Social Assessment and Management Plan for
Sewerage Schemes for Patna City

SMP-Karmalichak Zone

July 2015
### Table of Contents

**Chapter 1: Introduction**

- 1.1 The Project Area ................................................................. 1
- 1.1.1 Karmalichak Zone ............................................................. 1
- 1.2 Met and Climate .................................................................. 2
- 1.3 Topography ......................................................................... 2
- 1.4 Condition Assessment of Existing Sewerage System ............ 2
- 1.4.1 Existing STPs Scenario ....................................................... 2
- 1.5 Contract Agreement (for Existing Condition) ...................... 3
- 1.6 Need of the Project .............................................................. 3
- 1.7 Objectives of the Project ...................................................... 5
- 1.8 Population Projection & Sewage Generation ....................... 5
- 1.9 Sewage Treatment Plant (STP) ............................................ 5
- 1.10 Technology Options for STP .............................................. 6
- 1.11 Recommended STP Technology ......................................... 6
- 1.12 Reuse of Treated Effluent .................................................. 7
- 1.13 Project Scheduling & Financial Analysis ......................... 7
- 1.14 Instrumentation ................................................................. 7
- 1.15 Operation & Maintenance ................................................. 7
- 1.16 Social Management Planning ........................................... 8
- 1.17 Tariff Planning .................................................................. 8
- 1.18 Detailed Cost Estimates .................................................... 8

**Chapter 2: Organizational Structure** ........................................ 11

- 2.1 Background ....................................................................... 11
- 2.2 The National Ganga River Basin Authority ......................... 11
- 2.2.1 Key features of approach and functions of NGRBA ........ 11
- 2.3 State Level ........................................................................ 12
- 2.3.1 State Programme Management Group .......................... 12
- 2.3.2 Bihar Urban Infrastructure Development Corporation Ltd.- Executing Agency ............... 12

**Chapter 3: Project Description** .................................................. 13

- 3.1 The Project Area: Patna City .............................................. 13
- 3.2 Transportation & Connectivity ........................................... 14
- 3.3 Importance of River Ganga in Patna ................................. 14
Chapter 4: Approach and Methodology .............................................................. 18
4.1 Methodology ............................................................................................. 18
4.1.1 Secondary Data analysis (Identify Information/Data Requirements and their Sources) .......... 18
  a. Survey of the host population ................................................................. 18
  b. Screening: ............................................................................................ 18
  c. Identification and assessment of Impacts .................................................. 18
  d. Development of Mitigation Plan ............................................................ 18
4.2 Screening Activity for Project Impact Assessment .......................................... 19
4.3 Need for Social Impact Assessment ............................................................. 20
4.4 Objectives of the Study ............................................................................ 20
4.5 Conclusion of Screening Activity ............................................................... 21

Chapter 5: Resettlement Policy and Legal Framework ........................................ 23
5.1 General ..................................................................................................... 23
5.2 The Right to Fair Compensation and Transparency in LA RR Bill, 2013 .......... 23
5.3 Scheduled Caste and Scheduled Tribes Orders (Amendment) Act, 2002 .......... 26
5.4 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Bill, 2005 ........................................................................ 26
5.5 Environmental and Social Management Framework .................................... 26
5.6 Resettlement Policy and Land Acquisition Framework ................................. 27
5.7 Other Legislations applicable to Construction Projects under NGRBA ............ 27

Chapter 6: Baseline Status .................................................................................. 30
6.1 Baseline Social Status ................................................................................ 30
6.1.1 Demography ..................................................................................... 30
6.1.2 Literacy .............................................................................................. 31
6.1.3 Economy ........................................................................................... 31
6.2 Social Impacts .......................................................................................... 32
6.2.1 Potential Social Impacts .................................................................... 32
6.3 Design and Development Phase ................................................................ 33
6.3.1 Sewer lines ....................................................................................... 33
6.4 Impacts during construction phase ............................................................ 33
9.1 Social Development Outcomes of the sub project ........................................... 56
  9.1.1 Access to sewer network ................................................................. 56
  9.1.2 Better hygienic conditions ............................................................... 56
  9.1.3 Increase in household connections .................................................. 56
  9.1.4 Decrease in water pollution ............................................................ 56
  9.1.5 Cultural sentiments .......................................................................... 56

9.2 Social Development Issues in Project Vicinity and Social Services to be provided by the project. .......................................................... 56
  9.2.1 Ensure backward section of the society gets the facility .................................. 56
  9.2.2 Increasing public toilet facilities .......................................................... 57
  9.2.3 Targeting of economically weaker communities ....................................... 57
  9.2.4 Proper clean-up of project debris ......................................................... 57
  9.2.5 Sanitation for slum dwellers .................................................................. 57

Chapter 8: Social Management Plan ................................................................. 51
  8.1 Social Management Plan ......................................................................... 51
  8.3 Formulation and Implementation of Mitigation Plan .................................... 54
  8.4 Capacity Assessment of Institutions and Mechanisms for Implementing .... 55
  8.5 Develop Monitoring and Evaluation Mechanisms to Assess Social Development Outcomes .......................................................... 55

Chapter 9: Social Development Outcomes and Issues ...................................... 56
  9.1 Social Development Outcomes of the sub project ........................................... 56
  9.1.1 Access to sewer network ................................................................. 56
  9.1.2 Better hygienic conditions ............................................................... 56
  9.1.3 Increase in household connections .................................................. 56
  9.1.4 Decrease in water pollution ............................................................ 56
  9.1.5 Cultural sentiments .......................................................................... 56

  9.2 Social Development Issues in Project Vicinity and Social Services to be provided by the project. .......................................................... 56
    9.2.1 Ensure backward section of the society gets the facility .................................. 56
    9.2.2 Increasing public toilet facilities .......................................................... 57
    9.2.3 Targeting of economically weaker communities ....................................... 57
    9.2.4 Proper clean-up of project debris ......................................................... 57
    9.2.5 Sanitation for slum dwellers .................................................................. 57
Chapter 10: Institutional Arrangements ........................................................................................................ 58
10.1 Institutional Arrangement for Monitoring and Evaluation ................................................................. 58
10.2 Internal Monitoring ............................................................................................................................. 58
10.3 Subproject specific grievance redressal mechanism ........................................................................... 60
  10.3.1 Members of GRC ......................................................................................................................... 61
  10.3.2 Functions of the Cell ............................................................................................................... 61
Chapter 11: Conclusion ................................................................................................................................. 62
Annexure 1: Power Point Presentation ........................................................................................................... 63
Annexure 2: Attendance Sheet .................................................................................................................... 73
Annexure 3: Sample Feedback Form ........................................................................................................... 80
Annexure 4: Land Availability for IPS ......................................................................................................... 81

List of Tables
Table 1: Disposal of Wastewater in Ganga Basin, From Class-I and Class-II Towns in Bihar ............. 3
Table 2: Sewage pollution Load of Patna City (sewage disposed-off in the river Ganga) .................... 4
Table 3: Proposed Capacity of Sewage treatment plant at Karmalichak ............................................... 6
Table 4: Summary of Project Cost (Karmalichak STP) .......................................................................... 9
Table 5: Summary of Project Cost (Karmalichak Sewerage Network) ................................................ 10
Table 6: Land requirement summary of STPs with SBR Technology ................................................... 17
Table 7: Wards covered, Population and Land Requirement for Karmalichak STP ......................... 17
Table 8: Summary of Proposed SPS in Karmalichak Zone ................................................................. 17
Table 9: Outcome of Social Screening .................................................................................................. 19
Table 10: Social information format for screening ............................................................................. 20
Table 11: Other applicable Legislations .............................................................................................. 27
Table 12: Ward-wise population and population projection ................................................................. 30
Table 13: Demographic Parameters .................................................................................................... 31
Table 14: Scheduled Caste population of Patna ..................................................................................... 31
Table 15: Scheduled Tribe population of Patna .................................................................................... 31
Table 16: Literate Population of Patna .................................................................................................. 31
Table 17: Working Population of Patna ............................................................................................... 32
Table 18: Break-up of Working Population of Patna (Urban) ............................................................... 32
Table 19: List of FGDs and outcomes ................................................................................................... 36
Table 20: Social Management Plan matrix for Sewerage and Sanitation Projects ......................... 51
Table 21: Role of stakeholder in implementation and mitigation ..................................................... 54
Table 22: Internal Monitoring Framework ............................................................................................ 58
Chapter 1: Introduction

1.1 The Project Area

Patna, the capital of Bihar, is the second largest city in eastern India, after Kolkata. The Municipal limits of PMC form part of Patna Urban Agglomeration Area (PUAA). The PMC boundaries cover an area of 100 sq km with the present population of 16.83 lakhs as per 2011 census, whereas the PUAA covers an area of 146.16 sq km and has a population of 20.47 lakhs. The city is densely populated and is fast developing as a commercial hub of Bihar. The city comprises of 72 wards with variant population growth as per amenities & infrastructure available. As per recent survey by World Bank, Patna is one of the fastest growing cities in the world in terms of Infrastructural development.

The city forms part of Indo-Gangetic alluvial plains and has fertile soil. The region is flat permitting wide spread of flood waters while the soil permits fast percolation of rain water. However, since the ground water table in the region varies from 2-5 m bgl (below ground level) post monsoon and 5-10 m prior to monsoon, the absorption of water in the soil gets reduced in the monsoon period.

Geographically the city has a width of 9.5 km. on the western side which gradually reduces to 2.5 km on eastern side. The city is situated on southern banks of river Ganga and has extended linearly over a length of 25 km. The western periphery of PUA area is bounded by river Sone whereas on southern side 20 km away, parallel to the city, flows Punpun River which later joins river Ganga.

The largest tributary of the Ganga is Ghaghara, which meets it before Patna, bearing much of the Himalayan glacier melt from Northern Nepal. The Gandak, which has its origin near Kathmandu in Nepal, is another big Himalayan tributary. Other important rivers that merge with the Ganga are the Son and Gomati.

Upstream from Varanasi, one of the major pilgrimage sites along the river, the water is comparatively pure, having a low Biochemical oxygen demand and faecal Coliform count. Studies conducted in 1983 on water samples taken from the right bank of the Ganga at Patna confirm that ischemia coli (E.Coli.), faecal streptococci and vibro cholera organisms die two to three times faster in the Ganga than in water taken from the rivers Son and Gandak and from dug wells and tube wells in the same area.

Patna city covering an area of 100 sq.km is subdivided into 6 Sewerage Zones Digha, Beur, Saidpur, Kankarbagh, Pahari and Karmalichak.

1.1.1 Karmalichak Zone

This zone is in the southern-most part of Patna city. The existing STP is located at Karmalichak with 4.0 MLD (Oxidation Pond) and through open Nallas and around 6 km of main trunks, the sewage is conveyed to the existing STP. The terrain profile of the zone results in an economical sectioned sewer system with flow directed in southern direction. The boundaries are well defined with reference to the terrain of the city. East & south sides are bounded by PMC boundary while on north Ganga is the district boundary. While on west part, the boundary of Zone -V acts as boundary. The south side area of this catchment includes Bazar Samiti, Simli, Pani Tanki area, etc. and on east side it has the area named Maurya Motor area, HP Godown Power supply station etc. & Delhi-Howrah railway line divides this zone into two parts longitudinally. The north part is bounded by river Ganga. Area of zone-VI is about 8.50 sq. km. (i.e. 8.50% of project area).
At present Karmalichak zone has an existing Oxidation Pond based STP of capacity 04 MLD which is catering to a load of 2.0 MLD with primary level of treatment. The ultimate population for Zone-VI is projected as 2.29 lacs, 3.44 lacs & 4.79 lacs for years 2017, 2032 & 2047 respectively. On the basis of population projections for immediate (year 2017), intermediate (year 2032) and ultimate (year 2047), sewage generation from this zone is calculated at, 27.51 MLD, 41.25 MLD and 57.50 MLD respectively.

1.2 Met and Climate

Average annual rainfall in the district is 1230 mm which is primarily spread out from 15th June to 30th September. However, sometime showers continue up to early October also. The city has moderate climate characterized by moderately cold winters to hot summers with temperature varying from 7ºC to 43ºC.

1.3 Topography

Two major floods recorded in the city were in 1984 & 1975 with the HFL recorded as 168.45 feet (51.30 m) to 169.29 feet (51.51 m) respectively. The general contours of the city are lower than the HFL of river Ganga.

Other salient terrain aspects pertaining to planning & designing of the system of city are enumerated as under:-

- The linear bund constructed on northern periphery of the city prevents entry of river Ganga water into the city and hence, a major flood protection works. Similarly, the bund along river Punpun prevents the entry of flood waters into the city from eastern side particularly when the Ganga flows at high level & water backflows into Punpun River.

- Bulk of city is located between contour intervals of 48-51 m whereas HFL of river Ganga is 51.3 m, thus the problem of inundation of city in monsoons. However, the Patliputra area located towards north-western part has levels of 50-56 m and hence, does not have major problems of flooding.

- The city is further linearly bifurcated into northern & southern Patna by the railway line going west to east, right through the middle of the city. This railway line is on high embankment and acts as flood protection measure.

- The new Patna Bye-pass, south of railway line, which is under construction further provides additional flood protection measures to the Patna city.

1.4 Condition Assessment of Existing Sewerage System

Consultant’s team has carried out the detailed condition assessment of the existing sewerage system (i.e. existing sewers, pumping stations & STPs) in depth and same has been elaborated in a subsequent chapter of the DPR. A visit to all areas of the city was undertaken to understand ground topography, existing system, and problem being caused due to existing system and to critically identify consultants approach for handling design & planning. Consultant has also interacted with caretakers of existing system, so as to gather maximum information from their past experiences.

1.4.1 Existing STPs Scenario

Sewerage system was first introduced in Patna town during the years 1936-39 under which a STP of 4.5 MLD was constructed in the year 1937 at Saidpur. The existing STPs serve very few households which have central sewerage system facilities available. The sewer network consists essentially of the sanitary sewers and does not carry sullage (waste water) in the sewage system. These facts indicate that besides the complete sullage, the existing drains are
carrying bulk of sewage discharge also.

The existing STP was commissioned in GAP-II plan after 1994. Currently, the sewage of 2.0 MLD is reaching to STP due to lack of proper infrastructure and most of the sewage is directly discharged into open nallas through which it finally flows into river Ganga. The existing treatment facilities are not fully operational and they are treating only 2 MLD of sewage as against designed capacity of around 04 MLD. Some of the reasons for lesser inflow are improper maintenance of the sewer network due to siltation, dumping of refuse, debris, damaged pipes & manholes etc. besides want of repair & maintenance of STPs.

It is noteworthy that in most of the places/localities, all households are discharging their sewage/sullage through open drains into the nallas. Discharge of sullage/sewage into the drain causes septic condition resulting in foul odor and fly nuisance making the surroundings highly unhygienic. With the present population of 1.98 lakhs which generates sewage discharge of 23.71 MLD, open drains act as sewers during the dry weather flow, whereas, in the monsoon, the same infrastructure serves dual purpose i.e. as sewers and drains, thus making the situation worst for the local public.

1.5 Contract Agreement (for Existing Condition)

The existing sewerage infrastructure has been planned & augmented at different stages of Ganga Action Plan and has already outlived its life. As stated in CA, the main sewer line in Patna is only a length of 27.4 km and that too is in poor condition as have outlived its designed life. Hence, neither NGRBA’s nor CA’s report recommends to retrofit the existing infrastructure to proposed scheme. It is also recommended by the consultant to propose whole sewerage system as new.

1.6 Need of the Project

Bihar is an important state from the perspective of Ganga Action Plan as a total of 445 km (almost 18%) of its total length of 2525 km flows through the state, whereas length of Ganga river flowing adjacent to Patna is around 30 km. The recent survey of Class I and Class II cities indicated that about 8250 MLD of wastewater is generated in the Ganga basin out of which treatment facilities are available only for 3500 MLD of wastewater. A summary of total waste water discharged directly and indirectly into the Ganga River is presented in table below:

**Table-1: Disposal of Wastewater in Ganga Basin, From Class-I and Class-II Towns in Bihar**

<table>
<thead>
<tr>
<th>State</th>
<th>Amount of waste water directly discharged into the Ganga from class I cities and Class II towns (MLD)</th>
<th>Amount of waste water directly discharged into the tributaries and sub tributaries of the Ganga from class I cities and Class II towns (MLD)</th>
<th>Amount of waste water discharged on land/low lying areas from class I cities and class II towns (MLD)</th>
<th>Total wastewater (MLD) disposal in Ganga basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bihar</td>
<td>412.1</td>
<td>171.5</td>
<td>87.8</td>
<td>671.4</td>
</tr>
</tbody>
</table>

A recent survey conducted by CPCB revealed that there is huge infrastructural gap in
installed capacity and treatment capacity for the Patna City around the year 2001 has been presented in table 2 below:

Table 2: Sewage pollution Load of Patna City (sewage disposed-off in the river Ganga)

<table>
<thead>
<tr>
<th>S. No</th>
<th>City</th>
<th>Population (2001 census)</th>
<th>State</th>
<th>Total Sewage MLD</th>
<th>Capacity of STPs, MLD</th>
<th>Capacity GAP, MLD</th>
<th>Percent Treatment Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Patna</td>
<td>1366444</td>
<td>Bihar</td>
<td>249.2</td>
<td>109.0</td>
<td>140.2</td>
<td>43.7%</td>
</tr>
</tbody>
</table>

The above table reveals a gap of 140.2 MLD in treatment capacity but on-site surveys revealed that the installed treatment plants are not running on their designated capacities due to:

a. Lack of flow in absence of sufficient sewer length
b. Power shortage
c. Shortage of skilled and unskilled labour and
d. Paucity of funds.

Apart from the shortfall in sewage treatment capacity, there are other important causes of pollution of the river; disposal of garbage and wastewater and at times dead bodies, bathing and washing of clothes and disposal of religious waste.

1.6.1 Karmalichak Zone

There is a demand for STP’s of capacities 27.41 MLD, 41.25 MLD & 57.50 MLD for the years 2017, 2032 & 2047 respectively. The existing STP is only capable of catering to a load of 02 MLD, thus leaving a gap of 55.50 MLD. This load is directly getting into River...
Ganga through open channel/ nallas. As a result, despite numerous mitigative and corrective measures, water quality in Ganga River has not witnessed considerable improvement and is further going to be deteriorated if the present condition prevails along with the rapid expansion of the city.

For abatement of pollution & sustaining the flora & fauna of the Ganga, it is recommended to install/ augment the capacity of Karmalichak STP to cater the load up to 2047.

1.7 Objectives of the Project

The prime object of the project is to collect the waste water into the sewers and then to treat it before disposing off safely, so that the River Ganga does not get polluted through the drains in the project area. The quality of waste flowing in the drain/ open nallas is putrifiable with high BOD & Faecal Coliform content. This waste water via different routes is reaching Mandiri & Kurjee PS and finally into the outfall into river Ganga; thus making the condition of Ganga water not fit for aquatic life as well as posing health hazards for the downstream human settlements which are fully dependent on Ganga water. This project has been proposed to stop the uncontrolled flow of waste water into the open nallas and to divert the load finally to the STP.

1.8 Population Projection & Sewage Generation

1.8.1 Estimation of Population

Population projections have been carried out in detail by the consultant as recommended by CPHEEO. The projected populations at FR stage have been revised from 53.42 lakhs to 45.68 lakhs for whole Patna city. The population projection is based on ward area density (Population per Hectare) and is briefed as under:

- **Wards (Density < 200 PPH)** - Categorized into high growth scope & thus Geometric progression method has been suitably adopted.
- **Wards (Density 200 – 900 PPH)** - Categorized into stable or low growth scope & thus Incremental Increase method best fit.
- **Wards (Density > 900 PPH)** - Categorized into no future population growth scope & termed as fully grown and thus Arithmetic method has been adopted.

The final population projection of this zone is 2.29 lakhs, 3.44 lakhs & 4.79 lakhs for 2017, 2032 & 2047 respectively.

1.8.2 Estimation of Sewage Generation

As per CPHEEO Manual, the unit rate of water supply for metropolitan and mega cities, where sewage system are existing or contemplated, is taken at the rate of 150 LPCD and generation of sewage is estimated @ 80% of water supply. Thus for Patna, unit rate of sewage generation is taken at 80% of 150 LPCD i.e. 120 LPCD.

1.9 Sewage Treatment Plant (STP)

Patna city is located along the river Ganga and this stretch of the river is designated as critical from quality point of view. The National Ganga River Basin Authority (NGRBA) decided that no untreated municipal sewage and industrial effluents would be allowed to enter the river Ganga after 2020 under mission for clean Ganga.

After detailed planning & consultation with BUIDCo officials and all the stakeholders of the project, sewerage system of Patna city has been divided into 6 sewerage zones based on
topography, railway lines and contributory population for provision of complete sewerage system. The existing capacity of Karmalichak STP is 4 MLD which is proposed to be augmented for 58 MLD (Ultimate). The existing land parcel is so planned to be utilized that the load of Zone II would be catered by Karmalichak STP only. Elsewhere too, the new systems have been planned at the site of the existing STPs and no private land will be required at any location both for the STPs as well as the Pumping Stations.

**Table 3: Proposed Capacity of Sewage treatment plant at Karmalichak**

<table>
<thead>
<tr>
<th>Zones</th>
<th>Population (lakhs)</th>
<th>Sewer Generation (MLD)</th>
<th>Proposed STP (MLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2032</td>
<td>2047</td>
</tr>
<tr>
<td>VI (Karmalichak)</td>
<td>2.29</td>
<td>3.44</td>
<td>4.79</td>
</tr>
</tbody>
</table>

Layout plan of existing STP, Karmalichak and Screens at Inlet Chamber

1.10 Technology Options for STP

Various treatment technologies were evaluated considering the ground realities i.e., acute shortage of open available land vis-a-vis land requirement for various technology options. After the detailed optimal Analysis, it was concluded that SBR is the most suitable treatment technology and thus was recommended for adoption by the competent authority. It is also proposed to introduce UV based disinfection system instead of conventional chlorination as of obvious advantages. The chlorination with past history and based on research analysis are carcinogenic in nature and thus with perspective of abatement in pollution load from rivers, UV based technology would be preferable.

1.11 Recommended STP Technology

Since, the population projection have been revised thus revision in total sewage generation required. The total sewage generation finally got reflected from zone wise sewage generation. SBR based STPs with provision of disinfection through UV are recommended by the consultant considering following major advantages:

- Low land requirement (0.05 Ha/ MLD as per siting guideline for STPs, issued by GoB for SBR based technology).
- Effluent characteristics are far better and thus no requirement of tertiary treatment
- The treated effluent meets all stipulated guidelines such as of NGRBA and CPCB
- Efficient in removal of nitrogen & phosphorus concurrent with BOD
- Improve DO of waste water
- Absence of odor & corrosive gases
• Efficient in removal of Faecal Coliform
• Capable to manage and treat loading conditions; such as normal, diurnal, dilute monsoon and shock loads
• Lesser manpower due to automatic control and easy to operate
• Can be expanded as a modular system
• Low life cycle cost
• Various municipal corporations in India have adopted this technology.

Though SBR based STPs has been proposed by the consultant, however the technology provisioning shall be kept open up-to the tendering stage so as to ensure selection of most suited technology considering all facets (including capital cost, cost of land & its availability, reuse, O&M and Power consumption). It is noteworthy that the final selection of STP technology would be done by BUIDCo on DBO basis considering all above facts and additional if need to emphasize upon.

1.12 Reuse of Treated Effluent

Consultant has carried out the study for reuse of treated waste-water; some of the well-known and widely used methods of reuse are as under:

• Urban reuse
• Industrial reuse
• Agricultural reuse
• Recreational reuse
• Ground water recharge (generally not recommended for sub grade quality treated effluent)
• Flushing of sewers
• SBR based treated effluent can be efficiently utilized for non-domestic purposes like gardening, in house flushing, floor cleaning etc

1.13 Project Scheduling & Financial Analysis

The construction/ execution of project is planned to be completed by 2017 including STPs & sewer network. House connections for the whole project will be executed by or before 2019 end in a phased manner. It is noteworthy that all septic tanks will be disconnected once the house/ property connections for whole project will be finalized and completed.

There is a requirement to update the existing tariff plan of the city from competent authority so as to meet required/ desired cash flow to maintain the system for long a period. The proposed planning/ Financial Analysis have been done considering minimum tariff to be included in bye-laws and same has been annexed at the end. The income generated from tariff charges for sewerage & onetime subsidized cost for house connection may be utilized for O&M of STP, sewer lines, rising mains, SPSs if any etc. (after 05 years).

1.14 Instrumentation

PLC-SCADA based system has been proposed by the consultant for sewage treatment plants. This automatic system will benefit the O&M agency to track record and faults if any in the system. These systems thus minimize the total manpower requirements compared to conventional manual based systems.

1.15 Operation & Maintenance

Operation & Maintenance are one of the basic requirements for any system to have long life
and better output. Considering the basic benefits of O&M, use of various equipment &
methods has been suggested to clean the sewer line and to optimally utilize the whole
sewerage system without any major failure for long time. Better O&M of the system also
saves a lot of resources of municipal authority who is responsible for serving the
community.

1.16 Social Management Planning

A detailed environmental & social management with screening report has been prepared by
consultant for both during construction & operation stage and explained in the
corresponding sections of this report.

1.17 Tariff Planning

There is a requirement to update the existing tariff plan of the city from competent authority
so as to meet required/ desired cash flow to maintain the system for long a period. The
proposed planning/ Financial Analysis has been done considering minimum tariff to be
included in bye-laws and same has been annexed at the end. The income generated from
tariff charges for sewerage & onetime subsidized cost for house connection may be utilized
for O&M of STP, sewer lines, rising mains, SPSs if any etc. (after 05 years).

1.18 Detailed Cost Estimates

Cost of STP based on SBR technology is adopted from "Siting Guidelines of STPs" issued
by GoB. Cost adopted is based on per MLD of sewage load up-to 2032 (Intermediate stage).
The cost of disinfection (based on UV) has been adopted from market.
Table 4: Summary of Project Cost (Karmalichak STP)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Cost (INR Crores)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Sewage Treatment Plant at Karmalichak Zone VI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Construction of New Sewage Treatment Plants on SBR technology (37 MLD for 2027) @ 1.5Cr/ MLD</td>
<td>55.50</td>
<td>At Existing available land (Most feasible &amp; Techno-economical option)</td>
</tr>
<tr>
<td>2.</td>
<td>Extra cost for disinfection through UV (7 modules @ 5.5 MLD/ Module)</td>
<td>1.05</td>
<td>@ 15 lacs/ Per module</td>
</tr>
<tr>
<td></td>
<td><strong>Sub - Total of A (Sr. 1 to 2)</strong></td>
<td><strong>56.55</strong></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td><strong>Charges</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cost of Project preparation @ 4% as per NGRBA Programme guidelines</td>
<td>2.26</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cost of Project supervision @ 4% as per NGRBA Programme guidelines</td>
<td>2.26</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sub - Total of B (Sr. 1 to 2)</strong></td>
<td><strong>4.52</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td><strong>Cost of Work where charges will not be admissible</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Environmental Mitigation and Monitoring Cost</td>
<td>0.82</td>
<td>During construction &amp; Operation stage</td>
</tr>
<tr>
<td>2</td>
<td>Communication and Public Outreach</td>
<td>0.15</td>
<td>During construction &amp; Operation stage</td>
</tr>
<tr>
<td>3</td>
<td>GAAP</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sub - Total of C (Sr. 1 to 3)</strong></td>
<td><strong>1.04</strong></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>O&amp;M Cost for STP</td>
<td>14.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sub - Total of D</strong></td>
<td><strong>14.93</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Cost (Rs. in Crores)</strong></td>
<td><strong>77.04</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Table 5: Summary of Project Cost (Karmalichak Sewerage Network)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Cost (INR Crores)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sewerage system complete with laterals, collectors, interceptor and trunk sewers.</td>
<td>85.38</td>
<td>Gravity sewers 200 – 1600 mm diameter of total length 96.54 km</td>
</tr>
<tr>
<td>2.</td>
<td>Construction of 01 Nos. of New Pumping Station @ Rs 5.5 Crores per SPS</td>
<td>5.50</td>
<td>Civil &amp; EM cost for Proposed &amp; Existing SPSs</td>
</tr>
<tr>
<td>3.</td>
<td>O&amp;M for sewer lines &amp; SPS incl other infrastructure with capacity building</td>
<td>13.61</td>
<td>O&amp;M @ 3% pa for 5 years</td>
</tr>
<tr>
<td>4.</td>
<td>Total House Connections is 38167 nos. @ Rs 3840 per holding</td>
<td>14.72</td>
<td>House Connections is 38167 nos. @ 06 person per holding (for 2017)</td>
</tr>
<tr>
<td>5.</td>
<td>Relocation of Utilities</td>
<td>05</td>
<td>For water line, electric &amp; telephone line, electric poles etc</td>
</tr>
<tr>
<td>6.</td>
<td>Cost for Trenchless Technology</td>
<td>33.75</td>
<td>For 10 km (cost analysis from INDsTT)</td>
</tr>
<tr>
<td></td>
<td><strong>Sub - Total (Sr. 1 to 06)</strong></td>
<td><strong>157.96</strong></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Environmental Mitigation and Monitoring Cost</td>
<td>0.90</td>
<td>During construction &amp; Operation stage</td>
</tr>
<tr>
<td>8.</td>
<td>Public Outreach anc Communication Cost incl GAAP</td>
<td>0.30</td>
<td>During construction &amp; Operation stage</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>159.16</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Adding Establishment and contingencies charges etc @ 8%</strong></td>
<td>11.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Cost (Rs. in Crores)</strong></td>
<td><strong>170.71</strong></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 2: Organizational Structure

2.1 Background

The river Ganga has significant economic, environmental and cultural value in India. Rising in the Himalayas and flowing into the Bay of Bengal, the river traverses a course of more than 2,500 km through the plains of north and eastern India. The Ganga main stem – which also extends into parts of Nepal, China and Bangladesh – accounts for 26 per cent of India’s landmass, 30 per cent of its water resources and more than 40 per cent of its population. The Ganga also serves as one of India’s holiest rivers whose cultural and spiritual significance transcends the boundaries of the basin.

Despite its importance, extreme pollution pressures from increasing population and industrialization pose a great threat to the biodiversity and environmental sustainability of the Ganga, with detrimental effects on both the quantity and quality of its flows. Discharge of untreated sewage and industrial wastewater, non-point pollution sources from religious activities along the river, agriculture and livestock as well as poor solid waste management are the main causes for pollution in river Ganga. Programs also did not pay sufficient attention to the social dimensions of river clean-up, failing to recognize the importance of consultation, participation and awareness-raising. The lessons drawn from these prior experiences indicate that improving water quality in the Ganga cannot be achieved by plugging the infrastructure gap alone. Rather, any effective initiative will have to adopt a three-pronged approach:

- Establishing a basin-level, multi-sectorial framework for addressing pollution in the river (including national/state policies and river basin management institutions);
- Making relevant institutions operational and effective (e.g. with the capacity to plan, implement and manage investments and enforce regulations); and,
- Implementing a phased program of prioritized infrastructure investments (with emphasis on sustainable operations and mobilization of community support).

2.2 The National Ganga River Basin Authority

The Central Government, by a notification dated 20.2.2009, as set up ‘National Ganga River Basin Authority’ (NGRBA) as an empowered planning, financing, monitoring and coordinating authority for the Ganga river, in exercise of the powers conferred under the Environment (Protection) Act, 1986. The Prime Minister is ex-officio Chairperson of the Authority, and it has as its members, the Union Ministers Concerned and the Chief Ministers of states through which Ganga flows, viz., Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal, among others. The objective of the Authority is to ensure effective abatement of pollution and conservation of the river Ganga by adopting a holistic approach with the river basin as the unit of planning. The functions of the Authority include all measures necessary for planning and execution of programmes for abatement of pollution in the Ganga in keeping with sustainable development needs.

2.2.1 Key features of approach and functions of NGRBA

River Basin will be the unit of planning and management. This is an internationally accepted strategy for integrated management of rivers. Accordingly, a new institutional mechanism in the form of National Ganga River Basin Authority (NGRBA) will spearhead river conservation efforts at the national level. Implementation will be by the State Agencies and Urban Local Bodies.
The minimum ecological flows for the entire Ganga will be determined through modelling exercises. NGRBA will take appropriate measures in cooperation with the States to regulate water abstraction for maintaining minimum ecological flows in the river.

Attention would also be paid to the restoration of living parts of the river ecosystem for its holistic treatment to enable conservation of species like dolphin, turtles, fishes and other native and endangered species in their river.

The NGRBA would be responsible for addressing the problem of pollution in Ganga in a holistic and comprehensive manner. This will include water quality minimum ecological flows, sustainable access and other issues relevant to river ecology and management.

The NGRBA will not only be regulatory body but will also have developmental role in terms of planning & monitoring of the river conservation activities and ensuring that necessary resources are available.

The NGRBA will plan and monitoring programmes for clanging of Ganga and its tributaries. To begin with, it will concentrate on Ganga main stem.

The NGRBA would draw upon professional expertise within and outside the Government for advice on techno-economic issues. The technical and administrative support to NGRBA shall be provided by the Ministry of Environment & Forests.

2.3 State Level

2.3.1 State Programme Management Group

A society registered under the Department of Urban Development, Government of Bihar for implementation of NGRBA programme in the State

2.3.2 Bihar Urban Infrastructure Development Corporation Ltd.- Executing Agency

BUIDCo is a Flagship company to implement and accelerate urban infrastructure projects in the State of Bihar. These projects include basic infrastructure amenities such as Solid Waste Management, Water Supply, Drainage Network and Sewerage & Sewage Treatment. Also, projects of urban beautification like River Front Development, Amusement Parks, Commercial works, Hotels etc. are also being developed by the BUIDCo.
Chapter 3: Project Description

3.1 The Project Area: Patna City

Patna is the capital of the Indian state of Bihar and the second largest city in Eastern India (in terms of population). Patna is one of the oldest inhabited & civilized places in the world. Ancient Patna, known as Pataliputra, was the capital of the Magadha Empire under the Haryanka, Nanda, Mauryan, Sunga, Gupta, Pala and Suri dynasties. Patna is located on the south bank of the Ganga River. A characteristic of the geography of Patna is its confluence of rivers. The Ganga River is the largest. It is joined by four other rivers: Ghaghara, Gandak, Punpun and Sone. Patna is unique in having four large rivers in its vicinity.

The modern city of Patna is situated on the southern bank of the Ganges. Patna is approximately 25 km long and 9 km to 10 km wide. The city has grown up gradually from the ancient age with the name ‘Pataliputra’. It is located between the river Ganges in the North, the river ‘Pun Pun’ in the South and the river ‘Sone’ in the west. The geographical location of the Patna Urban Area is on the southern bank of River Ganges between latitudes 25°30’N & 25°40’N and longitudes 85°0’E &85°-15°E. It is the 14th most populous agglomeration in India and 168th in the world with a population of approximately 1.8 million. It is the second largest city in eastern India, after Kolkata. Today, all major industries have a base in Patna reflecting the growing importance of the city. There has been significant enhancement in GDP of Bihar in the last decade. The growth of economy, urbanization & population trends are indicators that city shall continue to develop rapidly in next two-three decades. It is also fast emerging as a hub of higher education with institutes of national repute being started in Patna.

The competitive advantage of Patna lies in its being the state capital and its central location. It is the centre for all higher order services in the state – education, health – and the political centre. The town is well connected by rail, road and air with the region and the rest of the country. Patna’s location on the banks of the River Ganges ensures that there is abundant water and fertile soil in the region. Patna is an important commercial centre. Due to its central position at the junction of the three rivers, it has the additional advantage of transport of goods by river. The commercial establishments within the city are mainly lined along the arterial and major roads and there is extensive mixed land use of commercial and residential use throughout the city.

The history and tradition of Patna go back to the earliest dawn of civilization. The original name of Patna was Pataliputra or Patalipattan and its history dates back to 600 B.C. Ancient Patna covers area of 42 sq km. The name Patna has undergone many changes at its earliest stages like Pataligram, Kusumpur, Patliputra, Azimabad, etc., ultimately terminating to the present one. Chandragupta Maurya made it his capital in the 4th century A.D.

Apart from being the administrative centre of the state and its historic importance, the city is also a major educational and medical centre. The economy of Patna is based on the local service industry. Ancient Patna, known as Pataliputra, was the capital of the Magadha Empire under the Haryanka, Nanda, Mauryan, Sunga, Gupta, Pala and Suri dynasties. Pataliputra was also a famous seat of learning and fine arts. Its population during the Maurya period (around 300 BCE) was about 400,000. The walled old area, called Patna City by the locals, is a major trading centre.

The Buddhist, Hindu, and Jain pilgrim centres of Vaishali, Rajgir, Nalanda, Bodhgaya, and Pawapuri are nearby and Patna is also a sacred city for Sikhs. Guru Gobind Singh, the tenth Guru of the Sikhs, was born in Patna.
3.2 Transportation & Connectivity

Patna was one of the first places in India to use horse-drawn trams for public transport. Public transportation today is provided for by buses, auto rickshaws and local trains. Auto rickshaws are said to be the lifeline of the city. BSRTC has started City bus service on all major routes of Patna. Recently, radio cab facility has also started.

Railway: The Patna Junction railway station is connected to most of the major cities in India by the railway network. Patna lies between New Delhi and Kolkata which is one of the busiest rail route in India. The city is a major railway hub and is well connected with Gaya, Jehanabad Biharsharif, Rajgir, Islampur with excessive train services. The plan also includes the modernisation of Patna Junction.

Airways: There is an airport, Lok Nayak Jayaprakash Airport, which is classified as a restricted international airport. The arrival of several low-cost carriers and a number of new destinations have caused a growth in air traffic in recent years. For the period April to December 2009 the airport ranked first in a survey of 46 airports in the country in terms of percentage growth of domestic passengers as well as domestic aircraft movement.

Roadways: The city is served by several major road highways and state highways, including National Highways 19, 30, 31, and 83. It is 1,015 kilometres (631 mi) from Delhi, 1,802 kilometres (1,120 mi) from Mumbai and 556 kilometres (345 mi) from Kolkata. Luxury bus service between Patna and several neighbouring cities is provided by the Bihar State Tourism Development Corporation and the Bihar State Road Transport Corporation.

Waterways: Patna has a fixed terminal on National Waterway No. 1 which was established in October 1986. This 1,620 kilometres (1,010 mi) route of navigable water runs from Haldia on the Bay of Bengal, across the extremity of Jharkhand province, across the centre of Bihar and then to Allahabad in Uttar Pradesh.

3.3 Importance of River Ganga in Patna

The mighty river Ganges is an intrinsic part of life of Patna. The famous Chhat Puja of Eastern India is celebrated in Patna with great gaiety on river Ganga’s banks. More than five lakhs devotees offer Puja to Sun God on the occasion of Chhat Puja in the month of October. On this occasion lakhs of people trek to Ganges and after holy dip in the Ganges worship Sun God.

Recently Ganga Aarti has started in two ghats, namely Gandhi Ghat and BhadraGhat. The Tourism Department is conducting these on weekly basis and already has emerged an attractive weekly event of city. Such programs can create enormous awareness for cleanliness of river Ganges. Ganga Diyara (Dryland on shores of Ganga and sand islands in middle of Ganga) is being developed as recreational spot for inhabitants of Patna city. People throng to these places on occasions like Christmas, New Year, Makar Sankranti to celebrate with their families.

This being a historical city the settlements started right after river’s bank edge and consequently the river’s edge remained unattended. The great potential of riverfront development eluded the people of Patna. Now with this decision of Bihar Govt. to develop the Ganga river front a great opportunity for urban transformation of city has emerged.
3.4 General Overview of Sewerage Zones of Patna

Sewerage system was first introduced in Patna town during the year 1936-39 under with a STP of 4.5 MLD constructed in the year 1937 at Saidpur. The capacity of STP was extended to 16.38 MLD in 1964, 28.2 MLD in 1971. Subsequently the treatment plant at Saidpur was augmented when sewerage system was extended to certain neighbouring areas. The above capacity of 28.2 MLD was augmented to 45 MLD in the year 1998 under Ganga Action Plan.

But, these treatment facilities are not fully operational as they are treating only 33 MLD of sewage as against designed capacity of around 45 MLD. Some of the reasons for lesser inflow are improper maintenance of the sewer network due to siltation, dumping of refuse, debris, damaged pipes & manholes etc; besides for want of repair & maintenance of STPs.

Further the existing STPs serve very few households which have central sewerage system facilities available. The sewer network are essentially the sanitary sewers and do not carry sullage (waste water) in the sewage system. These facts indicate that besides the complete sullage, the existing drains are carrying bulk of sewage discharge also.

It is noteworthy that at most of the places/ localities, all households are discharging their sewage/ sullage through open drains into the nallas. Discharge of sullage/ sewage into the drain causes septic condition resulting in foul odour and fly nuisance making the surrounding highly unhygienic. The situation is further aggravated as all the solid waste is also being disposed- off into these public drains. Due to the encroachment and dumping of solid waste causes silt deposition, the solid waste does not only obstruct the flow but due to the putrecible organic matter present in sewage/ waste (which is biodegradable), causes septic condition resulting in foul odour and fly nuisance making the surrounding highly unhygienic. In addition to the same, the solid waste settles into the drains causing siltation which further have reduced the carrying capacity of drains. Water logging in open/ low lying area is a common phenomenon in the city.

The existing STPs serve very few households which have central sewerage system facilities available. The sewer network are essentially the sanitary sewers and do not carry sullage (waste water) in the sewage system. These facts indicate that besides the complete sullage, the existing drains are carrying bulk of sewage discharge also.

Taking the above into consideration, a new sewerage system has been designed for Patna. This newly designed System has been divided into 6 zones which together have a projected installed capacity of 370MLD comprising of 5 STPs and 13 Sewage Pumping Stations. The total length of the designed sewerage network is about 1300 km

3.5 Karmalichak Zone

The old Karmalichak Zone of Patna as per the existing sewerage scheme is now divided in two zones namely Zone -V & VI. The maximum part of old Karmalichak is been taken up in this zone. This zone have a STP within its boundary at Karmalichak STP (04 MLD plant) site. As per new designation of Zones, zone –VI covers mostly the same area as Karmalichak zone except some part falls in Zone -V.

This zones is in the southern most of Patna city. The existing STP is located at Karmalichak with 4.0 MLD (Oxidation Pond) and through open Nallas and around 6 km of main trunks, the sewage are conveyed to the existing STP. The terrain profile of the zone results in an economical sectioned sewer system with flow directed in south direction. This zone forms the eastern part of city. The west side of this zone is bound by Zone –V and on the south it
is bounded by Badshahi Nalla & PMC boundary.

The south side area of this catchment includes Bazar Samiti, Simli, PaniTanki area, etc and on east side it has the area named Maurya Motor area, HP Godown Power supply station etc & Delhi-Howrah railway line divides this zone into two part longitudinally. The north part is bounded by river Ganga. Area of zone-VI is about 8.50 sq. km. (i.e. 8.50% of project area).

At present Karmalichak zone has an existing Oxidation Pond based STP capacity of 04 MLD which is catering a load of 2.0 MLD with primary level of treatment. The ultimate population for Zone-VI is projected as 2.29 lacs, 3.44 lacs & 4.79 lacs for years 2017, 2032 & 2047 respectively. On the basis of population projections for immediate (year 2017), intermediate (year 2032) and ultimate (year 2047), sewage generation from this zone is calculated at, 27.51 MLD, 41.25 MLD and 57.50 MLD respectively.

3.6 Land Availability

Patna city is densely populated in the core area, and outgrowth on the fringes is expected in the years to come. Therefore, at this stage it is possible to earmark the land requirement for ultimate stage STP capacity.

The area available at the existing STP at Karmalichak will be utilized for the project. The existing STPs are proposed to be converted to lesser land footprint intensive technologies during future expansion. After detailed study and feasibility analysis, it was found that retaining existing land is not only the most feasible available option, but also it has techno-economical advantage over other options.

3.7 Land Requirement

As per the recommendations and "Siting Guideline for STPs, issued by GoB" for adopting SBR Technology for STPs, the land requirement for each STP in respective zone shall be as under:
Table 6: Land requirement summary of STPs with SBR Technology

<table>
<thead>
<tr>
<th>Zone</th>
<th>Ultimate Flow (MLD)</th>
<th>Land Requirement (Ha)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>167</td>
<td>8.35</td>
</tr>
<tr>
<td>II</td>
<td>70</td>
<td>3.5</td>
</tr>
<tr>
<td>III + IV A (N)</td>
<td>83</td>
<td>4.15</td>
</tr>
<tr>
<td>IV</td>
<td>75</td>
<td>3.75</td>
</tr>
<tr>
<td>V + IV A(S)</td>
<td>97</td>
<td>4.85</td>
</tr>
<tr>
<td>VI</td>
<td>58</td>
<td>2.9</td>
</tr>
</tbody>
</table>

*Land requirement @ 0.05Ha/MLD for SBR

The list of wards in Karmalichak zone with population, sewage generation and land requirement for STP have been presented in table 7 below

Table 7: Wards covered, Population and Land Requirement for Karmalichak STP

<table>
<thead>
<tr>
<th>Wards Covered</th>
<th>Population projection for 2047 (lakhs)</th>
<th>Sewage Generation for 2047 (MLD)</th>
<th>Land Requirement (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>62,63,66,67,68,69,70,71,72</td>
<td>4.79</td>
<td>57.5</td>
<td>2.9</td>
</tr>
</tbody>
</table>

The total land required for Zone VI, Karmalichak STP is 2.9 Ha. The proposed construction and enhancement in capacity of existing STP will be carried out on land available at the existing site which is more than what is required; hence no land acquisition is necessitated

Table 8: Summary of Proposed SPS in Karmalichak Zone

<table>
<thead>
<tr>
<th>Zone</th>
<th>Sub-zone</th>
<th>Sewage Generation (MLD)</th>
<th>Proposed SPS Capacity (MLD)</th>
<th>Location of proposed SPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>SPS A</td>
<td>8.89</td>
<td>20.76</td>
<td>Behind Gauri Das Mandi</td>
</tr>
</tbody>
</table>

The SPS has been proposed at a site which is a vacant plot of land under the possession of the government. Hence no land acquisition is required

Site for SPS
Chapter 4: Approach and Methodology

4.1 Methodology

As per Environmental and Social Management Framework (NGRBA, 2011), the river pollution mitigation projects under the NGRBP is anticipated to encounter a variety of environmental and social problems. Hence, an environmental and social assessment with corresponding management plans for the proposed project of sewerage works in Patna has been conducted.

4.1.1 Secondary Data analysis (Identify Information/Data Requirements and their Sources)

All the available information and data (quantitative, qualitative) regarding the proposed project was collected mainly from the Detailed Project Report (DPR), consultation with stake-holders and other secondary sources.

a. Survey of the host population

With the help of questionnaires and interview schedules, local people were interviewed. A wide range of potentially affected people were interviewed including street vendors, residents of households, residents of temporary settlements, shop keepers, hospital patients, hospital staff, etc. Both men and women were interviewed from different sections of the society. Field visits were undertaken to carry out the survey and understand the ground situation. The interviewees were asked about their awareness of the project, their response to it and how the project will affect them during construction phase and what will be the likely impacts of the project after completion. Also they were asked about the mitigation plans they have adopted or are planning to adopt, suggestions for improvement and any public grievances. Surveys were conducted along the path of construction site.

b. Screening:

Screening is undertaken in the very beginning stages of project development. The purpose of screening is to screen out “no significant impacts” from those with significant impacts and get a broad picture of the nature, scale and magnitude of the issues. Team conducted screening process using the screening checklist format provided in ESMF report of NGRBA. Area around a number of Schools, Hospitals and local markets was covered during the screening process; Jalan High school, Gauri Das ki Mandi, Patna City Chauraha, Raj Marwari Degree College, Government Degree College, Meethapur, Sudarshan path and Manoj Kamalia Stadium being among them.

c. Identification and assessment of Impacts

Based on the analysis of the data gathered from field survey, stakeholder interaction/consultation and secondary sources, issues related to the environmental and social sectors were identified. The impacts so identified were compared with the existing baseline environmental and social condition of the study area. The impacts of the activities are mostly positive with few adverse impacts.

d. Development of Mitigation Plan

Based on the environmental and social impact assessment issues were identified and measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance were recommended. The mitigation plans is suggested in all three stages: designing phase, construction phase and, operation and maintenance phase.
4.2 Screening Activity for Project Impact Assessment

Screening activity is undertaken in the very beginning stages of project development. The purpose of screening is to screen out “no significant impacts” from those with significant impacts and get a broad picture of the nature, scale and magnitude of the issues. Based on the secondary data analysis, field assessments and stakeholder interaction/consultation, the screening activity was conducted as per the guidelines provided in Environmental and Social Management Framework of NGRBA (NGRBA, 2011) as given in the Table 9 below.

During the initial site visit to the project site between 20.08.2013 and 26.08.2013 some important areas of the city were visited to identify the major Environmental and Social factors as per the guidelines of WB and ESMF of NGRBA. The factors which were looked into include:

- Land availability/requirement
- Loss of structures
- Loss of livelihood
- Impacts on common property resources etc.

Table 9: Outcome of Social Screening

<table>
<thead>
<tr>
<th>Social Factors</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of Land</td>
<td>There will be no loss of private land in the project. The STP is located at the site of the existing one while the SPS is planned on a vacant plot of land under government possession and is free from encroachments. The network pipeline has been aligned on the existing RoW to negate acquisition of private land</td>
</tr>
<tr>
<td>Land Availability/Requirement</td>
<td>No additional land is required for the project as the STP has been designed on the site of the existing STP and the lone SPS on government land and proceedings for transfer of the same to the implementing agency has already been initiated at requisite levels and the required plot of land will be physically available to the civil contractor at the start of the civil works.</td>
</tr>
<tr>
<td>Loss of structures</td>
<td>No loss of structures is anticipated in this project</td>
</tr>
<tr>
<td>Loss of livelihood</td>
<td>There will be no loss of livelihood during implementation of the project as it does not involve acquisition of land. The street vendors and petty shopkeepers will have some temporary impact due to digging works for the pipeline but it has been taken care of and all such vendors will be temporarily shifted to other nearby locations, not far from their existing place of business. Also, wooden slabs would be placed on the dug-up trenches to facilitate movement of customers of the petty shopkeepers. In fact, the project will provide more gainful employment to a section of the local people through contract labour. During construction the Kiosks will be temporarily shifted to the other side of the road. Adverse impacts mainly include temporary relocation of mobile vendors and temporary blockage of roads during construction. During impact analysis vendors have welcomed the project and affirmed that this will not have any adverse impact on livelihood as they may relocate to a nearby place</td>
</tr>
</tbody>
</table>
4.3 **Need for Social Impact Assessment**

The loss of private assets resulting in loss of income and displacement has made social impact assessment an important input into the project design while initiating and implementing developmental interventions. An understanding of the issues related to social, economic and cultural factors of the affected people is critical in the formulation of an appropriate rehabilitation plan. A detailed social impact assessment (SIA) therefore was carried out to make project design responsive to social development concerns. SIA also helped in enhancing the project benefits to poor and vulnerable people while minimizing or mitigating concerns, risks and adverse impacts. Further as the project implementation entails a large number other social issues such as influx of labour during construction and others, a systematic assessment provided the basis to prepare a Social Management Plan.

4.4 **Objectives of the Study**

The main objective of the study is to ensure that the project addresses the adverse impacts on the livelihood of the people and that nobody is left worse off after implementing RAP and those affected have access to project benefits, both during project construction as well as operation. Specifically, the objectives of the study are:

1) To carry out a socio-economic, cultural and political/institutional analysis to identify the project stakeholders and social issues associated with the project;
2) To assess the extent of asset loss and undertake the census of potential project affected people;
3) To identify likely occurrence of HIV/AIDS resulting from the influx of outside labourers and others and develop a strategy to reduce their incidence; and
4) To develop a consultation framework for participatory planning and implementation of proposed mitigation plan.

<table>
<thead>
<tr>
<th>Table 10: Social information format for screening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title:</strong> STP and Sewerage Work for Karmalichak Zone</td>
</tr>
<tr>
<td><strong>Implementing agency:</strong> Bihar Urban Infrastructure Development Corporation</td>
</tr>
<tr>
<td><strong>Project cost:</strong> INR 248 Crore (approx.)</td>
</tr>
<tr>
<td><strong>Project components:</strong> Main Pumping Station (MPS), Outfall Channel and STP (41 MLD &amp; 58 MLD for 2032 &amp; 2047 respectively); Sewer Line, House Sewer Connections, Intermediate Pumping Stations (IPSs), Rising Main; Ward Nos. (62, 63, 66, 67, 68, 69, 70, 71, 72); Population for 2047 (4.79 lakh)</td>
</tr>
<tr>
<td><strong>Will the project create significant/limited social impacts?</strong> The project does not have any perceived negative social impact.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screening Criteria</th>
<th>Assessment of category</th>
<th>Explanatory note for categorization</th>
<th>Reference/Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land acquisition resulting in loss of income from agricultural land, plantation or other existing land-use.</td>
<td>No negative social impact likely to occur as there is no acquisition of private</td>
<td>All STPs and Pumping Stations have been designed on the land available with the existing STPs and Pumping Stations Also there exist no squatters or encroachers in and around the premises who could get affected by the project.</td>
<td>Table 6: Land requirement summary of STPs with SBR Technology</td>
</tr>
</tbody>
</table>
### Social Assessment and Management Plan for Sewerage Schemes for Patna City (Karmalichak Zone)

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Social Impacts</th>
<th>Description</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of livelihood</td>
<td>No</td>
<td>Loss of livelihood is not expected and since mobile vendors can change their location, there would be no loss. There could be minor disruption in terms of access to shops and traffic congestion.</td>
<td>Field visit &amp; detailed deliberations with Stakeholders, ULBs, PMC and BUIDCo. Also considering the ongoing execution work of water supply project in the city.</td>
</tr>
<tr>
<td>Land acquisition resulting in relocation of households.</td>
<td>No social impacts</td>
<td>No Land acquisition required and no relocation of households required since identified plots of land do not have any habitations or settlements. The location of STP has been proposed on existing site thus no habitation/household relocation is required. Also there exist no squatters or encroachers in and around the premises which will be affected.</td>
<td>Refer point number 3.7: Land requirement.</td>
</tr>
<tr>
<td>Any reduction of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood).</td>
<td>No social impacts</td>
<td>No access problem likely to be there to river.</td>
<td>Detailed planning &amp; consultation with shop keepers, local people, mobile vendors &amp; expert opinions.</td>
</tr>
<tr>
<td>Any displacement or adverse impact on tribal settlement(s).</td>
<td>No social impacts</td>
<td>There are no tribal settlements in the project area.</td>
<td>Consultations with stakeholders, like local people, local residents, government officials, ULBs etc.</td>
</tr>
<tr>
<td>Any specific gender issues</td>
<td>No social impacts</td>
<td>No gender issues were reported during survey.</td>
<td>Consultations, interviews, which were taken up with females specifically.</td>
</tr>
</tbody>
</table>

### 4.5 Conclusion of Screening Activity

In order to facilitate effective management and mitigation of the any impacts arising from the proposed projects, the Environmental and Social Management Framework of NRGB (Section #4 of ESMF report, NGRBA 2011) has grouped the pollution abatement projects/
investments into the following two categories high and low.

**High**: Mainly include the sub-projects which are likely to have adverse impact on the environmental and social aspects of the project influence area (including land acquisition). This category projects will also include mandatory environmental clearance as per the EIA notification.

**Low**: Projects which are likely to cause minimal or no adverse social impacts on human populations.

Based on the screening activity and the categorization of potential sub-projects of the NGRBA, the present project of Sewerage work in Kartmalichak zone in Patna City falls under Low Impact Category. In view of the above, this project would require preparation of an Environmental and Social Assessment, as part of the DPR, and implementation of Generic Safeguard Management Plan (SMP), relevant to the project.

Therefore, this scheme as per the guideline of NGRBA fall in "Low Impact" as there is no requirement to acquire private land for STP and SPSs.

**Some photographs with reference to screening and Impact Assessment**
Chapter 5: Resettlement Policy and Legal Framework

5.1 General

All strategic interventions on human development, spread across all social issues, need directives of policies and legal support to operationalize the appropriate actions. These policies and legislations help to overcome the constraints and support administrator, implementer, community and individual in delivery of justice. This chapter includes the World Bank as well as National policies and Acts applicable to such types of infrastructure projects. However, since the present project, i.e. Patna Sewerage Project has been designed keeping in view the likely negative socio-economic impacts of such projects, engineering design has assured that no private land is required for the project. This implies that there will be no acquisition of private land and as there are no squatters and encroachers on the identified government land, the problem of rehabilitation and resettlement has also been avoided. However, there will be some temporary relocation of street vendors and hawkers which has been taken care of through mitigative measures such as temporarily shifting them to an alternate location.

5.2 The Right to Fair Compensation and Transparency in LA RR Bill, 2013

An Act to ensure, in consultation with institutions of local self-government and Gram Sabhas established under the Constitution, a humane, participative, informed and transparent process for land acquisition for industrialization, development of essential infrastructural facilities and urbanization with least disturbance to the owners of the land and other affected families and provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition and make adequate provisions for such affected persons for their rehabilitation and resettlement and for ensuring that the cumulative outcome of compulsory acquisition should be that affected persons become partners in development leading to an improvement in their post-acquisition social and economic status and for matters connected therewith or incidental thereto.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (herein referred to as the Fair Compensation in Land Acquisition Act) was enacted to provide for just and fair compensation to the owners of the land and affected families for the land acquisitions made under the said Act and the 13 Acts specified in the Fourth Schedule, which makes provisions for acquisition of land for the purposes specified in the respective Acts, in terms of the provisions made in the First, Second and Third Schedule to the Fair Compensation in Land Acquisition Act. In other words, the benefit of the compensation, rehabilitation and resettlement provided in the Fair Compensation in Land Acquisition Act is proposed to be extended in cases of land acquisition made under the Acts specified in the Fourth Schedule.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Ordinance, 2014


The LARR Act 2013 outlines the process to be followed when land is acquired for a public purpose. Key changes made by the Ordinance are:
Provisions of other laws in consonance with the LARR 2013: The LARR Act 2013 exempted 13 laws (such as the National Highways Act, 1956 and the Railways Act, 1989) from its purview. However, the LARR Act 2013 required that the compensation, rehabilitation, and resettlement provisions of these 13 laws be brought in consonance with the LARR Act 2013, within a year of its enactment, through a notification. The Ordinance brings the compensation, rehabilitation, and resettlement provisions of these 13 laws in consonance with the LARR Act 2013.

Exemption of five categories of land use from certain provisions: The Ordinance creates five special categories of land use: (i) defence, (ii) rural infrastructure, (iii) affordable housing, (iv) industrial corridors, and (v) infrastructure projects including Public Private Partnership (PPP) projects where the central government owns the land.

The LARR Act 2013 requires that the consent of 80% of land owners is obtained for private projects and that the consent of 70% of land owners be obtained for PPP projects. The Ordinance exempts the five categories mentioned above from this provision of the Act.

In addition, the Ordinance permits the government to exempt projects in these five categories from the following provisions, through a notification:

The LARR Act 2013 requires that a Social Impact Assessment be conducted to identify affected families and calculate the social impact when land is acquired.

The LARR Act 2013 imposes certain restrictions on the acquisition of irrigated multi-cropped land and other agricultural land. For example, irrigated multi-cropped land cannot be acquired beyond a limit specified by the government.

Return of unutilised land: The LARR Act 2013 required that if land acquired under it remained unutilised for five years, it was returned to the original owners or the land bank. The Ordinance states that the period after which unutilised land will need to be returned will be five years, or any period specified at the time of setting up the project, whichever is later.

Time period for retrospective application: The LARR Act 2013 states that the Land Acquisition Act, 1894 will continue to apply in certain cases, where an award has been made under the 1894 Act. However, if such as award was made five year or more before the enactment of the LARR Act 2013, and the physical possession of land has not been taken or compensation has not been paid, the LARR Act 2013 will apply.

The Ordinance states that in calculating this time period, any period during which the proceedings of acquisition were held up: (i) due to a stay order of a court, or (ii) a period specified in the award of a Tribunal for taking possession, or (iii) any period where possession has been taken but the compensation is lying deposited in a court or any account, will not be counted.

Other changes: The LARR Act 2013 excluded the acquisition of land for private hospitals and private educational institutions from its purview. The Ordinance removes this restriction.

While the LARR Act 2013 was applicable for the acquisition of land for private companies, the Ordinance changes this to acquisition for ‘private entities’. A private entity is an entity other than a government entity, and could include a proprietorship, partnership, company, corporation, non-profit organisation, or other entity under any other law.

The LARR Act 2013 stated that if an offence is committed by the government, the head of the department would be deemed guilty unless he could show that the offence was
committed without his knowledge, or that he had exercised due diligence to prevent the commission of the offence. The Ordinance replaces this provision and states that if an offence is committed by a government official, he cannot be prosecuted without the prior sanction of the government.

**The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Second Ordinance, 2015**


The Bill replaces the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Ordinance, 2014.

The LARR Act, 2013 outlines the process to be followed when land is acquired for a public purpose. Key changes made by the Bill are:

**Provisions of other laws in consonance with the LARR 2013:** The LARR Act, 2013 exempted 13 laws (such as the National Highways Act, 1956 and the Railways Act, 1989) from its purview. However, the LARR Act, 2013 required that the compensation, rehabilitation, and resettlement provisions of these 13 laws be brought in consonance with the LARR Act, 2013, within a year of its enactment (that is, by January 1, 2015), through a notification. The Bill brings the compensation, rehabilitation, and resettlement provisions of these 13 laws in consonance with the LARR Act, 2013.

**Exemption of five categories of land use from certain provisions:** The Bill creates five special categories of land use: (i) defence, (ii) rural infrastructure, (iii) affordable housing, (iv) industrial corridors, and (v) infrastructure projects including Public Private Partnership (PPP) projects where the government owns the land.

The LARR Act, 2013 requires that the consent of 80% of land owners is obtained for private projects and that the consent of 70% of land owners be obtained for PPP projects. The Bill exempts the five categories mentioned above from this provision of the Act.

In addition, the Bill permits the government to exempt projects in these five categories from the following provisions, through a notification:

The LARR Act, 2013 requires that a Social Impact Assessment be conducted to identify affected families and calculate the social impact when land is acquired.

The LARR Act, 2013 imposes certain restrictions on the acquisition of irrigated multi-cropped land and other agricultural land. For example, irrigated multi-cropped land cannot be acquired beyond the limit specified by the appropriate government.

**Return of unutilised land:** The LARR Act, 2013 required land acquired under it which remained unutilised for five years, to be returned to the original owners or the land bank. The Bill states that the period after which unutilised land will need to be returned will be: (i) five years, or (ii) any period specified at the time of setting up the project, whichever is later.

**Time period for retrospective application:** The LARR Act, 2013 states that the Land Acquisition Act, 1894 will continue to apply in certain cases, where an award has been made under the 1894 Act. However, if such an award was made five years or more before
the enactment of the LARR Act, 2013, and the physical possession of land has not been taken or compensation has not been paid, the LARR Act, 2013 will apply.

The Bill states that in calculating this time period, any period during which the proceedings of acquisition were held up: (i) due to a stay order of a court, or (ii) a period specified in the award of a Tribunal for taking possession, or (iii) any period where possession has been taken but the compensation is lying deposited in a court or any account, will not be counted.

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The LARR Act, 2013 stated that if an offence is committed by the government, the head of the department would be deemed guilty unless he could show that the offence was committed without his knowledge, or that he had exercised due diligence to prevent the commission of the offence. The Bill replaces this provision and states that if an offence is committed by a government official, he cannot be prosecuted without the prior sanction of the government.

*The provisions of the Act are not applicable in the present project as there is no acquisition of private land; hence no compensation for acquired land.*

### 5.3 Scheduled Caste and Scheduled Tribes Orders (Amendment) Act, 2002

The Act provides for the inclusion in the lists of Scheduled Tribes (ST), of certain tribes or tribal communities or parts of or groups within tribes or tribal communities, equivalent names or synonyms of such tribes or communities, removal of area restrictions and bifurcation and clubbing of entries; imposition of area restriction in respect of certain castes in the lists of Scheduled Castes (SC) and the exclusion of certain castes and tribes from the lists of SCs and STs.

### 5.4 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Bill, 2005

The Scheduled Tribes (Recognition of Forest Rights) Bill, 2005 seeks to recognise forest rights of forest dwelling Scheduled Tribes (FDSTs) who have been occupying the land before October 25, 1980. An FDST nuclear family would be entitled to the land currently occupied subject to a maximum of 2.5 hectares. The land may be allocated in all forests including core areas of National Parks and Sanctuaries. In core areas, an FDST would be given provisional land rights for five years, within which period he would be relocated and compensated. If the relocation does not take place within five years, he gets permanent right over the land. The Bill outlines 12 forest rights which include the right to live in the forest, to self-cultivate, and to use minor forest produce. Activities such as hunting and trapping are prohibited. The Gram Sabha is empowered to initiate the process of determining the extent of forest rights that may be given to each eligible individual or family.

*The provisions of the Act are not applicable in the present project as there is no acquisition of forest land and also no infringement on rights of forest communities.*

### 5.5 Environmental and Social Management Framework

The National Ganga River Basin Authority (NGRBA) has adopted an Environmental and
Social Management Framework (ESMF) and agreed with the World Bank to apply for its investment projects involving World Bank fund. This framework describes the policy, principles, and approach to be followed in minimizing and mitigating adverse social and economic impacts by the sub projects. The social management framework has four parts viz., (i) Resettlement Policy and Land Acquisition Framework; (ii) Indigenous Peoples Management Framework (IPMF); (iii) Gender Assessment and Development Framework (GAD); and (iv) Consultation framework.

The ESMF document is intended to help manage the social and environmental impacts through appropriate measures during the planning, design, construction and operation of various sub-projects of NGRBP. The framework identifies the level of safeguard due-diligence required for all categories of sub-projects of NGRBP and provides specific guidance on the policies and procedures to be followed for environmental and social assessment along with roles and responsibilities of the implementing agencies.

5.6 Resettlement Policy and Land Acquisition Framework

The guidelines are prepared for addressing the issues limited to this project for resettlement and rehabilitation of the PAPs. This policy has been developed based on the National Resettlement and Rehabilitation Policy, 2007 and the World Bank OPs 4.12 on involuntary resettlement and 4.10 on indigenous peoples.

The 'Social Policy' of NGRBP aims to resettle and rehabilitate the affected persons on account of its sub projects in a manner that they do not suffer from adverse effects and shall improve or at the minimum retain their previous standard of living, earning capacity and production levels. It is also the endeavor of the NGRBP that the resettlement shall minimize dependency and be sustainable socially, economically and institutionally. Special attention will be paid for the improvement of living standards of marginalized and vulnerable groups.

Provisions of the Resettlement Policy and Land Acquisition Framework are not Applicable to the present project as there is no acquisition of private land.

5.7 Other Legislations applicable to Construction Projects under NGRBA

Apart from the above, there are a number of legislations and Acts applicable to projects falling under the purview of NGRBA. Important among them have been listed in table 14 below.

Table 11: Other applicable Legislations

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Acts / Rules</th>
<th>Purpose</th>
<th>Applicable Yes/ No</th>
<th>Reason for Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workmen's Compensation Act 1923</td>
<td>Provides for compensation in case of injury by accident arising out of and during the course of employment.</td>
<td>Yes</td>
<td>This act will be applicable for all construction workers deployed at worksite.</td>
</tr>
<tr>
<td>2</td>
<td>Payment of Gratuity Act, 1972</td>
<td>Under certain conditions Gratuity is payable to an employee on separation if an employee has completed 5 years of service.</td>
<td>Yes</td>
<td>This act will be applicable for all construction workers deployed at worksite if he/she has completed 5 years of service.</td>
</tr>
<tr>
<td>3</td>
<td>Employees PF</td>
<td>Monthly contribution by</td>
<td>Yes</td>
<td>Contractor need to</td>
</tr>
<tr>
<td>S. No.</td>
<td>Acts / Rules</td>
<td>Purpose</td>
<td>Applicable Yes/ No</td>
<td>Reason for Applicability</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>---------</td>
<td>--------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>1</td>
<td>and Miscellaneous Provision Act 1952</td>
<td>the employer and workers to the fund</td>
<td>Yes</td>
<td>contribute and deduct specific proportion of salary towards contribution to the fund.</td>
</tr>
<tr>
<td>4</td>
<td>Maternity Benefit Act, 1951</td>
<td>Provides for leave and some other benefits to women employees in case of confinement or miscarriage.</td>
<td>Yes</td>
<td>For all women employees under confinement or suffering miscarriage</td>
</tr>
<tr>
<td>5</td>
<td>Contract Labor (Regulation and Abolition) Act, 1970</td>
<td>Provides for certain welfare measures to be provided by the contractor to contract labour.</td>
<td>Yes</td>
<td>For all contract workers engaged in construction work.</td>
</tr>
<tr>
<td>6</td>
<td>Minimum Wages Act, 1948</td>
<td>Provides for payment of fixed minimum wages fixed by the Government as per provision of the act.</td>
<td>Yes</td>
<td>For all workers engaged in construction activity.</td>
</tr>
<tr>
<td>7</td>
<td>Payment of wages act 1979</td>
<td>Provides for by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.</td>
<td>Yes</td>
<td>Applicable to all workers.</td>
</tr>
<tr>
<td>8</td>
<td>Equal Remuneration Act, 1979</td>
<td>Provides for payment of equal wages for work of equal nature to Male and Female workers.</td>
<td>Yes</td>
<td>Prevents discrimination against women employees in wage payments.</td>
</tr>
<tr>
<td>9</td>
<td>Payment of bonus act 1965</td>
<td>Provides for payment of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages.</td>
<td>Yes</td>
<td>Applies to all workers in regular employment for more than a year.</td>
</tr>
<tr>
<td>10</td>
<td>Industrial Disputes Act 1947</td>
<td>Lays down the machinery and procedure for resolution of industrial disputes.</td>
<td>Yes</td>
<td>For resolution of disputes if any between the worker and the employer.</td>
</tr>
<tr>
<td>11</td>
<td>Industrial Employment (Standing Orders) Act 1946</td>
<td>Provides for laying down rules governing the conditions of employment.</td>
<td>Yes</td>
<td>Applies to all workers.</td>
</tr>
<tr>
<td>12</td>
<td>Trade Unions Act, 1926</td>
<td>Provides for procedure for registration of trade unions of workers and</td>
<td>Yes</td>
<td>Trade unions registered under the Act have been given certain</td>
</tr>
<tr>
<td>S. No.</td>
<td>Acts / Rules</td>
<td>Purpose</td>
<td>Applicable Yes/ No</td>
<td>Reason for Applicability</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>---------</td>
<td>--------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>14</td>
<td>Inter- State Migrant Workmen’s (Regulation of Employment and conditions of Services) Act, 1979</td>
<td>Migrant workers are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back etc.</td>
<td>Yes</td>
<td>Details facilities to be provided to migrant workers if any.</td>
</tr>
<tr>
<td>15</td>
<td>Building and other Construction workers (Regulation of employment and conditions of services) Act, 1996</td>
<td>Provides for safety measures required at the building or construction work site.</td>
<td>Yes</td>
<td>Establishments carrying out building or other construction work and employing 10 or more workers are covered under this act.</td>
</tr>
<tr>
<td>16</td>
<td>The Factories Act, 1948</td>
<td>Lays down the procedure for approval of plan before setting up a factory etc.</td>
<td>Yes</td>
<td>Provides for health and safety provisions, welfare provisions, working hours and rendering information regarding accidents.</td>
</tr>
</tbody>
</table>
Chapter 6: Baseline Status

6.1 Baseline Social Status

The baseline social status is important to understand the region's existing physical and biological characteristics along with cultural and social status of the residing community. Information and data presented in this section is based on field surveys, stakeholder interaction/consultation and secondary data collection which majorly include the draft Detailed Project Report (DPR) of proposed sewerage work in Patna town Development Plan (CDP).

6.1.1 Demography

From Bihar’s total area 96163 km² Patna district occupies an area of 3,202 km². Total Urban Population of Bihar is 1, 17, 58, 016.00 in which males’ population are 62, 04,307 and females are 55, 53,709. Out of the total Patna population for 2011 census, 43.07 percent lives in urban regions of district. As per 2011 census, total population of Patna urban is 25, 14,590 of which 1,683,200 lives within the municipality boundary. Total male population in Patna is 13, 32,487 which is approximately 53 % of total urban population. Sex ratio in Patna district as per Census 2011 is 887 whereas child sex ratio is 883. Child populations (0-6) in urban region were 3, 29,592 of which males and females were 1, 75,005 and 1, 54,587. This child population figure of Patna district is 13.11 % of total urban population. Ward-wise the present population and the projected population of the different wards of the Karmalichak sub-zone have been given below in table 12.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>20709</td>
<td>22721</td>
<td>32227</td>
<td>42193</td>
</tr>
<tr>
<td>63</td>
<td>19651</td>
<td>20878</td>
<td>27438</td>
<td>35321</td>
</tr>
<tr>
<td>66</td>
<td>21095</td>
<td>23023</td>
<td>32325</td>
<td>42251</td>
</tr>
<tr>
<td>67</td>
<td>20298</td>
<td>21263</td>
<td>26691</td>
<td>33778</td>
</tr>
<tr>
<td>68</td>
<td>25054</td>
<td>35206</td>
<td>60297</td>
<td>91657</td>
</tr>
<tr>
<td>69</td>
<td>20963</td>
<td>22084</td>
<td>28267</td>
<td>36061</td>
</tr>
<tr>
<td>70</td>
<td>22890</td>
<td>28536</td>
<td>48829</td>
<td>71102</td>
</tr>
<tr>
<td>71</td>
<td>20119</td>
<td>21693</td>
<td>29657</td>
<td>38567</td>
</tr>
<tr>
<td>72</td>
<td>24068</td>
<td>33882</td>
<td>57980</td>
<td>88236</td>
</tr>
</tbody>
</table>

Many languages are spoken in Patna. While Hindi is the official language of the state, English is also spoken extensively. The native dialect is Magahi. Other dialects from other regions of Bihar spoken widely in Patna are Bhojpuri, and Maithili. Other languages spoken in Patna include Bengali, Urdu and Oriya.

The demographic parameters of sex ratio, population density and literacy rate have been presented in table 13. The sex ratio is a little skewed towards the females with only 887 females to 1000 males, while in the field of literacy, females have returned a better figure than the male population. Population density of the city, at 1808, is a burden on the already deficient water and sewerage infrastructure.
Table 13: Demographic Parameters

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Indicators</th>
<th>Bihar Urban Male</th>
<th>Bihar Urban Female</th>
<th>Patna Urban Male</th>
<th>Patna Urban Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population</td>
<td>6204307</td>
<td>5553709</td>
<td>1332487</td>
<td>1182103</td>
</tr>
<tr>
<td>2</td>
<td>Sex Ratio</td>
<td>895</td>
<td></td>
<td>887</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Literacy</td>
<td>82.56%</td>
<td>61.95%</td>
<td>48.94%</td>
<td>54.25%</td>
</tr>
<tr>
<td>4</td>
<td>Population Density</td>
<td>1102</td>
<td></td>
<td>1808</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Census of India 2011*

The scheduled caste and scheduled tribe components of the population of Patna, urban area, have been provided in tables 14 and 15 below. The SC population comprises a little over 10.2% of the total urban population while the ST population is a mere 0.27% of the total urban population. In terms of numbers, these may be considered sizeable under certain circumstances but in the present project, as there is no land acquisition and no rehabilitation, resettlement or permanent relocation, OD 4.2: Involuntary Resettlement or any other special provision is not applicable.

Table 14: Scheduled Caste population of Patna

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>920918</td>
<td>482088</td>
<td>438830</td>
</tr>
<tr>
<td>Urban</td>
<td>256649</td>
<td>135552</td>
<td>121097</td>
</tr>
</tbody>
</table>

*Source: Census of India 2011*

Table 15: Scheduled Tribe population of Patna

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9069</td>
<td>4717</td>
<td>4352</td>
</tr>
<tr>
<td>Urban</td>
<td>6913</td>
<td>3597</td>
<td>3316</td>
</tr>
</tbody>
</table>

*Source: Census of India 2011*

6.1.2 Literacy

Average literacy rate in Bihar is 76.86% which males and females are 82.56% and 61.95%. In Patna district as per census 2011 literacy rate is 80.98% of which males and females are 85.75% and 75.59% literates respectively. In numbers 1769307 people are literate in urban region of which males and females are 992574 and 776733 respectively, which makes up for 51.59% for total, 48.94% for male and 54.25% for female population of the city.

Table 16: Literate Population of Patna

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3459679</td>
<td>2028047</td>
<td>1431632</td>
</tr>
<tr>
<td>Urban</td>
<td>1769307</td>
<td>992574</td>
<td>776733</td>
</tr>
</tbody>
</table>

*Source: Census of India 2011*

6.1.3 Economy

In 2006 the Ministry of Panchayati Raj named Patna one of the country’s 250 most backward districts (out of a total of 640). It is one of the 36 districts in Bihar currently receiving funds from the Backward Regions Grant Fund Programme (BRGF). Agricultural
products include: Paddy, Maize, Pulses and Wheat and also oil seeds. Roughly one third of the area sown is under rice (paddy). Cash crops such as vegetables and water-melons are also grown in Diara belt. Major industries include leather, handicrafts, and agro processing.

Though the human development indicators i.e., literacy, sex ratio, etc. have improved over past decade however income and poverty profile has not changed much due to natural resource degradation and natural calamities.

Table 17: Working Population of Patna

<table>
<thead>
<tr>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1881886</td>
<td>143641</td>
</tr>
<tr>
<td>Urban</td>
<td>742578</td>
<td>614101</td>
</tr>
</tbody>
</table>

Source: Census of India 2011

Table 18: Break-up of Working Population of Patna (Urban)

<table>
<thead>
<tr>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivators</td>
<td>22347</td>
<td>19635</td>
</tr>
<tr>
<td>Agricultural Laborers</td>
<td>40700</td>
<td>3387</td>
</tr>
<tr>
<td>HH Industry</td>
<td>29082</td>
<td>23480</td>
</tr>
<tr>
<td>Other Main Workers</td>
<td>512270</td>
<td>443694</td>
</tr>
<tr>
<td>Marginal Workers</td>
<td>138179</td>
<td>93405</td>
</tr>
</tbody>
</table>

Source: Census of India 2011

Of the total urban population of Patna, 29.53% constitutes the workforce of which 24.42% is male and 5.11% is female. Further break-up of working population returns a figure of 3% for Cultivators, 5.5% for Agricultural Laborers, 3.9% for Household Industries, 69% for Other Main Workers and 18.6% for Marginal Workers. Female contribution to economic activities is considerable; from 12.1% in Cultivation to 32.4% in the category of Marginal Workers.

6.2 Social Impacts

Pollution abatement projects may prove beneficial for the environment and society or they may have some adverse impacts as well. Planners and decision makers have realized the importance of understanding the consequences of any such projects on both environmental and social sectors, and have started taking steps to avoid any adverse impacts. Based on the major findings obtained from the field visits and secondary data analysis, the possible environmental and social issues with reference to the proposed sewer works in Karmalichak Zone of Patna has been discussed in these sections.

6.2.1 Potential Social Impacts

The proposed project of sewer works in Zone VI: Karmalichak Zone, would influence the environment in three distinct phases:

- During Designing phase
- During the construction phase which would be temporary and short term;
- During the operation phase which would have long term effects
6.3 Design and Development Phase

6.3.1 Sewer lines

All sewer lines including trunk, lateral and branch sewer lines must be designed considering the future population and waste generation rate. Otherwise the constructed sewer may not carry the waste load, leading to failure and financial loss. The alignment of sewer lines and sewerage pumping station must be properly planned; else it may lead to both technical and social problems along with environmental issues of back flow creating foul smell and unhygienic conditions.

6.4 Impacts during construction phase

The proposed sub-project consists of the following major activities which include:

- Construction of sewerage network including all required trunk/ branch/ lateral sewer.
- Construction of STP in the existing STP premises
- Construction of two sewage pumping station

The construction activities would generally include earthworks (excavation, filling, shuttering, compacting), temporary diversion of existing sewer lines, civil construction (sewer lines, STP, SPS, etc) and E & M installation and commissioning. The impacts of these construction stage activities on the various environmental parameters are examined below:

6.4.1 Socially sensitive areas

During construction there will be disruption of the small vendors business but like to shift on the other side of the road. There is STP shall be constructed on existing STP hence no displacement or acquisition has been seen. The Pumping stations are also located at available land hence no land acquisition is required.

6.4.2 Traffic Congestion

Due to the excavation work which will take place on the main roads of the city, there will be a disturbance in the traffic movement. People may suffer some inconvenience during the morning and evening peak hours. This issue is discussed in the DPR, and suggests de-routing of the traffic as the mitigation measure. Local residents complain of traffic congestions during construction owing to narrow streets which creates persistent traffic jams during peak hours. Also many of the roads in many pockets of the district are very narrow some ranging from 7 -12 ft. wide. No road closure is envisaged during construction phase. Shopkeepers have welcomed the project and affirmed there will not have any adverse impact on their livelihood.

6.4.3 Impact on livelihood

The excavation and tunneling work will lead to road blockage and as a result the commercial establishments and vendors will have some trouble in operating their business on daily basis. But there will be no loss of livelihood. Ambulatory vendors can very well shift their place as and when required. So, overall no loss of livelihood has been reported during the survey. Vendors in areas like Sabzi Mandi at different locations, parts of Gardani Bagh and area near Bahadurpur railway crossing are particularly vulnerable to such obstructions. As per anecdotal evidence gathered in the field visit, most shop-owners and mobile vendors are welcoming the sewage project implementation as they see a direct benefit of improved living and working conditions. They are aware of, and prepared to
face temporary inconveniences caused by construction if the project is implemented in a timely manner. However, the same interviewees felt that they had little confidence in the ability of the agency to execute a project in an efficient manner. They had grievances with the long duration of construction work.

Adverse impacts mainly include temporary relocation of mobile vendors and temporary blockage of roads during construction. During impact analysis vendors have welcomed the project and affirmed that this will not have any adverse impact on livelihood as they will temporarily shift to a nearby place.

6.5 Conclusion

Based on the overall secondary data analysis and field investigation, the proposed project is expected to benefit Patna City, as the wastewater that currently flows untreated into the Ganga river will be captured, treated and the remainder of the treated effluent will be allowed to flow into the river. The likely beneficial impacts of the projects include

• Improvement in sewerage collection and treatment within the cities/towns
• Prevention of storm drains carrying sanitary sullage or dry weather flow
• Prevention of ground water and soil pollution due to infiltration of untreated liquid waste
• Prevention of discharge of untreated sewage into River Ganga
• Improvement in water quality of River Ganga, a national resource
• Improvement in environmental sanitation health and reduction in associated health hazards within the cities/towns
• Improvement in quality of life, human dignity and increased productivity
• Reduced nuisance of open defecation due to low cost sanitation and reduced malarial risks and other health hazards.
Chapter 7: Public Consultation

7.1 Introduction
Consultation is a process in the project cycle in which an attempt is made to involve the public as stakeholders in project preparation through consultation and focus group discussion meetings. Stakeholders’ participation and consultation have been viewed as a continual course of action, which promote public understanding and help eradicate hurdles in the way of the project. Consultation during project preparation as an integral part of the social assessment process not only minimizes the risks and unwanted propaganda against the project but also removes the gap between the community and the project formulators, which leads to timely completion of the project and making the project people friendly.

7.2 Objectives
The main objectives of undertaking public consultations are dissemination of information to build awareness among them, to seek inputs from the stakeholders on their perceptions of the project design and understand the priorities / concerns of the communities, the likely negative and positive socio-economic impacts and to create a sense of ownership of the project for its sustainability. Another important objective is to assess the training requirements to enhance their skills for income restoration in case of a negative impact on their livelihood.

7.3 Forms of Public Consultation
The process of public engagement assumes different forms, ranging from active participation in document preparation, via consultations with the specialist public to discussions with broad public. The actual scope of engaging the public is left to the discretion of the author of the document who, however, has to see to it to secure the highest possible efficiency of the entire process. Public engagement has its formal and informal aspects. Much depends on the character of the prepared document and the time and financial horizon of its preparation. Primarily informal consultations should be used in the early days of the process of drafting the document in a bid to amass a broad spectrum of views on the given problem and possible modes of its solution. It has to be ensured that all the interested subjects have the same opportunity to get involved.

7.4 Methodology of Public consultation
The methodology of Public Consultation is designed for administration authorities who are responsible for drafting documents submitted to the Government for approval. The methodology may also serve as guideline for territorial self-governing units. The subject of the methodology is to offer a description of the process aimed at involving the public in terms of forms, identification of target groups, time requirements and evaluation of the entire process. Selection and scope of the public engagement process depend on the relevant authority and on the actual nature of the document concerned in whose preparation the public is to participate. On the other hand, the methodology gives the public information on what its members may ask from the administration in connection with the given methodology.

The purpose of the methodology is to ensure active participation by the general public in outlining social developments in area that are known to have direct impact on the quality of life and on upgrading the quality of the process of drafting Government documents. The ultimate aim of engaging the public should be acquisition of the broadest possible range of views on the problem under scrutiny.
7.5 Methods of Public Consultation

Keeping in mind the objective of minimizing adverse impact and the need of the stakeholders’ participation for the smooth implementation of the project, consultation with the members of different sections of society, the affected people, identified vulnerable groups including women headed households, slum dwellers, vendors, vegetable seller, tourist and students of the project area were carried out. In this regard several meetings were organized at various locations, as detailed in this chapter. Consultations were carried with different groups of stakeholders to elicit their views and opinions.

Different tools were employed in such interviews and discussions which ranged from informal and undirected to formal and directed. Focus Group Discussions, Interviews and Public Consultations were the three largely used tools; the latter being the most important of them. The entire process of public consultation was completed through a series of actions starting from giving out a public information notice in the newspapers and culminating in acquiring feedback from the participants.

7.6 Focus Group Discussion

Public consultation is a continual process and is being carried out at all stages throughout the project period. In order to document the issues raised by the potential affected peoples, public consultations were conducted in all focused wards. Some of the affected persons expressed their views about the proposed sewerage Development project. A total 8 such Focus Group Discussions were conducted during the ESMP preparation period details of which are given as under:

7.7 Details of FGDs

In all FGDs were held at six locations covering groups of local people including those from the slums, the boatmen community that depends on the river for its survival, vegetable sellers, hawkers and street vendors

<table>
<thead>
<tr>
<th>Date and Place</th>
<th>Nature of participants</th>
<th>Issues</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-10-2013 Bankipore</td>
<td>Slum dwellers</td>
<td>Information dissemination, understanding concerns, impact on livelihood</td>
<td>The general perception among the slum dwellers was that the project would benefit all of them; specifically in the areas of health and hygiene. It would also impart a sense of pride and honor among the women folk as they would no longer be forced for open defecation.</td>
</tr>
<tr>
<td>20-10-2013 Kazipur</td>
<td>Vegetable sellers &amp; boatmen</td>
<td>Information dissemination and understanding concerns</td>
<td>Vendors advised there will be no adverse impact on their livelihood as they will relocate temporarily.</td>
</tr>
<tr>
<td>Date and Place</td>
<td>Nature of participants</td>
<td>Issues</td>
<td>Outcome</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>21-10-2013 Pirbahore</td>
<td>Local community</td>
<td>Information dissemination and understanding concerns</td>
<td>All participants welcomed the project and agreed to take mitigation measures during implementation.</td>
</tr>
<tr>
<td>22-10-2013 Lohanipur</td>
<td>Local community</td>
<td>Information dissemination, understanding concerns, impact on livelihood</td>
<td>All participants welcomed the project and agreed to take mitigation measures during implementation.</td>
</tr>
<tr>
<td>22-10-2013 Sahganj</td>
<td>General people</td>
<td>Information dissemination and understanding concerns</td>
<td>The general perception was that the project would benefit all and help in pollution abatement of the river Ganga.</td>
</tr>
<tr>
<td>22-10-2013 Bahadurpur</td>
<td>Hawkers and street vendors</td>
<td>Information dissemination and understanding concerns</td>
<td>Participants were happy to know about the project. They confirmed there will be no adverse impact on livelihood and agreed to mitigation measures during implementation.</td>
</tr>
</tbody>
</table>

**Public Consultation with local communities**

**7.8 Interviews**

A number of questionnaire based interviews were conducted to elicit public response to some specific questions regarding the perception of the public about the project as well as their willingness for partnership in the implementation of the same. A detailed analysis of the responses was has been presented in the following pages. Simultaneously with the filling of the interview schedules, people were engaged in informal, unstructured discussion about the general objective and design of the project. An interesting outcome of such discussions was that largely the outcomes were in line with the prevailing viewpoint of the different political parties and the political affiliations of the respondents were clearly discernible by their behavior and responses. This necessitated a cautious approach in recording the statements and once these were recorded, it again involved careful analysis of the same. However, a general perception cutting across all the sections of the population covered in the interviews was the fear that the project might not meet the desired level of success due to corruption. This feeling was also pointedly raised in the subsequent public consultation.

The interview schedule was short and closed ended comprising thirteen questions; the idea behind administering the questionnaires was to identify the issues likely to be raised during the public consultations and to inform the general public and other stakeholders about the mitigative measures, if required. The responses have been tabulated and represented graphically as the following:
An overwhelming majority, 95%, of the respondents were of the opinion that the current sewerage system of Patna was inadequate and was adversely affecting public health. However, a minority, 5%, were still of the opinion that the city does not require a new sewerage system.

Comprehensive Information dissemination exercise will have to be taken-up to inform this segment of the population about the positive impacts the project will have in their socio-economic lives so as to mould the general opinion towards acceptance and ownership of the project for its sustainability. Moreover, 90% of the respondents were of the view that the present system was having adverse effects on the health of the society.
Altogether, 94% of the respondents were of the opinion that the city requires a new sewerage system while the remaining 6% gave negative response.

Regarding the impact of land acquisition, a majority, 65%, was of the view that it will affect the common man, here construed to be the person whose land is acquired, or anyone who may have to be relocated, albeit temporarily, while 35% shared the view that it will not have any adverse impact. This point was taken up again during the public consultation where the public was informed that there will be no acquisition of private land for the project.
While 70% of the respondents were concerned about the impact the project might have on the livelihood of the people coming directly in or along the designed network/pipelines, the remaining 30% were not. Important among those concerned are the street vendors and hawkers who would have to bear the brunt of the digging work. This perceived problem of adverse impact of the project on the livelihood of a section of the population was again brought out during the public consultation where all the doubts of the people were cleared.

The response of the people regarding any permanent impact of the digging work for laying of sewer pipelines was unevenly divided with a majority, 68% of the respondents, being of the view that the impacts will be permanent. This point was also discussed during the public consultations and the public was informed of the measures to be adopted by the implementing agency for mitigation of any adverse impact.
The respondents were mostly of the opinion that the project will have a positive impact on the health of the people. The project will help in keeping the city clean thus minimizing the outbreak of contagious diseases and provide a clean surrounding which will be conducive to healthy living. The response to impact on environment was more on the negative side with 61% of the respondents being of the view that the project will not have any impact on the environment.
The response of the people regarding the question whether the project will have any impact on the Ganga and other rivers was a little tilted towards positive with 60% giving a favorable response while the remaining 40% holding the negative view.

In contrast to the response to previous question about impact of the project on the river Ganga and other rivers, the question about pollution abatement of river Ganga received a positive response from 95% of the interviewees, i.e., an overwhelming majority of the respondents were of the view that there will be positive impact of the project as far as abatement of river pollution is concerned.

98% of the respondents believed that the civil works undertaken during the construction of the sewerage system and the restoration works post sewerage construction will be instrumental in infrastructural development of the city. This will include Storm Water Drainage and Road Restoration works along with beautification and street furniture.
95% of the respondents were willing to lend their support in the implementation of the project due to three main reasons that were voiced by them during subsequent informal discussions. These may be listed as: religious and cultural importance of the river Ganga and the sentiments attached to it, perceived health and other socio-economic benefits attached with it, and a feeling of ownership and participation.

7.9 Consultations

Consultations or public consultations are meetings arranged for members of the public to find out and express their opinion on a particular issue. Meetings are usually held in a public place convenient for people to get to. This is a more traditional method of engaging with people. Such meetings often provide for opportunities for small group discussions and feedback.
Consultations normally follow a step by step procedure starting from information dissemination to the general public though a general notification or invitation and culminating in an open discussion. The public consultation exercise for the present project, i.e. Patna Sewerage Scheme was also held through a well formulated process which started with the invitation to the general public through newspapers, invitation cards and hoardings.

A scanned copy of the information sent out to the general public through local newspapers has been appended for reference.

The second tool used for inviting the public and other stakeholders, the invitation cards, were personally delivered to the stakeholders departments, representatives of temples, mosques, hospitals, schools, public representatives and a number of hawkers, vendors and the general public.

The third important tool used for dissemination of information about the intended public consultation was putting up hoardings and banners across prominent locations in the City. Some of these locations were: Gandhi Maidan, Secretariat, Income Tax Crossing, Patel Chowk and Hartali More.
The methodology adopted for the public consultation was a mix of information dissemination through a power point presentation, discussions and a question-answer session.

The meeting started with an introduction to the project through a power point presentation bringing out the salient features of the proposed Patna Sewerage Project along with the informing the public about the other ongoing projects being implemented by BUlDCo. A copy of the presentation is attached as Annexure 3.

The meeting was attended by over 125 invitees representing almost all sections of the society that had been invited. The attendance sheet with signatures has been attached as Annexure 4. Public response to the event was good considering the inclement weather of the day; it was raining incessantly since morning.

Many questions related to planning, financing mechanism, coverage of the scheme, zoning, other sources of pollution of the river Ganga including immersion of ashes and the functioning mechanism of the STP were raised by the participants which were answered by the MD, BUlDCo. These have been presented below as queries and responses:

Q1. There is no integrated planning by the various government agencies and the result is that the roads are almost always dug up the very next day that they have been resurfaced.

A. It was clarified that the road restoration will be taken-up immediately after laying of the pipelines is completed. In case of specific complaints, inquiry will be initiated.

Q2. How is the project being financed?
A. The project is being financed by the World Bank and it includes two important components; the SMP and the EMP. It was added that positive impacts of the project in both domains will be visible after the completion of the project.

Q3. How will it be confirmed that all lanes and by-lanes have been covered in the project?

A. Packaging of all Wards will be checked and verified again before contracting the work. Efforts will be made to include a clause in the contract through which the contractor will prepare a presentation after a physical survey of the area and get it approved from the competent authority. The entire work will be in public domain and is open to social audit.

Q4. Micro-zoning should be done in all the six zones and some tax or tariff should be levied for operation and maintenance of the system.

A. The present project is a renovation project as far as the STPs and Pumping Stations are concerned as it will be using the land already available with the present ones. Sewerage Cess will be levied after the commissioning of the project as it will be a new project in terms of sewerage network.

Q5. How will you confirm that the desired project amount has actually been spent on the project?

A. Monitoring through vigilance and audit is undertaken to assure that there is no loss of time and diversion of funds. Additionally social audits should also be undertaken by the public and all Non Conformities reported to the competent authority.

Q6. Immersion of ashes in the river pollutes the river. How will the project address this issue?

A. GoI and GoB are actively contemplating on the issue. Electric crematoria are being built in all cities coming under the purview of NGRBA. Ashes from the electric crematorium do not pollute the river to a major extent. Also, the river has a self-cleaning mechanism and this ash is absorbed by the river.

Q7. How will the project meet the timeline as land acquisition is a big hurdle?

A. No private land has been identified for the project for STPs and Pumping Stations. Land acquisition is not required for the project so there are no foreseen procedural delays regarding the same.

Q8. How are impurities of water separated?

A. The impure water, the sewerage, is taken through the network to the STPs and treated to make it fit for agriculture or allied uses or it is released back into the river.
The conclusion of the consultation was that there will be no acquisition of private land and no negative impact on the life of people due to land acquisition. There will also be no adverse impact on the livelihood of the hawkers and street vendors and some perceived problems during implementation will be sorted out through mitigative efforts based on mutual understanding. It was agreed by all that the present sewerage system of Patna is inadequate and is adversely affecting public health. The attendees were of the view that the city requires a new sewerage system. 92% of the participants were of the view that such consultations are helpful in two ways; one, they give a clear picture of the project to the largely uninformed public and secondly, they create a feeling of ownership in public perception.

There was a wide coverage of the public consultation with almost all local dailies, including Dainik Jagran Hindustan Times, Times of India etc. reporting on the event. Scanned copies of three such newspaper reports are being appended.
2017 तक पूरी होगी पटना सीवरज परियोजना
Patna: Work on the Rs 2,580-crore Patna Sewerage Scheme will be kick-started by the end of 2014 and completed by 2017, benefiting every household in the state capital, said Bihar Urban Infrastructure Development Corporation Ltd (BUIDCO) managing director Anupam Kumar Suman.

Speaking at a public consultation organized by BUIDCO here on Friday, Suman said, “The project is planned to be executed in 36 months (2014-2017), which includes external sewers, sewage pumping stations, road restoration and sewage treatment plants. House connections are planned in 14 months (2017-2018) for phase-I.”

PMC ward councillors raised the issue of huge pile-up of pending projects of the corporation and expressed fears that the Patna Sewerage Scheme may meet the same fate. At this, Suman said, “A forum will be constituted to review the monthly progress of this project. This forum will also solve the problems cropping up during implementation of this project, helping in maintaining the pace.”

BUIDCO general manager Daya Shankar Mishra made a PowerPoint presentation on the project, which will receive 70% funding from Government of India (GoI) and 30% from government of Bihar. Mishra said, “Bihar government has started this project with the help of World Bank and National Ganga River Basin Authority. BUIDCO has been assigned the task of completing the project by the state urban development and housing department.

The corporation is supposed to build a sewerage pipeline of 1,250 km against the present length of 27.4 km (main sewers) and sewage treatment plant with a capacity of 370 million litres per day (MLD) by the year 2032 and 550 MLD by 2047 in state capital.”

The present sewage system of the city, introduced in 1936-39, caters to only 7% of sewage discharged. The presentation stated that the total sewage generation from the city in 2017, 2032 and 2047 will be 252, 370 and 550 MLD, respectively. The total land proposed to be acquired for the project is 100 acres, considering the need to replace the existing sewerage system.
Chapter 8: Social Management Plan

8.1 Social Management Plan

Based on the identified social issues, doable mitigation plans are proposed in the following table after taking into consideration all the perceived effects and likely impacts of the project during the implementation phase.

Table 20: Social Management Plan matrix for Sewerage and Sanitation Projects

<table>
<thead>
<tr>
<th>Activity</th>
<th>Impacts/Concerns</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Acquisition for new STPs and Pumping Stations</td>
<td>NA</td>
<td>STPs are planned within the premises of the existing STPs. SPSs are planned next to the current SPSs on land already owned by the government and confirmed by the revenue department.</td>
</tr>
<tr>
<td>Location of STP*</td>
<td>Nuisance hazard to neighboring areas</td>
<td>There is considerable distance from the residential settlements thus limiting nuisance related to construction noise and dust pollution.</td>
</tr>
<tr>
<td>Laying of sewer network*</td>
<td>Safety hazards to the public at the sites like open pits etc. Safety hazards to construction workers</td>
<td>Putting-up fences or other barricades to demarcate the area. Provision of safety equipment such as hard helmets, safety shoes, gloves etc. to the workers.</td>
</tr>
<tr>
<td></td>
<td>Dust generation resulting in negative impacts on human health</td>
<td>Water sprinkling, removal of excess material, cleaning of construction sites after completion of work. Construction of temporary enclosures to entrap dust.</td>
</tr>
<tr>
<td></td>
<td>Reduced pedestrian and vehicular access to residences and businesses Negative impacts on free access to residences and on livelihood</td>
<td>Prior notice to the public indicating the date of start and end of construction in every stretch of the road. Work to proceed on schedule to minimize road closure. Work on approaches to residences to be covered mostly during the nights. Proper clearance of debris. Temporary relocation of hawkers and vendors.</td>
</tr>
<tr>
<td>Laying of sewer network*</td>
<td>Increased traffic inconvenience like diversions, emissions, congestions and increase</td>
<td>Use of alternate traffic routes. Clear signages informing the dates of closure of particular roads and stretches to be put up at strategic locations to.</td>
</tr>
<tr>
<td>Activity</td>
<td>Impacts/Concerns</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>travel time</td>
<td>enable the residents to plan out alternative routes</td>
<td></td>
</tr>
</tbody>
</table>
| Temporary water and electricity supply interruptions | Circulation of layout plan of all underground infrastructure to ensure that the contractor is aware of underground water pipelines and electrical cables in the construction zone  
                                                                 | Line departments should be made aware of timing/location of all construction to enable them to respond swiftly to supply disruption  |
| Construction of new STP       | Safety hazards for workers                                                        | Provision of safety equipment such as hard helmets, safety shoes, gloves etc. to the workers                                                                 |
| Dust generation resulting in negative impacts on human health | Water sprinkling, removal of excess material, cleaning of construction sites after completion of work  
                                                                 | Construction of temporary enclosures to entrap dust  
                                                                 | Fences already in place around existing STP |

Note: *** Significant Impact; ** Moderate Impacts and *Minor Impact.

### 8.2 Impacts and Mitigative Measures

Some of these impacts and mitigative measures are already listed in the DPRs, and some of them are additionally recommended for social development of the project and the concerned stakeholders.

#### 8.2.1 Impact on human health

Mitigation plan involves the erection of temporary enclosures around construction sites. These barriers will help entrap some of the dust that is brought up in digging. They will also provide safety benefits, to be detailed below. According to the interaction/consultation with the key stakeholders, it was said that contractors are doing water sprinkling in the construction area.

#### 8.2.2 Traffic Congestion

Traffic must be re-routed to facilitate ease of movement. Proper signage should provide detailed information on the dates and duration of road closures and which detours will be available, ideally well in advance of actual construction so residents can plan accordingly. Strategic placement of traffic police at critical intersections will also facilitate better flow of traffic. Plans and budget for these measures are already included in the DPR.
8.2.3 Impact on livelihood

Sewer constructions will invariably lead to road closures, which will adversely affect shops on those streets. The first priority is for the contractor to take the necessary measures to ensure that pedestrians always have access to shops, vendors, etc. For mobile vendors, this may include adjusting the location of the cart, etc. to a similar location in the immediate vicinity of the original location for the duration of the project. Projects should also proceed on schedule so as to minimize disruption.

Additionally, clean-up of debris and clearance of blockages should commence immediately after project completion so as to remove any potential obstacles that might prevent customers from accessing businesses or other disruptions.

In the event that the contractor, despite best efforts, is unable to avoid blockages of the roads and/or disruption of local businesses, some compensation is necessary. The ESMF currently mandates compensation only in the case of permanent livelihood loss or displacement and provides no provisions for livelihood loss of mobile vendors. Additionally, no regulation, policy, guideline, etc. exists which can provide precedent or guidance in this instance. ESMF clearly states that mobile/ambulatory hawkers: fruit cart vendors, etc. who can easily relocate fall into this category. These vendors are most eligible for a temporary relocation just outside the construction area, and will thus not be eligible for compensation as is the case for this proposed project. However if during the construction of the project any party faces livelihood loss due to the proposed project, then that party should be compensated according to the entitlement matrix given in the ESMF report.

8.2.4 Impact on existing utility services

The utility services, the underground cables, water supply pipelines, OFCs, as well as the electric poles, letter boxes, hand-pumps etc. are likely to face the adverse impacts of the implementation of sewerage project. Some may have to be shifted while others may have to be relocated.

*Mitigation Measures*

- Circulating the layout plans of the existing underground alignment near the work site.
- Contacting the relevant department in case there is any damage to any of the utility services and ensuring prompt fixing/replacing of damaged infrastructure

8.2.5 Public Notice

According to the suggestion given by locals during the interview, Government and contractor should give a prior notice to each and every locality with the details of project, street wise start date of construction and street wise end date of construction, contact person during emergency. This information would help them better adjust to the situation and make necessary adjustments and provisions.

Additionally, the interviewees said that they understood the inconveniences were of a temporary measure and are providing a social good. Thus, they have created local adaptation measures as quick and efficient ways to mitigate the temporary inconveniences. However the proposed project has a well laid out grievance redress mechanism to be adopted as mentioned in the Environment and Social Management Framework.
8.3 Formulation and Implementation of Mitigation Plan

Relevant stakeholders, especially community members (residents, shop owners, etc.) may be informed about the details of the proposed mitigation plan. A public consultation may be conducted where the mitigation plan is presented, and feedback solicited from the community. Individual meetings with other key stakeholders – government officials, relevant NGOs, etc. – could be scheduled to solicit their feedback as well. Once construction begins and the mitigation plan is put into effect, third party audits should be taken up so as to evaluate the efficacy of the mitigation plan, as well as gauge local sentiments related to the construction and identify/address new issues that may have arisen during construction.

Stakeholders that should be involved in planning and implementation of the mitigation plan will include; All affected persons (APs), program beneficiaries, including representatives of vulnerable households; decision makers, policy makers, elected representatives of people, community and citizens, NGOs ,staff of executing agency, implementing agencies, officials of the revenue departments, social welfare department, and other departments as and when required

Table 21: Role of stakeholder in implementation and mitigation

<table>
<thead>
<tr>
<th>Stakeholder Category</th>
<th>Role in project implementation</th>
<th>Role in mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMCG</td>
<td>Over all coordination</td>
<td>Coordinating so that the mitigation plan is implemented well</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensuring funds for mitigation plan execution</td>
</tr>
<tr>
<td>Executing agencies</td>
<td>Implementation of the project by awarding the project to the suitable contractor and regional coordination Informing the relevant departments about the progress of the project</td>
<td>Ensuring that the relevant departments are available for mitigation plan</td>
</tr>
<tr>
<td>(BUIDCo.)</td>
<td></td>
<td>Enough safety provisions are available for the project implementation</td>
</tr>
<tr>
<td>Patna Municipal</td>
<td>While execution of projects related to sewerage line, Patna Municipal Corporation is responsible for the damage caused to the public utility functions like drinking water pipe lines</td>
<td>Should ensure that the basic amenities are in order during the construction and operational phase of the project</td>
</tr>
<tr>
<td>Corporation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipality</td>
<td>Ensuring better access to households</td>
<td>Should ensure all the households envisaged at project planning phase gets access to the services. Weaker section of the society should get equitable share.</td>
</tr>
</tbody>
</table>
### Stakeholder Category | Role in project implementation | Role in mitigation
---|---|---
State, local Government | Coordination Monitoring and evaluation | Coordination Monitoring and evaluation Ensure all the safeguarding plans are in line and acted upon.

NGOs, CSOs, Research Institutes | Awareness creation about the project activities Community participation for better project implementation | Public participation and coordination

#### 8.4 Capacity Assessment of Institutions and Mechanisms for Implementing

Roles and functions of the institutions are pre-defined, but they can enhance their capacity for better implementation and operation of the project. There should be synergies and continual interaction amongst the departments for better coordination. The officers of the relevant departments can be trained in social sciences and social management plan implementation. It will also be required to ensure that operating authorities have the ability and equipment to properly manage and finance the operation and maintenance of sewerage schemes. Otherwise continued development will not be sustainable.

#### 8.5 Develop Monitoring and Evaluation Mechanisms to Assess Social Development Outcomes

Regular monitoring and evaluation of the project activities should be carried out to judge its success or any gaps. Certain key parameters can be taken as the benchmark for monitoring and evaluation of the project based on the identified development outcomes. Some of the indicators are listed below;

- Increase in sewer access (number of households linked to the sewer network)
- Decrease in effluent discharge into the Ganga (water quality assessment of the river)
- Proper sites for industries, building etc.
- Accessibility of the service to backward and weaker sections of the society
- Increase in public toilet
- Increase in the land rate (property appreciation value)
- Decrease in water borne disease incidence in the area
Chapter 9: Social Development Outcomes and Issues

9.1 Social Development Outcomes of the sub project

9.1.1 Access to sewer network

There is a demand of 27.51 MLD, 41.25 MLD & 57.50 MLD capacities of STP’s for 2017, 2032 & 2047 respectively. At present since, existing STP is only capable to cater a load of 33 MLD, which thus have a gap of 10.69 MLD even at present. This load is directly getting into River Ganga through open channel/ nallas. Thus, for abatement of pollution & sustaining the flora & fauna of the Ganga, it is recommended to install/ augment the capacity of Karmalichak STP to cater the load up to 2047.

Hence, considering the existing condition of River Ganga, 58 MLD STP is proposed to be installed at existing site with SBR or any best available technologies.

As a result of this, despite numerous measures the water quality in Ganga River has not witnessed considerable improvement and is further going to be deteriorated if the present condition prevails along with the rapid expansion of the city.

9.1.2 Better hygienic conditions

The sewerage network will provide improved environmental conditions due to the contained handling of wastes, leading to improved public health conditions and will likely reduce the average medical expenses of the residents in the project areas. According to DPR this area is completely without a sewerage system and waste water finds its way into the river through open drains. These areas suffer from powerful odors and greater amounts of flies/mosquitoes, which will be mitigated with the sewerage connection and overall improvement in environment and health is anticipated from this project.

9.1.3 Increase in household connections

100% sewer connection has been proposed for Patna District. Sewer connection ratio of more than 95% has been proposed to be completed by 2020.

9.1.4 Decrease in water pollution

Because of the sewer line connection, all the waste water will be collected and directed to treatment plant, which only after treatment will be disposed-off to the river, hence decreasing the pollutant load in the river. Due to current pollution, water quality in the river Ganga is impaired at the City of Patna.

9.1.5 Cultural sentiments

Proper sewage disposal would increase the river water quality. As the holy river is attached to many rituals and customs, enhanced river water quality would connect to sentiments of the people. Especially during ‘Chhath Puja’ better water quality for bathing would be boon for pilgrims.

9.2 Social Development Issues in Project Vicinity and Social Services to be provided by the project

The social benefits of the proposed project are given above. The social services required to ensure that these benefits are realized are given as under:

9.2.1 Ensure backward section of the society gets the facility

Some residents complained that they did not feel they personally would benefit from the
project as their houses did not have sewer connection. Thus, increasing household connections will ensure that project benefits are equitably distributed. Plans for increasing connections are detailed in the DPR that is by 2025 coverage would increase to 75% from 10% of 2010 ratio. Special care should be taken to ensure access for backward and vulnerable sections of the society. Full benefits of the facilities proposed under DPR cannot be realized unless a programme to improve coverage of branch sewers and household connection is carried in parallel.

9.2.2 Increasing public toilet facilities

Similarly increasing public toilet facilities will ensure that residents of Patna without permanent housing and tourists are able to benefit from the increased sewerage access. Increasing toilet access will decrease practices such as Open Defecation. This eventually would lead to better water quality and would have better environment and social ramifications.

9.2.3 Targeting of economically weaker communities

For construction jobs related to sub-project: In order to ensure that the economic benefits of the sub-project is felt by those in need, those from backward communities should be specifically targeted for relevant jobs.

9.2.4 Proper clean-up of project debris

In order to maximize aesthetic benefits and ensure that debris does not clog sewer path, proper clean-up of project areas must be performed after the project is completed. Collection and disposal of debris is essential for proper function of other essential processes like traffic routing, pedestrian pathways, and clearance of dust and particles causing pollution. Clean area will also enhance the aesthetic value and increase the property rate of the area.

9.2.5 Sanitation for slum dwellers

Patna district has many slums, as mentioned above All these slums have no legal rights over land so it is not possible to provide such services to them. But there unsanitary condition is aim pediment for over all sanitary development. Hence they should be provided with the scheme of low cost sanitation technologies without sewerage connection.
Chapter 10: Institutional Arrangements

10.1 Institutional Arrangement for Monitoring and Evaluation

The project authority will be responsible for carrying out M&E. Internal monitoring will be carried out by the Social Officer of BUIDCO with assistance from Social Officer and NGO. This will help monitor project activities closely. Regular monitoring by undertaking site visits will help identify potential difficulties and problems faced in the project implementation and subsequently help take timely corrective measures including deviations, if needed.

10.2 Internal Monitoring

The project is responsible for internal monitoring on regular basis with the help of Social Officer of BUIDCO and Social Specialist of supervision consultant. A quarterly report of internal monitoring will be prepared by Social Officer. The internal monitoring will also provide feedback on community concerns, grievances and requests. Internal monitoring will focus and ensure the followings:

- Information campaign
- Effective operation of the Grievance Redress Committees detailing out number of complaints received and those resolved; reasons for not being able to resolve the grievance and status of unresolved grievances

Table 22: Internal Monitoring Framework

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicators</th>
<th>Issue</th>
<th>Procedure</th>
<th>Timing</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Level Monitoring</td>
<td>Project Implementation</td>
<td>Employement of local labor including women</td>
<td>Site observation, attendance record, interaction with laborers and contractors</td>
<td>Monthly</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Campsite management including lodging arrangement and campsite facilities</td>
<td>Site observation, interaction with laborers, contractors</td>
<td>Monthly</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of health and safety measures</td>
<td>Site observation, interaction with laborers, contractors</td>
<td>Quarterly</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temporary</td>
<td>Site observation,</td>
<td>Monthly</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td>Type</td>
<td>Indicators</td>
<td>Issue</td>
<td>Procedure</td>
<td>Timing</td>
<td>Responsibility</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Impact level</td>
<td>Change in household level income and economic activities</td>
<td>Changes in occupation</td>
<td>Consultation with relocated PAPs</td>
<td>Annually</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td>Impact level</td>
<td>Social safety</td>
<td>State of social harmony and social security</td>
<td>Police records, consultation with relocated PAPs, NGO’s progress report, report submitted by M&amp;E Consultants and</td>
<td>Annually</td>
<td>BUIDCO / NGO</td>
</tr>
<tr>
<td>Type</td>
<td>Indicators</td>
<td>leasing of private land and house</td>
<td>contractors, check contract agreement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social safety</td>
<td>Discrimination of wage rate between male and female workers</td>
<td>Discrimination of wage rate between male and female workers</td>
<td>Interaction with laborers, labor survey, record of wage payment</td>
<td>Monthly</td>
<td>BUIDCO / NGO / SPMG</td>
</tr>
<tr>
<td>Type</td>
<td>Indicators</td>
<td>Development of new settlements /slum along the river</td>
<td>Observation, recording of sites, photograph</td>
<td>Quarterly</td>
<td>BUIDCO / NGO / SPMG</td>
</tr>
<tr>
<td>Social safety</td>
<td>Incidence of communicable diseases like respiratory, STD, HIV/AIDS etc.</td>
<td>Incidence of communicable diseases like respiratory, STD, HIV/AIDS etc.</td>
<td>Discuss with local people, health workers/ health post/ center records</td>
<td>Annually</td>
<td>BUIDCO / NGO / SPMG</td>
</tr>
</tbody>
</table>
### Table: Social Assessment and Management Plan for Sewerage Schemes for Patna City (Karmalichak Zone)

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicators</th>
<th>Issue</th>
<th>Procedure</th>
<th>Timing</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing condition at new relocation site</td>
<td>Completed house with basic amenities</td>
<td>Visit the area, discuss with people, observation and photographs</td>
<td>Annually</td>
<td>BUIDCO / NGO</td>
<td></td>
</tr>
</tbody>
</table>

### 10.3 Subproject specific grievance redressal mechanism

Redressal of grievances contributes to a great extent to the positive perception of the public regarding the project implementation. Therefore it is essential that any query or a complaint vis a vis any aspect of the project implementation is promptly, effectively & positively addressed. The Grievances will be submitted through various mediums, in person, through phone calls, online or through letters. A single system for redressal of grievances shall be adopted at the project level to ensure that its purpose is met. The integrated grievance system will include the following:

1. Establishing Grievances Redressal Cell (GRC) with dedicated project officer and System at the local EA & ULB. At project level the proposed GRC includes designated Officer, Patna Municipal Corporation. Project Engineer, BuIDCo will be Grievance redressal officer at EA level including representative of DBO. Name and contact information of GRO will be displayed at project site/Notice Board and also disclosed on website of ULB, EA and SPMG.

2. The public also can submit their unresolved grievances at Tehsil Divas on every Second and fourth Tuesday of every month between 10:00 to 14:00, to District Magistrate/Sub District Magistrate and all district level officials for quick redressal.

3. The SPMG & EA will prepare a half yearly report on grievance redressal under GAAP and will be reviewed during meeting of CMCs and Social Audit.

4. The above arrangement will be in addition to the PIO official appointed under RTI Act.
10.3.1 Members of GRC

The GRC will be constituted by the DM of Patna. The GRC will have representatives of PAPs, NGO and other opinion leaders who will look into the grievance of the people. It will be chaired by a retired officer, who served as principal/judges/ DM/Additional DM, etc. The suitability of the Chairperson will be decided by the DM in consultation with BUIDCO. Apart from the nominated persons, the cell will have representative from BUIDCO as convener.

10.3.2 Functions of the Cell

All the grievances received shall be discussed by the Chairperson of the cell with DM for the necessary action.

The compliance to all the petitions shall be reviewed in each of the meeting by the chairman and the DM. In case of the grievances not addressed by the GRC, it will be escalated to the office of District Magistrate by the Chairperson / BUIDCO.
Chapter 11: Conclusion

The project report of the proposed Karmalichak Zone sub-project for Sewerage Zones of Patna district after environment and social analysis concludes that the project falls in ‘low impact’ category and has overall positive benefits on the life and environment of the people. There has been no reported land acquisition or livelihood loss under this project. As per environmental and social management framework guidelines of NGRBA, Environmental and Social Assessment, with a Generic Safeguard Management Plan was conducted for addressing possible issues/concerns arising from proposed project.

Impacts of activities identified during the assessment fell under two separate categories of Construction and Operation. Although no such permanently negative or adverse environmental or social impacts were identified, there were certain temporary impacts, for which appropriate mitigation plans have also been suggested. The Social Management Plan ensures to suggest appropriate mitigation measure against the issues/concerns identified during the environmental and social analysis study. All the social and environmental issues were appropriately studied and have been substantiated using appropriate evidences to ascertain the magnitude of their impacts. Even the issues of public grievances and public notice have been taken care-off in the report to confirm transparency during the project implementation. The report also ensures that well defined institutional mechanism is in place to monitor and evaluate the progress of the project during construction, implementation and operation phases.

One of the important points to be considered during execution phase is that of road restoration, particularly in the vicinity of schools, hospitals and other buildings of public importance. Road restoration should be simultaneous with completion of sewer laying works. Sewerage should be provided to all inhabitants; all colonies, irrespective of whether they are authorized or unauthorized. Damage to utilities would be inevitable as location maps are non-existent. Cooperation of line departments is essential for shifting identified utilities and restoration in case of damage. Another temporary impact; that of relocation of vendors and hawkers during the period of construction, i.e. laying of sewer lines and upgradation of existing Pumping Stations, has been taken care-off by identifying alternate sites where they are proposed to be shifted during such period, most of the times to the other side of the road.
Annexure 1: Power Point Presentation
पटना: महानगर की और बढ़ता ऐतिहासिक शहर

- लगभग 25 किमी लम्बा और 9–10 किमी चौड़ा।
- उत्तर में गंगा, दक्षिण में पुणपुर और पश्चिम में लोन।
- जनसंख्या 16,83,200*।
- बिहार के तेजी से होते विकास का प्रतीक।
- प्रमुख औद्योगिक व्यवस्थाओं की वाणिज्यिक ओझियों का केंद्र।
- प्रमुख राष्ट्रीय सैनिकिक संस्थाओं के केंद्र।

पटना और गंगा नदी: सह-अस्तिव

पटना के सांस्कृतिक, परिस्थितियों और आर्थिक समृद्धि के स्तर के रूप में गंगा नगर बासियों को उपस्थित कराती है।
- सफ्पत, स्वच्छ अभाव पानी।
- समुद्र जल विकास।
- गंगा किनारे की सांस्कृतिक कक्षा।
- पर्यटन केंद्र।
गंगा में प्रदूषण

- गंगा के किनारे बसे शहरों का एक छोर जहां लगातार विकास हो रहा है, वहां दूसरी ओर शहर का शोधित एवं अरोपित अपशिष्ट से और आंशिक कचरा गंगा में भागाया जा रहा है।
- विश्व वेंडों के अनुसार अपशिष्ट और अध्ययन के अनुसार प्रथम श्रेणी (423 शहर) और द्वितीय श्रेणी (449 शहर) के शहर संकुलन 3,30,000 लाख लीटर तरल अपशिष्ट कचरा उत्पादित करते हैं, जिन्हें धन की क्षमता में नाम 70,000 लाख लीटर तरल अपशिष्ट को शोधित करने की है।
- देश में अपशिष्ट पदार्थों के संचालन की जमावदेदी नगर निकायों की है और यह कार्य को अपने प्रबंधन के अनुरूप संचालित करते हैं।

हमारा संकल्प: निर्मल गंगा, स्वच्छ शहर

राष्ट्रीय गंगा नदी बेसिन प्राधिकार
- सीवरेज परियोजना
  - बबसर: 74.95 करोड़
  - हाजीपुर: 94.88 करोड़
  - बंगुलपुर: 58.88 करोड़
  - मुहराम: 122.85 करोड़
- गंगा नदी तट विकास परियोजना, पटना

JnNURM
- शौचालय सीवरेज परियोजना: 92.75 करोड़
- राज्य योजना
  - राज्यी दाता सीवरेज परियोजना: 47.36 करोड़
पटना: वर्तमान सीवर प्रणाली

- सीवर व्यवस्था का 1938 ई. में निर्माण।
- 4 सीवर ट्रांसफर संयंत्र: पहाड़ी, बेंगोर, राघवरूप एवं करमलीचक।
- कुल सीपेज़: 249.2 MLD
- सीवर ट्रांसफर संयंत्र की क्षमता: 109 MLD
- अंतर: 140.2 MLD (56.3%)

पटना: वर्तमान सीवर प्रणाली

samshya
- सीवर की अपरिहार्य लम्बाई होने से कमजोर प्रणाली।
- विस्तृत तरंग।
- कृच्छ्र एवं अग्रुपल कार्यकर्ता की कमी।
- फर्न ट्रांसफर अनुपालन।

parishram
- गवर्न में गांडे पानी के विकास में परिवर्तन; जल जनमान।
- गांडे जल के पदार्थ नियंत्रण में कठिनाई।
- गांडे बन्सन में कुल 871.4 MLD गांडे पानी का प्रणाली।
- अंतरस्त्रोत लोक स्वास्थ्य।
- जल संपदा का नुकसान।
पटना: वर्तमान सीवर प्रणाली

पटना: वर्तमान सीवर प्रणाली
पटना सीवरेज परियोजना

• बिहार सरकार द्वारा विश्व बैंक और राष्ट्रीय गंगा नदी बेल्सन प्राधिकरण के सहयोग से 'पटना सीवरेज परियोजना' की शुरुआत।
• गंगा नदी को निर्माण एवं पटना को स्वच्छ बनाने की पहल।
• परियोजना को कार्यरत करने की जिम्मेदारी गिरजागरण विधारण प्रशस्ति संचालन विकाल निगम लिमिटेड (बुरुंगा) को।
• परियोजना की लागत लगभग रुपये 2500 करोड़।
• सेंचुर और राज्य सरकार के बीच 70:30 की साझेदारी।

परियोजना का उद्देश्य

• शहरी आधारभूत संरचना और रक्षकता शुद्धियाँ को बढ़ावा देना।
• गंगा नदी बेल्सन तृणिकोण के साथ समग्र परियोजना एवं प्रकृतियों के द्वारा गंगा नदी के प्रदूषण को प्रभावित रूप से समाप्त करना।
• पानी की गुणवत्ता सुनिश्चित करने के उद्देश्य और पर्यावरण की वृद्धि से सतत विकास हेतु गंगा नदी के प्रपात को गन्नाय रखना।
परियोजना की विशेषताएँ

- वर्ष 2047 तक पटना नगर निगम क्षेत्र की संगठित जलसंध्या को लाभापन करना।
- निगम के सभी 72 वाड़ों का आयाम करना।
- निगम क्षेत्र का मुख्यतः 6 जोन में विभाजन।
- लगभग 1300 किमी सीवेर पाट्ट का जाल।
- गंगा पानी के शुद्धीकरण के लिए 5 सीवेज ट्रीटमेंट प्लांटों का निर्माण।
- 13 स्वाभाविक शरीर प्रदूषण का निर्माण।

परियोजना का कार्यान्वयन क्षेत्र

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<thead>
<tr>
<th>जोन</th>
<th>वाड़ा संख्या</th>
<th>सीवेज ट्रीटमेंट प्लांट</th>
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</thead>
<tbody>
<tr>
<td>जोन 1</td>
<td>1 से 9, 20 से 26, 28 (अंश)</td>
<td>दीघा (प्रस्तावित)</td>
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<td>जोन 4</td>
<td>20, 30(अंश) से 35(अंश), 44 से 45</td>
<td>बेठर</td>
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<tr>
<td>जोन 2</td>
<td>10 से 19, 30 (अंश)</td>
<td>सेदपुर</td>
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<tr>
<td>जोन 3</td>
<td>27 से 28 (अंश), 35 (अंश) से 43</td>
<td>पहाड़ी</td>
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<td>कुरमलीचक</td>
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<td>जोन 5</td>
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<td>जोन 4 दक्षिण</td>
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<td>जोन 6</td>
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<th>सहायक पुंगस स्टेशन की बनावट</th>
<th>सीवर नेटवर्क (किमी में)</th>
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<td>केंद्र (47 MLD)</td>
<td>70 MLD</td>
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<td>संतरु (83 MLD)</td>
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<td>जान 4</td>
<td>जान 41 उतरें 25 MLD</td>
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<td>कामलावलक (37 MLD)</td>
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<td>जान 6</td>
<td>A- 34 MLD, B- 20 MLD</td>
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### बजट विवरण

- परियोजना की कुल प्राकालित राशि लगभग रूपये 2500.00 करोड़
- रूपये 1248.04 करोड़ – सीवर नेटवर्किंग व अन्य।
- रूपये 68.00 करोड़ – सीवरेज पुंगस स्टेशन का निर्माण।
- रूपये 777.00 करोड़ – सीवरेज ट्रीटमेंट प्लांट का निर्माण एवं रक्षकार।
- रूपये 134.40 करोड़ – घरों से गर्भ वाहन के निकाल एवं हाउस कमांडर।
परियोजना का प्रभाव

- गंगा नदी की प्रवृत्ति से मुक्त होगी।
- घरों के गांवों में पानी का निलाव एवं हथकड़ी सुरक्षित निपटान।
- पटना शहर में सुनिश्चित पानी नागरिक दृष्टि का विस्तार।
- जल संरक्षण एवं पानी पूर्वाभास की सुनिश्चितता।
- जल साक्षरता बढ़ाने की पहल।
- सिंचाई के लिए पानी की प्रदूर्त उपलब्धता।

सामुदायिक भागीदारी

- परियोजना की सफलता के लिए आम जन का सहयोग और सहभागिता महत्वपूर्ण।
  - परियोजना कार्यालय में अब्दोली दूर करना
  - गृहस्वामी संरचना निर्माण में सहयोग
  - संचालन एवं रक्षकांश में भागीदारी।

आज की ध्यों रूढ़ी सी परेराली, देशी एक नवीनतर कल
अपेक्षाएं

• परियोजना की सफलता के लिए आम जन का सहयोग और सहभागिता महत्त्वपूर्ण।
  ○ परियोजना कार्यालय में अतिरिक्त की पहचान करना।
  ○ पुरुषत्तापूर्ण स्तरान्त निर्माण के महत्त्वपूर्ण आयामों के बारे में जानकारी देना।
• परियोजना के समयबाद पूर्ण होने में सहयोग।
• समुदाय में परियोजना के निर्माण के प्रति जागरूकता।
• पुरुषत्तापूर्ण कार्य की निगरानी, सहयोग एवं सामाजिक समीक्षा।
• समुदाय के कार्य के समृद्ध निर्माण में सहयोग के लिए प्रोत्साहन।
• सहयोगी विभागों के प्राथमिक एवं गैर सरकारी संस्थाओं/नागरिक समाज संगठनों का सहयोग।
Annexure 2: Attendance Sheet

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Name of the Office / Zone</th>
<th>Mobile / Email</th>
<th>Remarks</th>
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<tr>
<td>Nitek Kumar</td>
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<tr>
<td>SK Kavitha</td>
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<tr>
<td>Ramanpreet</td>
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<td></td>
</tr>
<tr>
<td>Chetan Yadav</td>
<td>Office Executive</td>
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<td></td>
<td></td>
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<tr>
<td>Biswa Saran</td>
<td>STUDENT</td>
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<tr>
<td>M Sreedha</td>
<td>Account</td>
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<tr>
<td>Devika</td>
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<tr>
<td>Arun</td>
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<td>निर्माण संस्थान</td>
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<td>संवाददाता</td>
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आचार वर्तमान समय में सभी प्रबंधन निर्माण एवं समन्वय के लिए

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आचार वर्तमान समय में सभी प्रबंधन निर्माण एवं समन्वय के लिए
### सामाजिक अध्ययन एवं प्रबंधन योजना लिखित प्रौद्योगिकी परियोजना के लिए

#### नागरिक परमार्श

<table>
<thead>
<tr>
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आपने करें, एक साध्य प्रयोजन लिखित प्रौद्योगिकी परियोजना के लिए

### सामाजिक अध्ययन एवं प्रबंधन योजना लिखित प्रौद्योगिकी परियोजना के लिए

#### नागरिक परमार्श

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76 | Page
### नागरिक परामर्श

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The above table contains the names and contact details of the social assessment and management plan for the sewerage schemes in Patna City (Karmalichak Zone).

The table contains the names of the individuals involved, their positions or departments, and their contact details.
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<td>Ravi Shankar</td>
<td>Sr. Urban Planner</td>
<td>PRU-SPUR (AEPD)</td>
<td><a href="mailto:r.shankar87@gmail.com">r.shankar87@gmail.com</a></td>
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<td>6</td>
<td>Sana Manjhi</td>
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आइवे करें, एक साझा प्रयास निर्माण संगठा—स्थान पटना के लिए
पटना सीवरेज परियोजना
निर्माण गंगा–स्वच्छ पटना का संकल्प
नागरिक परामर्श

विवाद: 04 जुलाई, 2014 (सुबह) समय: पूर्वतारा 11:30 बजे स्थान: तारापुष्पक सड़क, पटना

प्रतिभागी प्रश्निकता प्रश्न

नाम:.......................................................... पता:..........................................................

फोन नं.:...................................................... मोबाइल:......................................................

1. क्या पटना की वर्तमान सीवरेज व्यवस्था पर्याप्त है? हां नहीं
2. यदि नहीं, तो क्या सीवरेज व्यवस्था लोग स्वास्थ्य की प्राप्ति कर सकते हैं? हां नहीं
3. यदि हां, तो क्या पटना को उन्नत सीवरेज परियोजना की आवश्यकता है? हां नहीं
4. यदि इस परियोजना में कुछ जगहों का अवधारण होता है तो ज्ञात समान स्वीकार पर भाव वह? कोई प्रभाव नहीं कुछ प्रभाव होगा जानजारी नहीं
5. क्या इस परियोजना से आम जनता की जीवनिका पर कोई असर होगा? हां नहीं
6. क्या परियोजना के निर्माण कार्य के दौरान होने वाले जुदाई से कोई स्वास्थ्य प्रभाव पड़ेगा? हां नहीं
7. क्या परियोजना के निर्माण कार्य के दौरान होने वाले लोग स्वास्थ्य की समस्या होगी? हां नहीं
8. क्या परियोजना का कोई प्रभाव आत–पास के पर्यावरण पर होगा? हां नहीं
9. क्या परियोजना का कोई प्रभाव गांव या अन्य गांव पर पड़ेगा? हां नहीं
10. क्या परियोजना संभालने वाले लोग को प्रदूषण मुक्त बनाने में सहयोग करेंगे? हां नहीं
11. क्या सीवरेज परियोजना से पटना की बुनियादी सुविधाओं का बिस्तार होगा? हां नहीं
12. क्या परियोजना के कारों में सहयोग देना चाहिए? हां नहीं
13. क्या इस प्रकार के नागरिक पर्यावरण उपयोगी है? हां नहीं
14. कोई सुझाव/अन्य प्रतिभाग:..........................................................

निवाद:.......................................................... हस्ताक्षर:..........................................................

Annexure 3: Sample Feedback Form
Annexure 4: Land Availability for IPS
(Behind Gauridas Ki Mandi)