tube wells, rising mains, and reservoirs shown in following figure. **Appendix 6** shows photographs of existing reservoirs and pumping stations.

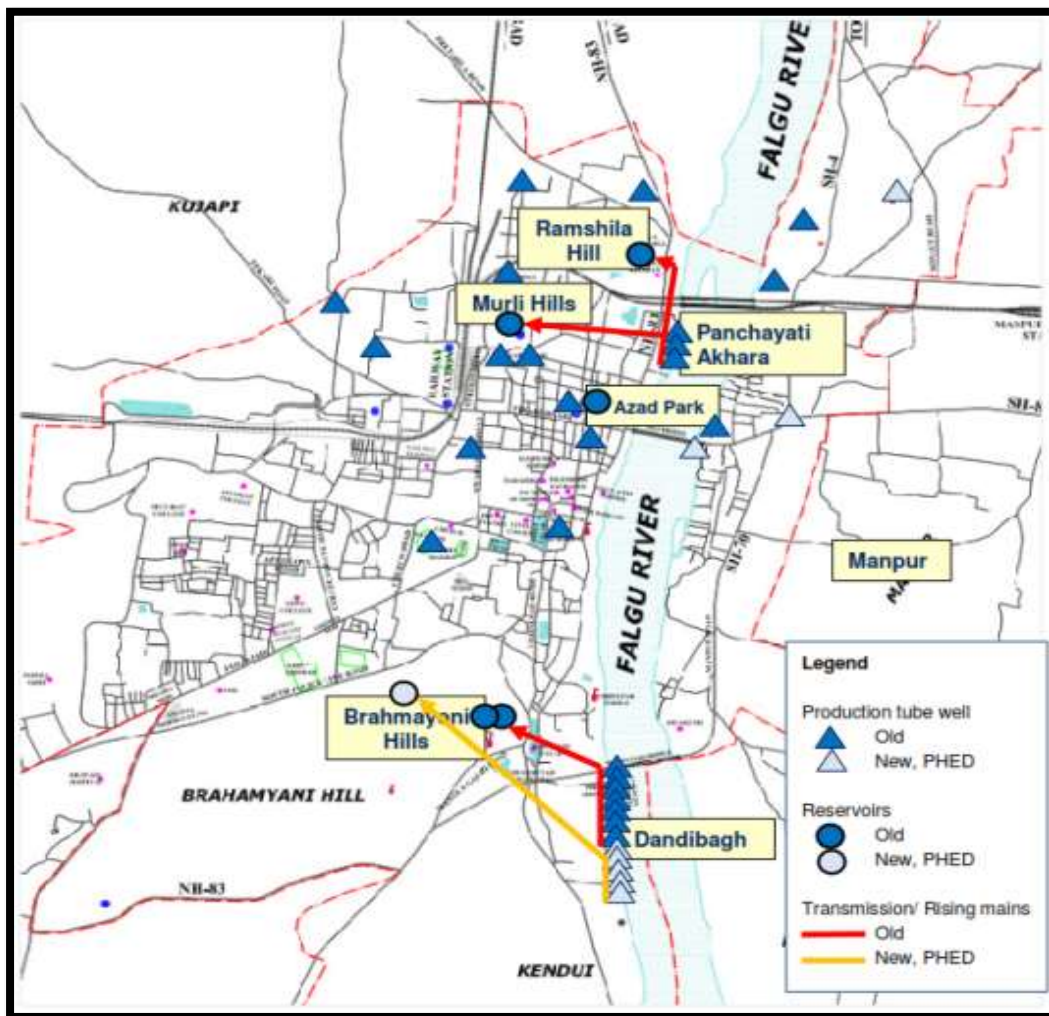


Figure 2: Gaya existing water supply system: wells, rising mains, reservoirs

### B. Justification of the proposed water augmentation project

72. The proposed water supply improvement project for Gaya is planned after analyzing the present situation and proper justification.

73. The subproject is needed because the present water supply system of Gaya is inadequate for the needs of the growing population. Per capita supply is low as 40 liters per capita per day (lpcd) which is below the required 135 lpcd and the unaccounted for water (UFW) is around 40%. The storage and distribution network is insufficient and old to meet even present requirements. Improvement and rehabilitation in the water supply system has been identified as a major priority for Gaya. The objective of this sub-project is to provide continuous (24x7) pressurized, safe water of 135 lpcd to the entire population, through household connections where feasible, at the required minimum pressure head. In other words, the water service will meet the Indian National Service Level Benchmarks.

### C. Proposed Subproject and Components

74. **Water sustainability.** Hydrogeological study has been conducted at Gaya in the year 2014. Based on the hydrogeological assessment studies of the ground water potential zone of Gaya, it is observed that present ground water abstraction of 24,000 m<sup>3</sup>/day for 75 days ( when the river Phalgu is dry ) is hardly 31.50 % of the total sub-surface water storage (5.70 mcm) within 2 metres of aquifer in 14.25 km<sup>2</sup> of the ground water potential zone during summer months.

75. Similarly, with the ground water abstraction of 124 MLD for 75 days of 9.30 mcm from the sub-surface water storage of 25 m thick aquifer of 53.43 mcm will be 17.40 % and it will lower the water level by 4.35 metres, still keeping the aquifer thickness of 20.65 metres which is considered as sufficient to sustain the yield of tube wells.

**76. It is concluded from the study that despite lowering of water level by 4.35 metres during summer months, the tube wells will sustain the yield and will restore original yield as soon as Phalgu river starts flowing after getting the first spell of rainfall in mid -June.**

77. The impact of pumping 124 MLD during the summer months (75 days) can be further reduced if the well fields are increased instead of having only one well field of Dandibagh. Two more well fields can be developed, one near village Kendui and another near Kendua on the left bank and fourth near Manpur - Buniyadgunj on the right bank. By having four different well fields, there will be less pumping from a small area of a well field, thereby creating a small ground water depression and less lowering of water level around it.

78. **Appendix 7** shows section related to water sustainability study and impact related to water abstraction from Phalgu river bed.

79. The design has been developed considering the future demand based on the population projections. **Table 5** shows the total water demand and water balance upto year 2048.

**Table 5: Demand Projection**

Description	2013 (Start of the project)	2018	2021	2033	2048
<b>Total Demand [MLD]</b>	55.84	89.26	103.92	126.05	163.21
<b>Total Demand [l/s]</b>	646.28	1,033.08	1,202.82	1,458.88	1,889.02
Needed Water Production [MLD]	68	90	104	130	165
NRW [%] of	33%	15%	19%	19%	23%

Description	2013 (Start of the project)	2018	2021	2033	2048
production					
<b>(+) Water Balance [MLD]</b>	12.16	<b>0.74</b>	<b>0.08</b>	<b>3.95</b>	<b>1.79</b>

In the above table the figures in the row containing the “Water Production” are based on the assumption that **water sources** are or **will be made available** for the respective target year. Producing (pumping) higher volumes of water will result in the increase of the NRW.

Source: DPR for Gaya water supply

80. There are 31 tube wells (one kept for use in fire fighting and another is defunct) of GMC and 8 tube wells constructed by PHED which are yet to be transferred to GMC. The condition of Tube Wells of GMC is not very good as they are quite old (ranging from 6 years to 50 years). It would be appropriate to undertake redevelopment of these tube wells. This is likely to improve the discharge and efficiency of tube wells and also make their discharge sand free. It was decided that after commissioning of tube wells those will be transferred to GMC for operation & maintenance.

**Table 6: Tube Wells Equipment Condition**

ID	Name	Transformer		In	Remark
		kVA	Available	Operation	
1	Dandibagh No. 1*	500 & 300	Yes	Yes	Pump no 1 will be installed after replacing with 125 hp pump-2
2	Dandibagh No. 2*			Yes	Will be changed with 125 hp motor, No room for pump
3	Dandibagh No. 3*			Yes	Poor condition of electrical equipment, No room for pump
4	Dandibagh No. 4*			Yes	Poor condition of electrical equipment
5	Dandibagh No. 5*			Yes	Poor condition of electrical equipment
6	Panchayati Akhara No. 1*	200	Yes	Yes	Needs maintenance(new starters provided of electrical systems)
7	Panchayati Akhara No. 2*			Yes	Needs maintenance(new starters provided) of electrical system
8	Azad Park*	200	Yes	Yes	Below overhead reservoir, needs maintenance of electrical system
9	Dhobighat*	100	Yes	Yes	Poor condition of Electric system
10	Central School*	200	No	Yes	Poor condition of Electric system
11	Nigam Store*	200	Yes	Yes	Valve not visible, no proper approach
12	Gurudwara*	100	Yes	Yes	Poor condition of Electrical system
13	Fire Station	200	No	Yes	Poor condition of Electric system
14	New Godown*	100	Yes	Yes	No proper approach, needs maintenance
15	Baba Dyalunath*	250	Yes	Yes	Needs maintenance for electrical equipment
16	Delha*	63	No	Yes	Poor Condition of Electrical system
17	Panchayati Akhara No. 3*	63	Yes	No	Poor Condition, Pump out of order
18	Janata Colony*	200	No	Yes	Needs maintenance of Electric system
19	Janata Colony*	100	No	Yes	New constructed, cabling laid above floor
20	Pilgrim Hospital*	100	Yes	Yes	Poor condition of Electrical system
21	Visnupad*	63	Yes	Yes	Needs maintenance

ID	Name	Transformer		In	Remark
		kVA	Available	Operation	
22	Bypass*	100	Yes	Yes	Needs maintenance for stators & pumps
23	Bairagi Powerganj*	63	Yes	Yes	Poor condition of electrical system
24	Bageshwari Pachim*	63	Yes	Yes	Needs maintenance
25	Pitamaheshwar*	100	Yes	Yes	Needs maintenance
26	Kauvasthan*	63	Yes	Yes	Poor condition of Electric system
27	Hata Godown*	200	No	Yes	Poor condition of Electric system
28	Manpur*	100	Yes	Yes	Pumps operated by local people also.
29	Manpur - Buniydiganj*	100	Yes	Yes	Pump house to be repaired
30	Khadigramodyog Lakhibagh*	300	Yes	Yes	Needs maintenance
31	Cotton Mill				Non functional
32	New TW Kirloskar-1			Yes	New constructed
33	New TW Kirloskar-2		Yes	Yes	New constructed
34	New TW Kirloskar-3	300	Yes	No	Not in operation
35	New TW Kirloskar-1	500	Yes	Yes	New constructed
36	New TW Kirloskar-2			Yes	New constructed
37	New TW Kirloskar-3			No	Not commissioned
38	New TW Kirloskar-4			No	Not commissioned
39	New TW Kirloskar-5	63	Yes	No	Not commissioned

(Note: Marked \* -29 tube wells considered for refurbishment)

81. The pumping machinery installed on tube wells is generally old and undergoes frequent breakdowns. There are no flow meters, pressure gauges, depth gauges and Non Return Valves installed in delivery pipe lines.

82. The proposed subproject comprises of three components which include:

#### **Component 1: Tube Well refurbishment**

- Replacement of pumping sets on all the old 29 tube wells.
- To provide one Electro-Magnetic type flow meter with AMR facility in the delivery pipe of each Tube Well for flow measurement along with one pressure gauge, one Non Return Valve, and Butterfly Valve.
- To provide a new Electric panel in each Tube Well pump room with an air break Star Delta starter with necessary protection relay, meters and level indicating meter.
- Provision of two 1000 KVA 11/0.415 KV transformers (1 Working + 1 Stand by) with necessary protections through 11 KV VCB, LAs and ACB on LT with proper cabling.
- Construction of a control room at Dandibagh campus for housing all switchgear and panels for centralized operation of all the 5 Tube Wells.
- Provision of one Electro Chlorinator at each Tube Well capable of producing 1kg/hour chlorine for disinfection at source. The raw material required in



these chlorinators will be common salt. Provision has been made in the electrical panel proposed for power supply required for the electro chlorinator.

### Component 2: Refurbishment & Construction of new pump houses

There is proposal for refurbishment of pump house at 12 locations. The work mostly comprise of repair of plaster, flooring, roofing, masonry, replacement of doors and windows and painting. Under the said sub project refurbishment of existing store at Dandibagh has been considered.

Also there is requirement of demolition of old pump houses (5 nos.) and construction of new houses of 9 nos.

**Table 7: Location of refurbishment & construction of new pump houses**

Refurbishment of pump house	Demolishing of existing pump house	Construction of new pump house with chlorine room in place of demolished structure	Construction of new pump house with chlorine room- where no existing room
12 locations namely, <ul style="list-style-type: none"> <li>• Khadigramodyog Lakhibagh</li> <li>• Dandibagh Type –I</li> <li>• Dandibagh Type – II</li> <li>• Bypass</li> <li>• Dhobi ghat</li> <li>• Panchyati Akhara</li> <li>• New Godown</li> <li>• Pilgrim Hospital</li> <li>• Bairagi Powerganj</li> <li>• Bageshwari Pachim</li> <li>• Kauvasthan</li> <li>• Cotton mill</li> </ul>	5 locations namely, <ul style="list-style-type: none"> <li>• Central school</li> <li>• Gurdwara</li> <li>• Delha</li> <li>• Janata colony</li> <li>• Hata Godown</li> </ul>	5 locations namely, <ul style="list-style-type: none"> <li>• Central school</li> <li>• Gurdwara</li> <li>• Delha</li> <li>• Janata colony</li> <li>• Hata Godown</li> </ul>	Dandibagh – 4 nos.

### Component 3: Rising/ Transmission Mains

The proposed water supply system of Gaya will be divided in District Metered Areas (DMAs). The water from the tube wells will be pumped through dedicated rising mains to the respective service storage capacities.

The rising mains to ground level / overhead service reservoirs located at various places of the Gaya have been designed and most techno-economical system has been proposed.

Most of the tube wells are presently pumping water to the distribution system. However, in order to have equitable distribution of water in a sustained manner, it is proposed to supply water through transmission mains to OHSRs or GLSRs on Hills.

Approximate proposed length of the pipeline (DI pipe) is 17.285 km with diameter from 125-600 mm. Existing pipeline length is 7.854 km. Hence total length will be 25.140 km.

### Component 4: Water Storage Reservoirs

The water distribution system has been designed with formation of DMAs. The DMAs are connected to nearest SRs. An examination of existing capacities of reservoirs



and water demand to be met has been done in the design section. Accordingly, in package 1 nine new SRs are to be constructed, among them 6 numbers are OHSR and 3 GLSRs. Refurbishment of existing OHSRs and GLSRs will be done at 7 locations as mentioned in **Table 8** below. All newly proposed OHSRs will have a staging of 21m and same has been incorporated in network design. **Table 8** shows the location, the capacity, the DMAs served.

**Table 8: Details of the Water Storage Reservoirs**

ID No.	Reservoir Location	Capacity (ML)	Type	Land requirement	DMA No.	Action
1	Near Joda Masjid	2.15	OHSR	30 m x 30 m	2 & 3	Phase-I- New
3	Budva mahadev	1.0	OHSR	30 m x 30 m	1	Phase-I- New
4	Mastalipur	2.0	OHSR	24m x 37.5m	4,5	Phase-I- New
5	Bhusunda Mela	2.15	OHSR	30m x 30m	6, 7	Phase-I- New
6 & 7	Ramshila Hill	0.22 + 2.6	GLSR	24 m x 40m	8,9	Existing (one additional GLSR 2.6ML to be provided- Phase 1 new) <i>Phase I - Refurbishment of existing GLSR</i>
8	Murli Hills	1.63+ 1.4	GLSR	-	10	Existing <i>Phase I - Refurbishment of existing GLSR</i>
9	Ajad Park	0.45	OHSR		Ward 15, DMA 13	Existing <i>Phase I - Refurbishment of existing OHSR</i>
10a	Brahmayoni Hills	1.86	GLSR		11, 13, 14, 17,21,22, 23, 24,25, 26,27	Existing <i>Phase I - Refurbishment of existing OHSR</i>
10b	Brahmayoni Hills	1.86	GLSR			Existing <i>Phase I - Refurbishment of existing OHSR</i>
11	Brahmayoni Hills	3.60	GLSR			Existing <i>Phase I - Refurbishment of existing OHSR</i>
12	Brahmayoni Hills	3.60	GLSR			Existing <i>Phase I - Refurbishment of existing OHSR</i>
10c	Brahmayoni Hills	4.64	GLSR	45 m x 90m		Phase-I- New
10d	Brahmayoni Hills	4.64	GLSR		Phase-I- New	
13a + 13 b	Shring Sthan	4.54+ 3.7	GLSR	45 m x 45 m	15, 16, 18, 19, 20	Existing (Additional storage 3.7ML to be provided in Gaya phase2, i.e Package GWSP2)
14	Behind Delha PS 1A	1.5	OHSR	30 m x 30m	29	Phase-I- New
16	Behind Delha PS A	2.15	OHSR	36 m x 34.5m	28, 30	Phase-I- New

Source: DPR Gaya water supply, OHSR: Overhead Storage Reservoir, GLSR: Ground water Storage Reservoir

83. As per present design proposed construction project involves relocation of nine dwelling units including one Gaya Municipal Corporation (GMC) staff quarter at one project location (Ramshilla hill). Also there will be partial impact on 6 households. Rehabilitation & resettlement issue deals separately under Resettlement Plan.

## Component 5: Laying of distribution pipeline

The District Meter Area serve to better manage the distribution network, based on the pressure patterns control and on the water flows monitoring. A DMA is fed from few monitored input pipe lines and supply and consumption can be easily compared.

A DMA of the distribution system for Gaya is covering 6 to 40 km of water supply pipelines and up to 4,000 and up to 7000 service connections in 2018 and 2048 respectively according to the present design. However further DMAs will be necessary as the network develops to the streets configuration at a certain target year. The DMAs have 1 to 3 monitored connections to transmission mains used to calculate and derive the water balance in that DMA.

Gaya will be divided in to 30 DMAs. Each DMA will be supplied with water from the storage tank with a dedicated feeder main. All DMAs are having separate monitoring stations at tapping point from feeder mains.

The length of new pipes to be laid is estimated at about 447.075 km. The pipe materials will be Ductile Iron and HDPE.

As a general policy, all existing pipelines installed after 1982, with an estimated length of 72.9 km, shall be kept in service and included in the DMAs based operation of the system and in the sub-sequent proof of performance as further required in this document. All pipelines installed before 1982 in the system, with an estimated length of 64.7 km, shall be replaced by new pipes (without disturbing old pipes- keep at same position, only laying of parallel new pipeline) and decommissioned to the satisfaction of the Engineer and according to procedures approved by the Engineer.

84. The **Table 9** shows the proposed distribution pipeline of different dia.

**Table 9: Proposed Water Distribution Pipeline- DI K-7 & HDPE pipe**

Diameter (mm)	Length (m)
<b>DI K-7 pipe</b>	
150	662354
200	29631
250	18919
300	9131
350	6321
400	5077
450	5376
500	2226
600	4897
700	2141
	<b>146073</b>
<b>HDPE pipes of PE-100 &amp; PN-6</b>	
110	301002
<b>Total</b>	<b>447075, i.e approx 447 km</b>

Source: BID document Gaya water supply

It is assumed that before the start of the capital investment works all the existing PHED pipelines laid by Kirlorskar Bros. will be taken over by GMC.

## Component 6: Metered House Connection at all the DMAs

It is proposed to arrange 92,000 metered house connection by 2021 and 1.88 lakh metered house connection in 2048.

## Component 7: Customer Service Centers

It is assessed that minimum of 6 customer service centres (CSC) will be required to cater to about 15000 connections each. The location of each CSC, including a central CSC is proposed to be identified, post commencement of DMA work. CSCs are proposed to be located on government land or within existing government buildings or rented space.

85. **Appendix 8** shows project location and maps of the proposed project components.
86. **Appendix 9** shows photo illustration and location details of project components.
87. **Appendix 10** shows site management plan drawing for all water storage reservoirs and major working areas.
88. **Table 10** shows the components of the subproject based on the present proposals which are expected to be substantially correct, although certain details may change as development of the subproject progresses.

**Table 10: Description of the proposed water supply subproject for Gaya City**

Component	Function	Description	Location
General	Improvement of water supply system in Gaya city	<ul style="list-style-type: none"> <li>➤ Satisfy the future needs</li> <li>➤ Enhancement of pumping, distribution and storage facilities to supply quality water to new areas and existing area with sufficient quantity</li> </ul>	Gaya city
Refurbishment - Rehabilitation/ replacement of worn-out machineries and electrical devices in tube wells Arrangement of chlorinator in tube well	Replacement of pumping equipments running at lesser efficiency, since machinery has outlived their lives. Quality of the supply water get improved through disinfection	Replacement of worn-out machineries and electrical devices in 29 tube wells Provision of one Electro Chlorinator at each Tube Well capable of producing 1kg/hour chlorine for disinfection at source	Scattered throughout Gaya
Refurbishment and construction of new pump houses	Protection of pumps and motors within room	Refurbishment of pump house at 12 locations. The work mostly comprise of repair of plaster, flooring, roofing, masonry, replacement of doors and windows and painting. Refurbishment of existing store at Dandibagh Demolition of old pump houses (5 nos.) and construction of new houses of 9 nos.	Scattered throughout Gaya
Laying rising mains from tube wells to overhead tanks/ground level service reservoirs	Connecting tube wells with the existing/proposed storage tanks	Approx. Length-17.285 km	Corresponding to the location of tube wells and storage reservoirs

Component	Function	Description	Location
Construction of overhead and ground level water storage reservoirs	Enhancement of additional storage capacity as per proposed DMAs	Construction of 6 over head reservoirs	<ul style="list-style-type: none"> <li>Near Joda Masjid</li> <li>Budva Mahadev</li> <li>Mastalipur</li> <li>Bhusunda</li> <li>Delha – 2 nos.</li> <li></li> </ul>
		Construction of 2 ground level reservoirs	<ul style="list-style-type: none"> <li>Brahmayoni Hills</li> </ul>
		Construction of 1 ground level reservoir.	<ul style="list-style-type: none"> <li>Ramshilla hill</li> </ul>
Refurbishment of water storage reservoirs	Proper storage of water	Refurbishment of 7 reservoirs – 6 GLSRs and 1 OHSR	<ul style="list-style-type: none"> <li>Brahmayoni Hills- 4 nos.</li> <li>Ramshilla hill- 1 no.</li> <li>Murli Hills – 1 no.</li> <li>Azad park – 1 no.</li> </ul>
Replacement of pipelines (through laying of parallel pipeline along old pipeline) as per requirement and strengthening of distribution network through additional pipe laying	Water loss reduction by replacing leaking water distribution pipelines, reducing the current water loss from existing 40% to 20%. Construction of additional storage/distribution capacity in some water deficient areas.	Approx. Length- 447 kmDI & HDPE pipe	Throughout the Gaya
Metered house connection	To supply measured water	Approx. 92,000 nos.	Throughout the Gaya
Customer Service Centers	To cater to about 15000 connections each.	6 nos.	To be located on government land or within existing government buildings or rented space.

Source: DPR Gaya water supply

89. The design standards adopted under this sub-project are from the Manual on Water Supply published by Ministry of Urban Development, Government of India. The same criteria are followed by the Public Health Engineering Department (PHED), the line department. Key design features of the proposed subproject are summarized in **Table 11** below.

**Table 11: Design features of the subproject**

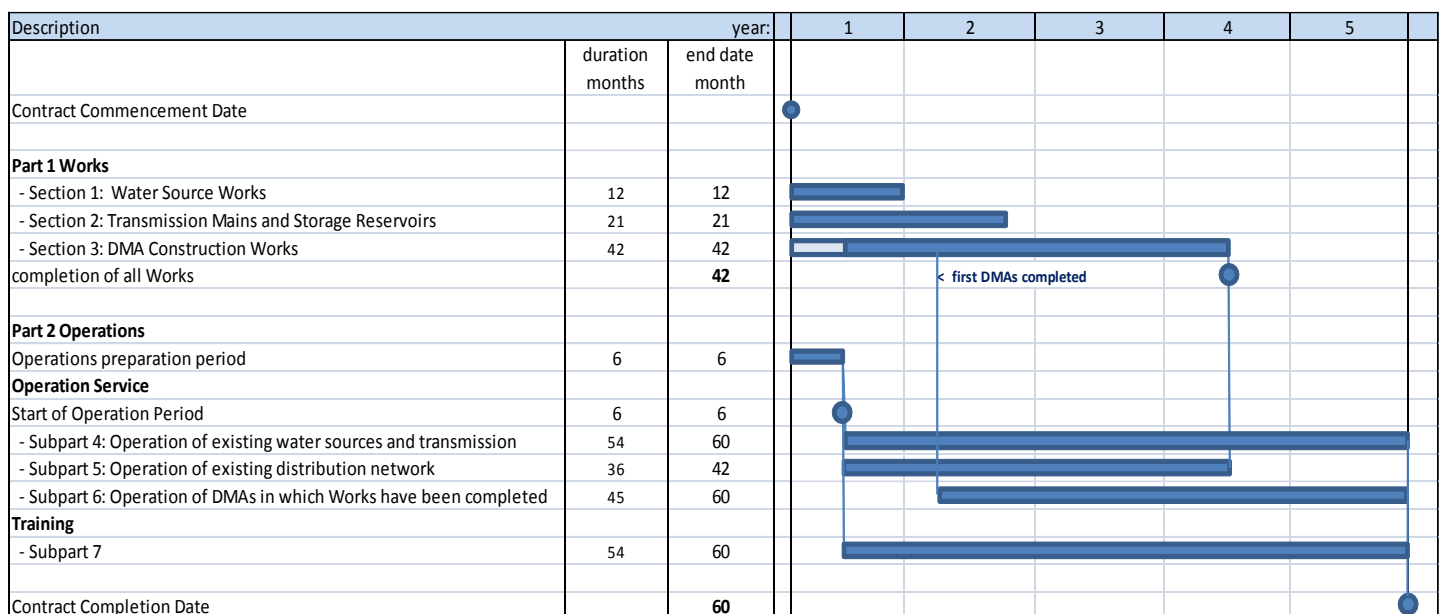
S. No:	Design features	Descriptions
<b>Refurbishment - Rehabilitation/ replacement of worn-out machineries and electrical devices in tube wells</b>		
<b>Arrangement of chlorinator in tube well</b>		
1	Working hours of tube wells	23 hours a day
2	Power	7.5 to 105 HP
3	Efficiency of pumps	Efficiency of pumps 80% for VT Pump and 70% for submersible pumps
4	Type of pumps	Multi-stage submersible pumps and vertical turbine pumps

S. No:	Design features	Descriptions
		for tube wells.
5	Incoming power supply	1000 KVA 11/0.415 KV transformers (1Working+1Stand by) with necessary protections through 11 KV VCB, LAs and ACB on LT with proper cabling.
6	Earthing System	Solidly earthed
<b>Construction of overhead tanks and ground level reservoirs</b>		
1	Foundation	Open type Reinforced Cement Concrete (RCC) raft
2	Super structure	RCC cylindrical shaft for overhead
3	Water tank	RCC cylindrical type
4	Material of construction of over head tanks	RCC (M30 )
5	Total storage capacity	22.83 MLD additional
6	Minimum storage capacity	20% of the average daily demand
7	Supply hours	24 hours
8	Location	Referred above Table
<b>Laying of distribution pipeline</b>		
1	Subproject area	Gaya City
2	Design period	30 years
3	Pipe diameter range	110 to 700 mm dia.
4	Net per capita water supply (excluding losses)	135 liters per capita per day
5	Distribution losses (allowable)	15%
6	Material of construction for distribution mains and laterals	Ductile Iron K 7& HDPE
7	Location	Throughout the city except newly laid area

Source: DPR Gaya water supply

#### D. Implementation Schedule

90. The proposed sequence of the works implementation under Gaya Water Supply Project is as given in the **Figure 3**.



**Figure 3: Implementation Schedule**

91. **Training** - The Contractor shall deploy a Human Resources Development and Training Specialist, to assess the training needs and prepare a Training Program describing all on-the-job and class-room training activities to be conducted during the project. The Training Plan shall be finalised and approved within six (6) months from the Commencement Date.

Implementation of the Training Program shall be finalised at least six(6) months before the Contract Completion Date. Commencing at least 6 months before the Contract Completion Date, the GMC deputed Managers (Operations Manager, Technical Manager, Financial Manager and Customer's Manager), still operating under the responsibility of the Contractor will take over water supply and maintenance duties. The Training Programme will comprise of both on-the job training as well as class room training. On the job training will be provided to staff that has been seconded for prolonged periods on deputation to the Contractor. If the Contractor is unsatisfied with the performance of a seconded staff member, he will inform GMC. If the unsatisfactory situation continues, the Contractor is allowed to reject further secondment deputation of the staff concerned and the GMC may nominate replacement. The Contractor will provide hands-on training to the deputed GMC staff related to all aspects of water supply operations including but not limited to: water production, storage, transmission and distribution, DMA based operation and maintenance, including water meter repair and maintenance, billing, fee collection, leak detection and leakage repair etc. The Contractor will also provide hands-on training to the deputed GMC staff in administrative, financial and customer affairs.

### III. DESCRIPTION OF THE ENVIRONMENT

#### A. Physical Resources

##### 1. Administrative Boundaries

92. Gaya is located in south central Bihar on the banks of the River Phalgu, between 84.40 and 85.50 east longitude and 24.50 and 25.10 north latitude. It is the district headquarters City of Gaya District and is situated at about 100 km south of State Capital Patna (**Figure 4**). Gaya is a prominent and most important religious centre for Hindus. The City is well connected by road and railways with the State Capital Patna and other Cities in the State. Bodhi Gaya, situated at 13 km south of Gaya, is a world famous Buddhist Centre, which attracts significant number of international tourists. Gaya has an airport to serve for this purpose.

93. Gaya is a Municipal Corporation with an area of 50.17 sq km. It is divided into 53 wards and had a population of 4, 63,454 (Census 2011). The gross population density of the city is 78 persons per hectare. **Figure 5** shows Gaya city map.

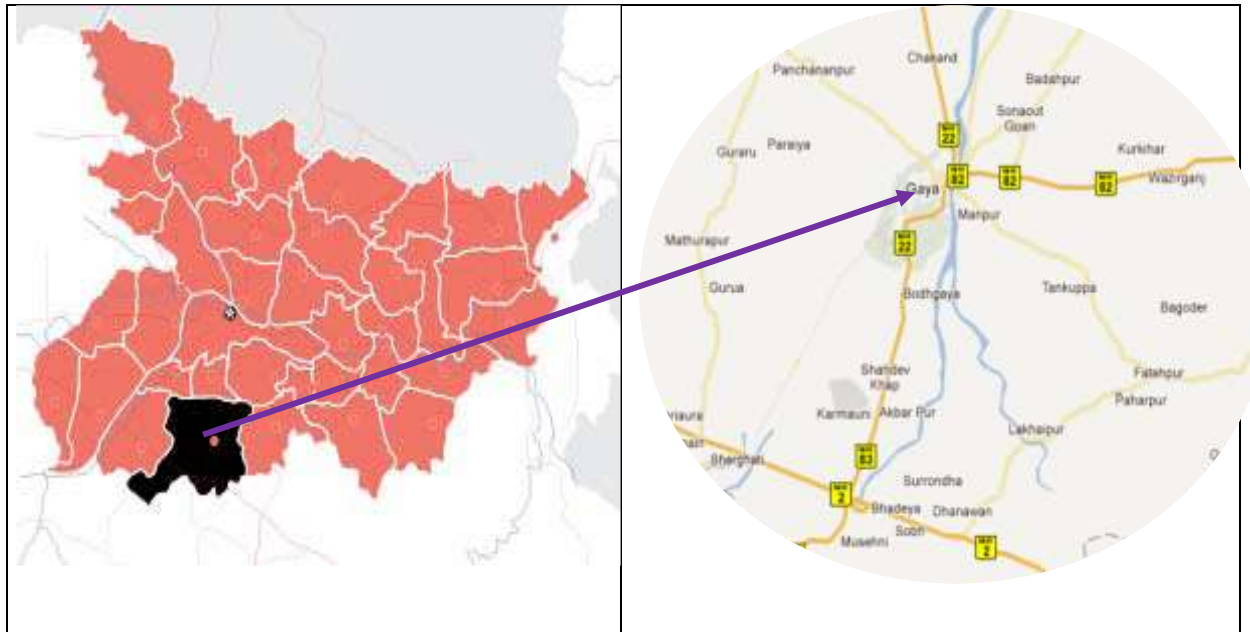


Figure 4: Location of Gaya in Bihar



Figure 5: Gaya City

## 2. Topography, Drainage, and Natural Hazards

94. **Topography.** The historical City of Gaya is developed along the banks of River Phalgu, a tributary of River Punpun, which in turn is a tributary of River Ganga. The elevation of the area on an average is 110 m above MSL (Mean Sea Level). Gaya is located in the transit region between the uplands of Chhotanagpur Plateau and Gangetic plains of South Bihar extending from Patna. There are a ring of hills around the City in the north (known as Ramshila), west (Katari Hill), and south (Brahmyoni). Except these hilly areas, topography of the City is flat, and gently slopes and drains into the River Phalgu, flowing from south to

north. City is mostly developed on western side of the river, while new development is seen on the eastern side.

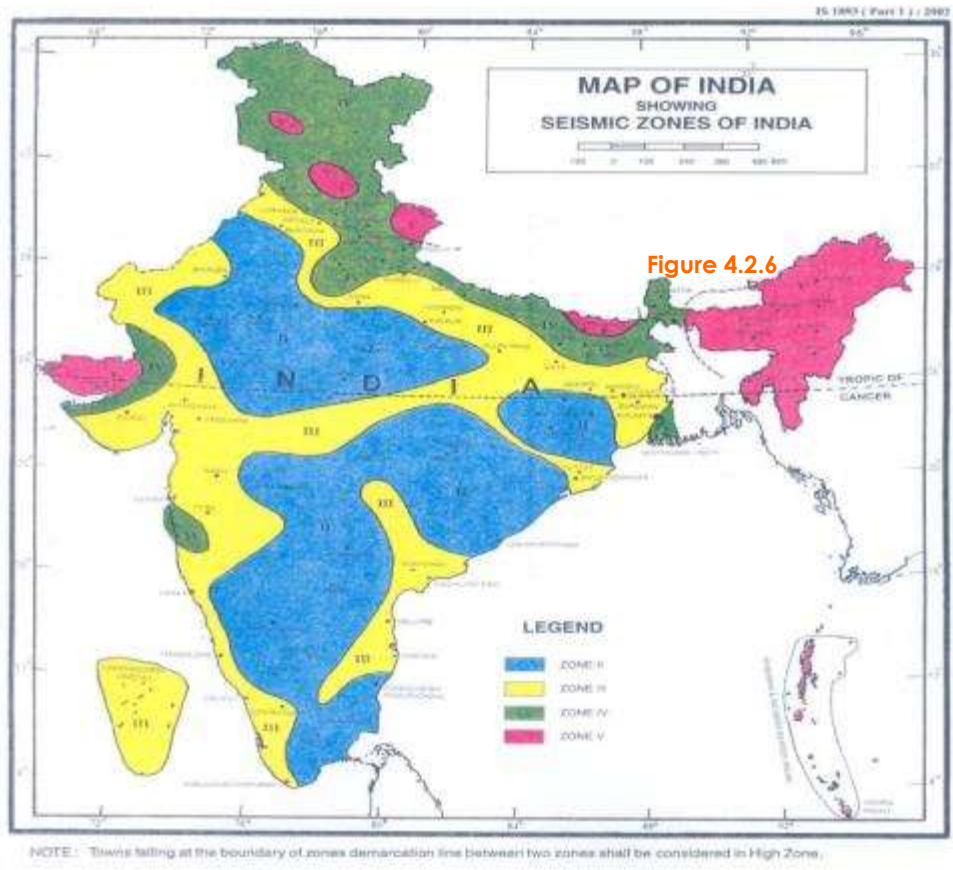
95. **Drainage.** General topography of the Gaya city is flat with some small hillocks in and around the city. River Phalgu divides the city into two parts. The portion located on the west bank of the river is much larger comparing to the portion located on the eastern bank of the river. Natural gradient of the Gaya Municipal Corporation (GMC) area is such that the portion of the GMC area on the west bank, slopes from west to east and south to north whereas the portion on the east bank of the river slopes from east to west and from south to north. As a result, storm runoff from both sides of the river normally flows towards the River Phalgu which flows along south-north direction. Average annual rainfall of the region is about 1150mm. The existing storm water drainage system of the Gaya is based on gravity flow. Depending on the existing topographical features, the city is divided into four drainage zones namely Central, North-Western, Western and Eastern zones. The existing drains are mostly outfall to the River Phalgu or open lands at Katari and Kondinava and Kujapee drain. Partial flow of Kujapee drain is leading to Jamune River that flows parallel to the river Phalgu, through the western fringe of Gaya, about 6 km from municipal boundary. Remaining flow of Kujapee drain finds its way to agricultural land. About 80 percent of the GMC area is covered under drainage network. Most of these drains were constructed during the period from 1932 to 1944.

96. **Natural Hazards. Earthquake.** Earthquake hazard map of India (**Figure6**) and Bihar shows that Gaya district falls in Seismic Zone III, which is a moderate risk zone and an earthquake up to a magnitude of 7.0 on Richter scale has the potential to hit the area. Thus Gaya Municipal Area is an earthquake hazard prone area and falls in moderate damage risk zone.

97. **Wind hazard.** The wind hazards map of Bihar shows that Gaya districts falls in moderate damage risk zone with cyclonic wind velocities around 39 m/s. Thus Gaya Municipal Area is a moderate wind hazard prone area.

98. **Floods.** The flood hazard map of Bihar shows that Gaya district is not susceptible to any major flooding. It is evident that Gaya city located in Gaya district is susceptible to natural hazards with moderate risk or probability of occurrence of a moderate intensity earthquake and wind. A map (**Figure7**) showing flood zone in Bihar is shown below. It is indicated that Gaya district does not come under flood zones.





**Figure 6: Earthquake zone map of India**



**Figure 7: Flood zone of Bihar**

Source: State Environment Report, Bihar (2007)

### 3. Geology, Geomorphology and Soils

99. **Geology and Geomorphology.** The main geological formation of the region is of Quaternary age. The area is mostly covered by unconsolidated sediments which is known as Alluvial deposits followed by consolidated deposits of Satpura range. Few areas are also characterized by units of Archaean ages. The Satpura range mainly exposed in Gaya hills and Rajgir hills comprises low grade supracrustals – Schists, ferruginous phyllite, quartzites and phyllitic slate.

100. The Archeans are the oldest rock formation in the area. The most predominant rock type is gneisses and granites with basic intrusives and pegmatoides.

101. **Soils.** Gaya is covered with recent Alluvium of both old and recent. It consists of a thick alluvial mantle of drift origin. This wide alluvial plain is part of Gangetic depressions with alluvial deposits of immense depth, and is broken by groups of low ranges of hills or isolated peaks arising abruptly from the plains. Soils in the region are deep and excessively drained that are formed in eolian sands over lacustrine deposits derived from mixed rocks. Five main types of soils present in the region: sandy loam, loamy soil, sandy loam, black soil and red soil.

### 4. Climate

102. The climate of Gaya is generally tropical and has three distinct seasons: winter season from November to middle of March, summer season from mid-March to mid-June and rainy season from mid-June to October. Winters are generally cold, summers are hot and dry, and the monsoon season is characterized by moist heat and oppressive nights. The cold weather commences early in November and temperatures (both day and night) decrease rapidly with the advance of the season. January is the coldest month. Temperature increases rapidly from middle of March till May. With the onset of monsoon in the month of June, the temperature starts decreasing. In the hot season Gaya is very unpleasant.

103. Rainfall in the region is mainly from southwestern monsoon during the period of June mid to early October. Rainfall also occurs due to northeast monsoon in January and February although its contribution is very limited. Monthly rainfall pattern is tabulated in **Table 12**. Annual rainfall during this period fluctuated between as low as 683 millimeter (mm) to 1260 mm. Monthly rainfall shows that about 90 percent of annual rainfall is received during the monsoon period of June to October.

**Table 12: Monthly Rainfall Pattern (2008-2014) in mm**

Month	2008	2009	2010	2011	2012	2013	2014
January	95.4	8.4	0.2	6.0	19.9	0.0	20
February	13.4	0.0	3.4	3.0	4.4	10.7	20
March	0.6	0.4	0.0	0.1	10.8	0.9	13
April	13.3	2.4	0.0	32.9	21.2	32.1	8
May	40.3	73.7	25.8	18.2	25	91.8	20
June	404.9	68.4	97.8	393.3	109.6	47.8	137
July	283.5	194.8	202.7	133.2	236	80.3	315
August	209.6	152.5	202.9	419.8	392.6	168.3	328
September	48.9	269	50.3	244.7	134.2	127.1	206
October	0.0	17	91.0	8.5	66.9	158.5	53
November	0.0	11.8	6.4	0.0	34.3	0.0	10
December	0.0	2.3	2.8	0.0	0.0	0.0	3
<b>Total</b>	<b>1109.9</b>	<b>800.7</b>	<b>683.3</b>	<b>1259.7</b>	<b>1054.9</b>	<b>717.5</b>	<b>1133</b>

104. Maximum and minimum temperatures during summers are: 43°C and 21°C and during winters: 20°C and 6°C. Normally lowest temperature is recorded in the month of January while the highest is in the month of May/June. During the summer the humidity is much lower (about 30-40 percent) due to the hot and dry westerly winds. With the onset of monsoon humidity increases and it is generally in the range of 80 to 84 percent in July and August. Predominantly winds blow from east and west. Westerly winds usually prevail from the beginning of January to the end of March. Then onwards till middle of June the east and west winds are nearly balanced. From middle of June to end of July winds are predominantly easterly. From end of July to the end of August westerly winds prevail. Then onwards till the end of October east winds prevail. In November and December east and west winds are nearly balanced.

## 5. Air Quality

105. Earlier there was no fixed monitoring air quality stations at Gaya, which was also not subject to monitoring by the Bihar State Pollution Control Board (BSPCB) as there are no major industries. Gaya is located in the transition zone between the fertile alluvial plains and hills of Chhotanagpur Plateau, and generally dry weather prevails. During summers it experiences very dry and hot weather. Traffic is the only significant air pollution source, so levels of oxides of sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS). Due to dry weather, poor road conditions and traffic particulate matter is likely to be high, particularly during summers. In the year 2014 ambient air quality monitoring has been conducted at Gaya. Monitoring station is located at Gaya Collectorate office corner. Month wise result is given in the **Table 13**. Result shows that at all the months concentration  $PM_{10}$  is above the standard. Except few months concentration of  $NO_2$  was above the national standard.

**Table 13: Recent ambient Air Quality of Gaya city**

Status of Ambient Air Quality of Gaya – Collectorate office											
S. No	Year 2014	Main Pollutants & BTX Parameters 2014 ( $\mu\text{g}/\text{m}^3$ )									
		CO	SO <sub>2</sub>	NO	NO <sub>2</sub>	NOx	O <sub>3</sub>	PM <sub>10</sub>	Benzene	Toluene	Xylene
		Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
1	March	1.56	6.9	25.4	93.8	119.2	17.7	239.5	3.05	11.4	7.8
2	April	2.99	6.6	34.2	113.4	147.6	34.9	270.5	2.76	11.3	4.82
3	May	2.61	6.1	16	51.5	67.5	46.8	198.2	1.98	7.7	3.08
4	June	3.00	5.7	12.1	58.3	70.4	42.2	165.9	1.94	7.3	2.82
5	July	1.77	5.2	15.8	40.5	56.4	18	83.9	1.78	8.1	3.55
6	Aug	1.38		16.9	33.4	50.2	16.9	73.5	1.57	6.1	2.81
7	Sept	2.45		16.5	25.5	42	10.2	75.9	1.51	6.3	3.23
8	Oct	3.84		24.9	25.5	50.4	12.4	196.8	1.89	7.5	4.38
9	Nov	4.63		53.2	49.8	103	15.1	324.2	2.7	9.8	6.8
<b>Standard – Annual average</b>		<b>2000</b>	<b>50</b>	<b>-</b>	<b>40.0</b>	<b>-</b>	<b>100</b>	<b>60.0</b>	<b>5.0</b>	<b>-</b>	<b>-</b>

Source-Bihar State Pollution Control Board (BSPCB)2015, BTX: Benzene Toluene Xylene

## 6. Ambient noise levels

106. The Bihar State Pollution Control Board (BSPCB) measures the noise level across the Gaya city during 2004-05. Data shows that day time noise levels are high at all locations, exceeding the ambient noise standards.

107. Presently primary noise level data is generated on September 2015 from the BUDIP project. Result presented in the following **Table 14**, the noise levels at silence, residential and commercial zones exceeding the standards, attributed mainly to the vehicular traffic.

**Table 14: Noise Levels in Gaya city**

Location	Noise Level (day time)	Noise Zone	Standard (day time)
	<i>dB(A) Leq</i>		<i>dB(A) Leq</i>
Panchayati Akhara	82.2	Residential	55
Panchayati Akhara-Tutwari Road	81.5	Residential	55
Near Ramshila	90.0	Commercial	65
Azad Park Near Temple	87.5	Commercial	65
Tikari road	85.4	Commercial	65
Ghanta Ghar	95.0	Commercial	65
Rammana road	94.0	Commercial	65
GB road	93.8	Commercial	65
SP road	87.7	commercial	65
DM office	90.5	commercial	65
Jai Prakash Narayan Hospital	87.6	silence	50
Prabhat hospital	70.9	silence	50
Zilashool gate	99.5	silence	50
Brabmayoni hill	84.5	silence	50
Near manglagauri	84.6	silence	50
Dandibagh	85.0	silence	50

(BUDIP generated data, September 2015)

108. On comparison of noise quality data with the limits specified for different types of the areas in the ambient noise quality standards {under schedule to the Noise Pollution (Regulation and Control) Rules, 2000 of Government of India} it is evident that the noise values at most of the sites are higher than the permissible standards. This may be attributed to the commercial activities and traffic movement coupled with frequent traffic jams and honking of horns in the subproject area.

## 7. Water Resources

### a. Surface Water

109. Gaya city is situated along the banks of River Phalgu. This river is formed by the merger of two streams of Nilanjan and Mohana about 15 km south of Gaya city, and flows south to north through the heart of Gaya District. The width of river in Gaya is about 900 m. The famous Vishnupad Temple is located on the banks of the River and there are a number of ghats (bathing and worshipping) developed for the pilgrims. This river is a tributary of River Punpun, which joins River Ganga near Patna.

110. Phalgu is a seasonal river, and flows only during monsoon and partly in post monsoon(mid-June to November/December). During the rains, river carries very high flows but in the other seasons of year it is nearly dry. Due to a good monsoon season in 2006, the river over flowed its banks and flooded the nearby localities. However, this was not severe and no damage to human lives or property is reported.

111. It is observed that due to lack of sewerage system in the City, the waste water is discharged into the storm water drainage system, which ultimately joins and pollutes River Phalgu.

#### **b. Geohydrology and Groundwater**

112. Gaya is located in the transition region between the uplands of Chhotanagpur Plateau and Gangetic plains of South Bihar extending from Patna. The extensive and deep aquifer of south Bihar Plains starts from Nepal Border, where depth is said to be about 2,000 m, and gradually decreases southwards to around 650 m in Patna and becomes shallower in further south to about 60 m in Gaya. In Gaya City, the aquifer thickness is still shallower. There is a thick clay bed of about 5-6 m on the top underlain by coarse sand mixture with gravel predominating to a depth of 20-30 m, from where generally hard rock is encountered.

113. Underground aquifer is presently tapped along the River Phalgu for Gaya water supply. City is surrounded by hills on three sides and ground water near hills is not available as depth of sand strata is quite less. Aquifer, particularly away from hills and along the river has moderate yield of 15,000 to 80,000 liter per hour. Though there were no ground water studies conducted in Gaya, local officials of the CGWB are of the view that depth of aquifer and its yield is relatively higher along the river. They are also of view that groundwater resource in Gaya is limited and therefore a proper study/investigation is required to establish the sustainability of resource.

114. **Groundwater Quality:** Although groundwater is used for domestic water supply, no regular water quality monitoring is conducted. Discussion with the local people and officials indicates that the water supplied from Panchayat Akhada well field, located downstream side of the city, at times contain colour and odour. This may be due to pollution of groundwater from disposal of untreated waste into the river. Moreover, many people in the city use septic tanks, which many times do not function properly, leading seepage of leachate into the groundwater. Comparatively water supplied from the Dandibag well field, located upstream side of the city, is good.

115. As far as chemical contents in groundwater are concerned, Gaya district is one of the six fluoride affected districts. A report shows that fluoride level upto 6.8 ppm has been detected against the permissible limit of 1.5 ppm in the groundwater of Nawada District, a neighbor district of Gaya. **Figure 8** shows the Fluoride map of Bihar and Gaya.



## FLUORIDE CONTAMINATION IN BIHAR

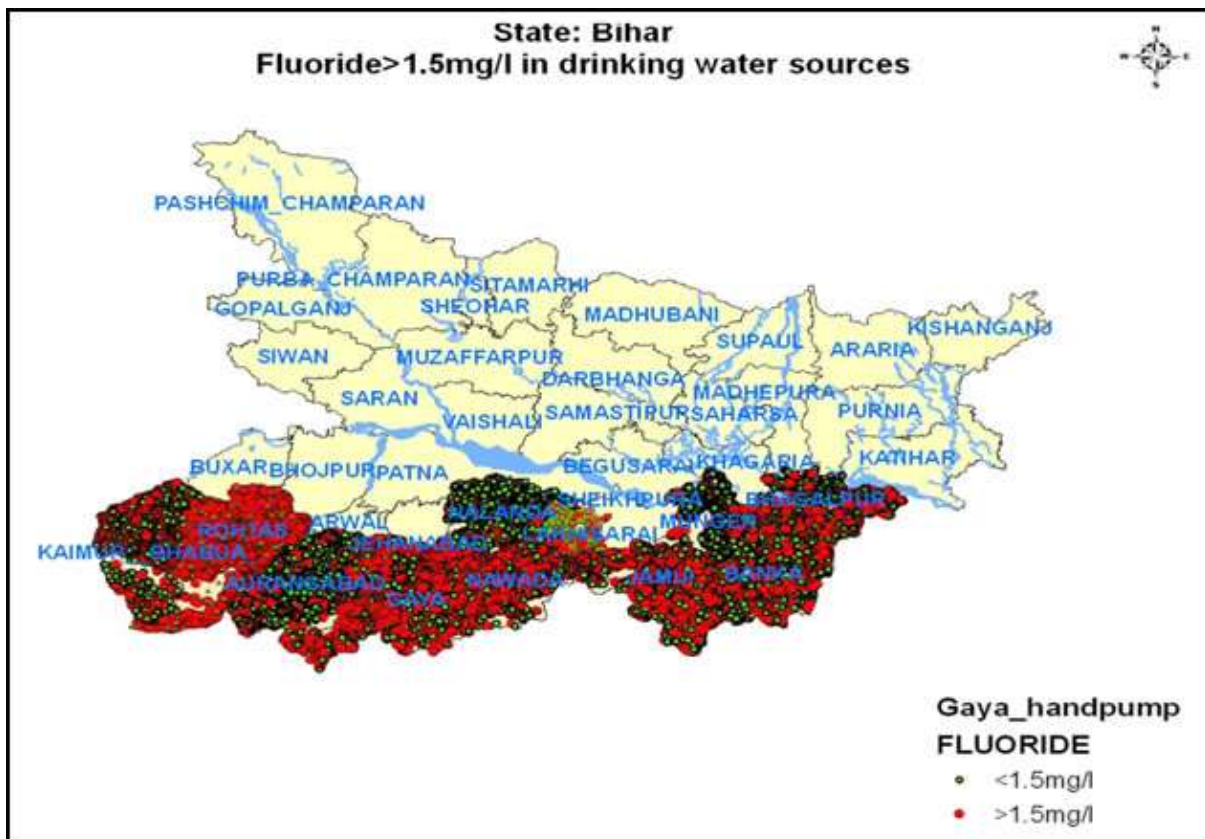
Fluoride contaminated aquifers in dry areas of following Districts of Bihar is confirmed:—

- Gaya
- Nawada
- Rohtas
- Katihar
- Munger
- Bhagalpur
- Jehanabad
- Aurangabad
- Jamui



www.ancollege.org

Source:IndiaWaterPortal



Source: PHED, Govt. of Bihar

Figure 8: Fluoride enriched area of Bihar

116. Secondary data of supplied water at Gaya have been collected from Public health engineering dept. at Patna. Results are depicted in **Table 15** below. It is noted that the



concentration level of all the parameters (except turbidity) is within the acceptable standards of surface water quality. One occasion concentration of iron is above the desirable limit.

**Table 15: Physico- chemical analyses data of Gaya supply water**

S. N.	Location Details	Physico - Chemical and Bacteriological Parameters														
		pH	Turbidity (NTU)	EC	Total Dissolved Solids (mg/l)	Total Hardness (mg/l)	Ca (mg/l)	Mg (mg/l)	Cl (mg/l)	Alkalinity (mg/l)	Fe (mg/l)	NO <sub>3</sub> ( mg/l)	SO <sub>4</sub> ( mg/l)	F (mg/l)	As (mg/l)	Total Coliform (no/ 100 ml)
1	P/W Supply Scheme Dandibag	7.7	4.0	190	123	84	25.65	4.86	22.72	40.0	0.17	0.36	0.29	0.43	BDL	ND
2	P/W Supply Scheme AP Colony-1	7.9	7.00	170.0	110	84	27.25	3.88	19.88	20.0	0.25	0.76	0.09	0.53	BDL	ND
3	P/W Supply Scheme AP Colony-2	8.0	5.00	160.0	104	88	17.63	10.7	56.80	140	0.79	0.95	0.19	0.14	BDL	ND
Desirable limit*		6.5-8.5	1	-	500	200	75	30	250	200	0.3	45	200	1	0.01	-
Permissible limit* in absence of alternate source		NR	5	-	2000	600	200	100	1000	600	NR	NR	400	1.5	0.05	**

(Source: Physico - Chemical and Bacteriological Parameters (Report no. PHE/Patna DW-26359-6361/R/Gay/12-13, dated 2/06/2012.)

Note: \*(1) Drinking Water Specification IS: 10500- 2012

(2) BDL = Below Detection Limit,

(3) Testing Methods are taken by APHA 20th Edition.

(4) NR = No Relaxation, ND= Not detected

\*\* (a) Throughout any year, 95% of the samples should not contain coliform organisms in 100ml,

(b) No sample should contain more than 10 coliform organisms per 100ml,

(c) Coliform organisms should not be detected in 100ml of any two consecutive samples.

117. A second set of data is also available from PHED and dates from March 2014. Testing results are shown in **Table 16**. The production tube wells at Azad Park and Delha tap the aquifer under the city. Especially Delha scores badly with values above acceptable levels in 6 counts. Although use of the water for drinking is permissible, it indicates the type of contamination mostly due to local discharge of household wastewater and unlined drain near water source. Conclusion is that the water from this aquifer would not be first priority for use in public water supply. Only after treatment at source and storage water can be supply for the public.

118. Alarming is the positive bacteria count in the Panchayatiya Akhara tube well. It makes it unfit for drinking. The well is not tapping the larger aquifer under the city but is located in the Phalgu River bed.

**Table 16: Physico-chemical and Biological test report**

S.No	Parameters	In Phalgu bed			In aquifer under city		Indian Standards IS: 10,500-2012 Acceptable/ Permissible level
		Dandibagh Pump-1	Panchayatiya Akhara	Manpur	Azad Park	Delha	
1	PH	7.84	7.03	7.64	8.07	7.40	6.5-8.5

S.No	Parameters	In Phalgu bed			In aquifer under city		Indian Standards IS: 10,500-2012 Acceptable/ Permissible level
		Dandibagh Pump-1	Panchayatiya Akhara	Manpur	Azad Park	Delha	
2	Turbidity (NTU)	1	2	3	1	1	1/5
3	Conductivity (( $\mu$ S/cm)	379	650	650	925	2350	-
4	TDS (mg/l)	249	<b>1000</b>	<b>1000</b>	<b>1400</b>	<b>1525</b>	500/2000
5	Total Hardness(mg/l)	140	168	200	<b>244</b>	<b>544</b>	200/600
6	Calcium(mg/l)	40.08	70.04	59.20	<b>84.8</b>	<b>188.8</b>	75/200
7	Magnesium (mg/l)	9.72	25.34	21.31	<b>30.52</b>	<b>67.96</b>	30/100
8	Chloride(mg/l)	36.87	140	124	184	<b>472</b>	250/1000
9	Alkalinity(mg/l)	<b>220</b>	<b>220</b>	<b>216</b>	<b>321</b>	<b>448</b>	200/600
10	Iron(mg/l)	0.09	0.10	0.10	0.10	0.10	0.3/0.3
11	Nitrate(mg/l)	37	25	25	25	25	45/45
12	Sulphate(mg/l)	8.75	10	10	25	75	200/400
13	Fluoride(mg/l)	0.25	0.59	0.36	0.40	0.66	1/1.5
14	Bacteria(+,-)	<5.1	Positive(not safe for drinking)	Negative	Negative	Negative	Not detectable in any 100 ml sample

Source-Public Health Engineering Department-PHD Testing Lab-Gaya, 20-03-2014

Bold value – above the acceptable –desirable limit

119. As part of the hydrogeological investigations of 2014 carried out by the project, water of 10 wells throughout the study area were sampled and analyzed. The results are presented in **Appendix 11**. The wells include both hand-pumped wells and production tube wells. The hand-pumped wells are located in the larger aquifer around and under the city, the production wells tap their water from or near to the Phalgu bed.

## B. Ecological Resources

120. Forest cover map of Bihar is shown below. Total Forest coverage of the state is 7.27% out of the state geographical coverage. As per 2011 assessment Gaya district have forest (medium and open) coverage of 12.66%.





Source: India state of Forest Report 2011

**Figure 9: Forest Map of Bihar**

121. Gaya city was developed along the western banks of the River Phalgu, in the transition between fertile Gengetic alluvial plains extending from Patna, and Chhotanagapur Plateau. Lands surrounding the city, especially on the northern side, are cultivated extensively. With the growing population, the city is grown to the present size occupying the surrounding land that was under agricultural use. There is no natural habitat in the city, and the flora is limited to artificially planted trees and shrubs, and the fauna comprises domesticated animals (cows, goats, pigs and chickens), plus other species able to live close to man (urban birds, rodents and some insects).

122. There is no wildlife sanctuary, national park or sensitive environmental areas in or near the city. Nearest protected area is Gautam Budha Wildlife Sanctuary located at a distance of 50 km south of Gaya. The area of the Sanctuary is about 259 sq. km and is predominantly a hilly terrain and undulating tract which is an extension of Chhotanagapur plateau. Among the wild life found in sanctuary are Tigers, Leopards, Hyenas, Sloth Bear, Wolf, Wild Dog, Wild Boar, Sambhar, Spotted Deer, and Nilgai etc.

123. No wild animals are reported in and around the subproject corridor as the same are located mostly in the city area. Acquisition of forest land will be required for construction of water reservoirs at Ramshilla hills and Brahmayoni hills, both are under protected forest.

124. Rare or Endangered Species: No rare or endangered animal or plant species are reported in the subproject impact zone.

125. **Table 17** below indicates type and approx. number of tree felling. During implementation of project saving of trees will be considered through judicial construction design.

**Table 17: Plant species within the reservoir and approach road areas**

S.No	Name of site	Name of Tree	Remarks
1	Budva Mahadev	<i>Albizia Saman</i> and few scrub ( <i>Junglee</i> ) plant	Need of 2 nos. Tree cutting, NOC from forest Dept., transfer charges to forest Dept. for felling and transportation of trees
2	Mastalipur	Small Nursery plant <i>Moringa oleiferaplant</i>	80 small nursery plants needs to be replanted at other sites- NOC from Gram Panchyat Dept.,Gaya Access road side 2-3 plants needs to be cut
3	Ramshilla hill	<i>Azadirachta indica,</i>	Tree cutting permission from DFO Gaya.Forest land acquisition proposal already sent to state forest department and 1 <sup>st</sup> level of clearance obtained. Approx. 4 nos. of treeneed to be cut.
4	Brahmayoni Hill	Tad tree	Permission for tree cutting from DFO Gaya. Number will be finalized by forest dept.

**C. Economic Development**

126. Gaya has a large number of household industries like production of agarbattis, production of tilkut and lai, power looms and hand looms. Gaya functions as a service centre for the surrounding towns and villages. Commercial activities are located along the important roads of the city. The main vegetable market in the city is the Kedarnath Market. In addition the city has a large number of informal shops. On account of Gaya being an important centre for religious tourism, the city has a large number of affordable accommodations.

127. **Land use Pattern.** The existing land-use distribution of Gaya Municipal Area based on the primary survey is tabulated in Table below.

**Table 18: Existing Land Use of Gaya Municipal Area**

Land Use Categories	Area in Ha	Area in Percentage	
Residential	1170	23.4	
Commercial	36	0.64	
Industrial	59	1.17	
Public Semi Public	27	2.53	
Transportation	164	3.27	
Parks/Open spaces (including Orchards)	108	2.15	
<b>Sub Total</b>	1664	33.2	
Area undeveloped/ natural features	Agricultural & Vacant Land	2699	53.79
	Water bodies (including river)	356	7.1
	Hills	298	5.93
<b>Sub Total</b>		3353	66.8
<b>Total Area under Gaya Municipal Corporation</b>		<b>5017</b>	<b>100</b>

Source: Gaya Master Plan vision 2027

128. The land use in the project corridor comprises of built up areas consist of residential complexes, government/private offices and buildings, educational institutes, religious places and commercial establishments such as shops, hotels, restaurants, etc. The transportation area constitutes of existing roads in the subproject area.

129. **Commercial Activities.** The subproject area is located within Gaya city and the predominant activities in the impact zone are of mixed type including, residential, commercial and institutional houses.

130. Commercial activity will be impacted due to the implementation of the subproject components for laying of distribution mains and rising mains. The new mains will be laid within the available right of way (ROW) of existing road (in shoulders). It has been found through the transect walks along with a team of water supply design engineers that on an average available ROW including the dedicated pedestrian walkway in selected category of roads in Gayacity. The improvement work will be carried out within the ROW in road shoulders. The maximum required width for laying down of different categories of pipeline will be 1.2 m. However, at certain junctions there may be some temporary impacts which may disrupt some business activities in terms of temporary impact on the access. The exact nature of temporary impacts will be known at the time of drawing up of the construction schedule of the contractor which will be documented and mitigated at the time of construction<sup>1</sup> as per the entitlement matrix of the resettlement plan and resettlement framework on case by case basis. To determine the extent of temporary impacts due to the laying of distribution and rising main pipelines within the city, transect walks were undertaken along the proposed networks with focus on the nature of the existing ROW, density of commercial and residential structure, etc.

131. The partial blocking of road will follow particularly in narrow stretch during the time string of action of excavation followed by laying of pipeline, testing of water supply, backfilling of excavated trenches and road restoration. The access to these shops, residences and institutions will be affected for a maximum of 1-2 days.

132. Potential temporary impacts of access disruption for all these shops/commercial establishments can be mitigated through good construction practices which will be the responsibility of construction contractors. Measures are identified in the IEE and include: (i) providing walkways and metal sheets to maintain access across trenches, (ii) increasing the workforce in front of shops/commercial establishments/ sensitive receptors so as to reduce the period of impact, (iii) consulting business and institutions regarding operating hours and factoring this in work schedules, (iv) providing advance information on works to be undertaken including appropriate signages etc. The project contractor will ensure that there is provision of alternate access during the construction so that there is no closure of these shops or any loss of clientage. Moreover, as per the contract provisions, the contractor will be required to put back the road to its original condition after the pipe laying.

133. In case, the loss of access to the shops during construction is not effectively mitigated by provision of alternate access by project contractors same may cause temporary loss of income during the construction for which provision for livelihood allowances have been made in the resettlement plan. There could be temporary disruption of business during

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<sup>1</sup> The excavation of trenches for primary lines will last for a maximum of 1 to 2 days. The construction will be scheduled in such a way as to minimize disruption.

working days for which affected persons will be provided assistance for this transitional period on a case-to-case basis as per the provisions of the Entitlement Matrix in agreed resettlement framework. A lump sum budgetary provision has been kept in the Resettlement plan for same. The payment of assistance will be made for days of closure, and will be subject to the production of requisite documents in support of the claim. Cash assistance will be released after proper verification of documents<sup>2</sup>.

134. A detailed Resettlement Plan has been prepared for rehabilitation and resettlement of parties affected by execution of proposed subproject.

135. The proposed augmentation of water supply system will ensure adequate availability of potable water to various areas in Gaya city.

136. **Industrial Development.** There is no major industrial development in and around Gaya in general. Small scale industries like production of agarbattis, production of tilkut and lai, power looms and hand looms are common. There are few agro-based industries in the city. Tourism is a most important economic activity in the city.

137. **Agriculture.** State is predominantly an agriculture based economy with fertile lands. Gaya region is also rich in agricultural produce, crops like rice, wheat, maize, jowar and other pulses are cultivated here.

138. **Infrastructure Facilities.** Since, the subproject is spread over portions of Gaya City; the infrastructure facilities like schools, hospitals, colleges, electricity and communication in the subproject area are satisfactory.

139. During execution of the proposed subproject, there will be no impact on the main building of any department/ facility, therefore no impact on any educational, administrative or medical service is anticipated.

140. **Water supply.** Piped water supply system in Gaya was introduced in 1924, with Phalgu River as a source. Later on in 1954-55, due to inadequate flow in the river during summers and to cope with the growing water demand, a groundwater based source at Dandibag on the bank of River Phalgu was developed. The water supply system was expanded to different parts of the City from time to time. The present water system is based on groundwater, and 61 MLD of water is supplied every day at the rate of 40 liters per capita per day (LPCD), much less than the stipulated norm of 135 LPCD. Water distribution system consists of 150 km with 50-600 mm Dia. Due to old system leakages are frequent, and the system losses are as high as 40% of the water supply. About 60% of population have access to water supply and remaining population depends on in house own tube wells and hand pumps provided by the GMC and PHED. The PHED is currently implementing a project to expand the water supply system to some uncovered areas. This will augment the supply by additional 16 MLD

141. **Sewerage and Drainage System.** Gaya has no separate sewerage system to carry the wastewater. Existing drainage system was developed in 1930's and is a combined system to carry both wastewater and storm runoff. This drainage system covers 80% of the City area, and consists of open and as well as underground drains: of the 80 km length, 65 km drains are open drains and remaining 15 km are underground closed drains. There is no

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<sup>2</sup>Income certificate or income tax return certificate or any other document proving their income from affected commercial establishment.

defined drainage system in southwestern and southern parts of the City. Due to lack of sewerage system, about 75% of the households depend on individual septic tanks and remaining 25% depend either on public toilets or resort to open defecation. Effluent from the septic tanks joins the drainage system. Owing to the topography, the drainage system is gravity based, and drains mostly into Phalgu River. Since there is no treatment facility, wastewater is directly discharged into the river without any treatment.

142. The drainage of Gaya is influenced by the hills surrounding it on three sides – Mangla Gauri, Shringa Sthan, Ramshila and Brahmayoni – and the River Phalgu on the remaining side. The road to the west of the Collectorate divides the drainage into two zones – western and eastern. Gaya's drainage network is 60kms long – covering 40% of the road network – with 46 km of the drains being pucca and 16km kutchha. The main drains in the western zone include Kujapi, Karimganj and Katari Hill Road Nallah and these discharge effluents at various places like the Gandhi Maidan, near the Railway Station etc. The main drains in the eastern zone include Mansarva, Mashanghat and Nadraganj Nallah and these discharge effluents into the River Phalgu. The area to the north of Dhobi Road Nallah to Katari Hill Road Nala, Gandhi Maidan to Kujapi Nallah and newly developed colonies in Manpur, Ghughari, Monapur, and Kumar Colony have no drainage and are prone to water logging.

143. **Solid Waste.** Gaya generates about 250 tons of municipal solid waste per day. The GMC collects about 60 percent of the waste generated through its solid waste management system. At present there is no door-to-door collection system. The waste collected through community dustbins (about 100 in Nos.) is transported to the disposal sites using tractors and open dumper trucks. Street littering is prevalent, and solid waste is mostly deposited on the side of the roads and vacant lands. At present no specific MSW disposal site exists in the City. Part of the solid waste collected is dumped along the roadsides at Gagri Tand area, 7 km from the City. Remaining waste is dumped in vacant plots, along the roads, drains and low-lying lands in and around the City.

144. **Transportation.** Gaya is well connected by road, rail and air. Two National Highways pass through the City: NH-83 running north-south connects Gaya to Patna in the north and Dobhi in the south; and NH-82 running east-west connects Gaya to Bihar Shariff and Mokama in the east and Dudnagar in the west. A bypass runs on the southern side of the City, connecting NH-82 and NH-83. There are three State Highways (SH) passing through Gaya. Gaya is well connected by railways. Main railway line connecting Kolkata in the east and Delhi and the west passes through the City. Gaya also has an airport. Gaya has a well developed internal road network. The total length of roads in Gaya is 105km, of which 67% are municipal roads and remaining are State and National Highways. Most of the roads in the City are narrow, congested and carries traffic exceeding its capacity. The average road width is 5.5m which is further reduced to 3.5m due to encroachments. There is no organized public transport system. There is heavy dependence on para-transit facilities: auto and cycle rickshaws and tongas (horse-drawn vehicles).

145. **Power Supply.** Thermal power is the main source of energy in Bihar, contribution of hydro power is negligible. State-owned Bihar State Electricity Board is responsible for power generation, transmission and distribution of electricity. Power is supplied from the central grid by overhead cables carried on metal and concrete poles, mainly located in public areas alongside roads. The power supply is erratic and there are frequent outages in warmer months, and large fluctuations in voltage.

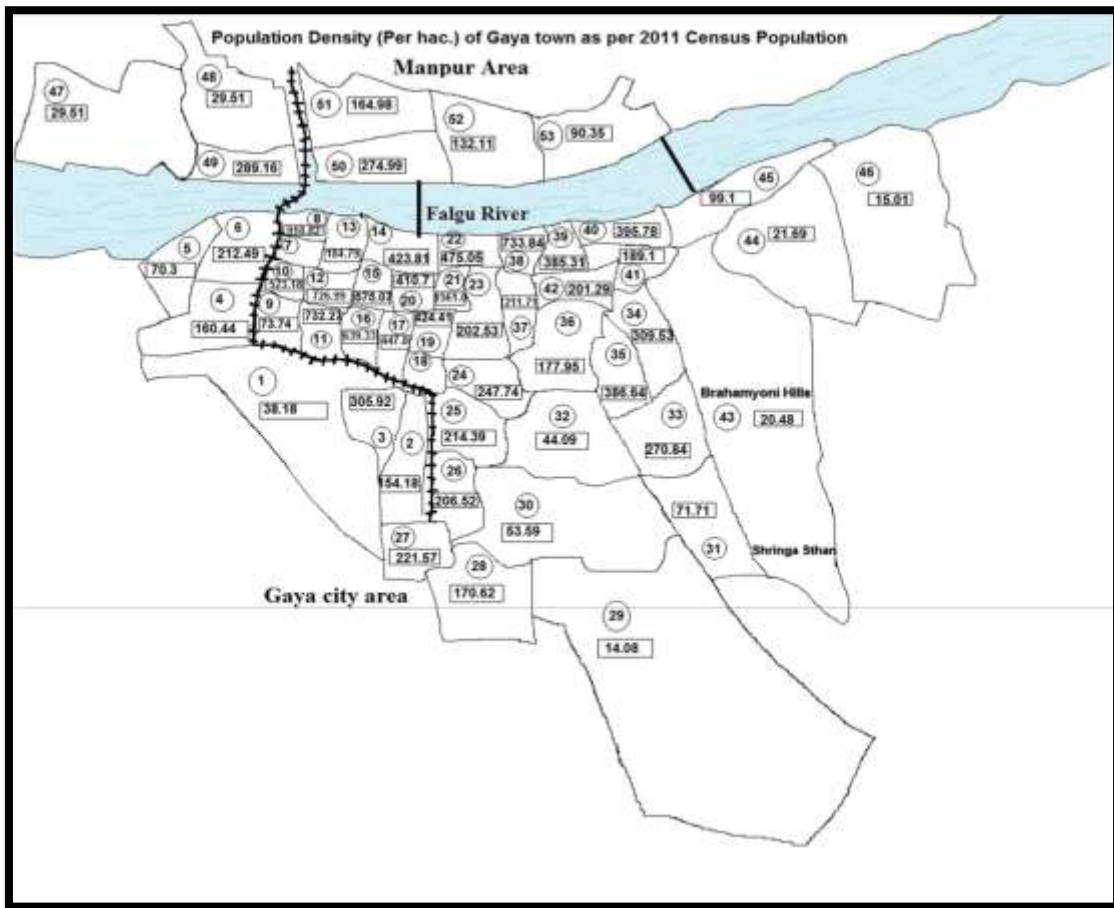
#### D. Social and Cultural Resources

146. **Demography.**Based on 2011 census, Gaya City population was 463,454, up from 291,675 in 1991,registering a decadal growth of around 33%. Average population density is 10,963persons/sq. km. Sex ratio (females per 1000 males) was 886 which is lower than the State and the national average of 919 and 929 respectively. Overall literacy rate is reported at 85.74% with 90.49 % for males and 80.35 % for females (the corresponding State figures are 63.82%, 73.39% and 53.33 % respectively).Overall work participation rate (WPR) in the City is 24.5 %, reported at 39.8% for males and 7.3% for females. Occupational pattern shows that 82.6% of the persons are engaged in industrial and service sector (organized and unorganized, excluding the workers engaged in household industry and agriculture). Around 7.2 % workers are engaged in agricultural activities and the rest 10.2% in household industries.. Majority of the people are Hindus and the remainder are mainly Muslims. Other religious communities like Sikhs, Christians, Jains and Buddhists also found in the City but in few numbers. Main languages spoken in the City are Hindi, Magahi (dialect), Bhojpuri andUrdu. Among the total population 9.6% comprise scheduled castes (SC) population; around 0.2% of population belong to Scheduled Tribes (ST) category - but these are all part of the mainstream population. Demographic status as per 2011 census is shown in Table below.

**Table 19: Demographic status of Gaya city**

<b>Gaya City</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
Population	<b>463,454</b>	245,764	217,690
Literates	<b>346,747</b>	194,377	152,370
Children (0-6)	<b>59,015</b>	30,966	28,049
Average Literacy (%)	<b>85.74</b>	90.49	80.35
Sex ratio	<b>886</b>		
Child Sex ratio	<b>906</b>		

Source: Census 2011



**Figure 10: Ward wise population density at Gaya**

147. **Educational and Health Facilities.** *Education:* There are at present about 117 primary schools, 52 middle schools, 15 inter schools and 3 district levelschools in the city. The availability of basic educational institutions appears to be fairly adequate at thecity level as the average population served is well within the norms for the same.The Magadh University established in 1962, is located at Bodhgaya, which is comfortably accessible from Gaya. Gaya has several colleges, the well known ones include Gaya College, Anugrah MemorialCollege, Jagjivan College, Mirza Ghalib College, and Gautam Buddha Mahila College for women.Anugraha Narayan Magadh Medical College and Hospital (ANMMCH) located here is a renowned institution in the field. There are also few private engineering colleges in the city. Gaya also has an Industrial Training Institute for vocational education located on Bodhgaya Thus, in respect of educational facilities, the availability of basic facilities appears fairly adequate though, spatial distribution has not uniformly facilitated their accessibility.

148. *Health.*At present there are six major hospitals, which caters to the patients from the entire region.In addition to these, there are a number of allopathic, ayurvedic and homeopathic and other dispensaries and private nursing homes of various specializations in Gaya.Thus, in terms of quantitative requirement, the availability of medical facilities appears to be quiteadequate as of now, while the accessibility is not uniform, in view of the location of these facilities onlyin selected areas.

149. **History, Culture, and Tourism.**Gaya, located in Mahadh Region, is a historic and a most important religious centre for Hindus. The world famous Buddhist centre of Bodh Gaya

is located 13 km south of Gaya. The history of Gaya has a unique place in the evolution and development of Hindu civilization. According to the religion of Puranas, it is incumbent on every Hindu to visit Gaya and make offerings for the souls of his ancestors. Gaya is believed to be the one of the oldest existing cities in the World, and it presents a nucleus of several religions (Hinduism, Buddhism, Jainism etc) and its effects.

150. *History:* Magadh history goes back to Sisunaga Dynasty (600 BC); however, it was during the time of Bimbisara (545 BC), the Magadh Region and the Gaya came into prominence. During his reign Gautama Buddha came to Gaya, and spent time in contemplation on a rocky crest, now known as Brahmayoni Hill (it is now a declared monument of the State Government) before he passed on to Bodh Gaya. After Bimbisara, his son Ajatasatru became the King. Ajatasatru was succeeded by Udayi, and then the Nanda Dynasty took over the Magadh Region. Thereafter, Magadh Region came under the rule of the famous Maurya Dynasty. Mauryan King Ashoka (272 BC – 232 BC) embraced Buddhism; he visited Gaya and built the first temple at Bodh Gaya to commemorate Prince Gautama's attainment of supreme enlightenment. Gaya came under the reign of Muhammadan rulers in the 12th century with Muhammad Bakhtiyar Khilji invading the region. The region came into British Rule after the battle of Buxar in 1764.

151. *Places of importance and Tourism.* Gaya City is divided into two parts: the old City of Gaya popularly known as Andar Gaya, and the new City of Sahebganj. Andar Gaya is one of the most ancient inhabited areas. The main attractions of this old City are the sacred shrines, which attract Hindu pilgrims from all over the world. Vishnupada temple is main temple in and around Gaya. **Table 20** presents a list of monuments/sites declared as protected by the Government of Bihar. People mainly visit Gaya for offering Pind Dan (oblations) for salvation of soul of one's ancestors. There are 360 Vedis (places where offerings are made) located within Pancha Kosi Gaya. Thousands of pilgrims visit Gaya throughout the Year. Pitrapaksha Mela (fair), organized for 15 days as per the Hindu calendar every year in Gaya is a very important Hindu festival. Few hundred thousands of people visit Gaya during this period.

**Table 20: Ancient Monuments, Historical and Tourism Places in Gaya**

S.No	Name	Features
1	Vishnupad Temple	This is the main temple in Gaya dedicated to Lord Vishnu. This is located along the Phalgu River, marked by a footprint of Vishnu and Buddha incised into a block of basalt. The present day temple was rebuilt by Devi Ahilya Bai Holkar, the ruler of Indore, in the 18 <sup>th</sup> century. There is a gold flag and couple of Kalash made of gold has been embedded at the top of the temple which use to always glitter
2	Brahmyoni Hill	It was at Brahmayoni hill that Buddha preached the Fire Sermon (Adittapariyaya Sutta) to one thousand former fire-worshipping ascetics, who all became enlightened while listening to this discourse. At that time, the hill was called Gayasisa.
3	Ramshila Hill	Ramshila Hill is situated 5 km from Vishnupad Temple. One of the most sacred hills, with considerable antiquity, the hill is dotted with numerous stone sculptors. It is closely associated with Lord Ram and takes its name after him.
4	Pratishila Hill	Pratishila Hill is situated at Gaya is about 10 km from Ramshila Hill. There is a lake known as Brahma Kund just below this hill, where people take bath and offer Pind Dan. There is a beautiful temple at its top known as Ahilya Bai



S.No	Name	Features
		Temple, built by the queen of Indore in 1787. The unique architecture and magnificent sculptures make the temple an important tourist attraction

Source: [http://asi.nic.in/asi\\_protected\\_monu\\_bihar.asp](http://asi.nic.in/asi_protected_monu_bihar.asp)

152. **Sensitive Environmental Receptors.** The sensitive environmental receptors existing along the alignment of proposed sub-project include religious places, educational institutions, health care centres, community property resources, etc. The details of the existing sensitive environmental receptors near distribution mains are given in the **Table21** below. Locations are shown in design report. These sensitive receptors will be not affected due to implementation of the project.

153. It is noted from the Table below that few religious places, health centers and schools are located within or near the ROW. All the sensitive environmental receptors existing along the subproject sites shall be properly supervised during the subproject execution stage so as to avoid and minimise any negative impact. As such, these sites may face the minor impacts of temporary disruption of access and increased air and noise pollution during execution of the proposed subproject. As per present design proposed construction project involves relocation of nine dwelling units including one Gaya Municipal Corporation (GMC) staff quarter at one site (Ramshilla hill). Also there will be partial impact on 6 households. Rehabilitation & resettlement issue deals separately under Resettlement Plan.

154. Transmission pipelines need to be laid within and nearby the state protected monuments area like Vishnupad Temple, Ramshilla hills, Brahmayoni hill. As per State Archeological Directorate NOC needs to be obtained from State Museum & Archeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar before commencement of the work. NOC is already obtained from State Museum & Archeological Directorate. Practically no historic or religious structure will be impacted during pipe laying only during implementation of project mitigation measures like permission for concerned dept. and their condition will be maintained.

**Table 21: Sensitive environmental receptors along distribution mains**

S.No	Zone	School/college	Temple	Masjid/ Church	Pump House	Water Body/water tank	Hospital	Petrol Pump	Angan badi (Rural education center)
1	Zone-01	5	17	8	6	1	Nil	1	
2	Zone 02	4	14	1		1		1	1
3	Zone 03	1	3	1		1	1		
4	Zone 04		1						
5	Zone 05	4	15			1			
6	Zone 06	1	5	1		1	1		
7	Zone 7	4	11	2	2	8	2		
8	Zone 7A	20	6				1	2	
9	Zone 08		3			3			
10	Zone 09	4	9	6		1	1		

#### IV. ANTICIPATED IMPACTS AND MITIGATION MEASURES

155. This section of the IEE reviews possible subproject-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the subproject's area of influence. As defined previously, the primary impact areas are (i) the sites for tube well, water storage reservoir, distribution and transmission/ rising mains; (ii) main routes/intersections which will be traversed by construction vehicles; and (iii) quarries and borrow pits as sources of construction materials. The secondary impact areas are: (i) entire Gaya city outside of the delineated primary impact area; and (ii) entire Gaya district in terms of overall environmental improvement.

156. This sub project is item rate contract not a DBO contract. Design has been finalized by DSC. In case of any change in location , scope IEE report will be revised by PMC.

157. **Methodology.** Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed subproject; (iii) site visit and professional assessment by environment specialist engaged by the implementing agency; and (iv) evaluation of proposed design scope and potential impacts based on the environment specialist's past experience.

158. Categorization of the subproject has been undertaken using ADB's REA Checklist for Water Supply. REA checklist is attached as **Appendix 1**.

159. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of Gaya city, will not cause direct impact on biodiversity values. The subproject will be in properties held by the local government and access to the subproject locations is thru public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

##### **A. Pre construction - Planning and Design Phase**

160. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. The concepts considered in design of the proposed water supply subproject are: (i) no involuntary land acquisition; (ii) substantial reduction of water losses in sub-project area; (iii) augmentation in adequacy of drinking water supply at the user end; (iv) enhancing the efficiency of existing tube wells; (v) providing adequate infrastructure facilities for storage and distribution of water in deficient areas; (vi) most suitable construction methodology; and (vi) site constraints.

161. **Design Features.** The design standards adopted under this sub-project are from the Central Public Health and Environment Engineering Organization (CPHEEO) Manual on Water Supply published by Ministry of Urban Development, Govt. of India. The same criteria are followed by the Public Health Engineering Department (PHED), the line department.

162. Salient design features are presented in **Table22**.

**Table 22: Salient design features of the subproject**

Parameter	Design Consideration
<b>Refurbishment - Rehabilitation/ replacement of worn-out machineries and electrical devices in tube wells</b>	
<b>Arrangement of chlorinator in tube wellfor disinfection</b>	
Working hours of tube wells	23 hours a day
Power	7.5 to 105 HP
Efficiency of pumps	80% minimum
Type of pumps	Multi-stage submersible pumps and vertical turbine pumps for tube wells
Incoming power supply	1000 KVA 11/0.415 KV transformers (1Working+1Stand by) with necessary protections through 11 KV VCB, LAs and ACB on LT with proper cabling.
<b>Construction of overhead tanks and ground level reservoirs</b>	
Foundation	Open type Reinforced Cement Concrete (RCC) raft
Super structure	RCC cylindrical shaft for overhead
Water tank	RCC cylindrical type
Material of construction of over head tanks	RCC (M30 )
Total storage capacity	22.83 MLD Additional
Minimum storage capacity	20% of the average daily demand
Supply hours	24 hours
<b>Laying and Replacement of distribution pipeline</b>	
Design period	30 years
Pipe diameter range	110 to 700 mm dia.
Net per capita water supply (excluding losses)	135 liters per capita per day
Distribution losses (allowable)	15%
Material of construction for distribution mains and laterals	DI K7 & HDPE pipes
Location	Throughout the Gaya city
Climatic Conditions	Rainfall and its run off in the subproject area may cause disruption/damage to works under execution and public inconvenience. Furthermore, climatic conditions play an important role during dispersion of noise and air pollutants. Seasonal climatic conditions have been considered for scheduling of construction activities. Materials will be used for construction of water storage reservoirs with consideration of extreme weather condition like flood hazard. DI and HDPE pipes will be utilized for distribution main. Those pipes will be not affected from extreme climatic condition like higher temperature and rainfall,
Air Quality <sup>3</sup>	During Construction phase some emissions of dust are anticipated during various transportation, excavation and construction activities. Certain volumes

<sup>3</sup>Roadside pollution is often localized and generally only affects a narrow band of roads along the sides of the road. The major source of roadside pollutants is vehicle exhaust emissions. Other pollution sources emanate from combustion of hydrocarbon fuels in air producing carbon dioxide (CO<sub>2</sub>) and secondary pollutants such as hydrocarbons (HC), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>). Emissions depend on the volume of traffic, the type of vehicle (including age, technology, and maintenance levels of the vehicle), fuel consumption and quality, engine temperature and road geometry. The highest emission rates are encountered in congested, slow moving traffic, and whenever vehicles shift gears, decelerate, accelerate or travel over steep gradients (hill slopes). There is also a tendency for emission rates to increase at high speeds.

Parameter	Design Consideration
	of dust and gaseous emissions will also be generated during the construction period from construction machineries like excavators, vehicles engaged in transportation of construction materials, etc. Pollutants of primary concern at this stage include Respirable Suspended Particulate Matter (PM <sub>10</sub> and PM <sub>2.5</sub> ) and gaseous emissions. However, transportation of construction materials will be confined to adequate trips per day depending upon extent of construction activity. Proper mitigation methods will be adopted to control obnoxious gases and dust generated, if any.
Drainage and hydrology	The subproject components are not expected to have any negative impact on the drainage and hydrology of the area. Runoff from the subproject will produce a highly variable discharge in terms of volume and quality and in most instances will have no discernable environmental impact. As per record the area of Gaya has surplus exploitable ground water potential. Detail hydrological investigation carried out for final conclusion (Ref chapter 10 of hydrological study attached as <b>Appendix 7</b> ).
Ecological diversity	The subproject is situated within an existing built up area of Gaya City except 2 new locations of water storage reservoirs within hills and forest. No areas of ecological diversity occur within the subproject location. Due to the nature and locality of the subproject, it is unlikely to have any impacts on biodiversity within the area. Only at forest area of Ramshilla hill tree felling will be required. No wildlife are present nearby the project location
Land use and livelihoods	The land use in the project corridor comprises of built up area and transportation area. There are few vacant areas in hill. The built up areas consist of residential complexes, government/private offices and buildings, educational institutes, religious places and commercial establishments such as shops, hotels and restaurants. The transportation area constitutes of existing roads in the subproject area. The key efforts undertaken to minimize impacts are: (i) before the preparation of engineering design, a detailed survey of the properties was conducted with regard to their ownership with the objective that minimum proprietary land is utilized for the subproject; (ii) utilizing available state land in possession of government departments for construction of OHSRs & GLSRs, aligning water supply pipelines towards the available government land to minimize impact on private properties and (iii) aligning water supply pipelines in commercial areas wherever possible to avoid any physical displacement or temporary impact. A Resettlement Plan has been prepared to address all involuntary resettlement impacts. No vulnerable people will be affected.
Traffic flow and access	Due to the location and nature of the subproject, there will be no as such interference with accesses to the adjoining properties. A communications strategy is of vital importance in terms of accommodating traffic during temporary road closure. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. The road closure together with the proposed detours will be communicated via advertising, pamphlets, road signages, etc. The implementation of the road detours will also be dependent on advance road signages indicating the road detour and alternative routes. Template for Traffic Management plan is shown as <b>Appendix 12</b>
Infrastructure and services	There are a number of existing infrastructure and services (roads, telecommunication lines, power lines and water pipelines) within the vicinity of the subproject. To mitigate the adverse impacts due to relocation of the utilities, DSC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) require construction contractors to prepare a contingency plan.
Noise and vibrations	During construction phase, some noise and vibration will be generated from the various construction activities like construction works, operation of construction equipment and vehicles engaged in transportation of construction materials. However, these will be confined to the work sites only

Parameter	Design Consideration
	and will be temporary in nature occurring mostly during daytime.
Aesthetics, landscape character, and sense of place <sup>4</sup>	The subproject is considered to be compatible with the surrounding landscape and is not expected to negatively impact the existing visual quality or landscape character of the area. Construction waste, spoil materials will be disposed as per Spoil Management Plan (Template shown in <b>Appendix 13</b> )

DI=ductile iron; GLSR=ground level service reservoir; OHT= overhead tank; MLD= million liter per day; RCC=reinforced cement concrete

Source: DPR Gaya

163. **Design Period:** Different components of the proposed subproject are designed with design periods as under:

- (i) The design period for distribution network is 30 years.
- (ii) The design period for pumps and electrical equipment is 15 years.
- (iii) The design period for civil works is 30 years.
- (iv) The design capacity for storage system is 30 Years (135 lpcd +15% for distribution losses).

164. **Basis of design.** Design population and coverage of the project is given below:

**Table 23: Design basis of the Subproject**

Design feature	Description
Base Year (2018)	5,24,297
Mid-Design Year (2033)	6,75,237
Design Year (2048)	8,48,200
Coverage	53 municipal wards of GMC
Project area	50.17 sq km

Source:DPR Gaya Water supply

165. The Gaya city will be subdivided in 30 DMAs. The designs considered the demands for the year 2018, 2033, and 2048 and available production for the DMAs. The capacity of water storage reservoirs required in each zone has been worked out using the mass flow curves specified in the Indian Manual on Water Supply and Treatment. Similarly water distribution is being planned.

166. **Utilities.** Telephone lines and wires, water lines within the proposed subproject locations may require to be shifted in few cases. To mitigate the adverse impacts due to relocation of the utilities, DSC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services

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<sup>4</sup>Aesthetics refer to the visual quality of an area as imparted by the physical properties of an area, such as scale, colour, texture, landform, level of enclosure, and in particular, the land use occurring within an area. Landscape character refers to an area's intrinsic appeal and is not dependent on its visual quality but rather on its specific situation as determined by the following: its level of accessibility or remoteness, level of naturalness, lack of disturbance, current and potential use, rarity, cultural or historic importance, and potential value to people. The landscape character determines the extent of visual compatibility of the water supply structures with its immediate surroundings. Impacts are not restricted to the vicinity but the entire viewshed (area from where the infrastructure will be visible). The spirit, or sense of place (Genius Loci), can be defined as the extent to which a person can recognise or recall a place as being distinct from other places and as having a vivid, or unique, or at least a recognizable character. It indicates the intrinsic value that a community places on the aesthetic, therapeutic or emotional qualities and character of an area. Aesthetics, landscape character and sense of place are all subjective concepts that are often influenced by individuals' perceptions.

during construction phase; and (ii) require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

167. **Water Supply.** A different but no less significant impact is the effect on people and communities if water supplies are closed down for extended periods when work is conducted on the network. This would be inconvenient in the short term, and there could be health risks if the water supply was unavailable for several successive days or longer. It will therefore be important to take the necessary measures to avoid such a situation. This will require PIU, GMC and appointed contractor during construction period to:

- (i) Plan the construction program to keep the cessation of water supplies to the minimum possible (in both area and duration);
- (ii) In coordination with PHED, provide alternative potable water to affected households and businesses for the duration of the shut-down; and
- (iii) Liaise with affected persons to inform them of any cessation in advance, and to ensure that they are provided with an alternative supply.

168. **Encroachment into private properties, forestland and cutting of trees and damage to vegetation.** Construction works in the Gaya city area, distribution pipe and rising main lines are to be laid on or along the roads in the un-used vacant land adjacent to the roads within the ROW. In narrow roads where there is no vacant land adjoining road, pipeline will be buried within the roadway. However, considering the narrow and busy lanes, temporary impacts are likely during construction stage.

169. No private land acquisition is required for construction of water storage reservoirs and allied components.

170. At 2 locations transfer of forest land will be required. 1st level of clearance has been obtained from DFO Gaya. In case of tree felling permission will be taken up from forest dept.

171. Gaya district falls in Seismic Zone III, which is a moderate risk zone and an earthquake up to a magnitude of 7.0 on Richter scale has the potential to hit the area. As per the seismic design philosophy laid in IS: 1893, 2002, the structures are designed such a way that it can withstand all Design Basis Earthquake (DBE) which are basically minor and medium ground shaking and it should not collapse but have cracks which are repairable during Maximum Considered Earthquake (MCE) which are basically major shaking. Thus as per the provision of the seismic code the structures are designed in such a way that in no case it will collapse. The present structures are also designed in line with the above provision of the IS 1893.

172. **Social and Cultural Resources.** Gaya is an area of large numbers of temples (some of them are historic) and other religious sites, so there is a risk that any work involving ground disturbance can uncover and damage archaeological and historical remains. For this subproject (construction of water storage reservoirs and laying of pipeline), excavation will occur in open area, so it could be that there is a medium risk of such impacts. Nevertheless, DSC/PMU/PMC will:

- (i) Consult GMC to obtain an expert assessment of the archaeological potential of the site;
- (ii) Consider alternatives if the site is found to be of high risk;

- (iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and
- (iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

173. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these near the subproject locations. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation and drinking water supply systems. Thickly populated residential areas will not be considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the forest, water bodies or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings. Locations are selected without impacting the local habitation. **Appendix 10** shows site management plan for water storage reservoir sites.

174. **Site selection for equipment lay-down and storage area.** Improper selection will affect local environment and inconvenience to public. Possible mitigation measures are,

- Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.
- Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children / animals etc.
- Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.
- Equipment lay-down and storage areas must be designated, demarcated and fenced if necessary.
- Fire prevention facilities must be present at all storage facilities.
- Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas.
- These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
- Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.
- Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.

175. **Site selection of sources of materials.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural



drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Mining Department approved sites would be selected first. If other sites are necessary, these would be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas even if some distance from construction activities. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Urban Local Body. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PIU/PMU/PMC.

176. **Maintaining Core Labour Standard.** The Contractor and PMU are responsible for ensuring that international CLS<sup>5</sup> –as reflected in national labour laws and regulations are adhered to. PMU is ultimately responsible for monitoring compliance with national labour laws and regulations, provided that these national laws are consistent with CLS. ADB will carry out due diligence – during loan review missions - to ensure that executing and implementing agencies and contractors comply with applicable (national) core labour standards and labour laws. PMU/PIU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labour laws and core labour standards on: (a) prohibition of child labour as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labour; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. These will be monitored as part of the project's safeguards reporting requirements.

## B. Construction Phase

177. **Table24** presents an indication of what activities and facilities are likely to be undertaken during construction of the subproject, including the associated inputs and outputs.

**Table24: Summary of Activities and Facilities, Resource Use, and Produced Outputs during Construction Phase**

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production
<ul style="list-style-type: none"> <li>• Construction camp and its associated facilities (including lay-down areas)</li> <li>• Storage camps and lay-down areas               <ul style="list-style-type: none"> <li>– Materials and</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Bitumen</li> <li>• Cement</li> <li>• Chemical additives used in concrete</li> <li>• Aggregate (sand and stone)</li> </ul>	<ul style="list-style-type: none"> <li>• Old asphalt (removed from road carriageway during laying of pipelines)<sup>6</sup></li> <li>• Waste concrete and other construction rubble</li> <li>• Waste bitumen<sup>7</sup></li> </ul>

<sup>5</sup>Core Labor Standards (CLSs) are a set of four internationally recognized basic rights and principles at work: (i) freedom of association and the right to collective bargaining; (ii) elimination of all forms of forced or compulsory labor; (iii) effective abolition of child labor; and (iv) elimination of discrimination in respect of employment and occupation.

<sup>6</sup> The water supply improvement works affecting roads may involve the stripping and demolition of old asphalt layers. Ideally, old asphalt shall be reused during construction of the new road in order to avoid large quantities of waste being produced. However, depending on the availability and cost of virgin aggregate in the area through which the road is aligned, reusing the old asphalt may be more costly than using virgin aggregate.

<sup>7</sup> Bitumen has relatively low levels of polycyclic aromatic hydrocarbons (PAHs) and is largely inert. However, certain other potentially hazardous chemical may be added to the bitumen or to the aggregate during the construction process in order to render the compound more workable. The objective is to use the least hazardous

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production
<ul style="list-style-type: none"> <li>equipment stockpiles</li> <li>- Handling and storage of hazardous materials including chemicals additives, gravel, cement, concrete and lubricants</li> <li>• Source of water</li> <li>• Vegetation clearance</li> <li>• Excavation</li> <li>• Drilling</li> <li>• Movement of construction staff, equipment and materials</li> <li>• Importation of selected materials for construction.</li> <li>• Temporary bypass</li> <li>• Noise and vibrations</li> <li>• Dust suppression</li> <li>• Waste production and temporary storage/disposal i.e. used fuels, waste concrete and bitumen, spoil materials and general waste</li> <li>• Use of bitumen/asphalt</li> <li>• Erosion prevention particularly at hill areas</li> <li>• Concrete batching plant (and associated storage and mixing areas, chemicals)</li> <li>• Rehabilitation of disturbed areas</li> <li>• Interaction between construction workforce and local communities</li> <li>• Management of the passing pedestrians and points of congestion</li> <li>• Implementation of the Resettlement Plan (as per R &amp; R policy) prior to start of construction</li> <li>• Reminders to affected people of construction with timeframes</li> </ul>	<ul style="list-style-type: none"> <li>• Gravel (fill material and selected material for sub-base and base layers)</li> <li>• Water <ul style="list-style-type: none"> <li>- Drinking, cooking and sanitation at construction camps</li> <li>- Water for dust suppression</li> <li>- Water applied to base and sub-base layers during compaction</li> <li>- Water for application to sub-base and base layers prior to compaction</li> </ul> </li> <li>• Petrochemicals</li> <li>• Other chemicals/lubricants/paints</li> <li>• Construction vehicles, machinery and equipment</li> <li>• Temporary energy supply to construction camps</li> <li>• Labour <ul style="list-style-type: none"> <li>- Recruitment of construction workforce</li> <li>- Skills training</li> </ul> </li> <li>• Public movement control <ul style="list-style-type: none"> <li>- need barriers (not just caution/danger tape) to protect people from trenches during construction</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Used fuels, lubricants, solvents and other hazardous waste</li> <li>• General waste</li> <li>• Contaminated soil <ul style="list-style-type: none"> <li>- Soil contaminated with bitumen</li> <li>- Soil contaminated with petrochemicals (i.e. oils and lubricants) and other chemicals</li> </ul> </li> <li>• Sewage and grey water (temporary construction camp sanitation)</li> <li>• Spoil material (excess soil removed during excavations for rehabilitation)</li> <li>• Noise and vibrations (construction vehicles and machinery operation)</li> <li>• Lighting at construction camps, equipment yards and lay-down areas</li> <li>• Smoke and fumes <ul style="list-style-type: none"> <li>- Burning of vegetation cover</li> <li>- Fires used for cooking and space heating (construction camps)</li> <li>- Vehicle exhaust emissions</li> </ul> </li> <li>• Dust <ul style="list-style-type: none"> <li>- Vehicle &amp; equipment movement</li> </ul> </li> </ul>

## 1. Screening of No Significant Impacts

178. The construction work is expected not to cause major negative impacts, mainly because:

- (i) Most of the activities will be on the built-up areas of Gaya city thus could be constructed without causing impacts to biodiversity;

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chemicals available and to locate asphalt plants, aggregate stockpiles and mixing areas where they do not pose a significant environmental risk.

- (ii) All the sites are located on an government-owned land which is not occupied or used for any other purpose;
- (iii) Overall construction program will be relatively short and is expected to be completed in 42 months with activities to be conducted by small teams and specified location so most impacts will be localized and short in duration; and
- (iv) Most of the predicted impacts associated with the construction process are produced because the process is invasive, such as involving excavation for pipe laying and construction of reservoirs. However the routine nature of the impacts means that most can be easily mitigated and the impacts are clearly a result of the construction process rather than the design or location, as impacts will not occur if excavation or other ground disturbance is not involved.

179. As a result, there are several aspects of the environment which are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These are shown in **Table 25**. These environmental factors are screened out presently but will be assessed again before starting of the construction activities.

**Table 25: Fields in which construction is not expected to have significant impacts**

<b>Field</b>	<b>Rationale</b>
Topography, Drainage, and Natural Hazards	Activities are not large enough to affect these features.
Geology, Geomorphology, Mineral Resources, and Soils	Activities are not large enough to affect these features. No mineral resources in the subproject location.
Climate	Activities are not large enough to affect this feature.
Air Quality	Short-term production of dust is the only effect on atmosphere
Geohydrology and Groundwater	Activities will not be large enough to affect these features
Protected Areas	No protected areas nearby the Gaya city and project locations
Flora and Fauna	No rare or endangered species reported at project site
Land Use	No change in major land use.
Socio-economic	Subproject site is within govt. Land. No socio economic impact
Commerce, Industry, and Agriculture	Activities are not large enough to affect these features
Population	Activities are not large enough to affect this feature.
Health and education facilities	Activities are not large enough to affect this feature.
Historical, Archaeological, Paleontological, or Architectural sites	No scheduled or unscheduled historical, archaeological, paleontological, or architectural sites

## **2. Construction method**

180. Rehabilitation of tube well will be done through replacement of mechanical and electrical equipments manually.

181. Renovation of water reservoirs will be done as per scope of work. All construction waste will be disposed after taking permission from the GMC. Simple civil construction method will be applicable for new reservoir.

182. Distribution mains and rising/ transmission mains will be buried in trenches adjacent to roads un-used RoWs. In some areas occupied by drains or edges of shops and houses, trenches may be dug into the edge of the road to avoid damage to utilities and properties.

183. Trenches will be dug using a backhoe/manual, supplemented by manual digging where necessary. Excavated soil will be placed alongside, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by hand or using ropes for the Ductile Iron (DI) pipes. Pipes will be joined by hand, after which filling will be done with the excavated soil manually upto the ground level and compacted by a vibrating compressor. Where trenches are dug into an existing roadway, the bitumen or concrete surface will be broken by hand-held pneumatic drills, after which the trench will be excavated by backhoe, and the appropriate surface will be reapplied on completion.

184. Pipes are normally placed by approx 1 m below the existing ground level/road level and a clearance of 200 mm is left between the pipe and each side of the trench to allow backfilling. Trenches will be smaller for the distribution main (minimum of 1m deep and 1 m wide).

185. New pipes and connections to the distribution main will be provided to house connections, and these will run to individual dwellings in small hand-dug trenches, or on the surface. New consumer meters will be located outside houses, attached to a wall or set onto the ground.

### **3. Anticipated Impacts and Mitigation Measures**

186. Although construction of the subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject locations in the built-up areas of Gaya city where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration. Physical impacts will be reduced by the method of working and scheduling of work, whereby the project components will be (i) constructed by small teams working at a time; (ii) refilled and compacted after pipes are installed; (iii) if trenching done on roads, repaired to pre-construction conditions and (iv) any excavation done near sensitive area like school, religious places and house will be protected as per standard norms<sup>8</sup>.

187. **Climatic Impact.** Potential impacts during construction are,

- The nature and intensity of rainfall events in an area, has implications for storm water management.
- Smoke from burning activities could be wider spread on windy days especially when dust could be blown off site.

#### **Mitigation measure:**

- ✓ Seasonal climatic variations will be considered during scheduling of construction activities in the area.
- ✓ Consideration of suitable season (non monsoon /lien period) for major construction activity

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<sup>8</sup> Occupational Health and Safety of employees working only in factories and mines have been specifically covered in GOI laws. However, the Constitution of India has provisions to ensure that the health and well-being of all employees are protected and the State has the duty to ensure protection. For this subproject, the mitigation measures were based on the World Bank Environmental, Health, and Safety (EHS) Guidelines.

- ✓ Excavations and other clearing activities will only be done during agreed working times and permitted weather conditions.
- ✓ Storm water control (through drainage, diversion) during construction phase as per the method approved by the Engineer.

188. **Sources of Materials.** Significant amount of gravel, sand, and cement will be required for this subproject. The construction contractor will be required to:

- (i) The material sources permitted by government;
- (ii) Verify suitability of all material sources and obtain approval of PIU & DSC; and
- (iii) Submit to DSC on a monthly basis documentation of sources of materials.

189. **Air Quality.** Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the construction sites. Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) but temporary and during construction activities only. To mitigate the impacts, construction contractors will be required to:

- (i) Consult with DSC/PIU on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
- (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
- (iii) Avoiding the need to stockpile on site;
- (iv) Use tarpaulins to cover sand and other loose material when transported by trucks;
- (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and regular servicing of the vehicles& equipments off site in order to limit gaseous emissions; and
- (vi) Excess earth and other windblown loads in transit will be kept covered

190. **Surface Water Quality.** Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate water body. These potential impacts are temporary and short-term duration only and to ensure these are mitigated, construction contractor will be required to:

- (i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with GMC/PIU on designated disposal areas;
- (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;

- (v) Dispose any wastes generated by construction activities in designated sites; and
- (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

191. **Noise Levels.** There are no health facilities, scheduled or unscheduled historical, archaeological, paleontological, or architectural sites within the construction impact zones. However, construction works will be on settlements, along and near schools, and areas with small-scale businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation equipment, and the transportation of equipment, materials, and people. Impact is negative, short-term, and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan activities in consultation with DSC/PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor;
- (iv) Ensure that machinery is in a good state of maintenance.
- (v) Monitor noise levels in potential problem areas, and
- (vi) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

192. **Traffic & Accessibility.** Hauling of construction materials and operation of equipment on-site can cause traffic problems. Road safety concerns due to slow moving construction vehicles are also an impact.. Traffic flow within the vicinity will be affected. The temporary road closure will result in a decrease in overall network performance in terms of queuing delay, travel times/ speeds. Also pedestrian movements will be affected by the temporary road closure or traffic diversion.

193. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (ii) Schedule transport and hauling activities during non-peak hours;
- (iii) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (iv) Keep the site free from all unnecessary obstructions;
- (v) Drive vehicles in a considerate manner;

- (vi) Coordinate with Govt. Traffic Department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

194. Sample Traffic Management Plan is attached as **Annexure 12**.

195. **Social, Socio-Economic Including Income.** The subproject components will be located in Government land. Construction works will impede the access of residents to specific site in limited cases. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

- (i) Contractor's activities and movement of staff to be restricted to designated construction areas.
- (ii) Conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times.
- (iii) Leave spaces for access between mounds of soil;
- (iv) Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- (v) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
- (vi) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- (vii) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- (viii) Contractor shall submit to Engineer the confirmation obtained from the business/shop owner that such access was provided during project execution on the specified format titled "Confirmation from Operator of Commercial establishment/shop for provision of temporary Access by Contactor". This format is appended as **Appendix 14**.
- (ix) Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.
- (x) The site must be kept clean to minimize the visual impact of the site.
- (xi) Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include:
  - noise generated by jackhammers, diesel generator sets, excavators, etc.
  - drilling
  - dewatering pumps
- (xii) Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract

- (xiii) A complaints register (refer to the Grievance Redressal Mechanism) shall be housed at the site office.

196. **Socio-Economic – Employment.** Manpower will be required during the 42-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

- (i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
- (ii) Secure construction materials from local market.

197. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. World bank Environmental, Health, and Safety (EHS) Guidelines - EHS Guidelines for water & sanitation will be followed(<http://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2Band%2BSanitation.pdf?MOD=AJPERE>). The construction contractor will be required to:

- ✓ Designate a safeguard focal person and undertake safeguards orientation by PMC/ DSC
- ✓ Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H and S Training<sup>9</sup> for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents (approval will be required from PMC before implementation;
- ✓ Strict compliance of H&S plan and requirements of wearing personal protective equipment (PPE) during work hours;
- ✓ Provide specific guidance for suitable PPE for every on-site work assignment.
- ✓ Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- ✓ Provide medical insurance coverage for workers;
- ✓ Secure all installations from unauthorized intrusion and accident risks;
- ✓ Provide supplies of potable drinking water;
- ✓ Provide clean eating areas where workers are not exposed to hazardous or noxious substances;

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<sup>9</sup> Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.



- ✓ Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- ✓ Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- ✓ Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- ✓ Ensure moving equipment is outfitted with audible back-up alarms;
- ✓ Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- ✓ Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

198. There should be official notification related to penalties for non compliance of safety issues.

199. **Community Health and Safety.** Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. In most of the cases location of project sites at isolated area, hence health and safety risk to community is minimum. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan routes to avoid times of peak-pedestrian activities.
- (ii) Liaise with DSC- PIU in identifying risk areas on route cards/maps.
- (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- (iv) Provide road signs and flag persons to warn of dangerous conditions, in case of location near the road.
- (v) Provide protective fencing around open trenches, and cover any open trench with metal planks during non-construction hours.

200. **Work Camps.** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Consult with DSC-PIU before locating project offices, sheds, and construction plants;
- (ii) Minimize removal of vegetation and disallow cutting of trees;
- (iii) Provide water and sanitation facilities for employees;

- (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
- (v) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (vi) Recover used oil and lubricants and reuse or remove from the site;
- (vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (viii) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (ix) Request DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

201. **Social and Cultural Resources.** For this subproject, excavation will occur at specific isolated location and along the roads, so it could be that there is a moderate risk of such impacts. Nevertheless, the construction contractor will be required to:

- (i) Strictly follow the protocol for chance finds in any excavation work;
- (ii) Request DSC- PIU or any authorized person with archaeological/historical field training to observe excavation; and
- (iii) Stop work immediately to allow further investigation if any finds are suspected; State Department of Archaeology will be contacted if any heritage resources or objects, defined in the Act, be discovered and all activities will be ceased until further notice.

**C. Operation and Maintenance Phase**

202. **Table26** presents an indication of what activities and facilities are likely to be undertaken during operation and maintenance of the subproject, including the associated inputs and outputs.

**Table26: Summary of Activities and Facilities, Resource Use, and Produced Outputs during Operation and Maintenance Phase**

Activities and Facilities	Inputs/Resource Use	Outputs/Waste Production
<ul style="list-style-type: none"> <li>• Signages</li> <li>• Safety barriers</li> <li>• Noise and vibrations</li> <li>• Litter collection</li> <li>• Maintenance activities               <ul style="list-style-type: none"> <li>- Repairing and maintenance of pipelines, pumps and machinery of tube wells,</li> <li>- Maintenance of OHTs, GLSRs and pipelines</li> </ul> </li> <li>• Eradication and control of invasive vegetation species</li> <li>• Auxiliary activities and Infrastructure               <ul style="list-style-type: none"> <li>- Markets and shops</li> </ul> </li> <li>• Ground water quality monitoring during operation and maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Control of vegetation species</li> <li>• Labour</li> <li>• Control of quality of supplied water</li> <li>• Vehicles and equipment used for inspections and maintenance</li> <li>• Aggregate and other material used during repairing of pump &amp; machinery of tube wells, pipelines, machinery and maintenance of OHTs, GLSRs</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle exhaust emissions</li> <li>• Dust</li> <li>• Potential for water resource contamination</li> <li>• Visual exposure of water supply infrastructure</li> <li>• Waste/worn out material removed during maintenance</li> <li>• Noise and vibrations</li> </ul>

Parameters as per Indian standard		
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### 1. Screening out areas of no significant impact

203. Because a water supply system should operate without the need for major repair and maintenance, there are several environmental sectors which should be unaffected once the system begins to function. These are identified in **Table 27** below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be mentioned further.

**Table 27: Fields in which Operation and Maintenance of the Water Supply Component is not Expected to have Significant Impacts**

Field	Rationale
Climate	No impact expected
Wildlife, forests, rare species, protected areas	There are no wildlife, forests, rare species, and protected areas.
Coastal resources	Gaya is not located in a coastal area.
Industries	The water supplied by the new system will not be for industrial use

### 2. Operation and Maintenance of the Improved Water Supply System

204. O & M of the water supply system will be the responsibility of GMC. A small number of people will be employed to operate and maintain the tube well, reservoir and pipelines. GMC will employ local contractors to conduct repairs, and contractors should be required to operate the same kinds of Health and Safety procedures as used in the construction phase to protect workers and the public.

205. The system have a design life of 30 years, during which shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the pumps and other equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

206. The main O&M activities of the refurbished infrastructure will be detection and repair of leaks and pipe bursts. These are, however, likely to be minimal as proper design and selection of good quality pipe material should mean that leaks are minimal. Leak repair work will be similar to the pipe laying work as earlier explained. Trenches will be dug to reveal the leaking area; pipe will be removed and replaced if necessary.

### 3. Anticipated Environmental Impacts and Mitigation Measures

207. **General.** If trenches are will be dug to locate and repair leaks or remove and replace lengths of pipe or illegal connections, the work will follow the same procedures during the construction stage. GMC needs to require its O and M contractor to:

- Refill and re-compact trenches soil and backfilled sand will be removed to expose the leaking junction or pipe;
- Conduct work during non-monsoon period; and

- Cover or wet excavated material to prevent dusts.

208. **Health & safety issues.** Adverse impacts on the appearance of surrounding environment and exposure of workers to hazardous debris. Improvement of water supply system is expected to significantly enhance the quantity and quality of the supplied water. Reduction in leakages will ensure adequate supply of potable drinking water minimizing contamination risks with corresponding reduction in health risks to the citizens.

209. Mitigation measure include, Follow World bank EHS guidelines during operation phase

- Undertake regular monitoring and maintenance of water supply infrastructure.
- Regular chemical & biological testing of tube well (ground water) from supply sites. Parameters are as per Indian standard
- Sewage water will be treated in STP before discharge into environment, which will protect environment

210. **Storage of Common salt as chemical used in water treatment at tube well site.** The impact associated with loss of chemical due to poor storage. Mitigation measures include,

- Storage should be in dry place
- Storage should be minimum
- Material safety data sheet to be maintained at chlorine/ common salt storage area
- Regular laboratory testing for dosing and residual chlorine
- Chlorination in water will be done as per CPHEEO manual and ensure residual chlorine within permissible limit.
- Trained workers will be depute for selected dosage of chlorine to be added in the water supply

211. **Ecological Resources.** There are no significant ecological resources in or around the city as well as project location, so any repairs or maintenance work can be conducted without ecological impacts.

212. **Economic Development.** There are no major anticipated economic development impacts during O and M of the facilities. Nevertheless GMC needs to require its O and M contractor to:

- (i) Inform all residents, businesses and sensitive receptors about the nature and duration of any work well in advance so that they can make preparations if necessary;
- (ii) Consult city authorities regarding any such work so that it can be planned to avoid traffic disruption as far as possible, and road diversions can be organised if necessary.

213. The provision of an improved and expanded water supply system is not expected to have direct economic benefits for business or industry, as connections will only be provided to domestic users. However businesses will almost certainly benefit from the expected

improvement in the health and well-being of their workforce as this should result in fewer days lost through illness, and overall increased productivity.

214. **Social and Cultural Resources.** Although there is a medium risk of excavation in the city discovering material of historical or archaeological importance, there will be no need to take precautions to protect such material when areas are excavated to repair.

215. Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, hospitals, temples, tourist sites etc, so the same precautions as employed during the construction period should be adopted. GMC needs to require its O and M contractor to:

- (i) Consult the city authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (ii) Complete work in these areas quickly;
- (iii) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

216. The citizens of the Gaya city will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. In addition to improved environmental conditions, the subproject will improve the over-all health condition of the town as diseases of poor sanitation (such as diarrhoea and dysentery) will be reduced.

217. **Appendix 15** depicts Indian Standards for Drinking Water - Specification (Bureau of Indian Standard, BIS 10500: 2012). The standard indicates desirable and permissible limit of drinking water under Indian condition.

#### **D. Cumulative Environmental Impacts**

218. As per present scope of work refurbishment of existing tube wells, construction of new OHTs & GLSR and laying of new rising mains and distribution pipelines will ensure adequate supply of potable water to the water deficient areas and low pressure area. Also water loss will be checked through development of the project, which will save energy. The proposal for rehabilitation of water supply facilities goes a long way in achieving some of the goals of a good urban water supply system. Cumulative impact is positive, which involves development of the city with better water supply system. At the same time there will also be reduce the health risks associated with contamination of water due to leakages in water supply pipelines. Metering of connections shall substantially reduce the non revenue water losses in the selected areas, which is also treated as positive cumulative impact towards development of a city.

219. **Table 28** presents the cumulative impacts which are impacts that result from the incremental impact of the subproject activity on a common resource when added to the impacts of other past, present, or reasonably foreseeable future activities. Cumulative impacts are identified, predicted in the same level of detail as the impacts discussed above.

#### **E. Assessment of No-Go (No Build) Option**

220. **Table29** outlines potential impacts associated with the “No-Go” option. The No-Go option involves no additional commitment of resources. Choosing the No-Go option has the same effect as if the decision never occurred.

**Table28: Summary of Anticipated Potential Cumulative Environmental Impacts**

Environmental Aspect	Summary of Implications and Mitigation	
	Potential Impacts	Mitigation
Significant enhancement in water production and storage facilities in water deficient areas of Gaya.	<ul style="list-style-type: none"> <li>Refurbishment of existing tube wells, construction of new OHTs &amp; GLSR and replacement of old pipes and laying of new rising mains and distribution pipelines shall ensure adequate supply of potable water to the water deficient areas and low pressure area</li> </ul>	<ul style="list-style-type: none"> <li>Refer to tables above</li> </ul>
Significant reduction in water losses due to leakage in distribution pipe lines.	<ul style="list-style-type: none"> <li>Laying of new distribution mains and replacement of old pipelines through laying of new parallel pipeline shall ensure significant reduction in water losses.</li> <li>This will also reduce the health risks associated with contamination of water due to leakages in water supply pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to tables above</li> </ul>
The rationalization and reorganization of water supply system	<ul style="list-style-type: none"> <li>It is important to provide better water supply facilities so as to ensure adequate supply of potable water to the user end.</li> <li>The proposal for rehabilitation of water supply facilities goes a long way in achieving some of the goals of a good urban water supply system.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to tables above</li> </ul>
Minimization of non revenue water losses	<ul style="list-style-type: none"> <li>Metering of connections shall substantially reduce the non revenue water losses in the selected areas.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to tables above</li> </ul>
Landuse	<ul style="list-style-type: none"> <li>It is expected that improvement in the water supply system of the water deficient areas will act as a catalyst for overall development of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to tables above</li> </ul>

**Table 29: Summary of Anticipated Potential Environmental Impacts of the No Build Options**

Environmental Aspect	Summary of Implications and Mitigation	
	Potential Impacts	Mitigation
Climate	<ul style="list-style-type: none"> <li>No obvious impacts</li> </ul>	<ul style="list-style-type: none"> <li>n/a</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Will remain the same</li> <li>No impacts on sensitive receptors during construction</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
Geology	<ul style="list-style-type: none"> <li>No obvious impacts</li> </ul>	<ul style="list-style-type: none"> <li>n/a</li> </ul>
Drainage and hydrology	<ul style="list-style-type: none"> <li>No obvious impacts</li> </ul>	<ul style="list-style-type: none"> <li>n/a</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>The water deficient areas shall continue facing the same impacts and their development shall be hindered.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>No obvious impact</li> </ul>	<ul style="list-style-type: none"> <li>n/a</li> </ul>
Health and Safety	<ul style="list-style-type: none"> <li>Subproject areas will continue facing health risks owing to degradation in water quality due to leakages in pipelines and storage reservoirs</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
Noise and dust Pollution	<ul style="list-style-type: none"> <li>Noise and dust pollution will remain the same.</li> <li>No impacts on sensitive receptors during construction.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
Aesthetics, Landscape Character and sense of place	<ul style="list-style-type: none"> <li>Likely to deteriorate as sanitation of the area depends largely on availability of water supply.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>



## **V. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION**

### **A. Project Stakeholders**

221. The primary stakeholders are:

- (i) Residents, shopkeepers and businesspeople who live and work alongside the roads in which improvements will be provided and near sites where facilities will be built;
- (ii) Custodians and users of socially and culturally important buildings in affected areas;
- (iii) State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts; and

222. The secondary stakeholders are:

- (i) Urban Development Housing Department (UDHD) as the Executing Agency and Bihar Urban Infrastructure Development Corporation Ltd (BUIDCo) as implementation agency;
- (ii) Other government institutions whose remit includes areas or issues affected by the subproject (state and local planning authorities such as PHED, GMC);
- (iii) Forest Department, ASI, State archeological department;
- (iv) Non-government organizations (NGOs) and community-based organizations (CBOs) working in the affected communities;
- (v) Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- (vi) The beneficiary community in general; and
- (vii) ADB, GoI, GoB and Ministry of Finance.

### **B. Public participation during the preparation of the IEE**

223. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments and concerns) with regard to the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

224. The following methodologies have been used for carrying out public consultation:

- Local communities, individuals affected and owners and employees of affected commercial establishments who are directly or indirectly affected were given priority while conducting public consultation.
- Walk-through informal group consultations in the proposed subproject area.

- The local communities had been informed through public consultation with briefing on project interventions including its benefits.
- The environmental concerns and suggestions made by the participants were listed out, discussed and suggestions were accordingly incorporated in the EMP.

225. Different techniques of consultation with stakeholders were used during project preparation (interviews, official meeting, public meetings etc). Questionnaire was designed and environmental information was collected. Apart from this, a series of public consultation meetings were conducted during the subproject preparation. Various forms of public consultations (consultation through adhoc discussions on site) have been used to discuss the subproject and involve the community in planning the subproject design and mitigation measures.

226. **Table 30** show the person consulted during preparation of IEE, information collection and capturing their views.

**Table 30: List of Official person consulted during preparation of IEE**

S.No	Name	Designation	Place	Date	Issue Discuss	Remarks
1	Dr Atul Kumar Verma	Director Archaeology, State of Bihar	Secretariat, Patna	30.12.2013	On archaeological protected site within the project area of Gaya and procedure to get NOC	Bramiyoni hill, Pretshilla, Ramshilla and Vishnupad temple these are state archaeological protected sites within Gaya city. List of Archaeological sites in Bihar collected from the Dept. Application for getting NOC needs to be submitted after finalization of design
2	Mr. Madan Singh Chouhan	Superintending Archaeologist	Central Archaeology Department, ASI, Patna	20.12.2013	About the place of Gaya under archaeology Dept and procedure for getting NOC	Suggested to get NOC from State Dept
3	Mr. S. N. Jaiswal	Scientist	Pollution Control Board, Patna, Bihar	02.01.2014	Secondary/ published Data of Air, Water, Noise for Gaya	Water and Air data provided
4	Mr. A. K Srivastava	Water Lab Incharge	Pollution Control Board, Patna, Bihar	02.01.2014	Water Quality Data for Gaya	Dandibagh ground Water Data Received. Understanding of contamination of ground water.
5	Mr. Arun Kumar	Air Lab In-charge	Pollution Control Board, Patna, Bihar	02.01.2014	Air quality Data for Gaya	Air Data received. Understanding air pollution status
6	Mr. Dipak Kumar	Executive Engineer	Gaya Municipal Corporation	09.01.2014	About the pipeline which was laid down by Krioloskar and regarding advantage of proposed project	Information on present status of pipeline as laid down by Kirloskar

7	Mr. Sailendra Kumar	Chemist	PHED, Gaya	13.11.2013	Groundwater quality	Collection of Ground Water Data
8	Mr. K. P. Sharma	Retd. Executive Engineer	SPUR	09.01.2014	About the existing water supply system and water quality. Discussed specifically about Ward 53	Existing water supply information map data provided
9	Mr. T.P. Sharma	Retd. Ex. En	SPUR	09.01.2014	About the existing water supply system and water quality. Discussed specifically about Ward 53	Existing water supply information map data provided
10	Mr. K. Nesamani	Divisional Forest Officer	Divisional Forest Office, Gaya Forest Division	10.01.2014	About the forest area of Gaya and procedure for getting NOC from State Forest Dept.	After finalization of design form will be filled up and submitted to state forest Department

227. Also discussion was held with the local people during site visit. Issues discussed are:

- Awareness and extent of knowledge about the subproject.
- Information on the benefits of the subproject in terms of economic and environmental enhancement.
- Information on perceived losses from the proposed subproject during execution stage in terms of temporary disturbance like loss of access to residences, commercial establishments/shops, institutions, etc., traffic problem and increase in air and noise pollution, etc. during construction.
- Drinking water and other problems encountered if any
- Necessity of tree felling etc. at project sites
- Labour availability in the Project area or requirement of outside labour involvement
- Presence of any historical/cultural site in the vicinity.
- Presence of any protected area/wetland in or adjoining the construction site.
- Information on economic development in terms of creation of an important urban facility and generation of direct employment during the execution of the subproject.

228. Public consultations and group discussion meetings were conducted by PMC and PMU during 9<sup>th</sup> to 11<sup>th</sup> January 2014, 5<sup>th</sup> to 6<sup>th</sup> February 2015, 23<sup>rd</sup> February 2015 and 6<sup>th</sup> March 2015 at Gaya. The objectives were to appraise the stakeholders about the program's objectives and safeguard issues. The Kick-off Meeting in Gaya was also concluded on 5<sup>th</sup> of December 2013 for inculcate a common understanding about the Project within the GMC officials and elected members. Minutes of the kick off meeting and local level consultations are attached as **Appendix 16** and **17** respectively. The major issues raised are related to possible dust and noise

problems during construction phase movement of vehicle/ machinery and construction activity. Other comments include construction vehicles creating some disturbances to the local people daily activities, necessity of proper safety arrangements. The issues and comments have been considered and incorporated in the design of the subproject and mitigation measures for the potential environmental impacts raised during the public consultations.

### **C. Future Consultation and Disclosure**

229. Program Management Unit of BUIDCoextended and expanded the consultation and disclosure process significantly during implementation of BUDIP. They are in the process of appointing an experienced NGO to handle this key aspect of the program. The NGO continuously (i) conducts a wide range of activities in relation to all subprojects in the city; and (ii) ensures the needs and concerns of stakeholders are registered and are addressed in proposed subproject design.

230. For this subproject, the NGO/Public Relationship and Community Development Specialist will develop, in close coordination with PMU and safeguard specialists of PMC, a public consultation and disclosure program which is likely to include the following:

- (i) Consultation during detailed design:
  - (a) Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary; and
  - (b) Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.
- (ii) Consultation before start of construction activity:
  - (a) Public meetings with affected communities (if any) to discuss and plan work program and allow issues to be raised and addressed once construction has started; and
  - (b) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation;
- (iii) Project disclosure
  - (a) Communications strategy is of vital importance in terms of accommodating traffic during road closure, if any. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. The road closure, if any, together with the proposed detours will be communicated via advertising, pamphlets, road signages, etc. Public information campaigns via newspaper/radio/TV, etc. wherever

required, to explain the subproject details to a wider population. Public disclosure meetings at key project stages to inform the public of progress and future plans.

231. Information, Education and Communication (IEC) materials for the sub project will be developed using mass-media techniques. Design of the systems and delivery of the messages will be responsibility of the NGO in consultation with the PMU/PMC. The process will include:

- ✓ Preparing education and awareness materials such as posters, billboards and streamers for community display
- ✓ Developing Leaflets and stickers for general awareness of all community members
- ✓ Television spots/messages of about 30 seconds duration
- ✓ Discuss with the PR team at PMU/PMC on the 'key messages' to be disseminated (indicated in table below)
- ✓ Videos
- ✓ Newspaper advertisements
- ✓ Any other suitable modern techniques

<b>Key Messages to Specific Target Groups</b>		
Sl.No.	Target Group	Key Message
1	All Citizens	<ul style="list-style-type: none"> <li>○ Good citizens are those who pay bills on time, have legal connection, &amp; avoid water wastage.</li> <li>○ Only good citizens can demand good services.</li> </ul>
2	Slum Dwellers	<ul style="list-style-type: none"> <li>○ Safe storage of water; seek individual HH Legal connections.</li> </ul>
3	Middle/Upper Class	<ul style="list-style-type: none"> <li>○ Pay bills on time; give up illegal connections.</li> </ul>
4	Business Centres/ Councillors	<ul style="list-style-type: none"> <li>○ Discourage illegal connections; exhort to pay bill on time;</li> <li>○ Participate in planning process by ULB &amp; PHED.</li> </ul>
5	Municipal Officers/ Municipal Supervisors/ Workers	<ul style="list-style-type: none"> <li>○ Support to water supply project, PHED to facilitate improved services;</li> <li>○ Communicate link between improper services &amp; water or vector borne diseases.</li> </ul>
6	Water Supply Dept. Workers, PHED Staffs	<ul style="list-style-type: none"> <li>○ Support to water supply project;</li> <li>○ Good water services means better work environment;</li> <li>○ To meet with the state level norms</li> </ul>
7	Media	<ul style="list-style-type: none"> <li>○ Good water services are good for families; it attracts more business &amp; industry</li> </ul>
8	School Teachers / Students	<ul style="list-style-type: none"> <li>○ Clean water means healthier lives &amp; better education.</li> </ul>

232. For the benefit of the community the summary of IEE will be translated in the local language and made available at: (i) BUIDCo office; (ii) District Magistrate Office; and, (iii) PIU/GMC. It will be ensured that the hard copies of IEE are kept at such places which are conveniently accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE will be placed in the official website of the BUIDCo and the official website of ADB after approval of the IEE by ADB. The PIU will issue Notification on the locality-wise start date of implementation of the subproject. The notice will be issued by the PIU in local newspapers one month ahead of the implementation works. Copies of the IEE will be kept in the PMU/PIU office and will be provided to any person willing to consult the IEE.

## **VI. GRIEVANCE REDRESSAL MECHANISM**

233. A common Grievance Redress Mechanism (GRM) will be put in place to redress social, environmental or any other project and/or subproject related grievances. The GRM described below has been developed in consultation with stakeholders, including affected persons and NGOs.<sup>10</sup> Customer Service Centres (CSC) proposed in each town, including a central CSC will serve as the focal points for registration of grievances. The APs will also be encouraged to lodge their complaints through phone or email or post and seek a complaint registration number either through the CSCs or directly, through the project grievance redress cell at PIU

234. The Grievance Redress Mechanism provides an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project. A Grievance Redress Cell will be established at PIU; the safeguards officer of PIU, supported by the social safeguards expert and social mobilisers of DSC will be responsible for conducting periodic community meetings with affected communities to understand their concerns and help them through the process of grievance redressal including translating the complaints into Hindi or English from the local language, recording and registering grievances of non-literate affected persons and explaining the process of grievance redress mechanism. All expedient and minor grievances will be resolved at project level; should the PIU fail to resolve any grievance within the stipulated time period, the PMU will be consulted and suggested actions by PMU taken by PIU with DSC support, within specified time. PIU will also be responsible for follow-through for each grievance, periodic information dissemination to complainants on the status of their grievance and recording their feedback (satisfaction/dissatisfaction and suggestions).

235. The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. All grievances – major or minor, will be registered. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from the PIU supported by DSC will try to successfully resolve them. In case of larger issues, they will seek the advice and assistance

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<sup>10</sup>The draft Grievance Redress Process has been circulated and discussed with the following Bihar-based NGOs and research institutes working on environment, social and gender issues, for comments: Asian Development Research Institute, Participatory Research in Asia, Nav Manas Kalyan Samiti and Taru Mitra.

of the PMU.<sup>11</sup> Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the City Level Committee/Grievance Redress Committee. GRC notification at state level has been issued on 27.05.2015.

236. City Level committees will be set up to monitor project implementation in each town. In its role as a Grievance Redress Committee (GRC), the CLC will meet every month (if there are pending, registered grievances), determine the merit of each grievance, and resolve grievances within specified time upon receiving the complaint-filing which the grievance will be addressed by the state-level Project Steering Committee (PSC). The PSC will resolve escalated/unresolved grievances received. Grievances related to land acquisition, rehabilitation and resettlement remaining unresolved by PSC will be referred by affected persons to the Land Acquisition, Rehabilitation and Resettlement Authority, if constituted during the project period in the state, or, to appropriate courts of law.<sup>12</sup> The multi-tier GRM for the project is outlined below (Figure 11), each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required. The GRC will continue to function throughout the project duration. The PMU has issued a notification to tranche 1 and 2 project towns to establish the respective city level GRCs, with details of composition, process of grievance redress to be followed, time limit for grievance redress at each level, etc.

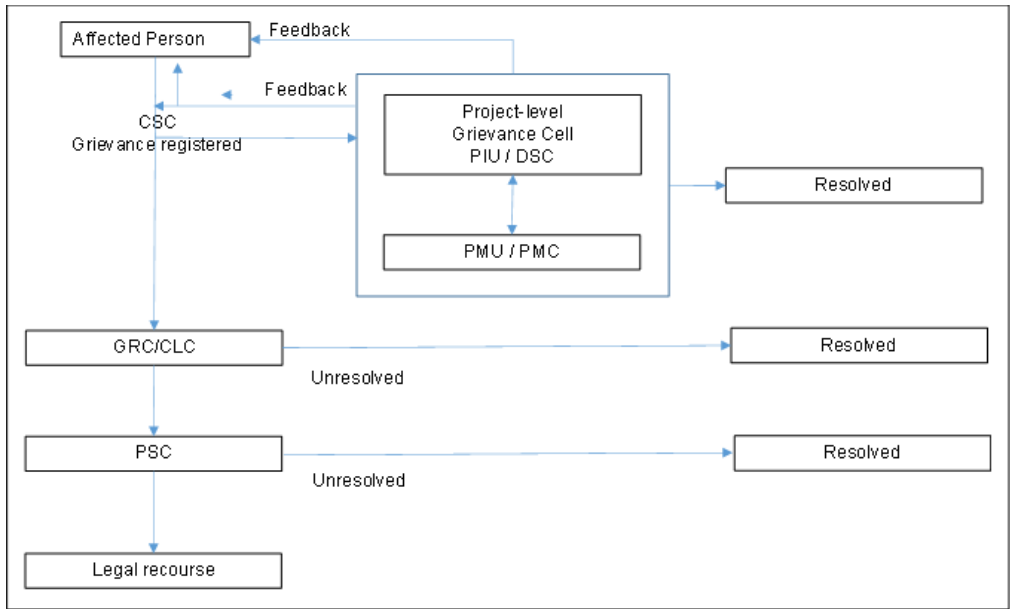
237. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB India Resident Mission (INRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

238. **Composition of GRC and PSC:** The CLC, acting as GRC will have District Magistrate (Chairperson), Mayor, Municipal Commissioner, Head, PIU (Convener), and City Level Heads of relevant departments (such as BRJP, Road Construction Department, PHED, Electricity Board, State Pollution Control Board, Police, etc. and departments such as Forest Department, Railways etc.); Chairpersons of the concerned Municipal Corporation's Standing Committee; ULB officials including Municipal Engineer, Town Planning Officer, Medical and Health Officer; representatives from the affected village panchayat and / or community, if any, eminent citizens, CBOs and NGOs. The GRC/CLC must have a minimum of two women members. In case of any indigenous people impacts in future subprojects, the GRC/CLC must have representation of the affected indigenous people community, including at least one female indigenous person, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.

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<sup>11</sup> The grievance redress mechanism cannot address expropriation related issues. Grievances related to the award of compensation can be addressed by the district collector's office and court of law.

<sup>12</sup> The land acquisition, rehabilitation and resettlement authority is required to be set up in every state as per LARR Act, 2013. The authority is not in place in Bihar yet. Until such time that the authority is constituted in the state, aggrieved parties will be able to directly approach the courts of law at any stage.



**Figure 11: Grievance Redress Mechanism Process**

**CLC=city level committee, CSC=customer service center, GRC=grievance redress committee; GRM=grievance redress mechanism, PIU= project implementation unit, PMU =project management unit, PSC=project steering committee**

239. The PSC will include the Minister for Urban Development (Chairperson), State Chief Secretary (Vice Chairperson), and Ministers, Directors and/or representatives of other relevant government ministries and departments, e.g., Finance, Planning, PHED, Roads, BRJP, etc., Mayors of respective municipal corporations and the project director (Member Secretary and Convener) as members.

240. **Areas of Jurisdiction:** The areas of jurisdiction of the GRC—headed by the District Magistrate will be (a) all locations/sites within the district where sub-project facilities are proposed, or (b) their areas of influence within the District. The PSC shall have jurisdictional authority across the State (i.e., areas of influence of sub-project facilities beyond district boundaries, if any).

241. **Consultation Arrangements:** This will include regular group meetings and discussions, at least twice during resettlement plan preparation, with affected persons by the social safeguards personnel of DSC and PIU. During the first year of RP implementation, such meetings will take place on a quarterly basis, while in subsequent years; these meetings will be held at least twice a year. The consultation arrangement thus envisaged is intended to address both general and/or specific individual grievances through a participatory approach. Besides, the consultative process is meant to be flexible to provide timely mitigation of grievances of the APs. The most complex cases will be dealt with through one-to-one consultation with particular APs by a host of actors comprising social safeguard expert of DSC and Resettlement Officer, PIU, with the support of PMU and PMC as and when required. DSC will be responsible for ensuring that non-literate affected persons and/or vulnerable affected persons are assisted to



understand the grievance redress process as well as for encouraging them to register complaints and follow-up with relevant authorities at different stages in the process.

242. **Recordkeeping:**Records of all grievances received,including contact details of complainant,date the complaint was received,nature of grievance,agreed corrective actions and the date these were effected and final outcome will be kept by PIU(with the support of CSCs and DSC) and submitted to PMC.

243. **Information Dissemination Methods of the GRM:**The PIU, assisted by DSC will be responsible for information dissemination to affected persons on grievance redressal procedure. ULB-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through theconsultation and participation plan. Public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated. The PIU environment and social safeguard officers will be assisted by design and supervision consultant (DSC) safeguards specialists with information/collateral/awareness material etc. and in conducting project awareness campaigns. The campaign will ensure that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per project Resettlement Framework including. who to contact and when, where/ how to register grievance, various stages of grievance redress process, time likely to be taken for redressal of minor and major grievances, etc.Grievances received and responses provided will be documented and reported back to the affected persons. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU and PIU offices, ULB/concerned local panchayat notice boards and on the web, as well as reported in the semi-annual environmental monitoring reports to be submitted to ADB. A Sample Grievance Registration Form has been attached in **Appendix 18**.

244. **Review and Documentation:Periodic review and documentation of lessons learned.**The PMU safeguard officers will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism,especially on the PIU'sability to prevent and address grievances

245. **Costs:** All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the PMU.

## **VII. ENVIRONMENTAL MANAGEMENT PLAN**

246. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between the DSC (Engineer), contractors, and PIU/ PMU/ PMC. The EMP identifies three phases of development as: (i) site establishment and preliminary activities; (ii) construction phase; and (iii) post construction/operational phase.

The Contractor shall comply with all applicable national, provincial, and local environmental laws and regulations. The Contractor shall (a)comply with the measures relevant to the contractor set forth in the Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA), the Environmental Management Plan (EMP) and any corrective or preventative actions set forth in a Safeguards Monitoring Report that the Employer will prepare from time to time to monitor implementation; (b) make available a budget for all such environmental and social measures;(c)

provide the Employer with a written notice of any unanticipated environmental impacts that arise during construction, implementation or operation of the Project that were not considered in the IEE or EIA, the EMP and prepare required actions; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction; and (f) submit to Employer monthly monitoring report on EMP Implementation. The IEE (including EMP) is attached hereto as Appendixes.

247. The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensuring that safety recommendations are complied with.

248. A copy of the EMP must be kept onsite during the construction period at all times. The EMP will be made binding on all contractors operating on the site and will be included in the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. It shall be noted that the Supreme Court of India<sup>13</sup> mandates that those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventive measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).

249. The Contractor is deemed not to have complied with the EMP if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of clauses;
- if environmental damage ensues due to negligence;
- the contractor fails to comply with corrective or other instructions issued by the Engineer/PMU/PIU within a specified time; and
- the Contractor fails to respond adequately to complaints from the public.

#### **A. Institutional Arrangement**

#### **B. Capacity Building**

250. Training and orientation program shall be organized by the Environmental Specialist of PMC and PMU for the contractors, laborers, and technical and office staff of the contractors, site engineers of DSC and the relevant staff of the PIU for building their capacity with regards to principles and procedures of environmental management, pollution abatement measures, public

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<sup>13</sup> Writ petition no 657 of 1995. The Supreme Court, in its order dated 4 February 2005, that "The Polluter Pays Principle means that absolute liability of harm to the environment extends not only to compensate the victims of pollution, but also to the cost of restoring environmental degradation. Remediation of damaged environment is part of the process of sustainable development."

consultation and participation, health and safety measures, grievance redressal mechanism and implementation of EMP.

**Table 31: Training Program for Environmental Management**

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
<b>A. Pre-Construction Stage</b>					
<b>Module 1- Sensitization Workshop</b>	<p><b>INTRODUCTION TO ENVIRONMENT ISSUES- Sensitization Workshop</b></p> <ul style="list-style-type: none"> <li>✓ Basic Concept of Environment &amp; Environmental consideration of development project</li> <li>✓ Explanation on ADBs SPS 2009 Guidelines, what are the different safeguard documents required to be prepared by the Project – Environment Assessment &amp; Review Framework, EIA/IEE, Environment Management Plan (EMP)</li> <li>✓ Environmental Regulations and Statutory requirements as per Government of India, Government of Bihar and ADB</li> </ul>	Secretaries, Chief Engineer, Superintendent Engineers of PHED, ULB, PMU; Project Manager, ESMC of PMU, Safeguard Officer of PIU, Concerned Engineers of DSC	Workshop	¼ Working Day	PMC / ADB Environment Safeguard Specialist
<b>Module 2</b>	<p><b>Season 1 Environmental Considerations in Urban Development Projects</b></p> <ul style="list-style-type: none"> <li>✓ Environmental components affected by urban development in construction and operation stages- BUDIP case</li> <li>✓ Rules and Regulations need to comply for implementation of BUDIP</li> <li>✓ Activities causing pollution during construction and operation stages – BUDIP case</li> <li>✓ Environmental Management Good</li> </ul>	<ul style="list-style-type: none"> <li>▪ PIU/PMU</li> <li>▪ DSC</li> <li>▪ Concerned Engineers from PHED, ULB and relevant dept.</li> </ul>	Lecture	¼ th Day	Environmental Specialist of PMC

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
	Practices in Urban Infrastructure Projects – BUDIP case				
	<p><b>Season 2</b>  <b>Review of EIA/ IEE and its Integration into Designs</b></p> <ul style="list-style-type: none"> <li>✓ EIA/ IEE Methodology</li> <li>✓ Environmental Provisions in the EMPs</li> <li>✓ Identification of mitigation measures and study of alternatives.</li> <li>✓ Implementation Arrangements</li> <li>✓ Methodology of Assessment of Pollution Monitoring</li> <li>✓ Methodology for site selection of borrow areas, waste disposal areas etc.</li> <li>✓ Incorporation of mitigating measures in the project design and contracts, co- ordination between the safeguard specialists and the design team, to ensure site visits are conducted by the design team and safeguard specialists.</li> </ul>	<ul style="list-style-type: none"> <li>▪ PIU/PMU</li> <li>▪ DSC</li> <li>▪ Concerned Engineers from ULB and relevant dept.</li> </ul>	Lecture	¼ th Day	Environmental Specialist of PMC
	<p><b>Season 3</b>  <b>Improved Coordination with other Departments</b></p> <p>Overview of the Project  Environmental Impacts  Statutory Permissions  Procedural Requirements  Cooperation and Coordination with other Departments</p>	PIU/PMU DSC Concerned Engineers from PHED, ULB and relevant dept.	Lecture	¼ th Day	Environmental Specialist of PMC
	<p><b>Season 4</b>  <b>Special Issues in the Project</b></p> <ul style="list-style-type: none"> <li>✓ Bio-Diversity Assessment and Conservation</li> <li>✓ Statutory Permissions (specifically for the project)– Procedural Requirements</li> <li>✓ Consultation and</li> </ul>	<ul style="list-style-type: none"> <li>▪ PIU/PMU</li> <li>▪ DSC</li> <li>▪ Concerned Engineers from PHED, ULB and relevant dept.</li> </ul>	Lecture	¼ th Day	Environmental Specialist of PMC

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
	<p>Counseling- Public consultation – sharing the project details and getting the opinion of the people especially in the case of displacement, incorporating the suggestions of the people in design as feasible and minimization of environmental impact.</p> <p>✓ Grievance redressal mechanism – institutional arrangements</p>				
<b>Module 3</b>	<b>Role during Construction</b> Roles and Responsibilities of officials/ contractors/ consultants towards protection of environment Implementation Arrangements	<ol style="list-style-type: none"> <li>1. PIU/PMU</li> <li>2. DSC</li> <li>3. Construction contractor</li> </ol>	¼ th Day	Lecture	Environmental Specialist of PMC
	If a half day site visit can be organized to a site where good practice has been adopted by the project to avoid impact, it will be a case study for the participants		½ Day	Field visit	Environmental Specialist of PMC, ESMC PMU
	Group Exercise – to discuss the issues identified during the field visit and how to address it, followed by an open house for questions		¼ th Day	Group Discussion	Environmental Specialist of PMC, ESMC PMU, Safeguard officer of PIU, Engineer of DSC, Construction contractor
	Monitoring and Reporting System		¼ th Day	Lecture	Environmental Specialist of PMC

251. Environmental Management Plan is prepared for pre construction, construction and post construction stages.

252. **Table 32** outlines the site establishment and preliminary activities.

253. **Table 33** outlines management of construction activities and workforce.

254. **Table 34** outlines the post-construction activities.

**Table32: Generic EMP: Site Establishment and Preliminary Activities - Design phase**

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
1.	Legislation, permits and agreements	In all instances- covering Environment & Forest, BUIDCo, implementation agency, contractors and consultants must remain in compliance with relevant local and national legislation.	SO- PIU, E- DSC	ES- PMC, ESMC- PMU, EE- PMU	Prior to moving onto site and Quarterly during construction
		Proof of compliance to Air Act & Noise Act must be forwarded by the contractor to PMU/PMC/PIU (in relation to hot mixing, batch mix plants, stone crushers, diesel generators, etc. if any)	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC- PMU, EE- PMU	Prior to moving onto site and Quarterly during construction
		Forest land clearance, NOC from forest Dep. for renovation work, clearance from State Museum & Archaeological Directorate	SO-PIU, DSC	ES- PMC, ESMC- PMU, EE- PMU	Prior to moving onto site and Quarterly during construction for compliance
		A copy of the EMP must be kept on site during the construction period	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC- PMU, EE- PMU	At all times
2.	Access to site <sup>14</sup>	Access to site at all water storage reservoir and tube well locations will be via existing roads. The Contractor will need to ascertain the existing condition of the roads and repair damage due to construction. Site management plan and alignment of approach road to site needs to be followed	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Prior to moving onto site and monthly
		The Local Traffic Department must be informed at least a month in advance if the traffic in the area will be affected (if any)	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Prior to moving onto site and quarterly
		The location of all affected services must be identified and confirmed.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Prior to moving onto site and quarterly

<sup>14</sup> Access to site and traffic management shall be done in accordance to the directions of Engineer

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		All roads for construction access must be planned and approved by the Engineer and its Environmental Specialist ahead of construction activities. They shall not be created on an ad-hoc basis.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Prior to moving onto site and during construction - quarterly
		No trees, shrubs or groundcover may be removed or vegetation stripped without the prior permission of the Engineer/Environmental Specialist	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	Before and during construction- semi annually
3.	Setting up of construction camp <sup>15</sup>	Choice of site for the Contractor's camp requires the Engineer's/ ES permission and must take into account location of local residents, businesses and existing land uses, including flood zones and slip / unstable zones. A site plan must be submitted to the Engineer for approval.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During surveys and preliminary investigations and prior to moving onto the site
		The construction camp may not be situated on a floodplain or on slopes greater than 1:3 (Horizontal : Vertical ratio). Preferable slope 1:1 (plain land) or 1:2 (marginal slope)	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During surveys and preliminary investigations and prior to moving onto the site- quarterly monitoring
		Private land needs to be avoided. If no option NOC from pvt party will be required	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site establishment and ongoing – monthly inspections
		In most cases, on-site accommodation will not be required. The construction camp can thus be comprised of: <ul style="list-style-type: none"> <li>• site office</li> <li>• designated first aid area</li> <li>• separate eating areas</li> <li>• storage areas</li> <li>• batching plant (if required)</li> <li>• refueling areas (if required)</li> </ul>	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During set-up and monthly

<sup>15</sup> Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		<ul style="list-style-type: none"> <li>• maintenance areas (if required)</li> <li>• crushers (if required)</li> </ul>			
		The camp must be properly fenced and secured	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site establishment and ongoing –monthly inspections
		The Contractor shall make adequate provision for temporary toilets (gender specific) for the use of their employees during the Construction Phase. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site establishment and ongoing – weekly inspections
		Bins shall be provided at convenient intervals for disposal of waste within the construction camp.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and ongoing- weekly
4.	Establishing equipment lay-down and storage area <sup>16</sup>	Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During site set-up
		Storage areas shall be secured so as to minimize the risk of crime. They shall also be safe from access by children / animals etc.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
		Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During site set-up and monthly
		Equipment lay-down and Storage areas must be designated, demarcated and fenced if necessary.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly

<sup>16</sup> Storage areas can be hazardous and unsightly and can cause environmental pollution if not designed and managed carefully.



Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		Fire prevention facilities must be present at all storage facilities.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
		Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
		These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
		Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
		Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and monthly
5.	Materials management – sourcing <sup>17</sup>	Prioritize sites already permitted by the Mining Department	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	On receipt of natural materials
		Contractors shall prepare a source statement indicating the sources of all materials (including sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to the Engineer for approval prior to commencement of any work.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	On award of contract and continued quarterly

<sup>17</sup> Materials must be sourced in a legal and sustainable way to prevent offsite environmental degradation.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of DSC	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	On receipt of natural materials and continued quarterly
6.	Education of site staff on general and environmental conduct <sup>18</sup>	Ensure that all site personnel have a basic level of environmental awareness training.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During staff induction and ongoing monthly monitoring
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During staff induction, followed by ongoing weekly
		All employees must undergo safety training and wear the necessary protective equipments (e.g helmets, gloves, gumboots, nose mask, ear plugs as per type of work) and clothing.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During staff induction, followed by monthly monitoring
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: <ul style="list-style-type: none"> <li>• no alcohol/drugs on site;</li> <li>• prevent excessive noise;</li> <li>• construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility);</li> <li>• no fires permitted on site;</li> <li>• trespassing on private/commercial properties adjoining the site is</li> </ul>	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During staff induction, followed by ongoing monthly monitoring

<sup>18</sup> These points need to be made clear to all staff on site before the subproject begins.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		forbidden; <ul style="list-style-type: none"> <li>other than pre-approved security staff, no workers shall be permitted to live on the construction site; and</li> <li>no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do.</li> </ul>			
7.	Social impacts <sup>19</sup>	Open liaison channels shall be established between the contractors and interested and affected parties such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	Prior to moving onto site and ongoing monthly
		Road closure (if any) together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	Prior to moving onto site and ongoing monthly
		Advance road signage indicating the road detour and alternative routes (if required). Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	Prior to moving onto site and ongoing monthly
		Storage facilities and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During surveys and preliminary investigations and site set-up. Monthly monitoring
8.	Conservation of the natural environment <sup>20</sup>	No vegetation may be cleared without prior permission from the Engineer.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During site setup and quarterly
		Trees that are not to be cleared shall be marked beforehand with danger tape. The	SO-PIU, E- DSC,	ES- PMC, ESMC-	During site set-up and as per requirement

<sup>19</sup>It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work.

<sup>20</sup> Alien plant encroachment is particularly damaging to natural habitats and is often associated with disturbance to the soil during construction activities. Care must be taken to conserve existing plant and animal life on and surrounding the site.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		PIU/ES-PMC /Engineer (DSC) must be given a chance to mark vegetation that is to be conserved before the Contractor begins clearing the site.	Contractor	PMU, EE- PMU	
9	Set-up of waste management procedure	The excavation and use of rubbish pits on site is forbidden.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Monthly monitoring
		Burning of waste is forbidden.	E- DSC, Contractor	ES- PMC, EE- PMU	Monthly monitoring
10	Social and Cultural Resources	(i) Consult Archaeological Survey of India (ASI) or concerned dept. of Tripura Govt. to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; (iii) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During site set-up and ongoing quarterly
11	Core Labour Standard (CLS)- safety and compliance	Monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. DSC will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to	SO-PIU, E- DSC, Contractor	ES- PMC, ESMC-PMU, EE- PMU	During site set-up and ongoing quarterly

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		employees and local communities surrounding the project sites.			
12	Occupational health & safety	Comply with IFC EHS Guidelines on Occupational Health and Safety- ref. ( <a href="http://www.ifc.org/ifcext/enviro.nsf/Content/Environmental%20Guidelines">www.ifc.org/ifcext/enviro.nsf/Content/Environmental Guidelines</a> )  Mitigation measures as mentioned during construction phase to be followed	Contractor	SO-PIU, ES- PMC, ESMC- PMU, EE- PMU	During site set-up and ongoing monthly.
13.	Security and safety	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	During site set-up and continued monthly
		Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Monthly
		Flammable materials shall be stored as far as possible from adjacent residents / businesses.	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Monthly
		All interested and affected parties shall be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples are: <ul style="list-style-type: none"> <li>stringing of power lines</li> <li>earthworks / earthmoving machinery on steep slopes above houses / infrastructure</li> <li>risk to residences along haulage roads / access routes</li> </ul>	SO-PIU, E- DSC, Contractor	ES- PMC, EE- PMU	Week prior to activity and monthly to be continued

DSC: Design and Supervision Consultant, E: Engineer, EE: Environmental Engineer, ES: Environment Specialist, ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant, PMU: Project Management Consultant, SO: Safeguard Officer

**Table 33: Generic EMP: Management of Construction and Workforce Activities- Construction phase**

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
1	Climatic impact	<ul style="list-style-type: none"> <li>✓ Seasonal climatic variations will be considered during scheduling of construction activities in the area.</li> <li>✓ Consideration of suitable season (non monsoon /lien period) for major construction activity</li> <li>✓ Excavations and other clearing activities will only be done during agreed working times and permitted weather conditions.</li> <li>✓ Storm water control (through drainage, diversion) during construction phase as per the method approved by the Engineer.</li> </ul>	E- DSC, Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Quarterly monitoring
2.	Maintenance of construction camp and work site	The Contractor must monitor and manage drainage of the camp site to avoid standing water and soil erosion.	E- DSC, Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		Run-off from the camp site must not discharge into neighbors' properties.	E- DSC, Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		Toilets are to be maintained in a clean state and shall be moved to ensure that they adequately service the work areas.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		Drinking water facility needs to be maintained at camp and work site	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		The Contractor is to ensure that open areas or the surrounding bushes are not being used as toilet facility.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		The Contractor shall ensure that all litter is collected from the work and camp areas daily.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		Bins and shall be emptied regularly and waste shall be disposed of at the pre-approved site.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		Eating areas shall be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly inspection
		The Contractor shall ensure that his camp and working areas are kept clean at all times.	E- DSC, Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Weekly monitoring
3.	Staff conduct	The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed.	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		The rules that are explained in the worker conduct section, must be followed at all times	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
4.	Dust and air pollution <sup>21</sup>	Consult with DSC/PIU on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		Avoiding the need to stockpile on site	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		Use tarpaulins to cover sand and other loose material when transported by trucks	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and regular servicing of the vehicles&equipments off site in order to limit gaseous emissions	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.
		Excess earth and other windblown loads in transit will be kept covered	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring.

<sup>21</sup> Main causes of air pollution during construction are dust from vehicle movements and stockpiles, vehicle emissions and fires.

	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		No fires are allowed on site	Contractor	PMU SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Ongoing monthly monitoring.
5	Noise Level	<ul style="list-style-type: none"> <li>➤ Plan activities in consultation with DSC/PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;</li> <li>➤ Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;</li> <li>➤ Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor;</li> <li>➤ Ensure that machinery is in a good state of maintenance.</li> <li>➤ Monitor noise levels in potential problem areas, and</li> <li>➤ Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.</li> </ul>	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring
6	Storm water	Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site i.e. these materials must not be placed in storm water channels, drainage lines	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring
		During construction, un-channeled flow must	E- DSC, Contractor	SO-PIU/ ES-PMC,	Monthly monitoring



	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		be controlled to avoid soil erosion.		ESMC- PMU, EE – PMU	
7	Water quality <sup>22</sup>	Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets	Contractor	SO-PIU/ES-PMC, EE –PMU	Regular monitoring - monthly
		Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with GMC/PIU on designated disposal areas	Contractor	SO-PIU/ES-PMC, EE –PMU	Regular monitoring - monthly
		Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies	Contractor	SO-PIU/ES-PMC, EE –PMU	Regular monitoring - monthly
		Place storage areas for fuels and lubricants away from any drainage leading to water bodies	Contractor	SO-PIU/ES-PMC, EE –PMU	Regular monitoring - monthly
		Dispose any wastes generated by construction activities in designated sites	Contractor	SO-PIU/ES-PMC, EE –PMU	Regular monitoring - monthly
		Conduct surface quality inspection according to the Environmental Management Plan (EMP)	Contractor	SO-PIU/ES-PMC, EE –PMU	Quarterly monitoring
8.	Conservation of natural environment – terrestrial flora	As the work front progresses the Contractor is to check that vegetation clearing has the prior permission of the DSC/PIU Engineer and Environmental Specialist of PMC.	E- DSC, Contractor	SO-PIU/ES-PMC, ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring
		Minimize removal of vegetation and disallow cutting of trees (particularly at forest area of Ramshilla hill and Brahmayoni hill) as far as possible through design modification	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring
		Require to plant three (3) native trees for every one (1) that is removed	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Monthly monitoring
		Prohibit employees from poaching wildlife, bird hunting, and cutting of trees for firewood	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Ongoing monitoring. Monthly monitoring

<sup>22</sup>Water quality is affected by the incorrect handling of substances and materials. Soil erosion and sediment is also detrimental to water quality. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		Non removal of trees of religious importance	Contractor	SO-PIU/ ES-PMC, ESMC- PMU, EE – PMU	Quarterly monitoring.
9.	Materials management	Stockpiles shall not be situated such that they obstruct natural water pathways.	E- DSC, Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring. Location as directed by the engineer
		Stockpiles shall not exceed 2m in height unless otherwise permitted by the concerned Engineer.	E- DSC, Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring Location as directed by the engineer and ES- PMC
		All concrete mixing must take place on a designated, impermeable surface.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Verify suitability of all material sources and obtain approval of PIU & DSC	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
10.	Landscape and Aesthetics including Waste management	Refuse must be placed in the designated skips / bins which must be regularly emptied.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Prepare and implement Waste Management Plan	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas for improvement of aesthetic environment. Recycling is to be encouraged by providing separate receptacles for different types of wastes (including demolition waste) and making sure that staff is aware of their uses.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		All waste must be removed from the site and transported to a disposal site or as directed by the Engineer.	E-DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Waste from toilets shall be disposed of	Contractor	PIU/ES-PMC, ESMC-	Weekly monitoring.

	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		regularly and in a responsible manner.		PMU, EE –PMU	
		Hazardous waste disposal must be carried out by the Contractor in a responsible manner	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Storage areas will be properly fenced off	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Top soil needs to be utilised by farmers for nutrient value	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Coordinate with DSC-PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Recover used oil and lubricants and reuse or remove from the sites	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
		Request DSC/PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work	E- DSC and Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
11	Occupational Health and Safety	World bank Environmental, Health, and Safety (EHS) Guidelines - EHS Guidelines for water & sanitation will be followed. Specifically,  (i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers;	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		<p>(iv) Secure all installations from unauthorized intrusion and accident risks;</p> <p>(v) Provide supplies of potable drinking water;</p> <p>(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(x) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and</p> <p>(xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p>			

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
12	Community Health & Safety	Plan routes to avoid times of peak-pedestrian activities.	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
		Liaise with DSC- PIU in identifying risk areas on route cards/maps	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
		Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
		Provide road signs and flag persons to warn of dangerous conditions, in case of location near the road.	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
		Provide protective fencing around open trenches, and cover any open trench with metal planks during non-construction hours	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
		Maintaining accident register and arrangement of emergency response plan for community	E-DSC Contractor and	PIU/ES-PMC, ESMC-PMU, EE –PMU	Ongoing Weekly
13	Traffic accessibility & impact	Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; Schedule transport and hauling activities during non-peak hours; Locate entry and exit points in areas where there is low potential for traffic congestion; Keep the site free from all unnecessary obstructions; Drive vehicles in a considerate manner; Coordinate with Govt. Traffic Department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and Notify affected sensitive receptors by providing sign boards informing nature and duration of	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring

	<b>Issues</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		construction works and contact numbers for concerns/complaints			
14	Social impacts <sup>23</sup>	Contractor's activities and movement of staff to be restricted to designated construction areas.	PIU, Contractor	PIU/ ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times.	PIU, Contractor	PIU/ ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the Engineer's permissions.	PIU, Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		The work plan for the construction and laying of pipelines will be devised in such a way to ensure that the construction period is minimized. Affected persons will be assisted in moving to the other side of the road and returning after construction work is completed. Where they are not required to shift, their access road will be ensured by the contractor. The construction period will be minimized and is estimated to be less than 30 days per section of work. Compensation will be provided to impacted person (all deals under Resettlement Plant)	PIU, Contractor	PIU/ ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		Provide walkways and metal sheets where required to maintain access for people and vehicles.	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		Increase workforce in front of critical areas such as educational institutions, places of worship, business establishment and health	Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring

<sup>23</sup> Regular communication between the Contractor and the interested and affected parties is important for the duration of the contract.

	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		care establishments to shorten the duration of impacts.			
		Consult businesses and institutions regarding operating hours and factoring this in work schedules.	PIU, Contractor	PIU/ES-PMC, EE – PMU	At least 1 week prior to the activity taking place. Monthly monitoring
		The Contractor is to inform neighbors in writing of disruptive activities at least a week beforehand.	PIU, Contractor	PIU/ES-PMC, EE – PMU	At least a week prior to the activity taking place. Monthly monitoring
		Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.	Contractor	PIU/ES-PMC, EE – PMU	Monthly
		The site must be kept clean to minimize the visual impact of the site.	Contractor	PIU/ES-PMC, EE – PMU	Weekly monitoring.
		Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors.	Contractor	PIU/ES-PMC, EE – PMU	Monthly monitoring.
		Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include: <ul style="list-style-type: none"> <li>• noise generated by jackhammers, diesel generator sets, excavators, etc.</li> <li>• drilling</li> <li>• dewatering pumps</li> </ul>	PIU, Contractor	PIU/ES-PMC, EE – PMU	Monthly monitoring
		A complaints register (refer to the Grievance Redressal Mechanism) shall be housed at the site office.	E- DSC, Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring.
15	Cultural environment	All the staff and labourers of the Contractor be informed about the possible items of historical or archaeological value	E- DSC, ES- PMC, contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
		If something of this nature be uncovered, ASI or State Department of Archaeology shall be contacted and work shall be stopped immediately.	E- DSC, ES- PMC, Contractor	PIU/ES-PMC, ESMC-PMU, EE –PMU	Monthly monitoring
16	Environment	Contractor shall appoint one Environment	Contractor	PIU/ES-PMC, ESMC-	Person to be

	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
	Safeguard/safety Officer	Safeguard/ Safety Officer who shall be responsible for assisting contractor in implementation of EMP, community liaison, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis.		PMU, EE –PMU	appointed before start of construction activities and remain available throughout the project duration.

PIU\* - for field level monitoring for all the cases, ES-PMC\*\* , ESMC- PMU\*\* - Responsible for supervision/ document check/ occasional field visit (atleast quarterly), EE- PMU\*\*- - Responsible for supervision/ document check/ occasional field visit and necessary advice to PIU

**Monitoring method- Through field check, document check, visual observation, generation of air, water & noise level data**

ASI = Archeological Survey of India, BSPCB= Bihar State Pollution Control Board,

DSC: Design and Supervision Consultant, E: Engineer, EE: Environmental Engineer, ES: Environment Specialist, ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant, PMU: Project Management Consultant, SO: Safeguard Officer

**Table 34: Generic EMP- Post Construction Activities and Operation**

	Activities	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
1.	Construction camp	All structures comprising the construction camp are to be removed from site or handed over to the property owner/ community as per mutual agreement (if established on private/community land).	Contractor	SO - PIU, ES-PMC, EE –PMU	Subproject completion
		The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up.	Contractor	SO - PIU, ES-PMC, EE –PMU	Subproject completion
		The Contractor must arrange the cancellation of all temporary services.	Contractor	SO - PIU, ES-PMC, EE –PMU	Subproject completion
		All vegetation that has been cleared (as per requirement) during construction is to be removed from site or used as much as per the re-vegetation specification	Contractor	SO - PIU, ES-PMC, EE –PMU	Subproject completion
		The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.	Contractor	SO - PIU, ES-PMC, EE –PMU	Subproject completion



	<b>Activities</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
3.	Land rehabilitation	All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.	Contractor	SO - PIU, ES-PMC, ESMC-PMU	Subproject completion
		All rubble is to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited.	Contractor	SO - PIU, ES-PMC, ESMC-PMU	Subproject completion
		The site is to be cleared of all litter.	Contractor	SO - PIU, ES-PMC, ESMC-PMU	Subproject completion
		Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.	Contractor	SO - PIU, ES-PMC, ESMC-PMU	Subproject completion
		The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.	Contractor	SO - PIU, ES-PMC, ESMC-PMU	Subproject completion
4.	Materials and infrastructure	Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	Engineer- DSC, Contractor	SO - PIU, ES-PMC, EE -PMU	Subproject completion
		All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.	Engineer- DSC, Contractor	SO - PIU, ES-PMC, EE -PMU	Subproject completion
		The Contractor must repair any damage that the construction work has caused to neighboring properties.	Contractor	SO-PIU, ES-PMC	As directed by the Engineer.
5.	General	A meeting is to be held on site between the Engineer, ES- PMC and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.	Engineer- DSC, SO-PIU, ES- PMC, Contractor	PIU, ES-PMC, ESMC- PMU	On completion of the construction and maintenance phases- monthly monitoring
		Temporary roads must be closed and access across these blocked.	Engineer- DSC, SO-PIU, ES- PMC, Contractor	SO - PIU, ES-PMC, EE -PMU	On completion of construction
		Refill and re-compact trenches soil and backfilled sand will be removed to expose the leaking junction or pipe	Engineer- DSC, SO-PIU, ES- PMC, Contractor	PIU, ES-PMC, ESMC- PMU	On completion

	<b>Activities</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		Cover or wet excavated material to prevent dusts	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly monitoring
		All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	On completion of construction
6	Hazardous chemical & waste management	Store of common salt, dry, and dark conditions for no more than one month	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly during Operation
		Use equipment constructed of corrosion-resistant materials	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly during Operation
		Minimize the amount of disinfection materials for using in chlorinator	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly during Operation
		Material safety data sheet to be maintained at chlorine/ common salt storage area	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly during Operation
		Regular laboratory testing for dosing and residual chlorine	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	Monthly during Operation
		Develop and implement a prevention program that includes identification of potential hazards, written operating procedures, training, maintenance, and accident investigation procedures	Engineer- DSC and Contractor	SO – PIU, ES-PMC, EE –PMU	During Operation – quarterly
7	Water quality assessment and maintained – Health & safety	<ul style="list-style-type: none"> <li>Undertake regular monitoring and maintenance of water supply infrastructure.</li> <li>Quality of drinking water will be checked regularly at tube well locations and water storage sites</li> <li>Sewage water will be treated in STP (which is under design stage) before discharge.</li> </ul>	Contractor, SO- PIU	ES-PMC, EE – PMU	Monthly monitoring - During Operation
8	Social and Cultural Resources	<ul style="list-style-type: none"> <li>Consult the city authorities to identify any buildings at risk from vibration</li> </ul>	Contractor, SO- PIU	ES-PMC, EE – PMU	Monthly monitoring during

	<b>Activities</b>	<b>Management/Mitigation</b>	<b>Responsible for Mitigation</b>	<b>Responsible for Monitoring/ Supervision</b>	<b>Frequency</b>
		damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; <ul style="list-style-type: none"> <li>• Complete work in these areas quickly;</li> <li>• Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals</li> </ul>			operation

ASI = Archeological Survey of India, BSPCB= Bihar State Pollution Control Board,  
DSC: Design and Supervision Consultant, E: Engineer, EE: Environmental Engineer, ES: Environment Specialist, ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant, PMU: Project Management Consultant, SO: Safeguard Officer

## B. Environmental Monitoring Program

255. **Table35** outlines the environmental monitoring program to ensure implementation of the management and mitigation measures specified in the EMP. The table shall be read within the context of the body of the entire EMP.

**Table35: Environmental Monitoring Program**

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring & Supervision
<b>1. Site establishment and preliminary activities</b>						
Legislation, permits and agreements	Consent for Establishment and Consent to Operate (in relation to hot mixing, wet mixing, batching plant, stone crushers, and diesel generators, etc. if any)	Air Act Water Act Noise Act	-	Prior to moving onto site and during construction	Contractor, PIU	Engineer of DSC / ESMC-PMU/EE-PMU/ ES-PMC
	Forest land clearance, NOC from forest Dep. for renovation work, clearance from State Museum & Archeological Directorate	Forest Act Act related to protection of Archeologic al objects	-	Prior to moving onto site and during construction	Contractor, PIU	Engineer of DSC / ESMC-PMU/EE-PMU/ ES-PMC
	Copy of EMP	EARF and ADB SPS	Subproject site, offices, website, library, etc.	At all times	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/EE- PMU/ ES-PMC
Access to site	Existing conditions	EMP	All access and haul roads	Prior to moving onto site	Contractor, Engineer of DSC &SO- PIU and ES- PMC	ES- PMC /EE- PMU
	Road closures and traffic rerouting if required	EMP	All affected roads	One week in advance of the activity	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/EE- PMU/ ES-PMC
	Notifications and road signages	EMP	All affected roads	One week in advance of the activity	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/EE- PMU/ ES-PMC
Construction camp	Approval of location and facilities	EMP	As identified	Prior to moving onto site	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/EE- PMU/ ES-PMC
Equipment lay-down and storage area	Approval of location and facilities	EMP	As identified	Prior to moving onto site and during site set-up	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/EE- PMU/ ES-PMC
Materials management – sourcing	Approval of sources and suppliers	EMP	As identified	Prior to procurement of materials	Contractor, Engineer of DSC &SO- PIU	EE- PMU/ ES-PMC
Education of site staff	Awareness level training - Environment - Health and safety	EMP and records	-	During staff induction, followed by schedule as	Contractor, ES-PMC	ESMC- PMU/EE- PMU/ ES-PMC

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring & Supervision
				determined		
Social impacts	Public consultations, information disclosure, communication strategy	EARF, ADB SPS and EMP	Subproject site	Prior to moving onto site and ongoing	Contractor, Engineer of DSC & SO- PIU	ESMC- PMU/ EE- PMU/ ES- PMC
	GRM register	EMP	Subproject site	Prior to moving onto site and ongoing	Contractor, SO- PIU	ESMC- PMU/ ES- PMC
Noise quality	Baseline data for noise level in dB(A) $L_{eq}$	National noise standards	Once before start of construction works at all the project locations as identified by ES- PMC	Once prior to site set-up	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	SO- PIU, EE- PMU/ ES- PMC
Air quality	Baseline ambient data for particulate matters 10 and 2.5 ( $PM_{10}$ , $PM_{2.5}$ ), sulfur dioxide ( $SO_2$ ), nitrogen dioxide ( $NO_2$ )	National ambient air quality standards	Once before start of construction works at all the project locations as identified by ES- PMC	Once prior to site set-up	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	SO- PIU, EE- PMU/ ES- PMC
Storm water	Storm water management measures	EMP	As identified by the engineer	During site set-up and throughout the duration of the subproject-monthly	SO-PIU, EE- PMU/ ES- PMC	EE- PMU/ ES- PMC
Conservation of natural environment	Existing conditions	EMP	Subproject sites	Prior to site set-up-then monthly	Contractor & ES- PMC	ESMC- PMU/ EE- PMU/ ES- PMC
Waste management procedure	Disposal sites	EMP	As determined	Prior to site set-up and ongoing throughout the subproject-monthly	Contractor, ES- PMC	EE- PMU/ ES- PMC
Cultural environment	Chance finds	ASI Act and EMP	As determined	Prior to site set-up and ongoing throughout the subproject-monthly	Contractor with Engineer- DSC & SO-PIU	EE- PMU/ ES- PMC
Security & safety arrangement	Arrangement at working sites	EMP	Subproject sites	Prior to site set-up and ongoing throughout the subproject	Contractor with Engineer- DSC & SO-PIU	EE- PMU/ ES- PMC
Occupational Health &	Compliance with IFC & EHS Guidelines of	EMP, Guidelines	Subproject sites	Prior to site set-up and	Contractor with Engineer- DSC	EE- PMU/ ES- PMC

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring & Supervision
safety	World Bank			ongoing throughout the subproject	&SO-PIU	
<b>2. Construction phase</b>						
Access to site	Qualitative characteristics	Pre-subproject condition and EMP	All access and haul roads	Refer to EMP (table on management of construction and workforce activities)	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Construction camp	Qualitative characteristics	Pre-subproject condition and EMP	Camp site	Prior to site set-up and ongoing throughout the subproject-weekly monitoring	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Staff conduct	Site records (accidents, complaints)	EMP	Subproject sites	Ongoing-monthly monitoring	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Air quality	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub>	National ambient air quality standards	Covering at all the project locations as identified by Engineer.	Once in every six months at water reservoir sites, pipe laying areas, during subproject execution	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	EE- PMU/ SO-PIU/ ES- PMC
Storm water	Soil erosion management measures	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Water quality	Protection from contamination	EMP, Water quality standard	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Conservation of natural resources	Vegetation conditions	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Materials management	Qualitative characteristics	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Landscape and Aesthetics including Waste management	Qualitative characteristics	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
	Disposal manifests	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO-PIU/ ES- PMC
Social impacts	Public consultations, information disclosure, communication strategy	EARF, ADB SPS and EMP	Subproject sites	Ongoing-monthly	Contractor with the Engineer, DSC ,SO- PIU	EE- PMU/ ES- PMC
	GRM register	EMP	Subproject	Ongoing-	Contractor with	EE- PMU/ ES-

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring & Supervision
			sites	monthly	the Engineer, DSC, SO- PIU	PMC
Occupational Health and Safety	World bank Environmental, Health, and Safety (EHS) Guidelines	EMP	Subproject sites	Ongoing-weekly	Contractor with the Engineer, DSC, SO- PIU	EE- PMU/ ES- PMC
Cultural environment	Chance finds	ASI Act and EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO- PIU/ ES- PMC
Noise quality	Noise level in dB(A) Leq	National noise standards	Covering at all the project locations as identified by Engineer.	Once in every six months at water reservoir sites, pipe laying areas, during subproject execution	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	EE- PMU/ SO- PIU/ ES- PMC
Community Health & Safety	Safety arrangement during construction	EMP	Subproject sites	Ongoing-weekly	Contractor	EE- PMU/ SO- PIU/ ES- PMC
Traffic accessibility impact	Arrangement and follow up rules related to traffic safety	EMP	Subproject sites	Ongoing-monthly	Contractor	EE- PMU/ SO- PIU/ ES- PMC
<b>3. Post-construction activities</b>						
Construction camp	Pre-existing conditions	EMP	Construction camp	Subproject completion	Contractor	EE- PMU/ ES- PMC
Vegetation (if felled)	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	EE- PMU/ ES- PMC
Land rehabilitation	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	ESMC- PMU/ EE- PMU/ ES- PMC
Materials and infrastructure	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	EE- PMU/ ES- PMC
General	Records	EMP	Subproject sites	Subproject completion	Contractor with Engineer- DSC & SO- PIU and ES-PMC	ESMC- PMU/ EE- PMU/ ES- PMC
Social and Cultural Resources	Pubic complaint	EMP	Subproject sites	During operation	Contractor	EE- PMU/ ES- PMC
<b>4. Operation and maintenance (defect liability period)</b>						
Water Quality	As per national standard	Central Pollution Control Board standards	Once at all constructed OHTs, GLSR and tube well locations	Once in 6 months	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	ESMC- PMU/ EE- PMU/ ES- PMC
Noise quality	Noise level in dB(A) Leq	As per national noise standards	Once at all tube well pumping areas	Once in 6 months	Contractor with the help of National Accreditation Board for Testing and Calibration	ESMC- PMU/ EE- PMU/ ES- PMC

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring & Supervision
					Laboratories	
Hazardous chemical & waste management	Storage and use	Safety data sheet EMP	At tube well water treatment site	Monthly monitoring	Contractor	ESMC- PMU/ EE- PMU/ ES- PMC

DSC: Design and Supervision Consultant, E: Engineer, EE: Environmental Engineer, ES: Environment Specialist, ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant, PMU: Project Management Consultant, SO: Safeguard Officer

**Note: PIU & contractor: Daily & weekly mitigation, monitoring and ES- PMC, EE- PMU, ESMC- PMU: Fortnightly, Monthly & Quarterly monitoring or as per requirement & overall supervision**

### C. Environmental Management and Monitoring Cost

256. The Contractor's cost for site establishment, preliminary activities, construction, and defect liability activities will be incorporated into the contractual agreements, which will be binding on him for implementation. The air quality and noise level monitoring at construction phase and water quality (tube well water) at defect liability phase will be conducted by the contractor.

257. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of implementing agency (BUIDCo) with the help of program Consultant. The water quality monitoring during the operation and maintenance phase will be conducted by the hired recognized environmental laboratory.

258. The activities identified in environmental monitoring program mainly includes site inspections and informal discussions with workers and local people and this will be the responsibility of PMU and PMC with the assistance of DSC's Engineer, costs of which are part of project management.

259. **Table36** presents the estimated cost to implement the EMP.

**Table36: Indicative Cost for EMP Implementation**

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
Legislation, Permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor.	As required	Not Applicable	Not Applicable	These consents are to be obtained by contractor on his own cost.
Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase.	As required	Lump sum	50,000	Project Cost- PMU
Forest land acquisition at Ramshilla hill and Brahmayoni hilland NOC from forest dept. for tree cutting and temporary impact	Acquisition of forest land for construction of water reservoir and laying of transmission pipeline. Trees need to compensate against each tree cutting	As per project requirement	Lump sum for all activities	7,00,000	Project Cost- PMU
Providing access	Providing access, in	As per	Contractor's	Not	Covered



Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
to commercial establishments and properties.	case of access disruptions, to affected properties.	requirement	liability	applicable	under engineering cost
Dust Suppression at subproject sites	Application of dust suppression measures during construction phase.	As required	Lump sum	2,00,000	Covered under engineering design and cost – by contractor
Traffic management	Safety Signboards, delineators, traffic regulation equipments, flagman, temporary diversions, etc	Wherever required throughout subproject corridor	Contractor's liability	Not applicable	Covered in engineering cost
<b>Baseline Monitoring</b> Site preparation and preliminary activities					
Air	Once before start of construction work at all the water reservoir locations and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 20 samples	10,000 per sample	2,00,000	Covered under engineering design and cost- by contractor
Noise	Once before start of construction work at all the water reservoir locations and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 20 samples	1500 per sample	30,000	Covered under engineering design and cost- by contractor
<b>Construction Monitoring</b>					
Air	Once in six months during construction works at all the water reservoir locations and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 80 samples	10,000 per sample	8,00,000	Covered under engineering design and cost- by contractor
Noise	Once in six months during construction works at all the water reservoir locations and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 80 samples	1500 per sample	1,20,000	Covered under engineering design and cost- by contractor

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
	Specialist of PMC				
<b>Defect Liability Period</b>					
Water Quality	At all constructed OHTs, GLSR and selected tube well locations, as per drinking water standard parameters	Approx. 60 numbers	12,000 per sample	7,20,000	Covered under O & M cost – by contractor
Noise quality	Once in six months during the defect liability period at selected tube well locations	Approx. 30 samples	1500 per sample	45,000	Covered under O & M cost – by contractor
Any unanticipated impact due to subproject implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period.	Lump sum	-	5,00,000	Project cost
<b>TOTAL (INR)</b>				<b>33,65,000</b>	
			<b>TOTAL (USD)</b>	<b>54274</b>	

#### D. Monitoring and Reporting

276. Prior to commencement of any civil work, the contractor will submit a compliance report to PMU/PMC/PIU ensuring that all identified pre-construction environmental impact mitigation measures as detailed in the EMP will be undertaken. PMC will review the report and thereafter PMU will allow commencement of civil works.

277. PMC will organize an induction course for the training of contractors preparing them on:

- (i). EMP/approved Site Specific EMP implementation including environmental monitoring requirements related to identified mitigation measures; and
- (ii). taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation.

278. During the construction phase, results from internal monitoring by the contractor will be reflected in their monthly EMP implementation reports to the PMC. These monthly report will be retained in PMC / PIU office for reference.

279. Monthly report will be prepared by PMC summarizing compliance with monitoring requirements, details on any noncompliance, remedial actions taken and additional environmental mitigation measures if necessary.

280. Environmental monitoring activities involving measurements will require engagement of external agencies and will be organized by contractor. Based on monthly reports and measurements, PMC will draft a 6-monthly EMP implementation report.

281. The PMU will review, approve and submit to ADB the 6 monthly (semi annual) EMP implementation progress report. Once concurrence from the ADB is received the report will be uploaded in the Project website.

282. Based on review of environmental monitoring results, future modifications in the EMP could be undertaken with the concurrence of the ADB. These will be generally undertaken, if required, upon review of the 6-monthly EMP progress reports submitted by the PMU to ADB following agreed procedures and mechanisms.

283. For Projects likely to have anticipated adverse environmental impacts during operation, monitoring may continue at the minimum on an annual basis during the operation phase. Monitoring reports will be posted in a location accessible to the public.

## **VIII. RECOMMENDATIONS AND CONCLUSIONS**

284. The process described in this document has assessed the environmental impacts of all elements of the proposed subproject for improvement of water supply system in Gaya City. Potential negative impacts were identified in relation to pre-, construction and operation of the improved infrastructure, but no environmental impacts were identified as being due to either the subproject design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design.

285. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

286. The subproject's Grievance Redressal Mechanism will provide the citizens with a platform for redressal of their grievances and describes the informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

287. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between the DSC (Engineer), contractors, PIU and PMU/PMC. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with.

288. A copy of the EMP will be kept on site during the construction period at all times. The EMP will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

289. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to

standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

290. Therefore, as per ADB SPS, the subproject is classified as Environmental Category B and does not require further Environmental Impact Assessment.

## Appendix 1 Rapid Environmental Assessment (REA) Checklist

**Instructions:**

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

**Country/Project title:** India/ Bihar Urban Development Project

**Sector division:** Water Supply- Gaya

Screening questions	Yes	No	Remarks
a. Project siting Is the project area			
▪ Densely populated?	√		Gaya is densely populated
▪ Heavy with development activities?		√	No such heavy development activity is noted at Gaya
▪ Adjacent to or within any environmentally sensitive areas?	√		Gaya is a historic and a most important religious centre for Hindus. History of Gaya has a unique place in the evolution and development of Hindu civilization. According to the religion of Puranas, it is incumbent on every Hindu to visit Gaya and make offerings for the souls of his ancestors. There are a number of temples in the town; a large number of pilgrims visit the town. Vishnupad Temple, Brahmyoni Hill and Ramshila Hill are the environmentally sensitive areas (State Archeological notified area) located nearby the project area
• Cultural heritage site		√	World famous Buddhist centre of Bodh Gaya is located 13 km of Gaya. In 2002, Mahabodhi Temple, located in Bodh Gaya, became a UNESCO World Heritage Site.

Screening questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>Protected area</li> </ul>	√		<p>Protected area <b>Gautam Budha Wildlife Sanctuary</b> located at a distance of 50 km south of Gaya.</p> <p>Water storage reservoirs at Ramshila hill and Brahmayoni hill are located within state protected forest. Forest land acquisition and NOC will be obtained from State Forest Dept.</p> <p>Only few project components (water reservoirs and pipelines) located near to Vishnupad Temple, Brahmuyoni Hill, Ramshila Hill. Those are Bihar state protected museum</p>
<ul style="list-style-type: none"> <li>Wetland</li> </ul>		√	Not applicable
<ul style="list-style-type: none"> <li>Mangrove</li> </ul>		√	Not applicable
<ul style="list-style-type: none"> <li>Estuarine</li> </ul>		√	Not applicable
<ul style="list-style-type: none"> <li>Buffer zone of protected area</li> </ul>		√	None of the subproject component sites are within buffer zone of protected area.
<ul style="list-style-type: none"> <li>Special area for protecting biodiversity</li> </ul>		√	None of the subproject component sites are in special area for protecting biodiversity.
<ul style="list-style-type: none"> <li>Bay</li> </ul>		√	Not applicable
<b>b. Potential environmental impacts will the project cause...</b>			
<ul style="list-style-type: none"> <li>Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?</li> </ul>		√	No such impact is anticipated. The water source for tube wells is underground water in deep water aquifers. Exploitation of surface water sources is not in the scope of the subproject.
<ul style="list-style-type: none"> <li>Impairment of historical/cultural monuments/areas and loss/damage to these sites?</li> </ul>		√	There will be no impact on the cultural monuments as the proposed project will include construction of new/renovation of water storage reservoirs, replacement of tube well machinery and laying of pipeline
<ul style="list-style-type: none"> <li>Hazard of land subsidence caused by excessive ground water pumping?</li> </ul>		√	Water from the existing tube wells is to be used, and with no risk of land subsidence
<ul style="list-style-type: none"> <li>Social conflicts arising from displacement of communities?</li> </ul>		√	No such impact is anticipated. In case of resettlement requirement (at one overhead tank location social impact is being noted) R & R plan deals the requirement
<ul style="list-style-type: none"> <li>Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?</li> </ul>		√	No such conflicts are anticipated. Abstraction of surface water for distribution is not proposed under this subproject. The ground water is not being tapped for any other purpose except drinking in the project area.

Screening questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?</li> </ul>		√	Ground water obtained from the tube wells is normally free from pathogens and will be supplied after disinfection. Regular water quality monitoring is carried out by the line department (PHED) to minimize threat to public health. Further, the tube wells will be deep and sufficiently away from any possible source of ground water contamination.
<ul style="list-style-type: none"> <li>Delivery of unsafe water to distribution system?</li> </ul>		√	Ground water will be treated before delivery Moreover regular monitoring of water distribution will be done so the delivery of unsafe water will be unexpected
<ul style="list-style-type: none"> <li>Inadequate protection of intake works or wells, leading to pollution of water supply?</li> </ul>		√	No such situation is anticipated in present case as raw water withdrawal is proposed from ground.
<ul style="list-style-type: none"> <li>Over pumping of ground water, leading to salinization and ground subsidence?</li> </ul>		√	No such impact is anticipated. The ground water abstraction has been planned after ensuring adequate availability in the ground water aquifer for withdrawal. Hydro-geological assessment study under progress
<ul style="list-style-type: none"> <li>Excessive algal growth in storage reservoir?</li> </ul>		√	The storage reservoirs shall be covered on top and the water in such reservoirs shall be regularly disinfected, hence no algal growth in the reservoirs is anticipated.
<ul style="list-style-type: none"> <li>Increase in production of sewage beyond capabilities of community facilities?</li> </ul>		√	No such impact is anticipated. Sewage volumes shall undoubtedly increase but this increase will not be beyond the existing community facilities. Moreover, the additional volume of water finding its way into the sewage shall dilute the actual concentration of contaminants.
<ul style="list-style-type: none"> <li>Inadequate disposal of sludge from water treatment plants?</li> </ul>		√	Not Applicable as per scope of work
<ul style="list-style-type: none"> <li>Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?</li> </ul>		√	Not Applicable as per scope of work
<ul style="list-style-type: none"> <li>Impairments associated with transmission lines and access roads?</li> </ul>	√		Temporary impairments with transmission lines and access roads are anticipated during laying of new and replacement of worn out pipes in the subproject area.
<ul style="list-style-type: none"> <li>Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.</li> </ul>		√	Chlorine dosing will be done through chlorinator and chlorine safety measures and facilities are proposed to be implemented as part of the subproject as per MSIHC
<ul style="list-style-type: none"> <li>Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?</li> </ul>		√	Proper arrangement will be made for storage of common salt, which will be used in chlorinator
<ul style="list-style-type: none"> <li>Dislocation or involuntary resettlement of people</li> </ul>	√		As per present design proposed construction project involves relocation of nine dwelling units including one Gaya Municipal Corporation (GMC) staff quarter and 6 partial impacts at one project location (Ramshilla hill) has been recorded. Rehabilitation & resettlement issue deals separately under Resettlement Plan.

Screening questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?</li> </ul>		√	No such impact is anticipated.
<ul style="list-style-type: none"> <li>Noise and dust from construction activities?</li> </ul>	√		The noise and the dust emissions will be insignificant as per the nature of the work. Adequate mitigation measures will be taken to further minimize it.
<ul style="list-style-type: none"> <li>Increased road traffic due to interference of construction activities?</li> </ul>	√		Construction will be managed as to allow traffic to maintain through access. There is no expected considerable increased in road traffic due to construction activities. Consultation with traffic police authority will be undertaken.
<ul style="list-style-type: none"> <li>Continuing soil erosion/silt runoff from construction operations?</li> </ul>		√	No soil erosion is anticipated. Trenches will be filled back and restored to original conditions after completion of day's work. The land below overhead tanks will be leveled properly after completion of construction works.
<ul style="list-style-type: none"> <li>Delivery of unsafe water due to poor O&amp;M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?</li> </ul>		√	O&M manual will be prepared and followed. Training will be given to the staffs operating the plant to ensure proper O&M. User agency will establish lab system of regular collection and analysis of water samples for preventing any such impact.
<ul style="list-style-type: none"> <li>Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?</li> </ul>		√	Not applicable as per chemical use
<ul style="list-style-type: none"> <li>Accidental leakage of chlorine gas?</li> </ul>		√	Not applicable. No chlorine gas will be used
<ul style="list-style-type: none"> <li>Excessive abstraction of water affecting downstream water users?</li> </ul>		√	No such impact is anticipated as water source for the sub-project is ground water.
<ul style="list-style-type: none"> <li>Competing uses of water?</li> </ul>		√	Ground water is not used for any other purpose except for drinking water supply in the project area.
<ul style="list-style-type: none"> <li>Increased sewage flow due to increased water supply</li> </ul>	√		An increase in sewage flow is anticipated due to increase in water supply. However, the additional volume of water finding its way into sewage shall be beneficial, as it shall dilute the actual concentration of contaminants. As per plan STP will be constructed for treatment of raw sewage of Gaya. Project will be funded under different program. Funding agency for waste water management will be finalized by BUIDCo. Work will be completed before completion of entire Gaya water supply project work (including water source augmentation).
<ul style="list-style-type: none"> <li>Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant</li> </ul>	√		A slight increase in the volume of sullage is expected due to increased water supply. However, the actual concentration of contaminants shall get diluted with this increase in water supply.



Screening questions	Yes	No	Remarks
<ul style="list-style-type: none"> <li>Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?</li> </ul>		√	Construction and laying of distribution and rising mains are not a big construction. Hardly 30-40 labourers will be work during construction, therefore temporary burden to social infrastructure is insignificant In case of setting up of labour camp permission will be obtained from GMC. Water supply and sanitation arrangement will be made as per hygienic norms
<ul style="list-style-type: none"> <li>Social conflicts if workers from other regions or countries are hired?</li> </ul>		√	Preference will be given to the local workers in order to minimize the chances of such conflicts.
<ul style="list-style-type: none"> <li>Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?</li> </ul>		√	No explosive will be used. Fuel and chemicals will be stored as per storage and import of hazardous chemical rules 1989 and safety norms
<ul style="list-style-type: none"> <li>Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?</li> </ul>		√	<p>No such impact is anticipated, in case of the proposed sub-project, as the structural elements of the sub-project are away from community habitations.</p> <p>In case of pipe laying for distribution and rising community safety will be considered as per EMP</p> <p>All structural design will be as per standard design for earthquake hazard zone III</p>

### A Checklist for Preliminary Climate Risk Screening

Country/Project Title: India/ Bihar Urban Development Investment Program

Sector: Urban Development

Subsector: Water Supply

Division/Department: Urban Development and Housing Department

Screening Questions		Score	Remarks <sup>24</sup>
<b>Location and Design of project</b>	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
<b>Materials and Maintenance</b>	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	Materials as selected for the project will be not affected from extreme climatic condition.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
<b>Performance of project outputs</b>	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

**Result of Initial Screening (Low, Medium, High): Low Risk**

<sup>24</sup> If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

**Conditional NOC from State forest department(GLSR at Ramshilla Hill and Brahmayoni hill) received on 24-08-2015**

**बिहार सरकार**  
पर्यावरण एवं वन विभाग  
कार्यालय : प्रधान मुख्य वन संरक्षक, बिहार, पटना।  
(कैम्पा एवं वन संरक्षण संभाग)  
राष्ट्रीय वन अरण्य भवन, इंदिरा पौर अलौ खाँ मार्ग, पटना-800 014  
संख्या-

प्रेषक,  
एस० डे० सिंह, भा० व० से०  
अपर प्रधान मुख्य वन संरक्षक (कैम्पा)  
-सह-नोडल पदाधिकारी (वन संरक्षण),  
बिहार, पटना।

सेवा में  
वन संरक्षक,  
गया अंचल, गया।

विषय : गया जिलान्तर्गत रामशीला एवं ब्रह्मयोनी पहाड़ी पर जलापूर्ति परियोजना के निर्माण हेतु वन (संरक्षण) अधिनियम, 1980 के तहत 0.6956 हे० वन भूमि 'जेमरल मैनेजर (वर्क), बुडको, पटना के पक्ष में' अपयोजन के प्रस्ताव की सैद्धान्तिक स्वीकृति।

महाराज,  
उपरोक्त विषयक वन संरक्षक, गया अंचल, गया से प्राप्त प्रस्ताव पर वन (संरक्षण) अधिनियम, 1980 की धारा-2 के तहत भारत सरकार, पर्यावरण एवं वन मंत्रालय के पत्रांक 11-9/98 FC दिनांक 13.05.2011 एवं बिहार सरकार, पर्यावरण एवं वन विभाग, के पत्रांक 474 दिनांक 30.08.2012 द्वारा प्रदत्त शक्तियों के आलोक में नोडल पदाधिकारी (वन संरक्षण), बिहार, पटना द्वारा निम्नांकित शर्तों के साथ गया जिलान्तर्गत रामशीला एवं ब्रह्मयोनी पहाड़ी पर जलापूर्ति परियोजना के निर्माण हेतु 0.6956 हे० वन भूमि अपयोजन की सैद्धान्तिक सहमति प्रदान की जाती है-

(i) अपयोजन हेतु प्रस्तावित वन भूमि का वैधानिक स्वरूप यथावत् रहेगा।

(ii) अपयोजित होने वाली 0.6956 हे० वन भूमि का NPV प्रयोक्ता एजेंसी द्वारा बिहार सरकार के संकल्प संख्या 513 (ई०) दिनांक 27.11.2008 द्वारा निर्धारित दर पर देय होगा। इसके तहत 6.26 लाख रु० प्रति हे० की दर पर कुल रु० 4,35,446/- (चार लाख पैंतीस हजार चार सौ छियालीस) मात्र की राशि जमा की जायेगी।

(iii) प्रयोक्ता एजेंसी द्वारा अपयोजित होने वाली 0.6956 हे० वन भूमि के समतुल्य गया जिलान्तर्गत बांकेबाजार अंचल, मौजा एवं थाना नं० नागोवार, 230, खाता सं० 24 खेसरा सं० 109 में चिन्हित गैर वन भूमि पर्यावरण एवं वन विभाग के पक्ष में क्षतिपूर्क वनीकरण हेतु उपलब्ध कराया जायेगा। इस निमित्त प्रयोक्ता एजेंसी द्वारा उक्त भूमि पर क्षतिपूर्क वनीकरण के लिये तात्कालिक मजदूरी दर पर प्राक्कलित राशि पर्यावरण एवं वन विभाग को 7-10 वर्ष के रखरखाव के साथ उपलब्ध कराई जायेगी। इसका मांग पत्र वन प्रमंडल पदाधिकारी, गया द्वारा निर्गत किया जायेगा।

(iv) प्रयोक्ता एजेंसी द्वारा क्षतिपूर्क वनीकरण के लिये उपलब्ध कराये गये गैर वन भूमि को पर्यावरण एवं वन विभाग के पक्ष में हस्तान्तरण एवं दाखिल-खारिज कराया जायेगा।

(v) प्रयोक्ता एजेंसी द्वारा चिन्हित गैर वन भूमि पर सर्वे एवं रेखांकन के पश्चात 4 फीट उंचाई का रक्षाई, पीलर का निर्माण कर क्षतिपूर्क वनीकरण के लिये उपलब्ध कराया जायेगा। इस

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भूमि को 1:500 (1:1000) स्केल के मापनिक नक्शे पर RTGS कोर्डिनेट दर्शाते हुए मार्ग कराकर एअरपोर्ट किया जायेगा।

- (vi) प्रयोक्ता एजेंसी द्वारा Net Present Value (NPV) और सभी अन्य राशि Compensatory Afforestation Fund Management and Planning Authority (CAMPA) के Ad-hoc Body के बचत खाता लेखा संख्या SB01025201 जो Corporation Bank CGO, Complex, Phase-1, लोदी रोड, नई दिल्ली 110003 (RTGS/IFSC No. CORP0000371) में धारित है या बचत खाता संख्या 344902010105410 जो Union Bank of India, Sunder Nagar, नई दिल्ली 110003, (RTGS/IFSC No. UBIN0534498) में धारित है, में RTGS/NEFT Mode से फंड ट्रांसफर कर जमा कराई जायेगी, जैसा कि भारत सरकार, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली के पत्रांक 12-2/2010-CAMPA दिनांक 13.5.2011 एवं दिनांक 24.06.2011 द्वारा संसूचित किया गया है। उक्त जमा की गयी राशि की सूचना इस कार्यालय को संबंधित बैंक द्वारा प्रदत्त UTR No. एवं दिनांक की मूलप्रति के साथ दी जायेगी।
- (vii) प्रयोक्ता एजेंसी को इस आशय की वचनबद्धता देनी होगी कि NPV के दर में वृद्धि होने पर उनके द्वारा अतिरिक्त/अन्तर की राशि जमा की जायेगी।
- (viii) प्रयोक्ता एजेंसी द्वारा परियोजना निर्माण के क्रम में मात्र 4 वृक्षों से अधिक का प्राप्ति नहीं किया जायेगा एवं आस-पास के वन क्षेत्र के वन विकास को क्षति नहीं पहुँचा जायेगा।
- (ix) वन भूमि का उपयोग गिट्टी कटार अथवा किसी भी निर्माण सामग्री निकालने के लिये नहीं किया जायेगा, और न ही अपशिष्ट निर्माण सामग्री को वन भूमि पर फेंका जायेगा।
- (x) प्रयोक्ता एजेंसी द्वारा परियोजना खर्च पर परियोजना निर्माण के उपरान्त खाली जगहों पर क्षतिपूर्क वनीकरण के अतिरिक्त थोड़ा शोपथ का कार्य करेंगे।
- (xi) आकरिमक स्थिति में पर्यावरण एवं वन विभाग को नर्सरी एवं अन्य कार्यों के लिये जल की उपलब्धता प्रयोक्ता एजेंसी द्वारा सुनिश्चित की जायेगी।
- (xii) वन क्षेत्र के अन्दर निर्माण सामग्री की दुलाई के लिये अतिरिक्त अथवा नये पथ का निर्माण नहीं किया जायेगा।
- (xiii) वन क्षेत्र के भीतर मजदूरों का निवास स्थान (Labour Camp) नहीं बनाया जायेगा।
- (xiv) वन क्षेत्र से बाह्य निवास कर रहे परिवीचाल प्रदाय में शोथिल मजदूरों को ईंधन आपूर्ति का दायित्व प्रयोक्ता एजेंसी का होगा प्रयोक्ता एजेंसी के क्षेत्रीय निरीक्षक/स्थानीय वन पदाधिकारी यह सुनिश्चित करेंगे कि वन एवं वन्य प्राणियों को प्रयोक्ता एजेंसी अथवा उनके द्वारा नियोजित मजदूर/कार्य एजेंसी किसी प्रकार से नुकसान नहीं पहुँचा रहे हैं।
- (xv) वन भूमि का उपयोग प्रस्तावित कार्य के अतिरिक्त अन्य किसी कार्य के लिए नहीं किया जायेगा।
- (xvi) प्रयोक्ता एजेंसी द्वारा पर्यावरण (संरक्षण) अधिनियम 1986 एवं अन्य सुसंगत अधिनियम/नियमावली के प्रावधान जो इस परियोजना के कार्यान्वयन से संबंधित होगा के तहत अलग से स्वीकृति प्राप्त की जायेगी एवं अन्तिम स्वीकृति के प्रस्ताव के साथ समर्पित किया जायेगा।
- (xvii) प्रयोक्ता एजेंसी द्वारा उन सभी अन्य शर्तों का अनुपालन किया जायेगा, जो समय-समय पर वनों की सुरक्षा, संरक्षण एवं प्रबंधन के लिये भारत सरकार अथवा राज्य सरकार द्वारा

- (xviii) उपर्युक्त शर्तों में से किसी एक का भी अनुपालन नहीं होने की स्थिति में संबंधित वन प्रमंडल पदाधिकारी इस कार्यालय को प्रतिवेदित करेंगे।
- (xix) यदि इस विषय पर पर्यावरण सुरक्षा के हित में कोई अन्य शर्त आवश्यक होगी तो कालान्तर में इसे अधिरोपित किया जा सकेगा एवं प्रयोक्ता एजेंसी के लिये यह बाध्यकारी होगा।
- (xx) उपनोक्ता अभिकरण [इस मामले में जेनरल मैनेजर (वर्क), बुडको, पटना] अपयोजित वन भूमि, किसी भी अन्य व्यक्ति, प्राधिकार विभाग आदि को किसी भी प्रकार से आवंटन/हरतान्तरण/अभ्यर्पण (assignment) नहीं करेगी।

अपयोजन स्वीकृति का यह आदेश राज्य के वामपंथी उग्रवाद प्रभावित जिलों के लिये भारत सरकार द्वारा 5.00 (पाँच) हे० वन भूमि के अपयोजन की शक्ति राज्य सरकार को देने तथा इस क्रम में राज्य सरकार द्वारा नोडल पदाधिकारी (वन संरक्षण) को यह शक्ति प्रत्योजित करने के आलोक में निर्गत किया जाता है।

उपर्युक्त शर्तों का अनुपालन प्रतिवेदन वन संरक्षक, गया के माध्यम से प्राप्त होने के पश्चात विषयांकित परियोजना के लिये वन (संरक्षण) अधिनियम 1980 की धारा-2 के तहत अन्तिम स्वीकृति प्रदान की जायेगी। नोडल पदाधिकारी (वन संरक्षण), बिहार द्वारा वन भूमि अपयोजन की अन्तिम स्वीकृति आदेश निर्गत करने के पश्चात ही उक्त वन भूमि पर गैर वानिकी कार्य किया जायेगा।

विश्वासभाजन,

ह०/-

(एस० के० सिंह)

अपर मुख्य वन संरक्षक (कैम्पा)  
-सह-नोडल पदाधिकारी (वन संरक्षण),  
बिहार, पटना।

ज्ञापांक- (F.C)..... दिनांक .....

प्रतिलिपि: अपर प्रधान मुख्य वन संरक्षक (केन्द्रीय), भारत सरकार, पर्यावरण एवं वन मंत्रालय, क्षेत्रीय कार्यालय, राँची/वन महानिरीक्षक-सह-मुख्य कार्यकारी पदाधिकारी, एड-हॉक कैम्पा, भारत सरकार, पर्यावरण एवं वन मंत्रालय, नई दिल्ली को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

ह०/-

(एस० के० सिंह)

अपर मुख्य वन संरक्षक (कैम्पा)  
-सह-नोडल पदाधिकारी (वन संरक्षण),  
बिहार, पटना।

ज्ञापांक- (F.C) 168..... दिनांक 24/08/2015

प्रतिलिपि: प्रधान सचिव, पर्यावरण एवं वन विभाग, बिहार सरकार, पटना/वन प्रमंडल पदाधिकारी, गया/जेनरल मैनेजर (वर्क), बुडको, पटना को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

(एस० के० सिंह)

अपर मुख्य वन संरक्षक (कैम्पा)  
-सह-नोडल पदाधिकारी (वन संरक्षण),  
बिहार, पटना।



**Stage 1 Clearance- District Forest Officer (DFO) sent a conditional NOC Letter to BUIDCO**

**कार्यालय: वन प्रमण्डल पदाधिकारी, गया वन प्रमण्डल, गया।**  
 सेवापत्र, न्यू कालीनगंज, गया [फोन / फैक्स नं. 0631-2220406, मो-7541820992, ई-मेल: dfoadfo@gmail.com]

दिनांक- गथा-823001, दिनांक-

प्रेषक  
 डा.0.वेदप्रसाद के.0.महाशय  
 वन प्रमण्डल पदाधिकारी,  
 गया वन प्रमण्डल, गया

सेवा में,  
 जेनरल मैनेजर(वर्क),  
 बिहार शाही आवासीय संरचना विकास निगम लि।  
 (पुस्तकें), 303 तीसरा काला, नौरा टावर, सीधालोक कॉम्प्लेक्स,  
 बुधनगर, पटना-800001

विषय-  
 गया जिलान्तर्गत रामशीला एवं ब्रह्मखेति पहाड़ी पर जलपूर्ति परियोजना के निर्माण हेतु वन(संरक्षण) अधिनियम 1980 के तहत 0.6956 हेक्टर वन भूमि आपके पक्ष में अपवोजन के प्रस्ताव की सैद्धान्तिक स्वीकृति।

प्रसंग-  
 अपर प्रधान मुख्य वन संरक्षक(कैम्प)-सह-नोडल पदाधिकारी(वन संरक्षण) बिहार पटना का ज्ञापक-FC 168 दिनांक 24.08.2015

महाशय,  
 उपरोक्त विषय के संबंध में सूचित करना है कि गया जिलान्तर्गत रामशीला एवं ब्रह्मखेति पहाड़ी पर जलपूर्ति परियोजना निर्माण हेतु वन(संरक्षण) अधिनियम 1980 के तहत 0.6956 हेक्टर वन भूमि का अपवोजन के प्रस्ताव की सैद्धान्तिक स्वीकृति प्राथमिक पत्र द्वारा प्रदान की गयी है। उक्त पत्र की शर्तों पर पुनः संलग्न कर पत्रों द्वारा अनुपालन आपके अपेक्षित की जा रही है।

- कठिनाई-2 के अनुपालन हेतु NPV मय में 4,36,446/- रु० एवं कठिनाई-3 के अनुपालन में अपवोजित होने वाले वन भूमि के बदले समतुल्य गया जिलान्तर्गत भांडेवावा संरक्षित भूभाग एवं खाला-नागीवाड़ा खाना नं० 230 खासा संख्या-24 संख्या संख्या-102 में चयनित गैर वन भूमि में सर्वाकरण एवं वन विभाग के पक्ष में शक्तिपूर्वक वनरोपण हेतु उपलब्ध किये जाने के क्रम में उक्त भूमि पर शक्तिपूर्वक वनरोपण हेतु पर्याप्त नकदूरी दर पर प्राथमिकित्व कुल राशि 13,31,851/- रु० (छठ्ठा प्रति शंलग्नांतर प्रसंगार्थीन पत्र के कठिनाई-6 में दिये गये शर्तों के अनुसार आपके द्वारा **अलग-अलग Ad-hoc Body of Compensatory afforestation fund Management and Planning Authority (CAMPFA) in A/C Name CAF Bihar of A/C No. SBO1025201 in Corporation Bank CGO, Complex, Phase-1 Lodi Road, New Delhi 11003 (RTGS/IFSC No. CORP0000371) अथवा SB A/c No. 344902010105410 of Union Bank of India, Sander Nagar, New Delhi 110003 (RTGS/IFSC No. UBION0534498) के द्वारा RTGS/NEFT Mode द्वारा फण्ड ट्रांसफर कर जमा कराया जाय उक्त उक्त जमा की गयी राशि की सूचना अपर प्रधान मुख्य वन संरक्षक(कैम्प)-सह-नोडल पदाधिकारी(वन संरक्षण) बिहार पटना को संबंधित बैंक द्वारा प्रवात (LTR No. एवं दिनांक की मूल प्रती वेटे हुए उसकी प्रति एवं सूचना इस कार्यालय को दिया जाय।**
- कठिनाई-4 के अनुपालन में प्रयोक्ता एजेंसी की द्वारा शक्तिपूर्वक वनरोपण के लिए उपलब्ध करायी गयी गैर वन भूमि को पर्यावरण एवं वन विभाग के पक्ष में **इस्तानांतरण एवं वास्तविक खरीज** करवाकर इसकी प्रति मूल रूप में उपलब्ध कराया जाय।
- कठिनाई-5 के अनुपालन में चयनित गैर वन भूमि पर सर्वे एवं रेखांकन के पश्चात चार फिट ऊंचाई का स्थाई पिलर का निर्माण एवं शक्तिपूर्वक वनरोपण के उपलब्ध कराया जायेगा। इस भूमि को 1:50000 के स्केल पर **मानचित्र पत्र डीपलीमैन्ट/एचएड कॅडिनेट** कराते हुए मार्क कराकर सर्वपिठ किया जायेगा।
- कठिनाई-8 के अनुपालन में आपके द्वारा निर्माण के क्रम में प्रस्तावित चार घुंघों का फलन के पश्चात पुनः सर्पि, लीट निर्माण अनिलेख संधारण, निलामी एवं सुरक्षा कार्य हेतु अलग से विभाग द्वारा मान नहीं करने में कारण औसत 2 एकड़/हेक्टर का प्रति वनमीटर 800/- रु० के दर से कुल 1200/- रु० मात्र वन प्रमण्डल पदाधिकारी, गया वन प्रमण्डल, गया के पदनाम से बैंक ड्राफ्ट बनाकर इस कार्यालय में समर्पित किया जाय।  
 का: अनुरोध है कि अविलम्ब 20 दिनों का अनुपालन कराते हुए प्रतियेदन सीध भेजने की सूचना की जाय।  
 एक अनिम स्वीकृति हेतु अर्देत्तर करेवाई किया जा सके।  
 उपरोक्त शर्तों के अनुपालन प्रतियेदन प्राप्त होने के पश्चात विभाजित परियोजना के लिए वन संरक्षण अधिनियम 1980 की धारा-2 के तहत अंतिम स्वीकृति प्रदान की जायेगी। नोडल पदाधिकारी(वन संरक्षण) बिहार द्वारा वन भूमि की अपवोजन हेतु अंतिम स्वीकृति आदेश निर्वत रूप में प्रस्ताव की उक्त वन भूमि पर गैर वानिकी कार्य किया जायेगा।

**अनुलग्नक-संश्लेष।**

दिएकाभाजन,  
 80  
 वन प्रमण्डल पदाधिकारी  
 गया वन प्रमण्डल, गया

क्रमांक- दिनांक-  
प्रतिष्ठिति वन संरक्षण, गन्ना अंकल गन्ना की प्राप्ति के साथ सुपनसई एवं आसई  
कार्यवाई हेतु समर्पित।

80  
वन प्रमोदक पदाधिकारी  
गन्ना वन प्रमोदक, गन्ना।

क्रमांक-5497 दिनांक-01/09/15

प्रतिष्ठिति समर्पण, गन्ना को वैज्ञानिक तरीक़ी की एक प्रजा प्रती सलन करतै हुए अनुरोध है कि  
अभिलेख प्रयोक्ता एजेन्सी वरि अनुपालन प्रतिवेदन समर्पित करने हेतु अपने सलन से निवेदित करतै चलेगे सलन  
कम्प्लेक्स-3 एवं 4 के अनुपालन में अपवर्जित होने वाले वन भूमि के बदले समस्तुल्य वन वन भूमि प्राप्ति  
पत्रांक-2218/10 दिनांक 07.07.2015ई0 के माध्यम से गन्ना जिलालगंठ बरिबिबलार अंचल बीजा एवं धाना-नामोवार,  
घागा नं0 230 आसा संख्या-34 खेसरा संख्या-109 संख्या- 174 एकड़ में समर्पित प्रस्तावित वन वन भूमि को पर्यावरण  
एवं वन विभाग के पक्ष में अतिपूरक मनरोपण हेतु हस्ताक्षरान्तरण एवं दायित्व स्वीक़ण करतक इसकी प्रती मूल रूप में  
उपलब्ध करतने की सूच की जाय।

*(Signature)*  
वन प्रमोदक पदाधिकारी  
गन्ना वन प्रमोदक, गन्ना।

**Appendix 3**

**NOC from State Museum & Archaeological Directorate under Art, Culture and Youth Dept. Govt. of Bihar**



1152

पत्रांक-5पुरा/सं0-1-02/2015 - 260  
कला, संस्कृति एवं युवा विभाग, बिहार  
(पुरातत्व निदेशालय)

प्रेषक,

अतुल कुमार वर्मा  
निदेशक, पुरातत्व, बिहार।

सेवा में,

श्री देवेन्द्र प्रसाद,  
अपर परियोजना निदेशक,  
ए.डी.बी प्रोजेक्ट्स, बुडको,  
303, मौर्या टावर,  
बुद्धमार्ग, पटना-1

पटना, दिनांक-01-09-2015

विषय:-

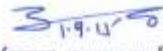
गया में गया जल आपूर्ति योजना हेतु राज्य सरकार द्वारा सुरक्षित पुरातात्विक स्थलों के निकट बुडको द्वारा प्रस्तावित निर्माण कार्य हेतु अनापत्ति प्रमाण पत्र प्रदान करने के सम्बन्ध में।

महाशय,

निदेशानुसार उपर्युक्त विषयक आपके पत्रांक-86, दिनांक-11.8.2015 के आलोक में प्रस्तावित परियोजना की व्यापक लोकोपयोगिता को दृष्टि में रखते हुए जनहित में 'बिहार प्राचीन स्मारक और पुरातत्व स्थल अवशेष तथा कलानिधि अधिनियम 1976' की धारा 18 (1) के अन्तर्गत प्रदत्त शक्तियों के आलोक में राज्य सरकार द्वारा उक्त परियोजना अन्तर्गत प्रस्तावित संरचनाओं के निर्माण एवं जीर्णोद्धार की अनुमति के साथ अनापत्ति प्रमाण पत्र निम्नांकित शर्तों के साथ प्रदान की जाती है-

1. Tank / Reservoir अथवा अन्य प्रस्तावित संरचनाओं के निर्माण/जीर्णोद्धार हेतु किसी विस्फोटक का प्रयोग नहीं किया जाएगा।
2. भारी मशीन उपकरण, यथा जे.वी.सी. आदि का उपयोग प्रतिबंधित होगा।
3. कोई भी गतिविधि जो भू-स्खलन अथवा पर्वत के स्वाभाविक निर्मिति में व्यापक परिवर्तन ला सकती हो, प्रतिबंधित होगी।

विश्वासभाजन,

  
(अतुल कुमार वर्मा),  
निदेशक, पुरातत्व, बिहार।



PRU-1167  
03/09/15

Appendix 4

Letter to DFO for granting NOC for Renovation work of water storage reservoirs at  
Gaya

# बिहार शहरी आधारभूत संरचना विकास निगम लि० Bihar Urban Infrastructure Development Corporation Ltd.

303, मौर्या टावर / Maurya Tower, बुद्ध मार्ग / Buddh Marg, पटना / Patna- 800 001  
दूरभाष / Phone : +91-612-2210101, फैक्स नं० / Fax No. : +91-612-2210103  
E-mail : contact@buidco.in, web : http://buidco.in



**BUIDCO**  
Building Better Tomorrow  
ISO 9001:2008, 14001:2004

सं/No.: BUIDCO/PMU(ADB Project) – 03/13 (Part - II) - 877

दिनांक/Date : 25/03/15

सेवा में:-

जिला वन अधिकारी,  
वन विभाग कार्यालय,  
समीप – किरिन मेमोरियल हाई स्कूल,  
करीम गंज, गया।

**विषय**—राज्य संरक्षित गया वन क्षेत्राधीन रामशिला, मुरली, ब्रह्म्योनि तथा श्रृंगस्थान पहाड़ियों पर अवस्थित जलाशयों में पेयजल आपूर्ति सम्बन्धित मरम्मति कार्य हेतु अनापत्ति प्रमाण पत्र के संबंध में।

महाशय,

उपर्युक्त विषय के संबंध में कहना है कि नगर विकास एवं आवास विभाग (यू०डी०एच०डी०) बिहार सरकार ने एशियाई विकास बैंक (ए०डी०बी०) द्वारा वित्तपोषित " बिहार शहरी विकास निवेश कार्यक्रम (बुडिप)" प्रारम्भ किया है। इस कार्यक्रम का निष्पादन नगर विकास एवं आवास विभाग, बिहार सरकार के द्वारा तथा कार्यान्वयन "बिहार शहरी आधारभूत संरचना विकास निगम (बुडको)" द्वारा बुडिप की परियोजना प्रबन्धन इकाई के माध्यम से हो रहा है।

इस परियोजना को चार शहरी निकायों यथा भागलपुर, गया, दरभंगा और मुजफ्फरपुर में कार्यान्वित किया जायेगा। इस पूरे कार्यक्रम का कार्यान्वयन 9 वर्षों की अवधि में 3 या 4 चरणों में होना है, जिसमें से एक उप परियोजना " गया में पेयजल आपूर्ति व्यवस्था में सुधार " है।

गया पेयजल आपूर्ति उप परियोजना के दो भागों में निम्नलिखित कार्यों को सम्मिलित किया गया है :-

1. नल कूपों की मरम्मति
2. जल संरचना के पाइपों को बिछाना
3. नये जलाशयों का निर्माण
4. जलाशयों की मरम्मति
5. जल वितरण हेतु पाइपों को बिछाना

इस उप परियोजना के कुछ कार्य क्षेत्र राज्य संरक्षित गया वन क्षेत्र में यथा रामशिला, मुरली एवं ब्रह्म्योनि पहाड़ियों पर अवस्थित जलाशयों पर स्थित है, जिसके लिए मरम्मति कार्य (परिशिष्ट 1) प्रारम्भ करने से पूर्व आपके विभाग से अनापत्ति प्राप्त करना आवश्यक है। इन मरम्मति कार्यों से

संरक्षित वन क्षेत्र का कोई भाग प्रभावित नहीं होगा।



बिहार सरकार का उपक्रम  
Govt. of Bihar Undertaking

बुडको: बिहार कल के लिए

अतः अनुरोध है कि संबंधित सिविल कार्य (अधिकोशतया मरम्मत) के लिए अनापत्ति प्रमाण पत्र प्रदान करने की कृपा की जाय, जिससे कि इस महत्त्वकांक्षी योजना को पूरा कराया जा सके।

अनुलग्नक - यथोक्त।

विश्वासभाजन,

(दया शंकर मिश्रा)  
महाप्रबंधक (कार्य)

जापांक- 877

दिनांक - 25/03/15.

प्रतिलिपि- मुख्य वन-संरक्षक, सह नोडल पदाधिकारी (वन-संरक्षण), बिहार, पटना को सादर सूचनाार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

महाप्रबंधक (कार्य)



बिहार सरकार का उपक्रम  
Govt. of Bihar Undertaking

बुजको: बिहार काल को शिबे

**NOC from Temple Trust Ramshilla Hill for using stairs during construction of GLSR**

24 अगस्त 2015

माननीय महोदय,  
गया जलापूर्ति योजना  
गया

संदर्भ – रामशिला पहाड़ी स्थित टंकी के समीप नई टंकी  
के निर्माण से सम्बन्धित ।

उपरोक्त जलापूर्ति योजना के अधिकारियों से वार्ता के  
सम्बन्ध में मंदिर प्रबंधकर्ता समिति, टंकी के निर्माण में लगने वाली  
निर्माण सामग्री हेतु सीढियों का उपयोग ( पितृपक्ष समय को  
छोड़ कर ) करने पर सहमति प्रदान करता है ।  
सीढियों में किसी भी तरह की टुट-फुट होने की स्थिति में पुनः  
सही करवाने का कष्ट करेंगे ।

धन्यवाद,

*Laxman Pandey*  
(लक्ष्मण अमर पांडे)  
प्रबंधकर्ता  
रामशिला मंदिर  
गया

Appendix 6

**Existing water storage reservoir- photo illustration**



**Murli Hill**



**Ramshila Hill**







**Singrasthan**



**Brahmayoni Hill**



















**Azad Park**





## Location of existing pump house

1					
S. No.	Components	No s.	Capacity /Quantity	Photograph Pump Houses	Photograph Pump
1	<b>REFURBISHMENT OF TUBE WELLS</b>	29	Cum/hr.		
1	Dandibagh No. 1	1	220		
2	Dandibagh No. 2	1	220		
3	Dandibagh No. 3	1	220		
4	Dandibagh No. 4	1	220		
5	Dandibagh No. 5	1	220		
6	Panchayati Akhara No. 1	1	100		
7	Panchayati Akhara No. 2	1	100		
8	Azad Park	1	55		

9	Dhobighat	1	40		
10	Central School	1	75		
11	Nigam Store	1	20		
12	Gurudwara	1	55		
13	New Godown	1	55		
14	Kharkhura	1	40		
15	Delha	1	40		
16	Panchayati Akhara No. 3	1	100		
17	Janata Colony 1	1	40		



18	Janata Colony 2	1	20		
19	Pilgrim Hospital	1	20		
20	Vishnupad	1	130		
21	Bypass	1	75		
22	BairagiPowerganj	1	55		
23	BageshwariPachim	1	20		
24	Pitamaheshwar	1	75		
25	Kauvasthan	1	20		

26	Hata Godown	1	55		
27	Manpur	1	100		

## CHAPTER – X: Geohydrological Study

### 10.0 EXPLOITABLE SUB-SURFACE WATER POTENTIAL OF PHALGU RIVER & IMPACT OF 124 MLD ABSTRACTION ON ITS POTENTIAL

#### 10.1 Delineation of ground water potential zone

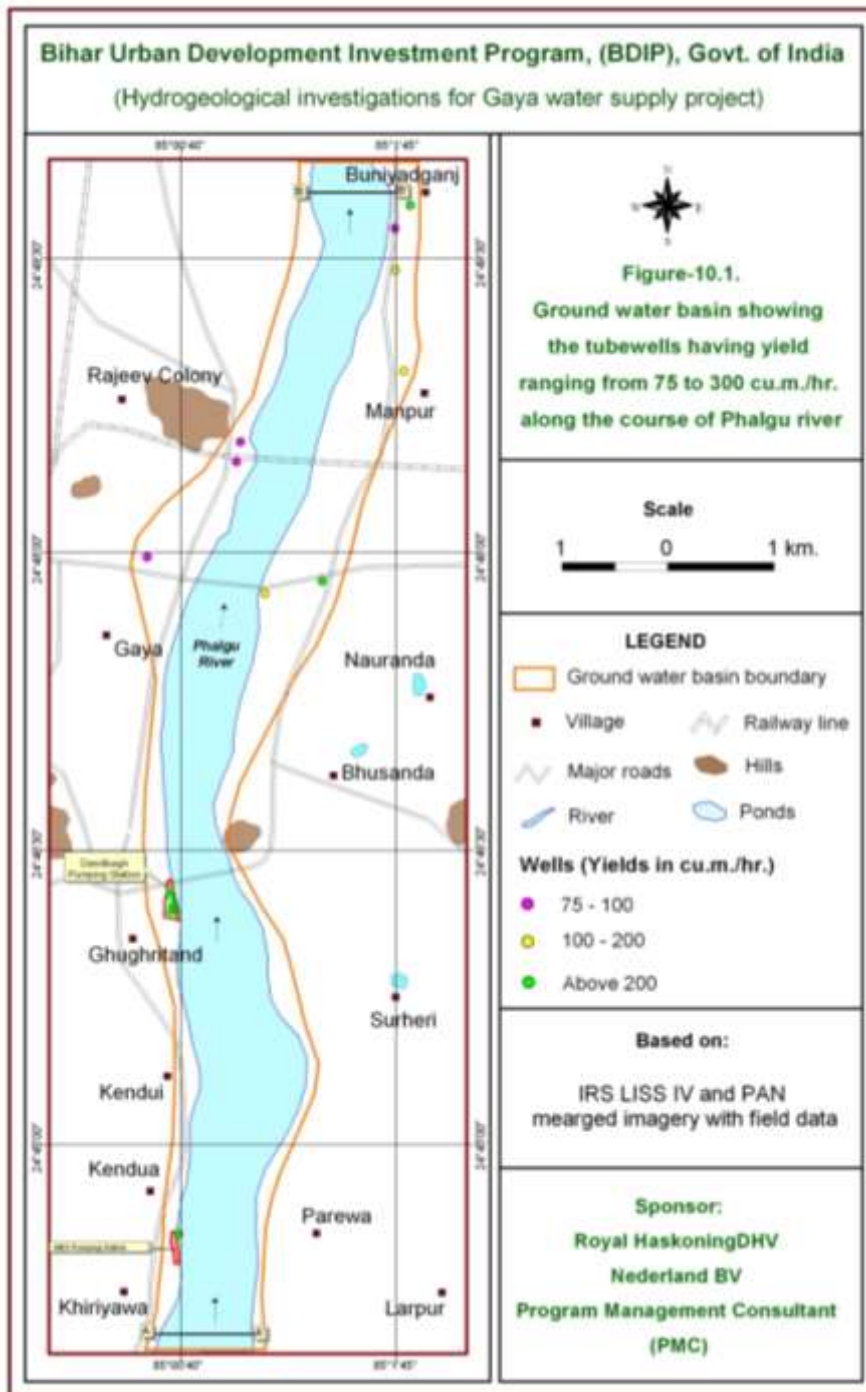
A ground water potential zone has been delineated based on hydro-geomorphological map, findings of resistivity surveys and covering the area where high yielding tube wells have been constructed/operated by GMC/PHED (yield ranging from 75 m<sup>3</sup>/hour to 300 m<sup>3</sup>/hour). This zone covers an area of 14.25 km<sup>2</sup> (**Figure-10.1**) on the left bank of Phalgu river, part of Manpur area on the right bank and part of Gaya city adjoining the river. Actually, this is the zone having adequate thickness of granular aquifer, deposited by Phalgu river along its present course and palaeo-channels which is most suitable for future ground water exploitation as has been proved by the existence of high yielding tube wells.

It was suggested by the CGWB during the meeting held on 16.05.2014 that ground water potential zone may cover area more than 14.25 km<sup>2</sup> if the lateral area on the left and right banks of Phalgu river are also studied by geoelectrical resistivity surveys. The existing well fields are a part of Phalgu ground water potential zone having the same aquifer thickness as in the river itself and it is likely that it may have similar aquifer thickness in lateral area. The exploitable ground water potential will be accordingly more if additional lateral area on either sides of river gets increased within the Phalgu ground water potential area.

It was also suggested by BUDIP during the meeting that an area of 4 -6 km downstream and 20 km upstream of Gaya town may also be studied along Phalgu river and it may provide additional ground water resources to plan for the 30 years water requirement.

#### 10.2 Present status of ground water abstraction on sub-surface water of Phalgu river.

It has been observed that the present total ground water abstraction of 24,000 m<sup>3</sup>/day considering 6-8 tube wells of Dandibagh well field (18,000 m<sup>3</sup>/day), 4 tube wells of Manpur area (4,000 m<sup>3</sup>/day), three tube wells of Gaya city (2,000 m<sup>3</sup>/day) near the river and 3 tube wells of MES (1000 m<sup>3</sup>/day) is recharged directly by the surface flow and during summer, it is tapping from the sub-surface water storage when the Phalgu river goes completely dry or with surface flow less than a cumec. The maximum lowering of water level in Phalgu river bed is less than 2 metres near the Dandibagh well field, which is being heavily pumped. This lowering is due to recharge provided by the sub-surface water of Phalgu river when a hydraulic gradient is developed towards the well field due to pumping of 18,000 m<sup>3</sup>/day.



Average lowering of water in Phalgu river, from Khiriyawa to Buniyadgunj is less than a metre. However, taking the maximum lowering of two metres of water levels in river bed, the sub-surface water availability amounts to 5.7 mcm or about 76,000 m<sup>3</sup>/day taking the specific yield of 20% (as the upper river bed is loose coarse sand and gravel) within the area of 14.25 km<sup>2</sup> of ground water potential zone.

$$14.25 \times 2 \times 0.20 = 5.70 \text{ mcm}$$

Area of ground water potential zone x aquifer thickness x Specific yield = Ground water availability

It is therefore seen that at present the availability of sub-surface water within the river bed in 2 metres of the saturated river bed is much more than the ground water abstraction of 24,000 m<sup>3</sup>/day or 1.80 mcm (considering 75 day of dry river bed) indicating that the lowering of water level in the ground

water basin will be less than a metre. The present ground water abstraction is only the 31.50 % of the sub-surface water availability in an area of 14.25 km<sup>2</sup>.

Even if the ground water abstraction increases from the existing tube wells for next 5 years or so, there will be no lowering of water level in the river bed of more than 2 metres as there is still surplus of 3.9 mcm in the river bed. The yield of existing tube wells will not be affected as there is still 23 metres of aquifer thickness available to sustain the present yields

### **10.3 Sub-surface flow of water in Phalgu river during summer months.**

#### **10.3.1 Sub-surface inflow**

Once the Phalgu river is dry, there is sub-surface water flowing in the river towards the down stream side due north. An attempt has been made to estimate the inflow at the Section AA', near Khiriyawa (MES pumping station), (**Figure-10.1**) considering the hydraulic conductivity (150 m/day), section area of flow (average width of the river and average aquifer thickness) and hydraulic gradient of 1.5 m/km. The quantity of sub-surface flow amounts to 3994 m<sup>3</sup>/day or say 4000 m<sup>3</sup>/day or 0.3 mcm during the 75 days.

$$150 \times 710 \times 25 \times 1.5 / 1000 = 3994 \text{m}^3/\text{day}$$

Hydraulic conductivity x width x aquifer thickness x hydraulic gradient = Sub-surface inflow

#### **10.3.2 Sub-surface out flow of water in Phalgu river during summer months.**

The sub-surface out flow has been estimated at Section BB' near village Buniyadgunj when the maximum 1,24,000 m<sup>3</sup>/day of ground water abstraction will be done by the year 2044 from the ground water basin formed along Phalgu river. With the expected average lowering of water level of 4.35 metres, the outflow will be reduced with aquifer thickness and will be 2950 m<sup>3</sup>/day.

$$150 \times 635 \times 20.65 \times 1.5 / 1000 = 2950 \text{m}^3/\text{day}$$

Hydraulic conductivity x width x aquifer thickness x hydraulic gradient = Sub-surface outflow

It is not known at this stage that what will be the impact of reduced inflow of river during summer months on the downstream stack holders of Section BB' as the number of irrigation tube wells are not known. However, as the irrigation wells are not operated during the summer months, (after the harvesting of Rabi crops), no major impact is anticipated.

### **10.4 Impact of ground water abstraction of 124 MLD on sub-surface water of Phalgu river**

The sub-surface water storage in the ground water potential zone covering an area of 14.25 km<sup>2</sup> will be 53.43 mcm taking average specific yield of 15 % for the average aquifer thickness of 25 metres

$$14.25 \times 25 \times 0.15 = 53.43 \text{mcm}$$

Area of ground water potential zone x aquifer thickness x Specific yield = Ground water availability

It is proposed that by the year 2044, there will be ground water abstraction of 124 MLD from tube wells located on left and right banks of the river. The ground water abstraction during the 75 days @ 1,24,000 m<sup>3</sup>/day will be 9.30 mcm which happens to be 17.40 % of the total sub-surface water storage. So, the water level will be lowered by 4.35 metres, leaving a substantial saturated aquifer thickness of 20.65 metres. It is presumed that entire ground water abstraction will be from sub-surface water storage of Phalgu river and the anticipated lowering of water level in the river bed will be 4.35 metres from an area of 14.25 km<sup>2</sup> of the ground water potential zone. This quantity of water will be derived from the static ground water reserves of the ground water potential zone covering the river bed which have been calculated as 53.43 mcm. In addition, there will inflow of sub-surface water from the upstream side, near Khiriyawa which has been estimated as 4000 m<sup>3</sup>/day or 0.30 mcm during 75 days. The sub-surface inflow will provide additional quantity of water for compensating the dewatering of the basin and raising the water level in the summer months. The total water storage including the sub-surface inflow of 0.30 mcm will be 53.73 mcm. The ground water abstraction of 9.30

mcm will be 17.30 % which will create lowering of water level by 4.325 metres, leaving the aquifer thickness of 20.675 metres.

### **10.5 Discharge of tube well at reduced aquifer thickness during summer**

It has been observed that tube wells constructed in Dandibagh well field are yielding around 300 m<sup>3</sup>/hour at very low drawdown, less than 3 metres. The average thickness of aquifer is around 25 metres.

Hydrogeologically, it is stated that discharge of a tube well is directly proportional to its transmissivity which is hydraulic conductivity x aquifer thickness. Dandibagh, tube wells are yielding around 300 m<sup>3</sup>/hour from an aquifer having transmissivity of 3750 m<sup>2</sup>/day (K=150 m/day and aquifer thickness of 25 metres). The same tube well with aquifer thickness of 20 metres during summer with and maximum destortion of 5 metres due to ground water abstraction of 124 MLD, the discharge of the tube well will be 240 m<sup>3</sup>/hour at the same drawdown. Generally, tube wells tapping granular aquifer are pumped at normal drawdown of 6 to 8 metres. If the same tube well is pumped at 300 m<sup>3</sup>/hour with aquifer thickness of 20 metres, it will yield 300 m<sup>3</sup>/hour at drawdown of 6 to 8 metres. Normally, in case of confined aquifer, the discharge is directly proportional to drawdown and a tube well tapping confined aquifer will yield double the discharge at the double value of drawdown but in case of phreatic aquifer, it is not so and by doubling the discharge, the drawdown value becomes more than double due to reduced transmissivity. So, the tube wells will maintain the same yield even in the summer but with increased drawdown by the same capacity of turbine pumps

### **10.6 Estimation of the period when the river has less surface flow to sustain well fields**

While estimating the lowering of water in Phalgu river of 4.325 m for ground water abstraction of 124 MLD, it has been presumed that river will become dry or will have less flow of 2 cumecs for 75 days. (April to Mid –June). This is for period when monsoon fails for prolonged years. A case study has been done for Phalgu river on 18<sup>th</sup> February, 2014 using Manning equation. During the year 2013, the catchment area of Phalgu river received rainfall of only 574 mm against the normal annual rainfall of 1089 mm (Average of 100 years of IMD data). So, it was much below the average annual rainfall and consequently very much reduced flow. It was observed on 18<sup>th</sup> February, 2014 that there is average water column of 15 cm in the river in the average width of 30 metres (**Photoplate-2.2**). This much flow is equivalent to 2.5 m<sup>3</sup>/s or 0.21 mcm. as per the Manning's equation.

It means that by the 1<sup>st</sup> week of March, 2014, it will be reduced to 0.124 mcm and the tube wells would start tapping water from the sub-surface water of the river. It is therefore safe to assume that if the rainfall would have been 1089 mm of normal annual rainfall, the river might have had the surface flow of 2 cumecs ( 0.124 mcm) up to end of April,2014. Under such situation, the dry period of Phalgu river would have been only 45 or 50 days.

The maximum average peak flow of Phalgu river during the flood period has been observed as 3376 cumecs, when the rainfall during any day of the month of July was around 235 mm/day, the maximum rainfall as shown in Iso-pluvial map of IMD (**Figure-2.5**) during last 25 years. The minimum flow during such years of less than 2 cumecs will be either in the 1<sup>st</sup> week or 2<sup>nd</sup> week of May for normal rainfall of 1089 mm and 50.47 mm in October. Under such situation, the dry period will be only of 30 days. Accordingly, there will be less drawl of sub-surface water storage of Phalgu river.

### **10.7 Stream gauging data recorded by Central Water Commission on Phalgu river at Gaya**

Central Water Commission (CWC) has set up a stream gauging site on the left bank of Phalgu river, just down stream of road bridge (**Photoplat-10.1**). This bank gets water when Phalgu river has full flow in its river width and during flood periods. Most of the time when there is no flow of water on the left bank, as seen in **Photoplate-10.2** but there is flow in the river, some where in its central part when the flow is more than 2 cumecs.

Efforts were made by HCPL to use the stream gauge data of CWC at Gaya if it could give reliable estimate of the period when the river is completely dry and well fields are tapping sub-surface water



storage. But it is observed that gauge heights show no flow while the central part of the river is having flow more than 124 MLD, the water requirement of Gaya town in the year 2044.

Under such situation, there is no other alternative except to take up hydrological modeling of Phalgu river basin.

**Photoplate-10.1. Stream gauging station being monitored by CWC**



**Photoplate-10.2. Flow in Phalgu river in February while the left bank of CWC station shows no flow much earlier**



## 10.8 Conclusions

Based on the hydrogeological assessment studies of the ground water potential zone, it is observed that present ground water abstraction of 24,000 m<sup>3</sup>/day for 75 days( when the river is dry ) is hardly 31.50 % of the total sub-surface water storage ( 5.70 mcm ) within 2 metres of aquifer in 14.25 km<sup>2</sup> of the ground water potential zone during summer months.

Similarly, with the ground water abstraction of 124 MLD for 75 days of 9.30 mcm from the sub-surface water storage of 25 m thick aquifer of 53.43 mcm will be 17.40 % and it will lower will lower the water level by 4.35 metres, still keeping the aquifer thickness of 20.65 metres which is considered as sufficient to sustain the yield of tube wells.

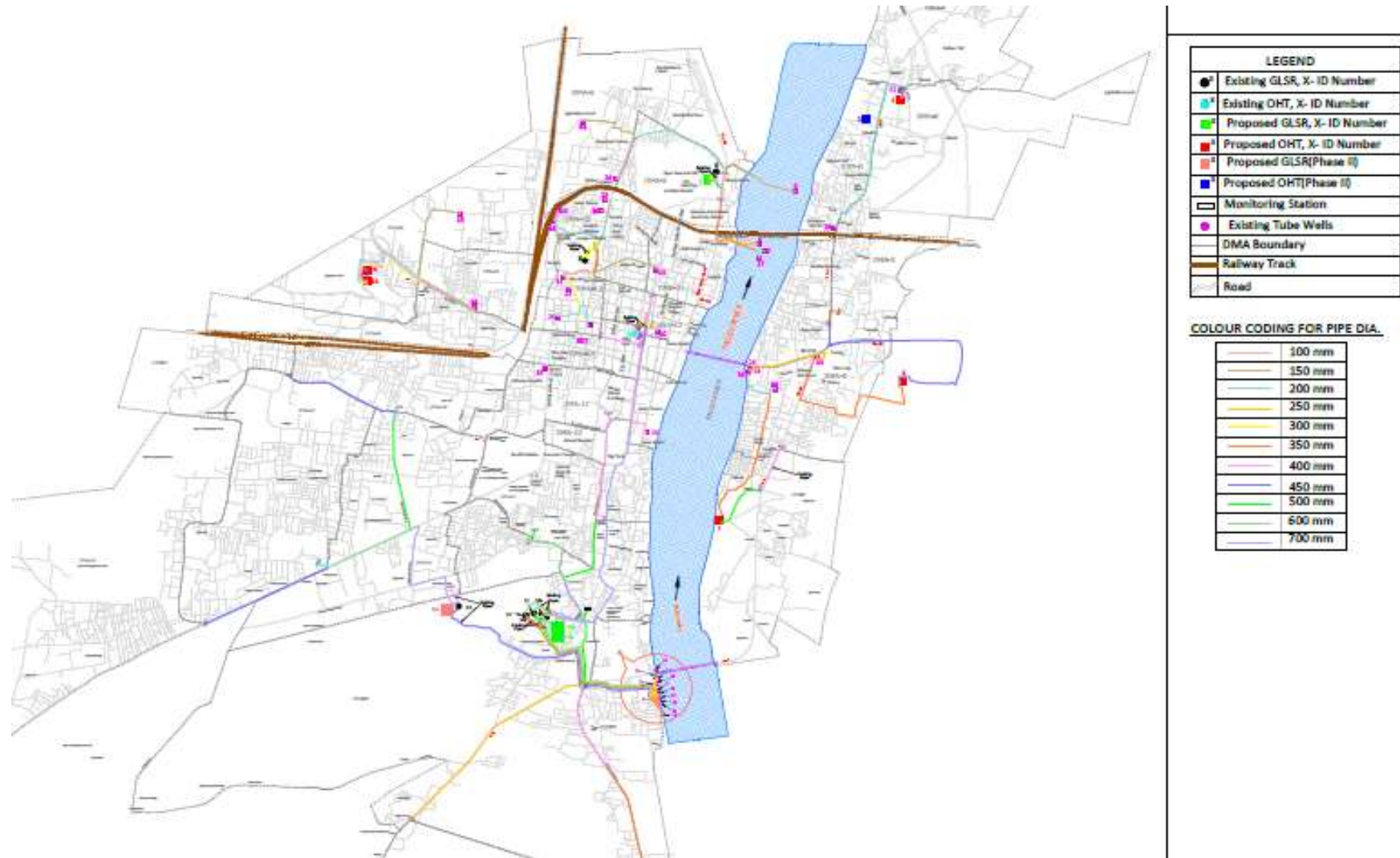
So, it is concluded that despite lowering of water level by 4.35 metres during summer months, the tube wells will sustain the yield and will restore original yield as soon as Phalgu river starts flowing after getting the first spell of rainfall in mid -June.

The impact of pumping 124 MLD during the summer months (75 days) can be further reduced if the well fields are increased instead of having only one well field of Dandibagh. Two more well fields can be developed, one near village Kendui and another near Kendua on the left bank (**Figure-9.1**) and fourth near Manpur - Buniyadgunj on the right bank (if investigated by resistivity surveys). By having four different well fields, there will be less pumping from a small area of a well field, thereby creating a small ground water depression and less lowering of water level around it.

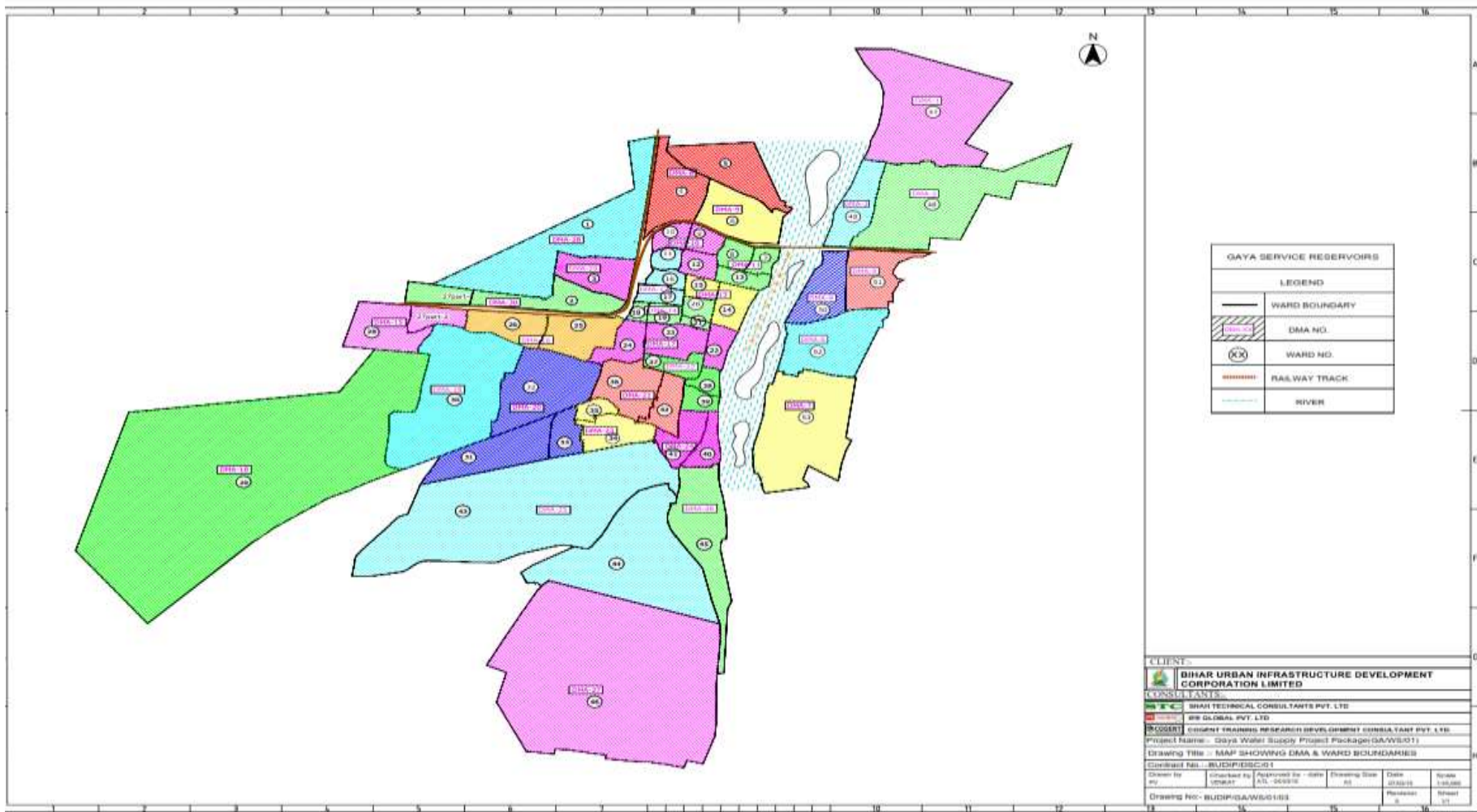
Although, it was recommended by DSC during the meeting held on 16.05.2014 that geoelectrical resistivity soundings may be recorded in Manpur area to find out the aquifer thickness and ground water worthy area, PMC suggested that any additional work may now be taken up by DSC and BUIDCo as PMC has done the studies within its allocations.



## Appendix 8: Location and maps of proposed project components



Map showing location of project area



**DMA area for water distribution**















Location of proposed water storage reservoirs at Gaya – Google map





Appendix 9: Photo illustration – project locations

Proposed OHT and GLSR sites






S.No.	Name of Site	Latitude/ Longitude	Ownership	Photograph	Google map
1	Joda Masjid	24°49'7.37"N/85°1'50.25"E	Gaya Municipal Corporation		
2	Budhva Mahadev	24°49'48.03"N/85°1'44.82"E	Govt. of Bihar		





S.N o.	Name of Site	Latitude/ Longitude	Ownership	Photograph	Google map
3	Mastalipur	24°47'43.95"N/85° 1'52.39"E	Govt. of Bihar		
4	Bhusunda	24°47'4.03"N/85° 0'55.54"E	Govt. of Bihar		
5	Behind Delha Police Station – 2 nos.	24°48'20.52"N/84° 59'4.72"E	Govt. of Bihar		

S.No.	Name of Site	Latitude/ Longitude	Ownership	Photograph	Google map
6	Ramshila Hills GLSR	24°48'43.50"N/85° 0'52.71"E	State Forest Department		
7	Brahmyoni Hills GLSR (2 Nos.)	24°46'34.57"N/85° 0'1.92"E	State Forest Department		

### Tube Well locations under Rehabilitation


Sl. No.	Location of Tube Well	Tube well ID No.	Ward No.	Coordinates	Land
1	Dandi Bagh <sup>25</sup>	01,02, 03,04, 05	45	24.771450, 85.010200	Govt Land
2	Hata Godown 	27	29	24.7999000, 85.004100	Govt Land
3	GMC's Godown (store room)- Nigam store 	11	26	24.80396, 85.0017	Govt Land
4	Gurudwara , Golbagicha Gabda 	12	07	24.80315, 85.00262	Govt Land
5	Panchayati Akhara No.1 	06	07	24.80669, 85.01842	Govt Land
6	Panchayati Akhara No.2 	07	07	24.80669, 85.01842	Govt Land







25

Dandibagh TW 1	Dandibagh TW 2	Dandibagh TW 3	Dandibagh TW 4	Dandibagh TW 5
				

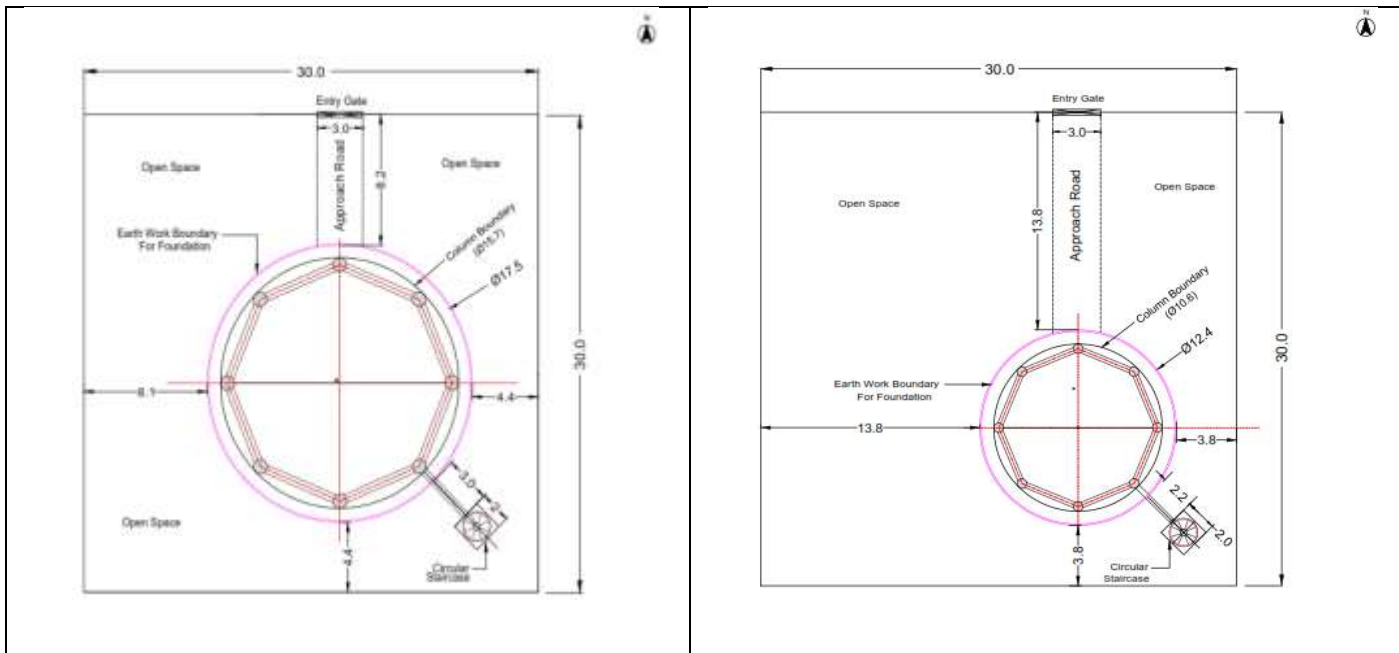
Sl. No.	Location of Tube Well	Tube well ID No.	Ward No.	Coordinates	Land
7	Panchayati Akhara No.3 	07	07	24.80669, 85.01842	Govt Land
8	Pitamaheshwar 	25	19	24.4728, 85.003152	Govt Land
9	Delha 	16	03	24.80922, 84.99069	Govt Land
10	Kauv Sthan 	26	38	24.800670, 85.001380	Govt Land
11	Powarganj Bairagi 	23	10	24.81602, 85.02682	Govt Land
12	Central school 	10	10	24.80928, 85.00498	Govt Land



Sl. No.	Location of Tube Well	Tube well ID No.	Ward No.	Coordinates	Land
13	Azad park 	8	20	24.799590, 85.008660	Govt Land
14	Janta Colony 1 	18	10	24.80849, 85.00114	Govt Land
15	Janta Colony 2 	19	10	24.80849, 85.00114	Govt Land
16	Bageshwari 	24	10	24.81678, 85.00539	Govt Land
17	Khadi Gramodyog, Lakhi Bagh 	30	52	24.79521, 85.02022	Govt Land
18	Dhobi ghat 	09	06	24.81104, 85.02109	Govt Land
19	Manpur 	28	52	24.79778, 85.02466	Govt Land

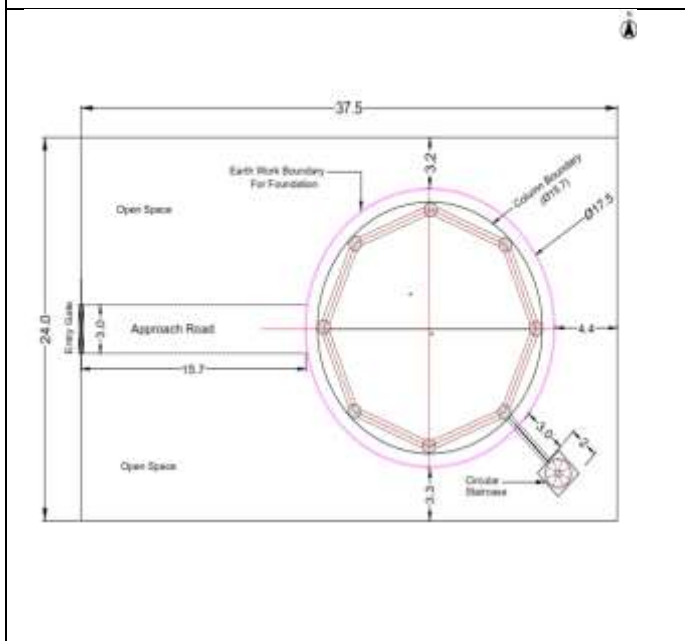
Sl. No.	Location of Tube Well	Tube well ID No.	Ward No.	Coordinates	Land
20	Pilligram Hospital 	20	14	24.799630, 85.009860	Govt Land
21	Bypass 	22	27	24.46139, 84.0659	Govt Land
22	Baba Dayalunath 	15	01	24.47987 , 84.59439	Govt Land
23	New Godam 	14	13	24.48263 , 85.0587	Govt Land
24	Visnupad Temple 	21	41	24.463654 85.003011	Govt Land
25	Manpur, Buniyadganj 	29	48	24.484254 85.13975	Govt Land

Site Management plan – Project location wise

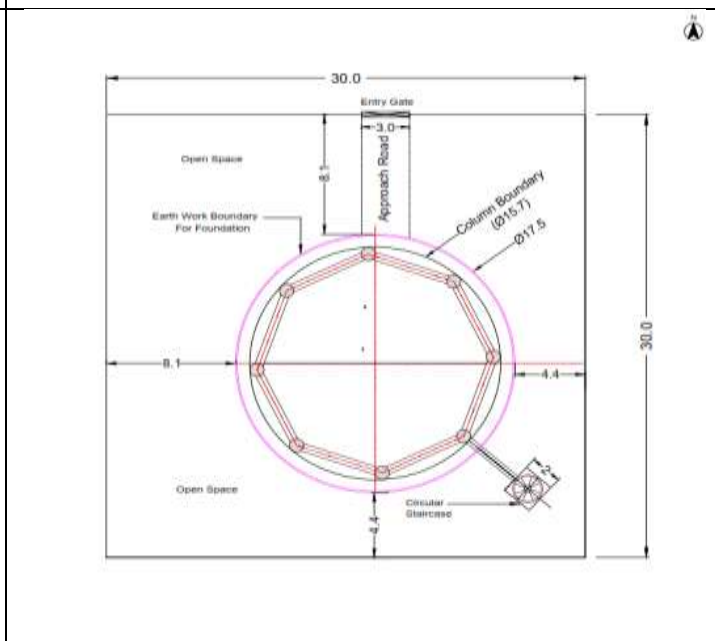


Near Joda Masjid

Budva mahadev



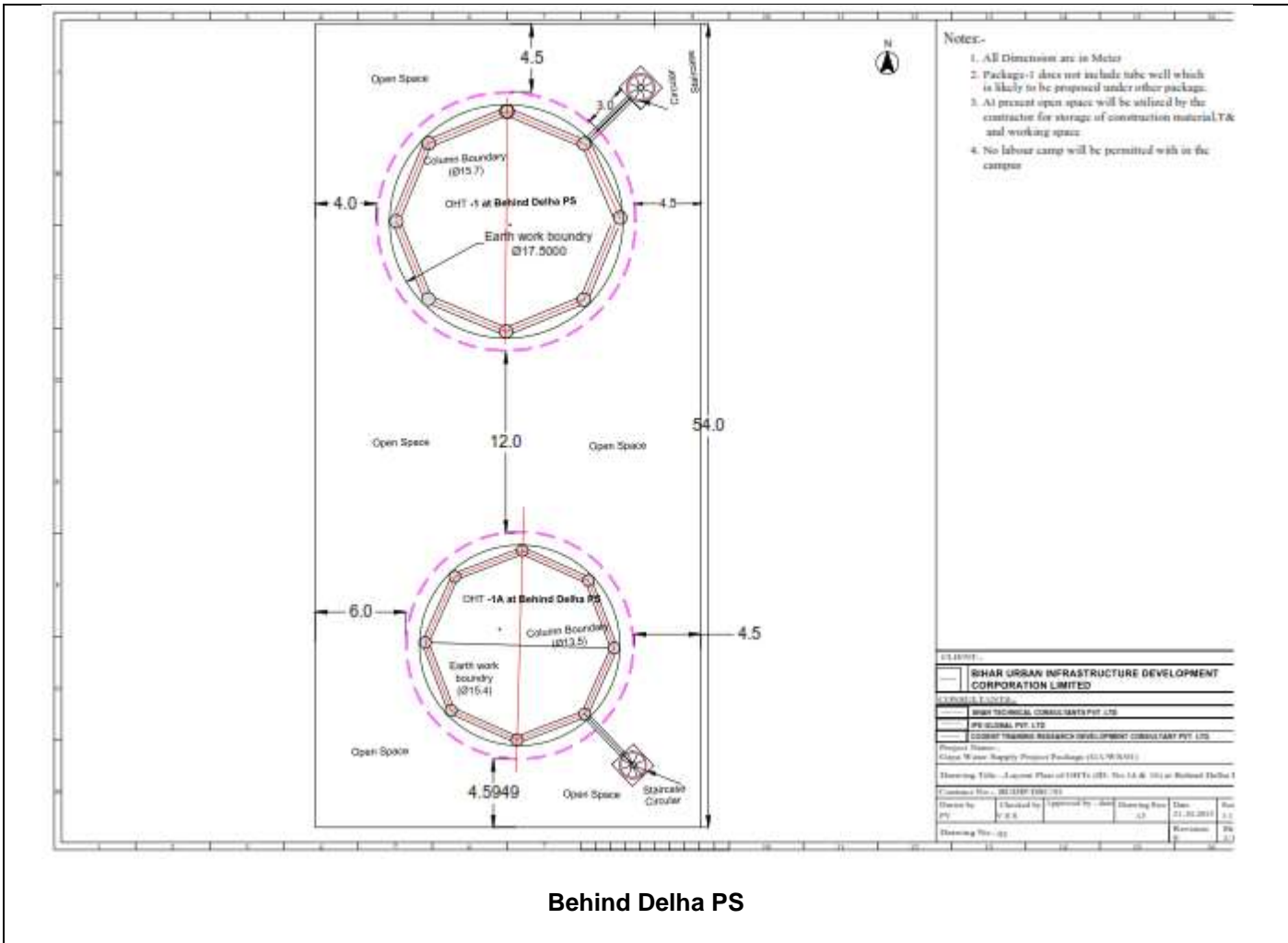
Mastalipur



Bhusunda Mela

Notes:-

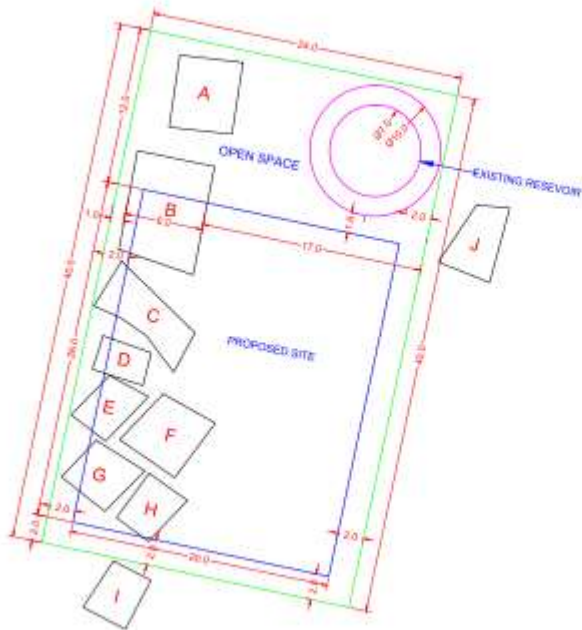
1. All Dimension are in Meter
2. Package-1 does not include tube well which is likely to be proposed under other package.
3. At present open space will be utilized by the contractor for storage of construction material, T&P and working space
4. No labour camp will be permitted with in the campus



- Notes:-**
1. All Dimension are in Meter
  2. Package-1 does not include tube well which is likely to be proposed under other package.
  3. At present open space will be utilized by the contractor for storage of construction material, L&K and working space.
  4. No labour camp will be permitted with in the campus

S.HAR URSSAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED	
S.HAR TECHNICAL CONSULTANTS PVT. LTD.	
SPE GLOBAL PVT. LTD.	
COSMET TRAINING RESEARCH DEVELOPMENT CONSULTANT PVT. LTD.	
Project Name: Ghazal Water Supply Project Package (S.L.N. 5411)	
Drawing Title: Layout Plan of DHT-I (Ø15.7) & DHT-IA (Ø13.5) at Behind Delha I	
Drawing No.: S.HAR/URSS/100/10	
Drawn by: P.S.S.	Checked by: A.P.
Approved by: A.P.	Drawing Date: 21.01.2015
Scale: 1:1	Revision: 06
Drawing Size: A2	Sheet No.: 1/1

### LAYOUT OF GLSR ON RAMSHILA HILLS



**Notes:-**

1. All Dimension are in Meter
2. At present open space will be utilized by the contractor for storage of construction material, Y&P and working space
3. No labour camp will be permitted with in the campus

LEGEND-	
	EXISTING RESERVOIR
	PROPOSED RESERVOIR
	PROPOSED SITE AREA-02.17ha
	BUILDING
<b>A</b>	STAFF QUARTER
<b>B,C,D,E, F,G,H,I,J</b>	PRIVATE HOUSES

CLIENT:-  
**BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED**

CONSULTANT:-

**MTC TECHNICAL CONSULTANTS PVT. LTD.**

**PR GLOBAL PVT. LTD.**

**CBRE TRAINING RESEARCH DEVELOPMENT CONSULTANT PVT. LTD.**

Project Name:- Gaya Water Supply Project Package (I,C,W&S)

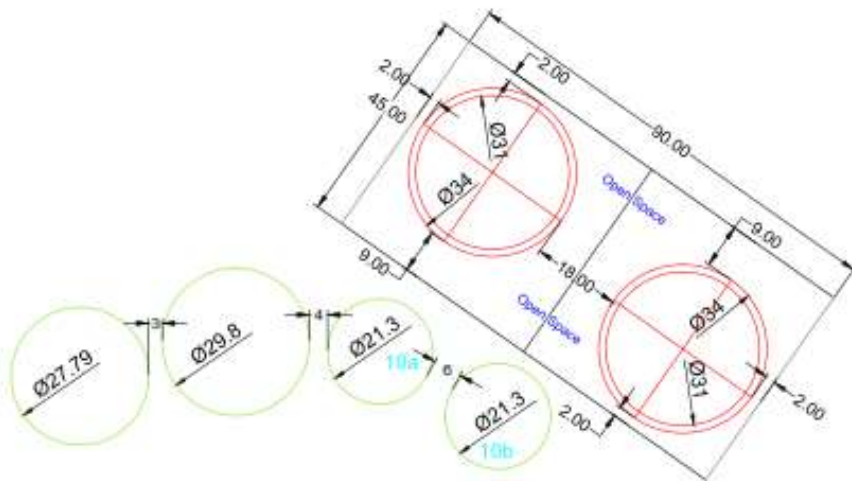
Drawing Title:- LAYOUT PLAN OF RESERVOIR AT RAMSHILA HILLS

Drawing No:- BA-009-002-01

Drawn By	Checked By	Approved By	Drawing Date	Drawn Date	Scale
10007	25-10-15	42	10-15	10-15	1:20

Drawing No.	Revision	Date
BA-009-002-01	0	10-15

LAYOUT OF GLSRs ON BRAHMAYONI HILLS



Notes:-

1. All Dimension are in Meter
2. At present open space will be utilized by the contractor for storage of construction material, TM and working space
3. No labour camp will be permitted with in the campus
4. No buildings or structures are exist at proposed site
5. Tanks 10a & 10b shall not be demolished as per (works) suggested in meeting on 15/11/2014.

LEGEND:-

	EXISTING RESERVOIR
	PROPOSED RESERVOIR
	PROPOSED AREA BOUNDARY

CLIENT:-

**BHARAT URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED**

CONSULTANT:-

**P&P TECHNICAL CONSULTANTS PVT. LTD.**  
**PE GLOBAL PVT. LTD.**  
**CONCEPT TRADING RESEARCH DEVELOPMENT CONSULTANT PVT. LTD.**

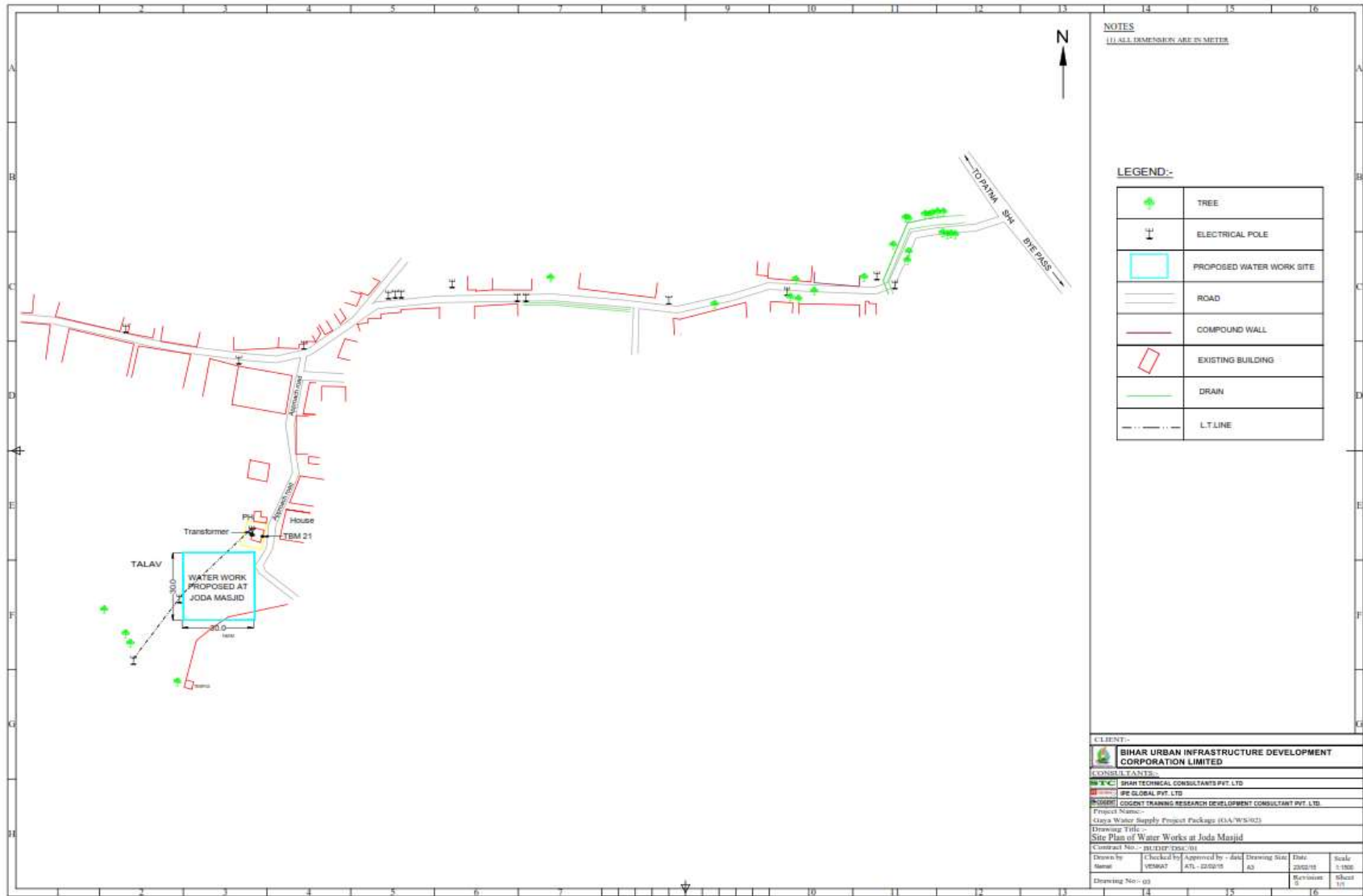
Project Name:-  
 Glass Water Supply Project Package (GWA/WO/01)

Drawing Title:- LAYOUT PLAN OF RESERVOIR AT BRAHMAYONI HILLS

Drawing No.:- BU/001/140/01

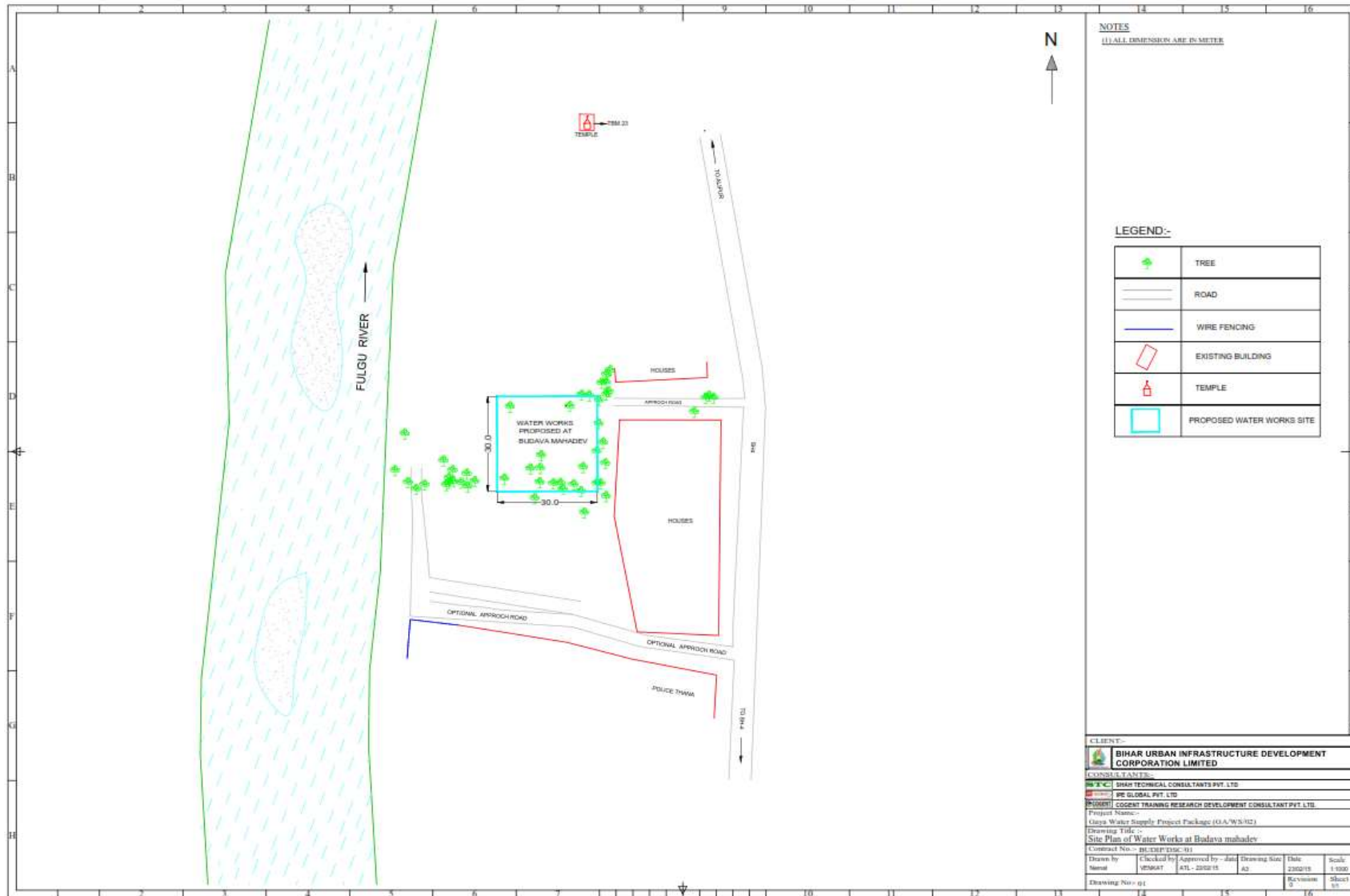
Drawn by	Checked by	Approved by	Drawing Date	Scale	Sheet No.
WSP	WSP	WSP	01	1:100	01

Drawing No. 01



Proposed OHT location and access road at Joda Masjid





**NOTES**

(1) ALL DIMENSION ARE IN METER

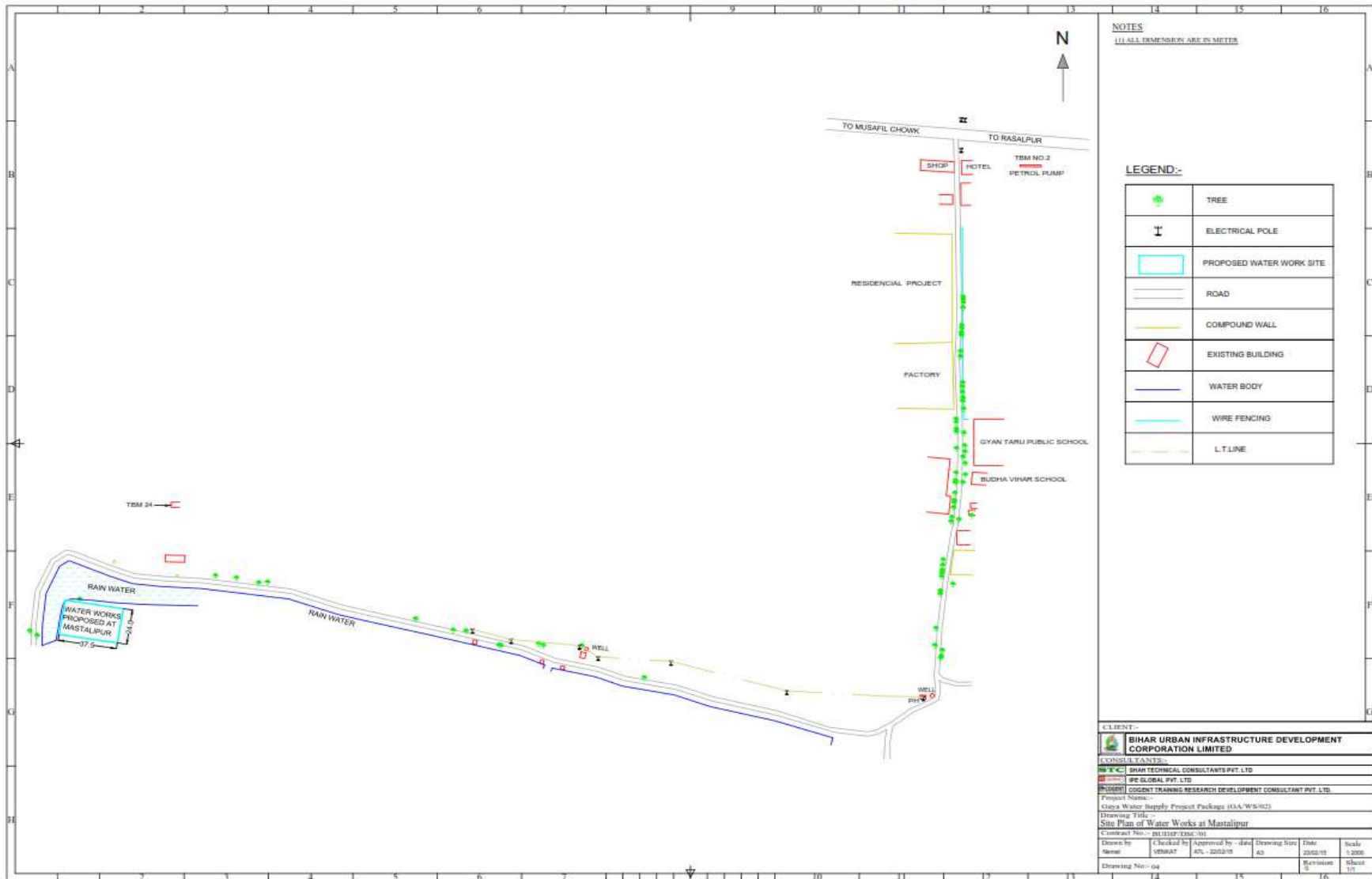
**LEGEND:-**

	TREE
	ROAD
	WIRE FENCING
	EXISTING BUILDING
	TEMPLE
	PROPOSED WATER WORKS SITE

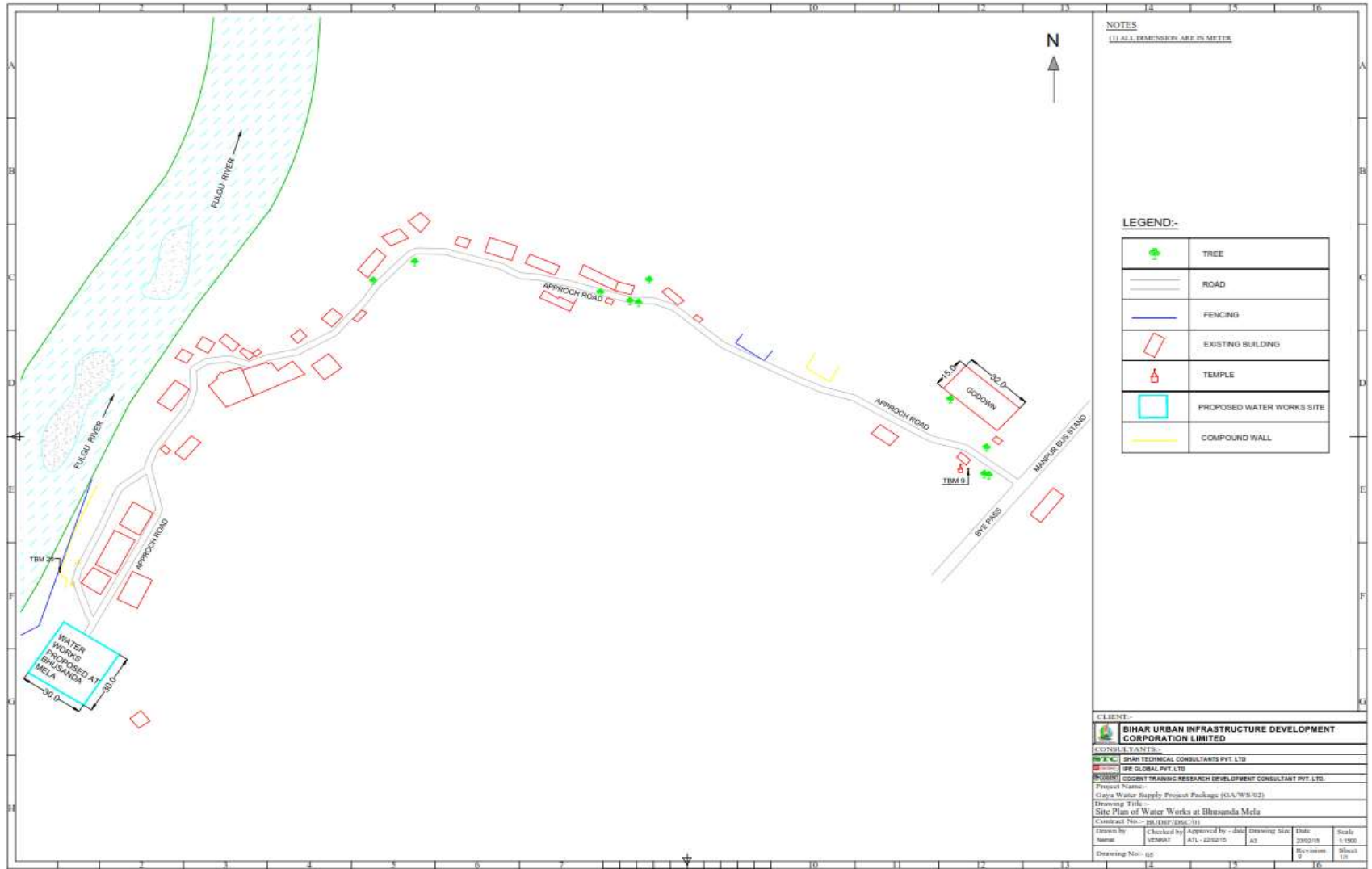
<b>CLIENT:-</b>					
BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED					
<b>DESIGNER/ENGINEER:-</b>					
M/S/C/ SINGH TECHNICAL CONSULTANTS PVT. LTD.					
M/S/C/ IRE GLOBAL PVT. LTD.					
<b>PROJECT/ COORDINATOR/ SUPERVISOR:-</b>					
COGNATE TRAINING RESEARCH DEVELOPMENT CONSULTANT PVT. LTD.					
<b>Project Name:-</b>					
Ozone Water Supply Project Package (O/A/WS/02)					
<b>Drawing Title :-</b>					
Site Plan of Water Works at Budva mahadev					
<b>Contract No.:-</b> BE/STP/1142-01					
Drawn by	Checked by	Approved by - Jm	Drawing Size	Title	Scale
name	VERMAT	ATL - 23/02/15	A3	23/02/15	1:1000
<b>Drawing No. :- 01</b>				<b>Revision</b>	<b>Sheet</b>
				0	01

**Proposed OHT location and access road at Budva mahadev**





Proposed OHT location and access road at Mastalipur



**NOTES**  
 (1) ALL DIMENSIONS ARE IN METERS

**LEGEND:-**

	TREE
	ROAD
	FENCING
	EXISTING BUILDING
	TEMPLE
	PROPOSED WATER WORKS SITE
	COMPOUND WALL

**CLIENT:**  
 BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

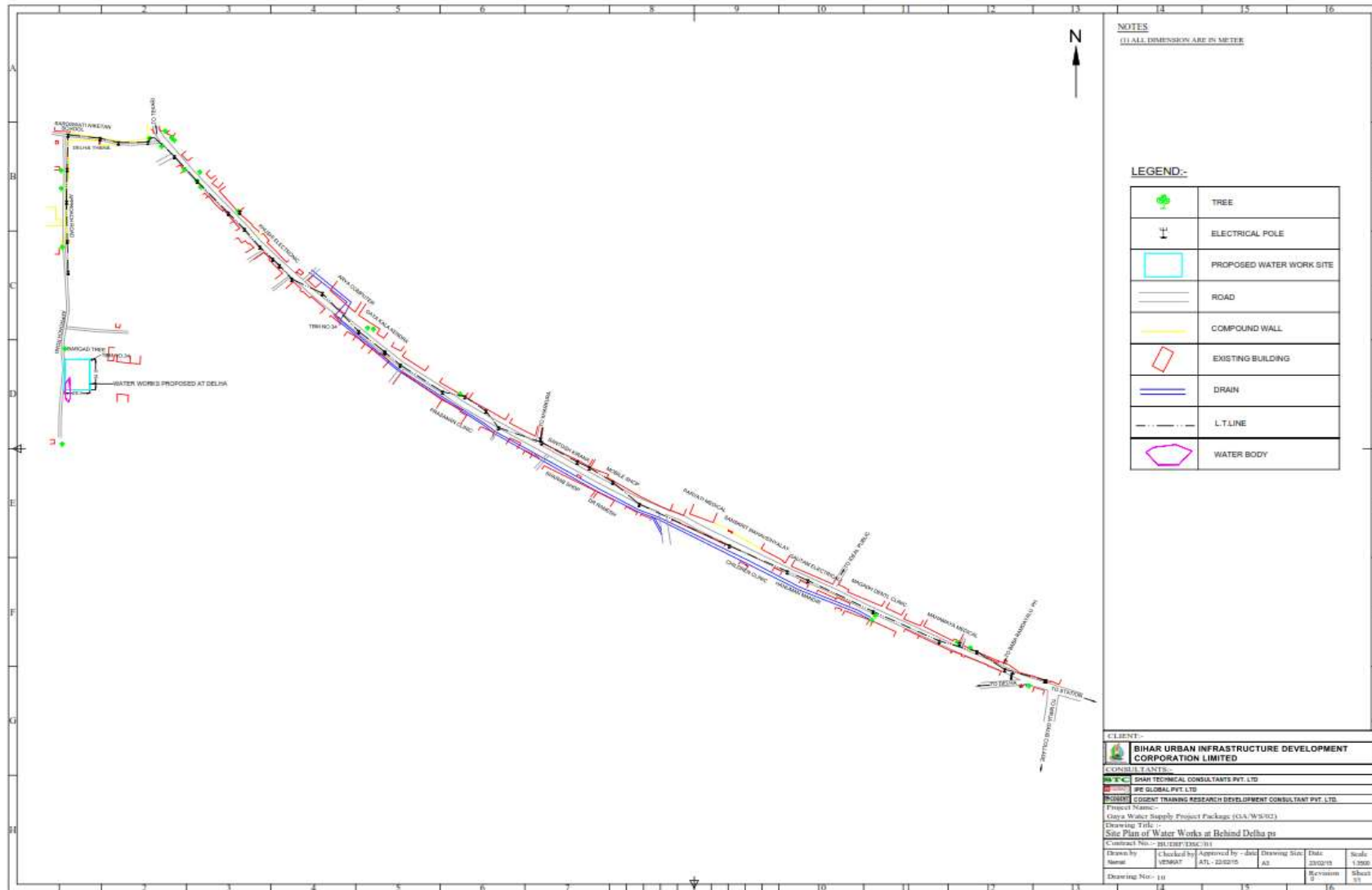
**CONSULTANTS:**

	SHAH TECHNICAL CONSULTANTS PVT LTD
	IPE GLOBAL PVT LTD
	COGNITIVE TRAINING RESEARCH DEVELOPMENT CONSULTANT PVT. LTD.

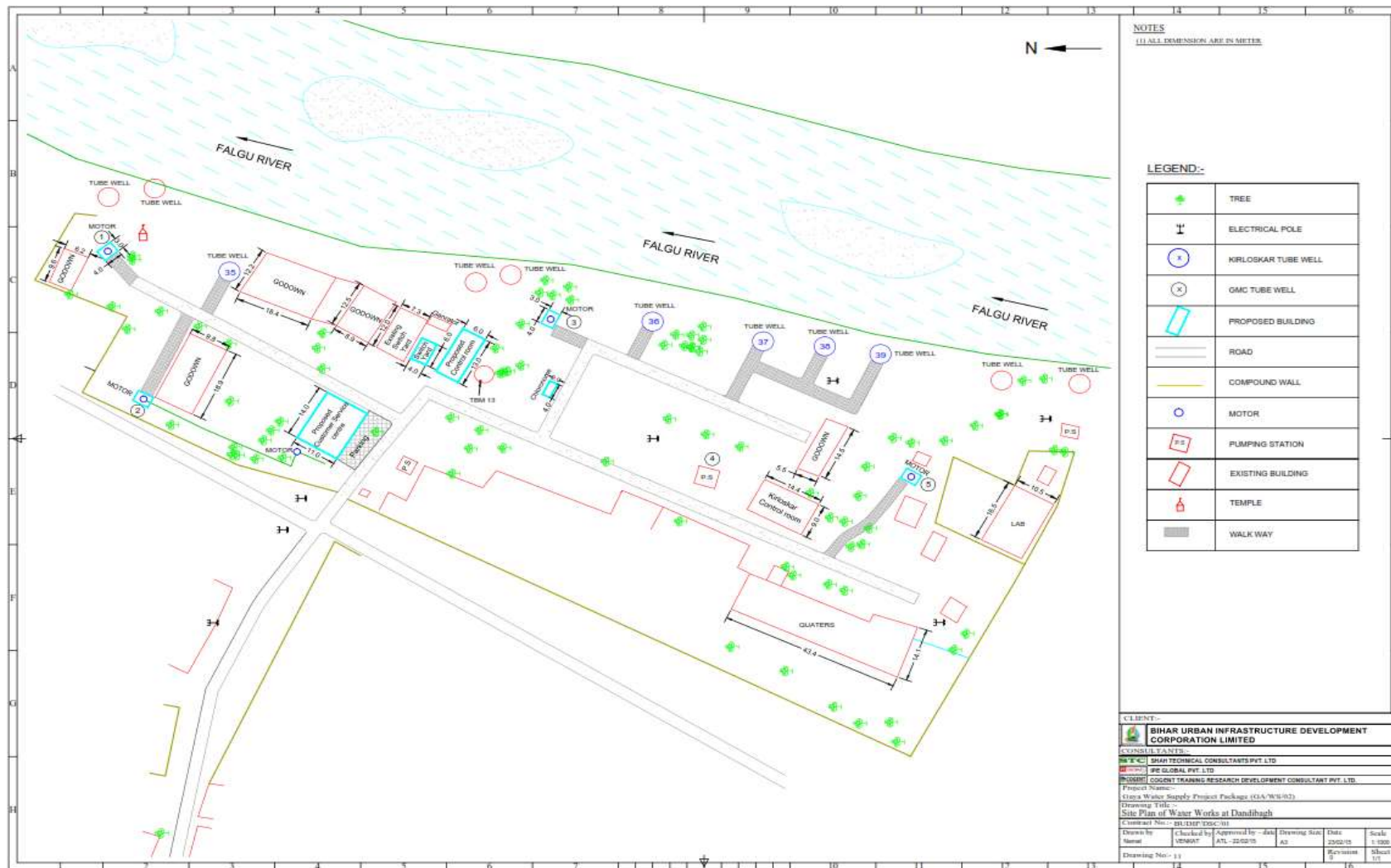
Project Name: City Water Supply Project Package (CWA/WSP/02)  
 Drawing Title: Site Plan of Water Works at Bhusanda Mela

Contract No.:	BUEIP/DRG-01
Drawn by:	VENKAT
Checked by:	ATL
Approved by:	ATL
Drawing Size:	A3
Date:	23/02/15
Scale:	1:1000
Drawing No.:	02
Revision:	0
Sheet:	01

**Proposed OHT location and access road at Bhusanda Mela**

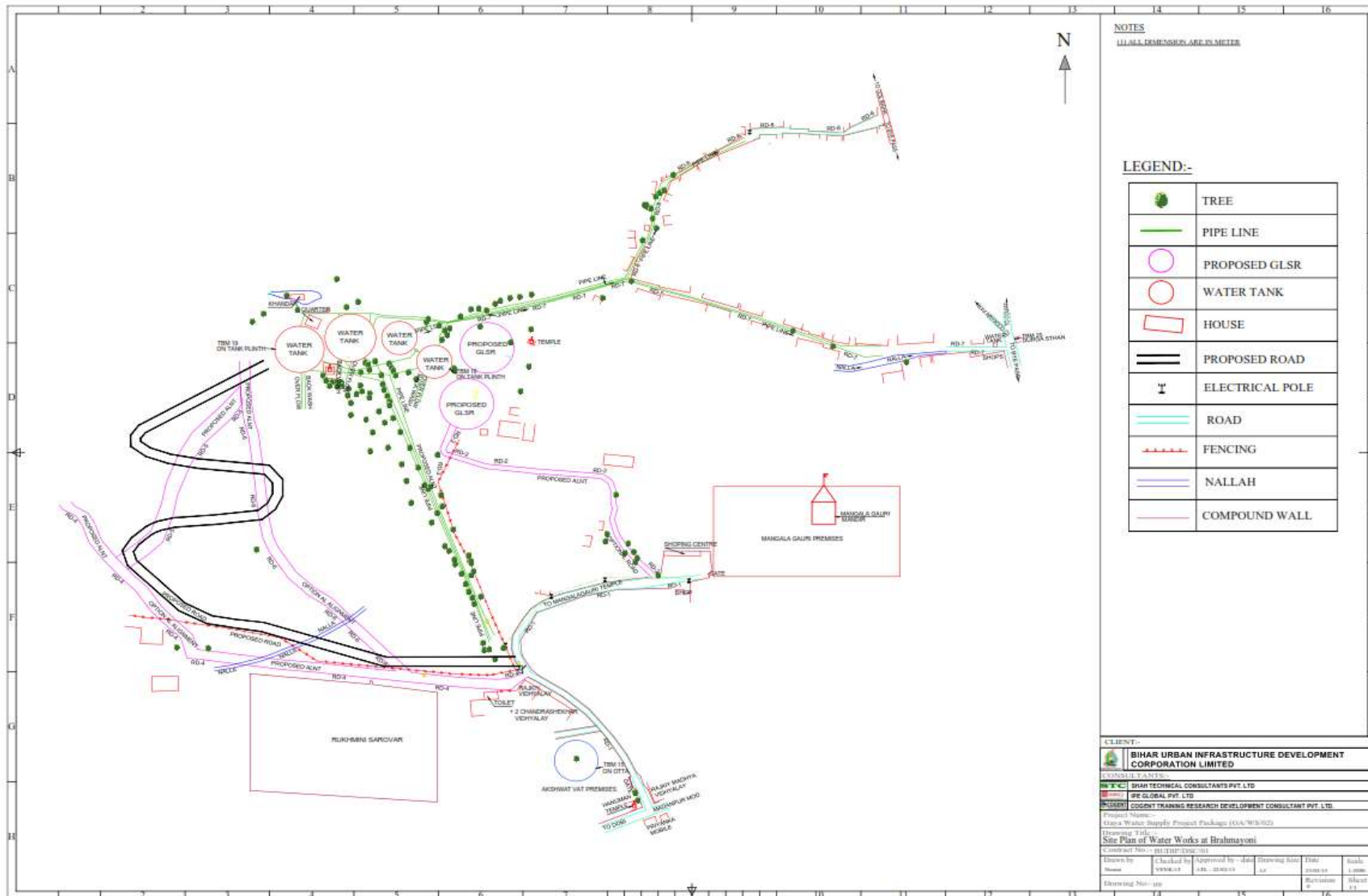


Proposed OHT location and access road at behind Delha Police Station



Water works location at Dandibagh





Proposed GLSR location and access road at Brahmayoni hill

## Appendix 11

### Details of location, type of source, coordinates and villages from where the water samples were collected and analyzed (May 2014)

S. No.	Water Sample Code	Source	Location/village	Co-ordinates	
				Longitude	Latitude
1.	WS-1	Hand pump	Partapi	85° 1' 47.4"	24° 30' 26.1"
2.	WS-2	Hand pump	Mohanpur	85° 4' 39.0"	24° 34' 53.8"
3.	WS-3	Hand pump	Bakror	85° 0' 03.7"	24° 41' 26.3"
4.	WS-4	Hand pump	Nima	85° 0' 42.4"	24° 39' 56.1"
5.	WS-5	Hand pump	ITI Ghughitand	85° 0' 35.0"	24° 45' 49.0"
6.	WS-6	Tube well	Dandibagh pump house	85° 0' 35.8"	24° 46' 15.2"
7.	WS-7	Hand pump	Khiriyawan	85° 0' 36.5"	24° 44' 37.7"
8.	WS-8	Tube well	Kundua	85° 0' 37.8"	24° 45' 08.6"
9.	WS-9	Tube well	Kundui	85° 0' 17.4"	24° 45' 30.5"
10.	WS-10	Tube well	Janta Colony, Gaya	85° 0' 05.2"	24° 48' 33.9"

### Chemical analysis of water sample collected from study area and acceptable limits as per IS-10,500-2012

Parameter Tested	Results					Indian Standards IS: 10,500-2012	
	WS-1	WS-2	WS-3	WS-4	WS-5	Acceptable limit	Permissible limit
Color (Hazen units)	Colorless	Colorless	Colorless	Colorless	Colorless	5	15
Odor	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity (NTU)	Nil	1	Nil	Nil	2	1	5
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	7.79	7.74	7.71	7.74	7.72	6.5-8.5	No Relaxation
Electrical Conductivity at 25°C in $\mu$ mhos/cm	595	510	272	518	315	N.P.	N.P.
TDS (Total Dissolved Solids)	340	285	155	292	175	500	2000
Calcium	39	33	18	34	19	75	200
Magnesium	23	20	10	21	12	30	100
Sodium	46	39	22	38	25	N.P.	N.P.
Potassium	3	2	1	2	1	N.P.	N.P.
Chloride	85	78	42	79	46	250	1000
Carbonate	138	119	61	120	72	N.P.	N.P.
Bi-Carbonate	-	-	-	-	-	N.P.	N.P.
Sulphate	46	32	17	34	21	200	400
Nitrate	17	13	8	15	9	45	No relaxation
Fluoride	0.37	0.34	0.29	0.34	0.29	1.0	1.5
Total Hardness as CaCO <sub>3</sub>	192	165	86	171	97	200	600
Arsenic	BDL	BDL	BDL	BDL	BDL	0.01	0.05
E. Coli MPN/	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Parameter Tested	Results					Indian Standards IS: 10,500-2012	
	WS-1	WS-2	WS-3	WS-4	WS-5	Acceptable limit	Permissible limit
100 ml							
Total Coliform MPN/100	0	0	0	0	0		

Contd..

Parameter Tested	Results					Indian Standards IS: 10500-2012	
	WS-6	WS-7	WS-8	WS-9	WS-10	Acceptable limit	Permissible limit
Color (Hazen units)	Colorless	Colorless	Colorless	Colorless	Colorless	5	15
Odor	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity(NTU)	2	Nil	Nil	Nil	3	5	10
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	7.72	7.71	7.69	7.78	7.70	6.5-8.5	No Relaxation
Electrical Conductivity at 25°C in µmhos/cm	310	290	312	326	366	N.P.	N.P.
TDS (Total Dissolve Solids)	173	165	170	184	214	500	2000
Calcium	18	17	18	20	22	75	200
Magnesium	12	10	11	13	14	30	100
Sodium	26	26	27	25	30	N.P.	N.P.
Potassium	1	1	1	3	2	N.P.	N.P.
Chloride	45	44	45	48	51	250	1000
Carbonate	71	66	71	70	84	N.P.	N.P.
Bi-Carbonate	-	-	-	-	-	N.P.	N.P.
Sulphate	21	18	21	23	27	200	400
Nitrate	8	7	8	9	14	45	100
Fluoride	0.26	0.27	0.22	0.24	0.28	1.0	1.5
Total Hardness as CaCO <sub>3</sub>	94	84	90	103	112	200	600
Arsenic	BDL	BDL	BDL	BDL	BDL	0.01	0.05
E. Coli MPN/ 100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Total Coliform MPN/100	0	0	0	0	0		

BDL- Below detection limit

N.P – Not prescribed



## Traffic Management Plan (TMP) Template

### A. Principles

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:
  - (i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
  - (ii) protection of work crews from hazards associated with moving traffic;
  - (iii) mitigation of the adverse impact on road capacity and delays to the road users;
  - (iv) maintenance of access to adjoining properties
  - (v) Avoid hazards in addressing issues that may delay the project.

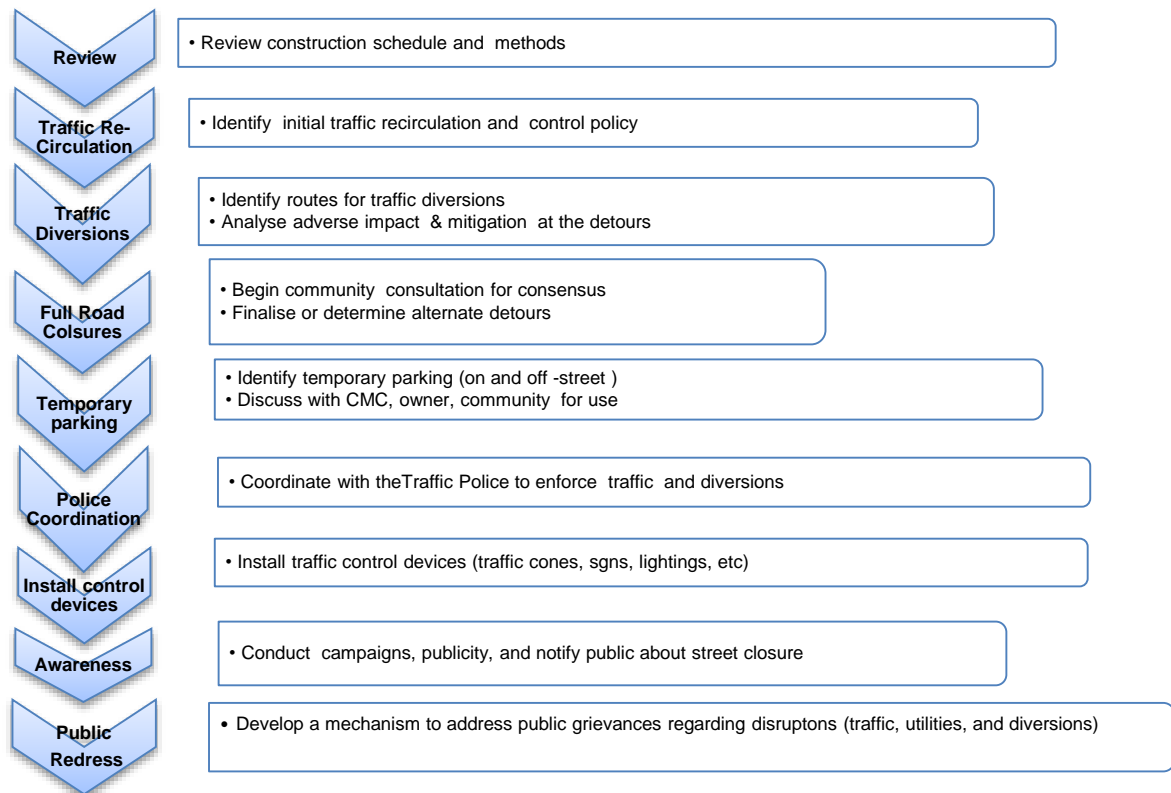
### B. Operating Policies for TMP

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.
  - (i) Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
  - (ii) Inhibit traffic movement as little as possible.
  - (iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
  - (iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
  - (v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
  - (vi) Train all persons that select, place, and maintain temporary traffic control devices.
  - (vii) Keep the public well informed.
  - (viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

### C. Analyze the impact due to street closure, if required

3. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:
  - (i) approval from the PIU, local administration to use the local streets as detours;
  - (ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
  - (iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
  - (iv) determining if additional traffic control or temporary improvements are needed along the detour route;
  - (v) considering how access will be provided to the worksite;
  - (vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
  - (vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.
4. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

**Figure: Policy Steps for the TMP**



#### D. Public awareness and notifications

5. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

7. The PMC/DSC will also conduct an awareness campaign to educate the public about the following issues:

- (i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- (ii) defensive driving behaviour along the work zones; and
- (iii) reduced speeds enforced at the work zones and traffic diversions.

8. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

9. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around

the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- (i) explain why the brochure was prepared, along with a brief description of the project;
- (ii) advise the public to expect the unexpected;
- (iii) educate the public about the various traffic control devices and safety measures adopted at the work zones;
- (iv) educate the public about the safe road user behaviour to emulate at the work zones;
- (v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- (vi) indicate the office hours of relevant offices.

**E. Vehicle Maintenance and Safety**

10. A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of Bihar Govt./ GoI. All vehicles to be used shall be in perfect condition meeting pollution standards of Bihar Govt./ GoI. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of India
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can't leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

**F. Install traffic control devices at the work zones and traffic diversion routes**

10. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

11. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

12. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

13. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

14 In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

15. The PMC/ DSCand contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

## Sample Outline of Spoil Management Plan (SMP)

### 1.0 Purpose and application:

SMP is to describe how the project will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

### 2.0 Objectives of SMP:

The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- Manage onsite spoil handling to minimize environmental impacts on resident and other receivers
- Minimize any further site contamination of land, water, soil
- Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

### 3.0 Structure of SMP:

Section 1: Introduction of SMP

Section 2: Legal and other requirements

Section 3: Roles and responsibilities

Section 4: Identification and assessment of spoil aspects and impacts

Section 5: Spoil volumes, characteristics and minimization

Section 6: Spoil reuses opportunities, identification and assessment

Section 7: On site spoil management approach

Section 8: Spoil transportation methodology

Section 9: Monitoring, Reporting, Review, and Improvements

### 4.0 Aspects and Potential Impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and Groundwater	Contamination of water (surface and ground water)
Noise	Associated with spoil handling and haulage and storage

Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

## **5.0 Spoil volumes, characteristics and minimization**

5.1 Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

5.2 Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials)

5.3 Adopt Spoil Reduce, Reuse Opportunities

An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

5.4 Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior client approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

5.5 Storage and stock piling

5.6 Transportation and haulage route

**6.0 Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSC for their review and approval.**

Format

**Confirmation from Operator of Commercial establishment/shop for provision of temporary Access by Contactor**

Name of Subproject : \_\_\_\_\_  
Name of Contractor : \_\_\_\_\_  
Name of the Affected Person : \_\_\_\_\_  
Nature of Establishment : \_\_\_\_\_  
Location of Establishment : \_\_\_\_\_  
Nature of Access Disruption : \_\_\_\_\_  
Nature of Alternate Access : \_\_\_\_\_  
Provided by Contractor : \_\_\_\_\_  
Duration & Date of Disruption : \_\_\_\_\_ days from \_\_\_\_\_ to \_\_\_\_\_

I hereby confirm that access disruption caused to my property as per the duration and the dates mentioned above was effectively mitigated by provision of alternate access by contractor. Provision of alternate access ensured no closure or loss of clientage to my commercial establishment.

**Signature of Affected person**

**Signature of Contractor's representative**

---

## Appendix 15

### Indian Standards for Drinking Water - Specification (Bureau of Indian Standard, BIS 10500: 2012)

Sl.No	Substance or Characteristic	Requirement (Desirable Limit)	Permissible Limit in the absence of Alternate source
<b>Essential characteristics</b>			
1.	Colour, ( Hazen units, Max )	5	25
2.	Odour	Unobjectionable	Unobjectionable
3.	Taste	Agreeable	Agreeable
4.	Turbidity ( NTU, Max)	5	10
5.	pH Value	6.5 to 8.5	No Relaxation
6.	Total Hardness (as CaCO <sub>3</sub> ) mg/lit.,Max	300	600
7.	Iron (as Fe) mg/lit,Max	0.3	1.0
8.	Chlorides (as Cl) mg/lit,Max.	250	1000
9.	Residual, free chlorine, mg/lit, Min	0.2	--
<b>Desirable Characteristics</b>			
10.	Dissolved solids mg/lit, Max	500	2000
11.	Calcium (as Ca) mg/lit, Max	75	200
12.	Magnesium (as Mg)mg/lit, Max.	30	100
13.	Copper (as Cu) mg/lit, Max	0.05	1.5
14.	Manganese (as Mn)mg/lit ,Max	0.10	0.3
15.	Sulfate (as SO <sub>4</sub> ) mg/lit, Max	200	400
16.	Nitrate (as NO <sub>3</sub> ) mg/lit, Max	45	100
17.	Fluoride (as F) mg/lit, Max	1.0	1.5
18.	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH) mg/lit, Max.	0.001	0.002
19.	Mercury (as Hg)mg/lit, Max	0.001	No relaxation
20.	Cadmiun (as Cd)mg/lit, Max	0.01	No relaxation
21.	Selenium (as Se)mg/lit,Max	0.01	No relaxation
22.	Arsenic (as As) mg/lit, Max	0.05	No relaxation
23.	Cyanide (as CN) mg/lit, Max	0.05	No relaxation
24.	Lead (as Pb) mg/lit, Max	0.05	No relaxation
25.	Zinc (as Zn) mg/lit, Max	5	15
26.	Anionic detergents (as MBAS) mg/lit, Max	0.2	1.0
27.	Chromium (as Cr <sup>6+</sup> ) mg/lit, Max	0.05	No relaxation
28.	Polynuclear aromatic hydro carbons (as PAH) g/lit, Max	--	--
29.	Mineral Oil mg/lit, Max	0.01	0.03
30.	Pesticides mg/l, Max	Absent	0.001
31.	Radioactive Materials		
	i. Alpha emitters Bq/l, Max	--	0.1
	ii. Beta emitters pci/l,Max	--	1.0
32.	Alkalinity mg/lit. Max	200	600
33.	Aluminium (as Al) mg/l,Max	0.03	0.2
34.	Boron mg/lit, Max	1	5



## **Gaya Kick-off Introductory Meeting Minutes**

The Kick-off Meeting in Gaya was concluded on 5th of December 2013 at Hotel Garv, Gaya from 1500 hrs. to 1800 hrs.

### **Objective:**

Inculcate a common understanding about the Project within the GMC officials and elected members.

### **Approach:**

The meeting was devised to create a better understanding thus it adopted a mixed tools viz. class room model and participatory approach.

### **Details:**

The meeting was facilitated by Mr. A. K. Raja. First all the participants from both sides introduced themselves (Refer Annexe 2: List of Participants). Every individual from the organizing team introduced themselves also. This was followed by the opening speech by the PM – BUDIP Mr. V. K. Sharma. He elaborated the overall objectives and the output of the project; he told that the program is devised for the sustainable growth through improved quality of life. He also told that the program will arrange for the water supply in 3 towns and sewerage system in 1 town viz. Bhagalpur, Gaya, Darbhanga and Muzaffarpur respectively. Further he introduced all the BUDIP Partner agencies involved in the project.

In context to timeline of the project he elaborated the project tenure specifying the construction period as well as O & M Period. He discussed the present project status of the GMC elaborating that firstly we will prepare the DPR; which will be an exhaustive report. He explicitly mentioned that the project will undergo the planning phase initially expectedly for another 1 year. He also told that our experts are investigating the water availability and alternate sources. He also said the cooperation and coordination is highly solicited from the GMC.

After that the Team Leader – PMC, Mr. Butter Jaap started with the presentation (refer Annexe 3). The presentation was designed to create a better understanding. The presentation was led by Mr. Jaap Butter and duly participated by the thematic experts viz. Water Supply, Social & Environment, and PR during the course of their part.

The program further made an open session for query handling of the participants (refer Annexe 1.). The open session was facilitated by Mr. A. K. Raja and the query was duly responded by the respective expert.

The program was concluded by the Closing Speech by Hon. Dy. Mayor Mr. Akhoury Onkar Nath. He elaborated his understanding and ensured that all the required support for the successful completion of the project will be duly extended by the GMC Officials and elected representatives. He also put in his acknowledge to the Government, ADB, and Program Consultants that they had selected Gaya to implement the project out of 28 ULB considering the Growth Chart and potential etc. He also presented his personal analysis over the socio – economic and geographical status of the Gaya and the basis he gave his suggestions and recommendations too

The presentation was an interactive session and a regular attempt was made to make it both way communicable.

### **Achievement:**

The program was felt to be a successful event and it was understood so by the facial expression and active participation during the session. The participants were in well noting the concepts as well as putting up the relevant queries in context. The attraction of the session was that the deliberation of the team leader Mr. Jaap Butter was duly interpreted to the participants in Hindi. The GMC has ensured the cooperation in total activities from inception to research and execution.

**Way Ahead:** During the session suggestions from all came to arrange a next meeting which will include Local reputed personalities, All Parshads, NGOs, and relevant Line Departments etc. once the DBO Contractor is finalized as Program Launch function.

### **Annexe 1: BUDIP Kick – off Meeting: Question – Answers during the open session**

1. As of now, the Holding Tax includes water charges. If the water charges are introduced, one will require to pay the metered water charges as well as the holding Tax includes water charges?

**Ans.** Mr. Yasir Sahid replied: The UDHD has already issued an order stating that 9 % will be the only holding tax which won't include the service charge for sewerage and water supply. The charges for water supply will be based mere on the usages.

2. The river Phalgu is going barren and all the sewerage waste is discharge in it, what is the plan for sewerage system, will it be incorporated within the GMC Water Supply Plan? If the water is inducted from the river how it will ensure the quality of water. He also suggested incorporating the rain water harvesting within our plan.

**Ans.** Mr. V. K. Sharma replied: An alternate plan for proper sewerage is hereby being prepared under another project and it will take due care of it. A proper time for the research and study for the source (Quality and Quantity) of water has been allocated in the project; the study is going on. After its completion we will be in the position to give comment over it, and further decisions will be made for maintaining the quality and the quantity of the water and / or alternate plan.

3. There are 7 wards lying on the other side of the Phalgu River, is those area are included the project?

**Ans.** Mr. J. K. Singh replied: All the urban area has been duly incorporated in the plan including both side of the banks.

4. Mr. Mayor pointed out the following issues to be considered while preparing the GMCWS Plan:

a. Presently we are able serve 40 % of the population only with drinking water service rest of the 60 % are left with their own arrangements.

b. I had arranged to conduct Satellite GIS Mapping of Gaya City in coordination with Patna and it states that the water is blocked on the south side of the river as the inner ground level is slope towards south.

c. The sewerage waste is discharged throughout the northern river without any treatment which makes the river water non-usable.

d. The present distribution line is around 50 years old and it needs to be renovated in complete to avoid wastage and leakage.

e. Geographically deep boring is required to ascertain the ground water but due rocky base it's not possible in around 80 % of the Gaya. It should be duly considered while planning.

f. Presently most of the pumps are directly attached to the transmission line but to have the better plan the pump should be attached to OHT and it should transmit to the households.

g. Lying down of the new transmission line should be considered for the whole area in the first phase but could be attached through the new proposed Pump later during second phase.

**List of the Participant**

<b>Sl. No</b>	<b>Name</b>	<b>Department/ Organization</b>	<b>Designation</b>
	Vijay Kumar Sharma	PMU – BUDIP, BUIDCo	PM-PMU
2.	Mr. Akhouri Omkar nath alias Mohan Shrivastava	Gaya Municipality Corporation	Dy. Mayor
3.	Jaap Butter	PMC – BUDIP, BUIDCo	Team Leader, PMC
4.	Bob Bakker	PMC – BUDIP, BUIDCo	Utility Operation Expert
5.	Cristian Angelescu	DSC – BUDIP, BUIDCo	Team Leader, DSC
6.	Ashish Kumar	PMU – BUDIP, BUIDCo	R.O
7.	Jitendra Kumar Singh	PMC – BUDIP, BUIDCo	Water Supply Specialist
8.	Sumitabha Ray	PMC – BUDIP, BUIDCo	Financial Specialist
9.	Yaser Shahid	PMC – BUDIP, BUIDCo	UTS
10.	P.K.Sahu	PMC – BUDIP, BUIDCo	Resettlement and Gender Specialist
11.	Jitendra Tyagi	PMC – BUDIP, BUIDCo	Non-key Expert, Water supply
12.	Mohit Kumar	PMC - BUDIP, BUIDCo	Social Expert
13.	Dr. Anil Kumar Patni	PMC - BUDIP, BUIDCo	Non Key Expert, Environment
14.	A.K.Raja	PMC - BUDIP, BUIDCo	PRO
15.	Bibekananda Das	PMC - BUDIP, BUIDCo	Office. Assit
16.	S. Rama Krishnan	DSC – BUDIP, BUIDCo	A. Team Leader
17.	Om Prakash Goyel	DSC – BUDIP, BUIDCo	
18.	Prakash Kumar	GMC, Gaya	City Manager
19.	Dharmendra Kumar	GMC, Gaya	Assistant Engineer
20.	Manoj Kumar	GMC, Gaya	Assist. Engineer
21.	Shailendra Kumar Sinha	GMC , Gaya	Asst. Engineer
22.	Francil Bara	GMC, Gaya	J.E, GMC
23.	Jai Prakash singh	GMC, Gaya	J.E, GMC
24.	Md. Tahir Hasan	PHED, Gaya	SDO
25.	Md. Nihaluddin	BSNL, Gaya	Divisional Engineer
26.	Binod Prajapati	BSPHCL	EEE
27.	Upendra Kumar	GMC, Gaya	Ward - 11

28.	Pramod Kumar Navdia	GMC, Gaya	Ward - 11
29.	M.R. Neeraj Kumar Gupta	GMC, Gaya	Ward - 11
30.	Tahir Husain	GMC, Gaya	Ward - 47
31.	Manoj Kumar	GMC, Gaya	Ward - 49
32.	Nand Kishor Gupta	GMC, Gaya	Ward - 51
33.	Santosh Yadav	GMC, Gaya	Ward Councillor
34.	Anita Anu	GMC, Gaya	Ward Councillor
35.	Sarita Devi	GMC, Gaya	Ward Councillor
36.	Shashi Kishore Shashi	GMC, Gaya	Ward Councillor
37.	Rajesh Kumar	GMC, Gaya	Ward Councillor – 02
38.	Jitendra Kumar Verma	GMC, Gaya	Ward Councillor – 03
39.	Brij Bhushan Prasad	GMC, Gaya	Ward Councillor – 18
40.	Lalji Prasad	GMC, Gaya	Ward Councillor – 22
41.	Shamim Ara	GMC, Gaya	Ward Councillor – 24
42.	Arupa Kumar (Representative)	GMC, Gaya	Ward Councillor – 28
43.	Naresh Kmar	GMC, Gaya	Ward Councillor – 30
44.	Representative	GMC, Gaya	Ward Councillor – 31
45.	Om Prakash (Representative)	GMC, Gaya	Ward Councillor – 32
46.	Chitranjan Prasad Verma	GMC, Gaya	Ward Councillor – 36
47.	Rajni Kumari	GMC, Gaya	Ward Councillor – 39
48.	Om Prakash	GMC, Gaya	Ward Councillor – 40
49.	Ajay Kumar Sinha	GMC, Gaya	Ward Councillor – 42
50.	Surendra Prasad	GMC, Gaya	Ward Councillor – 44
51.	Munna Kumar	GMC, Gaya	Ward Councillor – 47
52.	Hajra Khatoon	GMC, Gaya	Ward Councillor – 48
53.	Pramila Devi 49, Patva	GMC, Gaya	Ward Councillor – 49
54.	Kiran Devi	GMC, Gaya	Ward Councillor – 51
55.	Gudiya Devi	GMC, Gaya	Ward Councillor – 52
56.	Ram Lakhan Chaudhary	GMC, Gaya	Ward Councillor – 53
57.	Sanjay Kumar Sinha	Advocate Civil Court,	Advocate

		Gaya	
58.	Suresh Sharma (Representative)	Gaya Nagar Nigam	Counciler
59.	Rakesh kumar	Urban Citizen	Student
60.	Ragini	GMC, Gaya	
61.	Deepak Kumar	Social Worker	
62.	Bumeshar Kumar	Citizen Gaya	

## **Appendix-17: Summary of local level consultations at Gaya**

### **RECORDS OF PUBLIC CONSULTATION-GAYA**

#### **Subproject:Improvement of Water supply system in Gaya City**

**Date & Time:** 09.1.2014 to 11.1.2014; 05.02.15, 06.02.15, 23.02.2015 to 25.02.2015  
06.03.2015  
From 9.30-00 AM to 5-00 PM

Various issues related to the proposed subproject were discussed at various locations of the subproject area. Discussions were held with the parties directly and indirectly affected by the subproject execution as well as the general public of the subproject area. The problems faced by them along with their suggestions/concerns were recorded and the same have been given due consideration during formulation of the project design, IEE and EMP.

The participants, in general were in favour of the upcoming subproject. However, they were concerned about the permanent and temporary impacts which are expected to arise during construction stage such as traffic related issues, loss of access and increase in air pollution due to dust emissions. People are ready to extend all types of support during execution of the project. The details of the public consultation are detailed below:

#### **Issues discussed-Joda Masjid**

- Gangi pond issue was discussed. Which is a low laying area and people suggested for filling of land before construction
- Related to health and safety measures of the people during construction
- People are interested to do work on project area during construction

#### **Issues discussed-Budva Mahadev**

- People need pure drinking water at earliest
- What precaution will be taken on health and safety of the people during construction
- People are interested to do work on project area during construction
- Tree cutting needs on project site for which permission needs to be obtained from DFO Gaya.

#### **Issues discussed-Mastalipur**

- Access road is very narrow and this is also used for general public so what safety measures will be taken during construction
- Health and safety issue of workers will be considered.
- People are interested to do work on project area during construction
- For cutting of nursery plants discussed with head of nagar Panchyat and MNERGA commissioner

#### **Issues discussed-Delha**

- Access road used for general public so what safety measures will be taken during construction
- Air pollution and noise pollution issue was also discussed for nearby area
- People are interested to do work on project area during construction

**Consultation Location:** Joda masjid, Budva Mahadev, Mastalipur and Delha

**RECORDS OF LOCAL LEVEL PUBLIC CONSULTATION- GAYA**

**Consultation 1**

**Date & Time:** 5.2.2015, From 12.00 to 2-00 PM

**Location-**Joda masjid(Proposed work: Construction of NewOHT)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	In what way locals may associate with the project	At the construction phase some people can work as labourers.	Atleast 50% local labour will be engaged
3	Presence of historical/ cultural/ religious sites nearby	No	
4	Unfavourable climatic condition	Winters are generally cold, summers are hot and dry, and the monsoon season is characterized by moist heat and oppressive nights	Scheduling of work will be planned as per climatic condition
5	Occurrence of flood	No as such	
6	Drainage problem facing	Project site is at Low laying area, Yes Drainage problem	Land filling is required
7	Present drinking water problem – quantity and quality	People have their own boring system or obtained from tube well Water quality not good	After completion of project treated water will be supply
8	Availability of labour during construction time	Yes, labours are easily available nearby the site	Local labours will be engaged
9	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
10	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp. Local people will allow to set up labour camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
11	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned near main city road.	Mitigation measures will be applied as per EMP



## Consultation 2

**Date & Time:** 5.2.2015, From 3.00 PM to 5-30 PM , 23.02.2015

**Location** –Budva Mahadev(Proposed work: Construction of NewOHT)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	In what way they may associate with the project	At the construction phase some people can work as labourers, after completion water supply to nearby areas shall be improved	Atleast 50% local labour will be engaged
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	Yes 20-25 trees on the project site. No forest land located	Permission will be required from forest dept.
4	Occurrence of flood	No	
5	Drainage problem facing	Project site without drainage system. At lower side drainage system is old	Improvement of drainage system will be taken up through seperate funding
6	Present drinking water problem – quantity and quality	Water quality not good	Requirement of sufficient supplied water
7	Access road to project Site	Yes <i>Kaccha</i> road available	Haul road will be constructed as per requirement
8	Perception of locals On tree felling and afforestation	On OHT site tree cutting required. People are agreed.	Necessary permission needs to be obtained
9	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
10	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp. Local people will allow to set up labour camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority





### Consultation 3

**Date & Time:** 06.2.2015, From 2.30 to 4-00 PM

**Location-**Mastalipur(Proposed work: Construction of NewOHT)


Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	In what way they may associate with the project	Locals only need good and sufficient water	Outside labourers will be engaged. Quality water will be supplied after completion of project
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	MNERGA sponsored nursery plants will be comes under project area	Yes , included in EMP,NOC will be taken from Gram Panchyat
4	Drainage problem facing	No Drainage system present	Improvement of drainage system will be taken up through separate funding
5	Present drinking water problem – quantity and quality	Water quality not good and insufficient	Under the project good quality water will be supplied
6	Access road to project Site	Narrow and <i>Kaccha</i> road	Tree cutting may be required at access road area, permission will be taken from Panchyat or forest department
7	Perception of locals On tree felling and afforestation	People are agreed for tree cutting for water supply project	Plantation against tree cutting
8	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
9	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned	Mitigation measures will be applied as per EMP



#### Consultation 4

**Date & Time:** 06.2.2015, From 2-30 PM to 4-00 PM

**Location:**South east corner of Bargad tree-Delha (Proposed work: Construction of New OHT)




Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	Occurrence of flood	Not reported at site	
3	Drainage problem facing	Drainage system not present	As per discussion public required a proper drainage system soon
4	Present drinking water problem – quantity and quality	No water supply at present. People have own boring system and water quality is not good	Under the project good quality water will be supplied
5	Availability of labour during construction time	Yes, labours are easily available nearby Area	Local labours will be engaged
6	Access road to project Site	Yes, <i>Kaccha</i> road in most of the cases	Haul road will be constructed as per requirement
7	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
8	Setting up worker camp site within the village/ project locality	Project area having space for workers camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
			

#### Consultation 5

**Date & Time:** 6.2.2015, From 5.00 PM to 6-30 PM, 23.02.2015

**Location:**Bhusunda mela (Proposed work: Construction of NewOHT)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	Occurrence of flood	No as such	
3	Drainage problem facing	Drainage system not present	As per discussion public require a proper drainage system soon
4	Present drinking water problem – quantity and quality	Yes. No water supply till date. Boring Water used,	Complete supply of water
5	Access road to project Site	<i>Kaccha</i> road	Haul road will be constructed as per requirement

6	Perception of locals On tree felling and afforestation	Generally not required in most of the cases	
7	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
8	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
			

**Consultation Location:** Murli Hill ward -5, Ramshilla ward- 6, Brahmayoni ward- 33, Manglagauri ward -44 , Panch Mohalla ward- 40  
Date – 09.01.14, 10.01.14, 06.03.14

#### **Issues discussed-Murli Hill**

- Contaminated water due to Leakage of all old pipes
- What precaution will be taken on health and safety of the people during construction
- People are interested to do work on project area during construction
- Access road problem

#### **Issues discussed-Ramshilla Hill**

- Access road NOC will be needed from mandir trust
- What precaution will be taken on health and safety of the people during construction
- People are interested to do work on project area during construction
- State Protected forest area on project site which permission will receive from forest department and DFO Gaya.

#### **Issues discussed-Brahmayoni Hill**

- Access road
- No land is available for workers camps
- People are interested to do work on project area during construction
- State Protected forest area on project site which permission will receive from forest department and DFO Gaya.

#### **Issues discussed-Panch Mohalla**

- For general public what safety measures will be taken during construction
- Air pollution and noise pollution issue was also discussed near by site
- Any harmful impact on vishnupad temple during construction

## RECORDS OF LOCAL LEVEL PUBLIC CONSULTATION- GAYA

### Consultation 6

**Date & Time:** 09.1.2014, From 4.00 PM to 6-00 PM

**Location-** Ramshilla Hill and surrounding area Ward-6 (Proposed work: Construction of one GLSR and water pipeline laying work)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	In what way locals may associate with the project	At the construction phase some people can work as labourers.	Atleast 50% local labour will be engaged
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	Forest area nearby the project location	Permission will be required from forest dept. proposal already send to Forest department
4	Presence of historical/ cultural/ religious sites nearby	Yes,Ramshilla hill comes under State Archaeological site	Permission will be required from State Archaeological dept. Before commencement of work
5	Present drinking water problem – quantity and quality	At Higher altitude there is no supply of water. In some cases local complained on presence of insect in supplied water, stingy smell in water, only 3-4 Hr water supply Water tank at Rashilla is old and not functioning Some people have their own boring system	Immediate requirement of sufficient supplied water
6	Access road to project Site	Yes existing bitumen road in most of the cases (below the hill area)	On the project site material will be supplied through head load and NOC will be required from Temple committee
7	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
8	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp. Local people will allow to set up labour camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
9	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned near main city road.	Mitigation measures will be applied as per EMP





## Consultation 7

**Date & Time:** 10.1.2014, From 9.30-00 PM to 11-30 PM

**Location** -Brahmayoni Hill and surrounding area Ward-44 (Proposed work: GLSR locations and pipe laying area nearby)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	Forest area nearby the project location	Permission will be required from forest dept. Proposal already send to forest department
3	Presence of historical/ cultural/ religious sites nearby	YesBrahmayoni hill comes under state archaeological site	Permission will be required from State Archaeological dept. before commencement of work
4	Drainage problem facing	Project site is at height, without drainage system. At lower altitude drainage system is old	Improvement of drainage system will be taken up through separate funding
5	Present drinking water problem – quantity and quality	At Higher altitude there is no supply of water. Below hill area water quality of supplied water is good. Water will be supplied from Dandibagh only 2-3 time in a day	Immediate requirement of sufficient supplied water
6	Access road to project Site	No	For access road construction permission will be required from forest department
7	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
8	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp. Local people will allow to set up labour camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
9	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned near main city road.	Mitigation measures will be applied as per EMP



### Consultation 8

**Date & Time:** 10.1.2014, From 12.00 Noon to 2-30 PM

**Location-** Panch Mohalla Andar Gaya, Ward-40 &41(Proposed work: Distribution pipeline laying)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	Presence of historical/ cultural/ religious sites nearby	Yes. Vishnupad Temple, State Archeologically protected area is located nearby	Permission will be required from State Archaeological dept. Before commencement of work
3	Drainage problem facing	Drainage system present	
4	Present drinking water problem – quantity and quality	Yes supply is less, water quality is not good because water line is cracked and contamination of water in the old line is being reported. Daily 2 times water supply with the duration of half an hour. Supply is from Dandibagh area tube well	Immediate requirement of sufficient supplied water
5	Perception of locals On tree felling and afforestation	Generally not required in most of the cases.	In case of tree felling permission needs to be obtained
6	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
7	Setting up worker camp site within the village/ project locality	Project area is not having sufficient space for workers camp	Arrangement of labour camp at adjacent vacant area nearby the working zone
8	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned near main city road.	Mitigation measures will be applied as per EMP



### Consultation 9

**Date & Time:** 06.3.2014, From 8-30 AM to 10-00 AM

**Location:**Kharkhura Raja Kothi wards -1 (Proposed OHT)

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	Local people are not much aware on components of the project.	Awareness program at different project locations related to project components is essential
2	Occurrence of flood	No as such	
3	Drainage problem facing	<i>Nallah/Open nallah</i>	Require of Drainage system. All small nallah joints with big nallah
4	Present drinking water	No water Supply, boring	Locals requested for immediate

	problem – quantity and quality	water available. Water quality not good.	arrangement of supply water
5	Access road to project Site	Yes. Bituminous road is existing	
6	Dust and noise pollution and disturbances during construction work	Request for arresting of dust and protection of habitation from noise pollution	Mitigation measures will be applied as per EMP
7	Setting up worker camp site within the village/ project locality	Project area is having sufficient space for workers camp. Local people will allow to set up labour camp	Prior setting up site office and labour camp NOC needs to be obtained from local authority
8	Safety of residents during construction phase and plying of vehicle for construction activities	Local requested for safety arrangement particularly where excavation is being planned near main city road.	Public safety arrangement will be considered as per EMP
			

### **Summary of General and specific discussion – Feedback & action taken**

1. Issues: Problems faced due to absence of the proposed facility under the subproject
  - ✓ Feedback:
    - The quality and quantity of the water supplied at present is not adequate. Supply from new Kirloskar tube well is expected at few locations
    - New settlements mostly in the peripheries of the town lack proper water production and water storage infrastructure.
  - ✓ Remarks
    - The participants in general were of the view that the proposed augmentation is the definite need and welcomed the subproject and ensured their full support.
  
2. Issues: Awareness and extent of knowledge about the subproject
  - ✓ Feedback
    - Local people are not much aware on components of the project.
  - ✓ Remarks
    - Public consultation in different forms like one to one consultation, circulations of questionnaire, group discussions, etc. need to be a continuous process and IA will ensure this process throughout the project execution.
  
3. Issues: Information on the perceived benefits of the subproject in terms of economic and environmental enhancement
  - ✓ Feedback:
    - General benefits perceived by the people are summarized as follows:
      - Improvement in the water supply scenario will solve the issues and problems related to the unsatisfactory quantity and quality of the water supplied.
      - It is hoped that adequate provisions will be made for satisfactory and standardized filtration and purification of the water which will be supplied in future.

- The improvement in the water supply will provide safety to the people as they will be not at the risk of water borne diseases.
  - Areas of new settlements will get highly benefited with the proposed subproject.
  - Proposed infrastructure will ensure overall health and hygiene of the people in the subproject area.
- ✓ Remarks
- People impacted directly or indirectly due to subproject implementation should be adequately compensated.
  - During implementation, maximum efforts should be made to minimize hindrances of public access by providing alternative access to roads, streets and homes.
  - The work should be carried out at a fast pace so that the duration of access disruption is minimized.
  - People suggested an efficient operation and maintenance system after the completion of the project
4. Issues: Information on perceived losses from the proposed subproject during execution stage in terms of disruptions in traffic, temporary access disruptions during execution and air and noise pollution, etc.
- ✓ Feedback:
- People opined that potential temporary impacts of access disruption for residences, shops/commercial establishments, and institutions, etc. should be mitigated through good construction practices and an effective environment and contractors construction plan which should ensure providing walkways and metal sheets to maintain access across trenches, increasing the workforce in front of shops/commercial establishments, consulting business and institutions regarding operating hours and factoring this in work schedules, providing advance information on works to be undertaken including appropriate signages etc.
- ✓ Remarks
- Effective mitigation measure should be in place so that problems related to traffic disruptions; air and noise pollution are minimized.
5. Issues: Presence of any historical/cultural site in the vicinity  
Presence of any protected area in or adjoining the construction site.
- ✓ Feedback:
- There is no historical/cultural site in the corridor of the subproject.
  - There is no protected area in the corridor of the subproject.
- ✓ Remarks
- There are some sensitive receptors which include few educational institutions, health centers, religious places etc. in the project area for which proper mitigation measures relevant to the location and nature of the receptor will be kept in place during project execution and same will be part of EMP.

**All Feedback and actions (remarks) considered in design**



List of the Participants in Public Consultation

Subproject Name: Gaya Water Supply  
 Location of Meeting/Consultation: Joda Masjid (OHT)  
 Date & Time: 5/2/2015

Sl. No	Name & Address	Occupation	Signature
1.	Santosh K. At. Head marduz	teaching	Santosh K.
2.	Dinesh chandra At. Head marduz	teaching	Dinesh chandra
3.	Girish Chandra At. Head marduz	कार्यवाही मंत्री	Girish Chandra
4.	श्रीधर राय		श्रीधर राय
5.	राजेश चन्द्र शर्मा		राजेश चन्द्र शर्मा
6.	रा. श्रीधर राय		रा. श्रीधर राय
7.	कामेश्वर शर्मा	कृषी	कामेश्वर शर्मा
8.	कुशील शर्मा	मजदारी	कुशील शर्मा
9.	सुरेश चन्द्र शर्मा	बहोली	सुरेश चन्द्र शर्मा
10.	जितेंद्र सिंह	हस्ता	जितेंद्र सिंह
11.	प्रकाश कुमार शर्मा	स्वयंसेवी	प्रकाश कुमार शर्मा
12.	Tripur Kohli		Tripur Kohli
13.	चन्द्र शर्मा		चन्द्र शर्मा
14.			

**List of the Participants in Public Consultation**

Subproject Name: Gaya Water Supply  
 Location of Meeting/Consultation: Budva Mahadev (OHT)  
 Date & Time: 5/2/2015 3 PM

Sl. No	Name & Address	Occupation	Signature
1.	सोल्कराज अंबारी शहाबाद		सोल्कराज अंबारी
2.	रामशिव ठाकुर	मजदूर	रामशिव ठाकुर
3.	जुद्धी लाल शहाबाद	-	जुद्धी लाल
4.	Md. Shamim	-	Md. Shamim
5.	Md Sachin	-	Md Sachin
6.	ममर	चिताई	
7.			

**List of the Participants in Public Consultation**

Subproject Name: Gaya Water Supply  
 Location of Meeting/Consultation: Mastalipur (OHT)  
 Date & Time: 6/2/2015 12:00 - 2 PM

Sl. No	Name & Address	Occupation	Signature
1.	राजनन्दन वसी	हमाजमेन	राजनन्दन वसी
2.	शैलेश चौरा	चालक	शैलेश चौरा
3.	सुदामा पाखान	बेनी	
4.	शंशोनी देवी	जन्टा	
5.	Lakshman Choudhary	janta	Lakshman Choudhary
6.	नीर कुमारी		नीर कुमारी
7.	दादलाल मीसा	मजदुरी	
8.	रामचन्द्र राम	कुमान	रामचन्द्र राम

**List of the Participants in Public Consultation**

Subproject Name: **Gaya Water Supply**  
 Location of Meeting/Consultation: **Behind Delha Thana**  
 Date & Time: **6/2/2014 4:30 PM 4:00 PM**

Sl. No	Name & Address	Occupation	Signature
1.	Deepak Kumar	Study	Deepak kumar
2.	सुनेजा	-	सुनेजा
3.	Nikesh Kumar	-	Nikesh Ke.
4.	सुदेश भारती	-	Sudish kumar
5.	Abhinash Kumar	-	Abhinash kumar
6.	Nalini Kumari	-	Nalini Kumari
7.	Mamta Kumari	-	Mamta Kumari
8.	मिती सी रोइ	-	Miti Siroi
9.	CHHOTU KUMAR	-	CHHOTU kumar
10.	प्रदीप कुमार	-	प्रदीप कुमार
11.	मनिमणि कुमारी	-	मनिमणि कुमारी

List of the Participants in Public Consultation

Subproject Name: Gaya Water Supply

Location of Meeting/Consultation: Bhusanda





Date & Time: 6/2/2015 5 PM to 6 PM

Sl. No	Name & Address	Occupation	Signature
1.	राजेश कुमार चौधरी	-	राजेश कुमार चौधरी
2.	मीरा देवी	-	मीरा देवी
3.		-	2
4.	शिवेंद्र पाण्डेय	-	शिवेंद्र पाण्डेय
5.	रेणु देवी	-	रेणु देवी
6.	उषा कुमारी	-	उषा कुमारी
7.	कमलेश	-	कमलेश चौधरी
8.	बिरेन्द्र	-	Birendra Singh
9.	सस्ती देवी	-	सस्ती देवी
10.	गीता देवी	-	गीता देवी
11.	सोनी कुमारी	-	सोनी कुमारी
12.	सौरभ कुमार	-	सौरभ कुमार



*List of the Participants in Public Consultation*

Subproject Name: *Gaya Water Supply*  
 Location of Meeting/Consultation: *Chusanda Mela*  
 Date & Time: *23/2/2015*

Sl. No	Name & Address	Occupation	Signature
1	कमलेश चौधरी	भाजदूरी	
2	कुन्ती देवी	गृहणी	
3	सन्ध्यापुष्पन चौधरी	भाजदूरी	<i>Sandhya</i>
4	अरवीवेश चौधरी	भाजदूरी	अमितेश चौधरी
5	कृष्ण चौधरी	भाजदूरी	
6	अनील चौधरी	भाजदूरी	अनील चौधरी
7	जय प्रकाश चौधरी	व्यवसाय	<i>Jayprakash Choudhary</i>
8	सुनीता देवी	व्यवसाय	सुनीता देवी
9	संजु देवी	दाई	
10	वेणी कुमारी	गृहणी	वेणी कुमारी
11	उममा पूज देवी	भाजदूरी	
12	<i>gita davi</i>	<i>house wife</i>	<i>gita davi</i>
13	मुनी देवी	गृहणी	मुनी देवी
14	मालती देवी	गृहणी	मालती देवी

List of the Participants in Public Consultation

Subproject Name: Gaya Water Supply  
 Location of Meeting/Consultation: Budva Mahadev  
 Date & Time: 24/2/2015

Sl. No	Name & Address	Occupation	Signature
1.	अबुल फाजल मोहम्मद फाजल	बकाल	عبد القادر
2.	MD. SUHAIL ALAM	भजनपुरी	Md. Suhail Alam
3.	VIRENDRA VERMA	जोड़ <del>virendra verma</del> virendra verma	virendra verma
4.	मोहनलाल मोहनलाल	मिस्त्री	मोहनलाल
5.	शायकन	आगरवाली	
6.	शाबिना	आगरवाली	
7.	मोहनलाल मोहनलाल	मिस्त्री	मोहनलाल
8.	मोहनलाल आगम	बिस्त्रुट फेरी	मोहनलाल
9.	Md. Shamin	सूचना	Md. Shamin
10.	मो जाद्वि	टाका पम्पर	मो जाद्वि
11.	अबुल हमीद	राममिस्त्री	अबुल हमीद
12.			

## List of participants in public consultation

Sub project name-

Location of Meeting/Consultation- Ward - 6

Date and Time- 9.1.2014 . 4.00 PM

S.No	Name & Address	Occupation	Signature
1	दुलभा प्रसाद	गौरा समथर	दुलभा प्रसाद
2	किष्ण देवी	मजदूरी	किष्ण देवी
3	सुनील प्रसाद	सुनील प्रसाद	सुनील प्रसाद
4	उर्मिला देवी	अगवली	उर्मिला देवी
5	देवान्ती देवी	मजदूरी	
6	बरती देवी	गृहमार्थ	
7	विलीप राऊ	रिश्ता	
8.	सोने प्रसाद	मजदूरी	सोने प्रसाद
9.	रामेनु कुमार	मजदूरी	रामेनु कुमार
10	ओम प्रसाद	मजदूरी	
11	माया देवी	अगवली	
12	वेदी देवी	"	वेदी देवी
13	सगीरा देवी	अगवली	
14	Ganesh Shankar Pandey	Pandey	9/1/2014
15	सुबु प्रसाद	PUS	सुबु 9-1-2014
16	राजेश कुमार	राजेश कुमार	Rajankumar

**LIST OF PARTICIPANTS IN PUBLIC CONSULTATION**

**SUBPROJECT NAME:**

**LOCATION OF MEETING/CONSULTATION:** Ward No - 44

**DATE & TIME:** 9:30 AM  
10/11/2014

S.NO	Name & Address	Occupation	Signature
1	Prem Kumar, Murali HEM	Stady	Prem KR
2	दिनेश पासवान, बूखी हिल	उभावसान, vendor	दिनेश
3	बेनी माधो मालाकार	-	बेनी माधो
4	राजेश कुमार मंगला गौरी मन्दिर	चक्रवर्ती म दुकानदार	Rajesh Kumar
5	जगदल कुमार	उभावसान - दुकानदार	मौ. जगदल गौरी
6	Anchu Kumari	उभावसान	Anshu
7	Manglo Gauri Temple (Maya)	STUDENT	Anchu Kumari
8	ARUN KUMAR YADAV	STUDENT (सामाजिक कार्यकर्ता)	ARUN KUMAR
9	मन्मथ शर्मा	उभावसान	मन्मथ शर्मा
10	नरेश कुमार	उभावसान	नरेश
11	पुनीप कुमार (सा.स.पुर)	उभावसान दुकान	पुनीप कुमार
12	Pintoo	Kingdom Online	Pintoo
13	Ramkant Puhakar	Business	Ramkant
14	Vikash Anand	STUDENT	Vikash Anand
15	Pril Kumar	S. Health	Pril Kumar
वार्ड 40			
16	दुमोदर लाल गोस्वामी	पण्डाजी	दुमोदर लाल गोस्वामी
17	सुभाष कुमार उत्रा	उभावसान	सुभाष कुमार उत्रा
18	दिनेश कुमार गुप्ता	उभावसान 9974215738	B.K Gupta
19	Ashim kr Chakrabarty	Business	Chakrabarty
20	कल्याणलाल गुप्ता	उभावसान दुकान	कल्याणलाल गुप्ता
21	रुद्रेश प्रसाद	दुकान	रुद्रेश प्रसाद
22	सजय लाल गुप्ता	पण्डाजी	सजय लाल गुप्ता
23	जीपाल प्रसाद	-	जीपाल प्रसाद
24	रुद्रेश प्रसाद	दुकान -	रुद्रेश प्रसाद
25	मनोहर रजवाड़ा	-	मनोहर रजवाड़ा
26	शशि ठरवारा	-	शशि ठरवारा



**LIST OF PARTICIPANTS IN PUBLIC CONSULTATION**

SUBPROJECT NAME:

LOCATION OF MEETING/CONSULTATION: Ward 53

DATE & TIME: 11/1 10.00

S.NO	Name & Address	Occupation	Signature
1	Manoj Kumar	Bussong	Manoj Kumar
2	Vishenohar P/S/6	Govt Service	Vishenohar
3	MIELITS इरफान	इरफान	मीरफान
4	Dharamjay Kumar	Govt Servant	डा
5	Dr. K.	Govt Service	Dr. K.
6	Bengali P/S/20	Agriculture	Bengali
7	Ajay Sharma	डा	Ajay
8	रामजानम समी	-	रामजानम समी
9	Jalita	house wife	Jalita Sharma
10	दिपल मीनी - 47	दुकान	दिपल मीनी
11	राकेश कुमार वार्ड 49 अडमन	अडमन	Rakesh
12	विक्रम कुमार - 48	दुकान	Vikram Kumar
13	रमनी देवी	-	रमनी देवी
14	मीर अकील खा.	इरफान	मीर अकील खा.
15	मीर अकील खा. (पुनः)	-	मीर अकील खा.
16	मीर अकील खा.	-	मीर अकील खा.

Location of Meeting: Ward 48 & 49

List of Participants : Date: 11/11/2014

1:00 PM

S.No	Name	Occupation	Address	Date	Sig.
1	मी०अजीम	-	वार्ड 49		मी०अजीम
2	दीपक शर्मा	-	"		दीपक शर्मा
3	मोरीमो हॉलीम	-	"		मोरीमो हॉलीम
4	मी० हॉलीम	अगरब ली	"		मी० हॉलीम
5	सोनीगरीर दीपक	-	"		सोनीगरीर दीपक
	सोनीगरीर	-	"		
6	दीपक मुकुल	-	"		
7	गरीमो दीपक	-			
8	वरजदा	अगरब ली	वार्ड 49		
9	शायदा बानो	"			
10	रफीक	कुमिंग	"		रफीक

**LIST OF PARTICIPANTS IN PUBLIC CONSULTATION**

**SUBPROJECT NAME:** City Water Supply System

**LOCATION OF MEETING/CONSULTATION:** Kharkura Rajakothi Ward - 1.

**DATE & TIME:** 6/3/2014 8:30-10AM

S.NO	Name & Address	Occupation	Signature
1	Alay Kumar Singh	Business	Alay Kumar Singh
2	Arishu Kumar Wasoni	Govt Job	Arishu Kumar
3	Suresh Singh	Govt Job	Suresh Singh
4	Saurabh Kumar Singh	Student	Saurabh Kumar Singh
5	Anand Kumar	Student	Anand Kumar
6			
7	गीता देवी	गीता देवी	गीता देवी
8	रीता कुमारी	-	रीता कुमारी
9	ज्ञानिता	-	Anita Gupta
10	कुमुदी	-	Kumudini
11	रिंकी	-	रिंकी

## Appendix 18: Sample Grievance Registration Form

(To be available in Hindi, Urdu and English or local language, if any)

The **Bihar Urban Development Investment Program (BUDIP)** welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing **\*(CONFIDENTIAL)\*** above your name. Thank you.

<b>Date</b>		<b>Place of registration</b>			
<b>Contact Information/Personal Details</b>					
<b>Name</b>		<b>Gender</b>	<b>Male</b>	<b>Female</b>	<b>Age</b>
<b>Home Address</b>					
<b>Village / Town</b>					
<b>District</b>					
<b>Phone no.</b>					
<b>E-mail</b>					
<b>Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:</b>					
If included as attachment/note/letter, please tick here:					
<b>How do you want us to reach you for feedback or update on your comment/grievance?</b>					

### FOR OFFICIAL USE ONLY

<b>Registered by: (Name of official registering grievance)</b>	
<b>If – then mode:</b> <input type="checkbox"/> <b>Note/Letter</b> <input type="checkbox"/> <b>E-mail</b> <input type="checkbox"/> <b>Verbal/Telephonic</b>	
<b>Reviewed by: (Names/Positions of Official(s) reviewing grievance)</b>	
<b>Action Taken:</b>	
<b>Whether Action Taken Disclosed:</b>	<input type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b>
<b>Means of Disclosure:</b>	

### GRIVENCES RECORD AND ACTION TAKEN

Sr. No.	Date	Name and Contact No. of Complainer	Type of Complain	Place	Status of Redress	Remarks

परिशिष्ट 8: नमूनाशिकायतपंजीकरणफार्म

(हिंदी, उर्दू और अंग्रेजी या स्थानीय भाषा में उपलब्ध हो, यदि कोई हो, )

बिहार शहरी विकास निवेश कार्यक्रम

(BUDIP)

शिकायतें,

सुझाव,

प्रश्नों और परियोजना के कार्यान्वयन के बारे में टिप्पणियों का स्वागत करता हूँ। हम लोगों को शिकायत के साथ उनके नाम और संपर्क

जानकारी प्रदान करने के लिए प्रोत्साहित करते हैं ताकि हम स्पष्टीकरण और प्रतिक्रिया के लिए आपके साथ संपर्क कर सकें। 1

आपको अपने व्यक्तिगत विवरण शामिल करने चाहिए लेकिन उस जानकारी को गोपनीय रखा जायगा। 1 आपका नाम ऊपर

(गोपनीय) \* लेखन / टाइपिंग द्वारा हमें सूचित करें धन्यवाद

तारीख			पंजीकरण का स्थान		
संपर्क करने संबंधी जानकारी / व्यक्तिगत विवरण					
नाम		लिंग	पुरुष महिला	आयु	
घर का पता					
गांव / शहर					
जनपद					
फोन नं.					
ईमेल					
शिकायत / सुझाव / टिप्पणी / प्रश्न नीचे अपनी शिकायत का विवरण (जो, क्या, कहां और कैसे) प्रदान करें:					
सलगनक / नोट / पत्र के रूप में, शामिल हैं, कृपया यहाँ टिक करें					
हम आप तक प्रतिक्रिया के लिए कैसे पहुँच सकते हैं या अपनी टिप्पणी / शिकायत पर नवीनीकरण?					

केवल कार्यालय उपयोग के लिए

द्वारा पंजीकृत: (सरकारी पंजीकरण शिकायत का नाम)	
यदि - फिर विधि:	
<input type="checkbox"/> नोट / पत्र <input type="checkbox"/> ईमेल <input type="checkbox"/> मौखिक / टेलीफोन	
सेसमीक्षित: (नाम / अधिकारी की पोजिशन समीक्षा शिकायत)	
की गई कार्रवाई:	
की गई कार्रवाई का खुलासा:	<input type="checkbox"/> हां <input type="checkbox"/> नहीं
प्रकटीकरण का मतलब:	

शिकायत रिकॉर्ड और की गई कार्रवाई

क्रम संख्या	तारीख	नाम और complainer का संपर्क नंबर	शिकायत के प्रकार	जगह	निवारण की स्थिति	टिप्पणियाँ

**Semi-Annual Environmental Reporting Format**

**I. INTRODUCTION**

- Overall project description and objectives
- Description of subprojects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

**II. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send

to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:

- (i) What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries?
- (ii) If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
- (iii) Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
- (iv) Are there designated areas for concrete works, and re-fuelling?
- (v) Are there spill kits on site and if there are site procedures for handling emergencies;
- (vi) Is there any chemical stored on site and what is the storage condition?
- (vii) Is there any dewatering activities if yes, where is the water being discharged;
- (viii) How are the stockpiles being managed?
- (ix) How is solid and liquid waste being handled on site?
- (x) Review of the complaint management system;
- (xi) Checking if there are any activities being under taken out of working hours and how that is being managed.

**Summary Monitoring Table –Water supply subproject**

**A. Pre-construction Stage**

<b>Field</b>	<b>Mitigation Measures</b>	<b>Parameters Monitored (As a minimum those identified in the IEE should be monitored)</b>	<b>Method of Monitoring</b>	<b>Location of Monitoring</b>	<b>Date of Monitoring Conducted</b>	<b>Name and Designation of Person Who Conducted the Monitoring</b>
Legislation, permits and agreements	Proof of compliance to Air Act & Noise Act must be forwarded by the contractor to PMU/PMC/PIU (in relation to hot mixing, batch mix plants, stone crushers, diesel generators, etc. if any)					
	Proof of Forest land clearance, NOC from forest Dep. for renovation work, clearance from State Museum & Archaeological Directorate					
	A copy of the EMP must be kept on site during the construction period					
Access to site	Access to site will be via existing roads. The Contractor will need to ascertain the existing condition of the roads and repair damage due to construction.					
	The Local Traffic Police Department shall be involved in the planning stages of the road closure					
	The Local Traffic Department must be informed at least a week in advance if the traffic in the area will be affected					
	The location of all affected services must be identified and confirmed.					
	All roads for construction access must be planned and approved by the Engineer and its Environmental Specialist ahead of construction activities.					
	No trees, shrubs or groundcover may be removed or vegetation stripped without the prior permission of the Engineer/Environmental Specialist					
	Contractors shall construct formal drainage for all temporary haulage roads in the form of side drains to prevent erosion and discharge of run-off.					
Setting up of construction camp	Choice of site for the Contractor's camp requires the Engineer's/ ES permission and must take into account					



Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	location of local residents, businesses and existing land uses, including flood zones and slip / unstable zones. A site plan must be submitted to the Engineer for approval.					
	The construction camp may not be situated on a floodplain or on slopes greater than 1:3.					
	In case of camp site on private land, contractor must get prior permission from both the Engineer/ ES and the landowner.					
	The construction camp comprised of: <ul style="list-style-type: none"> <li>• site office</li> <li>• designated first aid area</li> <li>• eating areas</li> <li>• storage areas</li> <li>• batching plant (if required)</li> <li>• refueling areas (if required)</li> <li>• maintenance areas (if required)</li> <li>• crushers (if required)</li> </ul>					
	Cut and fill must be avoided where possible during the set up of the construction camp.					
	The camp must be properly fenced and secured					
	The Contractor shall make adequate provision for temporary toilets (gender specific) for the use of their employees during the Construction Phase.					
	Surrounding bushes not to be used as a toilet facility.					
	Bins shall be provided at convenient intervals for disposal of waste within the construction camp.					
	Recycling and the provision of separate waste receptacles for different types of waste					
Establishing equipment lay-down and storage area	Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	of the soil. Impervious surfaces must be provided where necessary.					
	Storage areas shall be secure so as to minimize the risk of crime.					
	Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.					
	Equipment lay-down and Storage areas must be designated, demarcated and fenced if necessary.					
	Fire prevention facilities must be present at all storage facilities.					
	Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used					
	These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.					
	Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.					
Materials management – sourcing	Contractors shall prepare a source statement indicating the sources of all materials (including sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to the Engineer for approval prior to commencement of any work.					
	Prioritize sites already permitted by the Mining Department					
	If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of DSC					
	Where possible, a signed document from the supplier of natural materials shall be obtained confirming that they have					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	been obtained in a sustainable manner and in compliance with relevant legislation (e.g Consent to operate by crusher)					
Education of site staff on general and environmental conduct	Ensure that all site personnel have a basic level of environmental awareness training.					
	Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.					
	All employees must undergo safety training and wear the necessary protective equipments (e.g helmets, gloves, gumboots, nose mask, ear plugs as per type of work) and clothing.					
	<p>A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:</p> <ul style="list-style-type: none"> <li>• no alcohol/drugs on site;</li> <li>• prevent excessive noise;</li> <li>• construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility);</li> <li>• no fires permitted on site;</li> <li>• trespassing on private/commercial properties adjoining the site is forbidden;</li> <li>• other than pre-approved security staff, no workers shall be permitted to live on the construction site; and</li> <li>• no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do.</li> </ul>					
Social impacts	Open liaison channels shall be established between the contractors and interested and affected parties such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Road closure (if any) together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.					
	Advance road signage indicating the road detour and alternative routes (if required). Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/ complaints.					
	Storage facilities and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.					
Noise impacts	Construction vehicles are to be fitted with standard silencers prior to the beginning of construction.					
	Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers, etc) will be used as per operating instructions and maintained properly during site operations					
Conservation of the natural environment	No vegetation may be cleared without prior permission from the Engineer.					
	Trees that are not to be cleared shall be marked beforehand with danger tape.					
Set-up of waste management procedure	The excavation and use of rubbish pits on site is forbidden.					
	Burning of waste is forbidden.					
Social and Cultural Resources	Consult Archaeological Survey of India (ASI) or concerned dept. of Tripura Govt. to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
Occupational health & safety	Comply with IFC EHS Guidelines on Occupational Health and Safety					
	Develop comprehensive site-specific health and safety (H&S) plan.					
	Provide medical insurance coverage for workers					
Security and safety	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.					
	Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.					
	Flammable materials shall be stored as far as possible from adjacent residents / businesses.					
	All interested and affected parties shall be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples are: <ul style="list-style-type: none"> <li>• stringing of power lines</li> <li>• earthworks / earthmoving machinery on steep slopes above houses / infrastructure</li> <li>• risk to residences along haulage roads / access routes</li> </ul>					
Core Labour Standard (CLS)- safety and compliance	Monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. DSC will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites.					

**B. Construction Stage**

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
Climatic impact	<ul style="list-style-type: none"> <li>✓ Seasonal climatic variations will be considered during scheduling of construction activities in the area.</li> <li>✓ Consideration of suitable season (non monsoon /lien period) for major construction activity</li> <li>✓ Excavations and other clearing activities will only be done during agreed working times and permitted weather conditions.</li> <li>✓ Storm water control (through drainage, diversion) during construction phase as per the method approved by the Engineer.</li> </ul>					
Maintenance of construction camp and work site	The Contractor must monitor and manage drainage of the camp site to avoid standing water and soil erosion.					
	Run-off from the camp site must not discharge into neighbors' properties.					
	Toilets are to be maintained in a clean state and shall be moved to ensure that they adequately service the work areas.					
	Drinking water facility needs to be maintained at camp and work site					
	Open areas or the surrounding bushes are not being used as toilet facility.					
	All litter is collected from the work and camp areas daily.					
	Bins shall be emptied regularly and waste shall be disposed of at the pre-approved site.					
	Eating areas shall be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.					
Staff conduct	Camp and working areas are kept clean at all times.					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	points relayed during their induction have been properly understood and are being followed.					
	The rules that are explained in the worker conduct section, must be followed at all times					
Dust and air pollution	Consult with DSC/PIU on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;					
	Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;					
	Avoiding the need to stockpile on site					
	Use tarpaulins to cover sand and other loose material when transported by trucks					
	Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and regular servicing of the vehicles& equipments off site in order to limit gaseous emissions					
	Excess earth and other windblown loads in transit will be kept covered					
	No fires are allowed on site					
Noise Level	Plan activities in consultation with DSC/PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach; Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; Ensure that machinery is in a good state of					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	<p>maintenance.</p> <p>Monitor noise levels in potential problem areas, and Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.</p>					
Storm water	<p>Earth, stone and rubble is to be properly disposed off so as not to obstruct natural water pathways over the site</p>					
	<p>During construction, un-channeled flow must be controlled to avoid soil erosion.</p>					
Water quality	<p>Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;</p>					
	<p>Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with GMC/PIU on designated disposal areas</p>					
	<p>Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies</p>					
	<p>Place storage areas for fuels and lubricants away from any drainage leading to water bodies;</p>					
	<p>Dispose any wastes generated by construction activities in designated sites</p>					
	<p>Conduct surface quality inspection according to the Environmental Management Plan (EMP).</p>					
Conservation of natural environment	<p>As the work front progresses the Contractor is to check that vegetation clearing has the prior permission of the DSC/PIU Engineer and Environmental Specialist of PMC.</p>					
	<p>Minimize removal of vegetation and disallow cutting of trees (particularly at forest area of Ramshilla hill and</p>					



Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Brahmayoni hill) as far as possible through design modification					
	Require to plant three (3) native trees for every one (1) that is removed					
	Prohibit employees from poaching wildlife, bird hunting, and cutting of trees for firewood					
	Non removal of trees of religious importance					
Materials management	Stockpiles shall not be situated such that they obstruct natural water pathways.					
	Stockpiles shall not exceed 2m in height unless otherwise permitted by the concerned Engineer.					
	All concrete mixing must take place on a designated, impermeable surface.					
	No vehicles transporting concrete to the site may be washed on site.					
Landscape and Aesthetics including Waste management	Refuse must be placed in the designated skips / bins which must be regularly emptied.					
	Prepare and implement Waste Management Plan					
	In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.					
	Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.					
	Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas for improvement of aesthetic environment. Recycling is to be encouraged by providing separate receptacles for different types of wastes (including demolition waste) and making sure that staff is aware of their uses.					
	All waste must be removed from the site and transported to a disposal site or as directed by the Engineer.					
	Waste from toilets shall be disposed of regularly and in a responsible manner.					
	Hazardous waste disposal must be carried out by the					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Contractor in a responsible manner					
	Storage areas will be properly fenced off					
	Top soil needs to be utilised by farmers for nutrient value					
	Coordinate with DSC-PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas					
	Recover used oil and lubricants and reuse or remove from the sites					
	Request DSC/PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work					
Occupational Health and Safety	<p>World bank Environmental, Health, and Safety (EHS) Guidelines - EHS Guidelines for water &amp; sanitation will be followed. Specifically,</p> <p>(i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;</p> <p>(ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;</p> <p>(iii) Provide medical insurance coverage for workers;</p> <p>(iv) Secure all installations from unauthorized intrusion and accident risks;</p> <p>(v) Provide supplies of potable drinking water;</p> <p>(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) Provide H and S orientation training to all new</p>					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	<p>workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(x) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and</p> <p>(xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p>					
Community Health & Safety	Plan routes to avoid times of peak-pedestrian activities.					
	Liaise with DSC- PIU in identifying risk areas on route cards/maps					
	Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.					
	Provide road signs and flag persons to warn of dangerous conditions, in case of location near the road.					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Provide protective fencing around open trenches, and cover any open trench with metal planks during non-construction hours					
Traffic & accessibility impact	<p>Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;</p> <p>Schedule transport and hauling activities during non-peak hours;</p> <p>Locate entry and exit points in areas where there is low potential for traffic congestion;</p> <p>Keep the site free from all unnecessary obstructions;</p> <p>Drive vehicles in a considerate manner;</p> <p>Coordinate with Govt. Traffic Department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and</p> <p>Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints</p>					
Social impacts	The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times.					
	Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the Engineer's permissions.					
	The work plan for the construction and laying of pipelines will be devised in such a way to ensure that the construction period is minimized. Compensation will be provided to impacted person					
	Provide walkways and metal sheets where required to maintain access for people and vehicles.					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Increase workforce in front of critical areas such as educational institutions, places of worship, business establishment and health care establishments to shorten the duration of impacts.					
	Consult businesses and institutions regarding operating hours and factoring this in work schedules.					
	The Contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand.					
	Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.					
	The site must be kept clean to minimize the visual impact of the site.					
	Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors.					
	<p>Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include:</p> <ul style="list-style-type: none"> <li>• noise generated by jackhammers, diesel generator sets, excavators, etc.</li> <li>• drilling</li> <li>• dewatering pumps</li> </ul>					
	Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.					
	A complaints register (refer to the Grievance Redressal Mechanism) shall be housed at the site office.					
	Interested and affected parties' need to be made aware of the existence of the complaints book and the					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	methods of communication available to them.					
	Contractor shall immediately take the necessary remedial action on any complaint/grievance received by him					
Cultural environment	All the staff and labourers of the Contractor be informed about the possible items of historical or archaeological value					
	If something of this nature be uncovered, ASI or State Department of Archaeology shall be contacted and work shall be stopped immediately.					
Environment Safeguard/safety Officer	Contractor shall appoint one Environment Safeguard/ Safety Officer who shall be responsible for assisting contractor in implementation of EMP, community liaison, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis.					

### C. Defects Liability Stage

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
Construction camp	All structures comprising the construction camp are to be removed from site or handed over to the property owner/ community as per mutual agreement					
	The area that previously housed the construction camp is to be cleaned up.					
	The Contractor must arrange the cancellation of all temporary services.					
Vegetation	All areas that have been disturbed by construction activities must be cleared of alien vegetation.					
	All vegetation that has been cleared during construction is					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	to be removed from site					
	The Contractor is to water and maintain all planted vegetation until the end of the defects liability period					
Land rehabilitation	All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.					
	All rubble is to be removed from the site to an approved disposal site.					
	The site is to be cleared of all litter.					
	Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.					
Materials and infrastructure	Fences, barriers and demarcations associated with the construction phase are to be removed from the site					
	All residual stockpiles must be removed to spoil or spread on site					
	All leftover building materials must be returned to the depot or removed from the site.					
	The Contractor must repair any damage that the construction work has caused to neighboring properties.					
General	A meeting is to be held on site between the Engineer, ES-PMC and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.					
	Temporary roads must be closed and access across these blocked.					
	Refill and re-compact trenches soil and backfilled sand will be removed to expose the leaking junction or pipe					
	Cover or wet excavated material to prevent dusts					
	All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer					
Hazards chemical and waste management	Store of common salt, dry, and dark conditions for no more than one month					
	Use equipment constructed of corrosion-resistant materials					
	Minimize the amount of disinfection materials for using in chlorinator					
	Material safety data sheet to be maintained at chlorine/common salt storage area					

Field	Mitigation Measures	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name and Designation of Person Who Conducted the Monitoring
	Regular laboratory testing for dosing and residual chlorine					
	Develop and implement a prevention program that includes identification of potential hazards, written operating procedures, training, maintenance, and accident investigation procedures					
	Store of common salt, dry, and dark conditions for no more than one month					
Water quality assessment and maintained – Health & safety	<ul style="list-style-type: none"> <li>Undertake regular monitoring and maintenance of water supply infrastructure.</li> <li>Quality of drinking water will be checked regularly at tube well locations and water storage sites</li> <li>Sewage water will be treated in STP (which is under design stage) before discharge.</li> </ul>					
Social and Cultural Resources	<ul style="list-style-type: none"> <li>Consult the city authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;</li> <li>Complete work in these areas quickly</li> <li>Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals</li> </ul>					

### Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

### III. Training Orientation program details – Date, Venue, Participants, Subjects



#### IV. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each subproject

- Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS (ambient air, water quality and noise levels)
- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

##### Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>

##### Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	Turbidity in NTU	TP mg/L

##### Noise Quality Results

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			Day Time	Night Time

#### V. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

Summary of follow up time-bound actions to be taken within a set timeframe

#### VI. APPENDIXES

Photos

Summary of consultations

Copies of environmental clearances and permits

Sample of environmental site inspection report

Others