

## EXECUTIVE SUMMARY

### 1. Introduction

The Government of India has given Ganga the status of a National River and has constituted the National Ganga River Basin Authority (NGRBA) on 20th February 2009, for the comprehensive management of the river. The main objective of the NGRBA is to ensure effective abatement of pollution and conservation of the river Ganga by adopting a river basin approach for comprehensive planning and management.

Ganga Action plan program for Budge Budge Town was initiated in the year 1990. In order to give effect to the above pollution abatement measures, schemes were designed as per the guidelines framed by GAP/NRCD and execution of schemes was planned under two phases. However no work was completed under GAP-I.

Works completed under Ganga Action Plan Phase II included an Interception & Diversion Scheme that was executed in the town with the view to divert the contaminated flows of city drain to a sewage treatment plant. However the Interception and Diversion sewer with Main Pumping stations (MPS) and Sewage Treatment Plant (STPs) system by KMDA is partially functioning due to inadequate quantum of drainage flow. Further the inability of taking over of the asset by the ULB due to non-availability of O&M fund has made the sewerage system partly operational which failed to render any significant benefit. In the absence of sewerage the town faces regular sanitation problems like:

- I. Maintenance & Cleaning of septic tanks.
- II. Maintenance and repairs of pour flush latrines.
- III. Open defecation in the town and along the banks of the river.
- IV. Serious contamination of open drains by septic tank effluents, open defecation in drains and connection of house toilets with drains particularly in slums.

As per the Environmental and Social Management Framework (NGRBA, 2011), the implementation of such river pollution mitigation projects under the NGRBP is anticipated to encounter a variety of environmental and social issues/problems. Therefore the study of environment and social sector is required for analyzing the impacts of proposed project and suggesting the management plans to handle any negative impacts. In this regard the Environmental and Social Assessment with Management Plan (ESAMP) report has been prepared.

### 2.0 Portfolio of Investments under NGRBA

The portfolio of investments under the NGRBA program includes the following:

- Sewerage and sanitation systems/sewage treatment plants (new/up gradation)
- Solid Waste Management
- Industrial Pollution Control Initiatives
- River front Management initiatives

These investments in the first phase of program is spread across several cities and/or towns within Ganga main stem states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal and may be extended to entire Ganga river basin comprising of 11 states in the later phases.

### 3. Need for the Comprehensive Sewerage project under NGRBA

It may be noted that, like any construction project, the proposed investments under the NGRBA scheme for

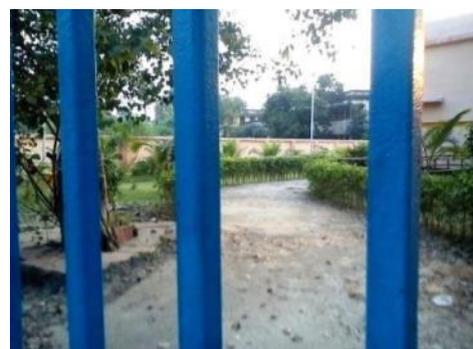
Budge Budge may have adverse impacts that have to be effectively managed during the planning, design, construction and operational phases. These impacts may have the potential to cause major and minor, and reversible and irreversible societal/ community damage.

Drainage and Sanitation are two major environmental issues with the Budge Budge municipality. Total length of drain 42.97 km. out of which lined drain is 11.04 km, unlined drain 31.93 km. Water logging during rainy season is very prominent. Most of the household are connected with septic tank with soak pit, septic tank without soak pit (15%) and Pour flush toilet (25%). 20% of the population does not have latrine facilities. Overall sanitation facilities are very poor in terms of drainage and sewerage system. In the slum area kuccha latrines are predominant without proper sanitation facilities. The main water bodies surrounding the Municipal boundary are Churial Khal and River Ganga. Topographical feature and the existing drainage system indicate Churia lkhali is the main rain water receiving body of the town. It starts from the south of Khabaria road on the southern side of municipal boundary and flows towards the north westerly direction for ultimate discharge to river Ganga. There is another khal which flows from south towards north almost parallel to Churialkhal and both meet at a confluence point. This khal is utilized as one of the storm water discharging bodies for the present drainage system. Thereafter the combined discharge under the same name Churial Khal flow to river Ganga.

The outfall in river Hooghly is mainly through several drainage channels/drains. They are as follows:

- 1) **Balur Ghat Nala**
- 2) **Drain in front of B.B. Jute Mill**
- 3) **Drain near Queen Cinema**
- 4) **Jhautala Bathing Ghat**
- 5) **B.B. Kali Bari Ghat**
- 6) **Drain Outfall at Churial Khal**

An Interception & Diversion Scheme under Ganga Action Plan (GAP) was executed in the town in past with the view to divert the contaminated flows of city drain to a sewage treatment plant. In this scheme, about 1 km sewers of size 400/500 MM along with 2 pumping stations and Stabilization Ponds based Sewage Treatment Plant of **3 MLD** capacity was introduced. The scheme is completed but for want of sewage disposal arrangements, the works have not yet been commissioned.



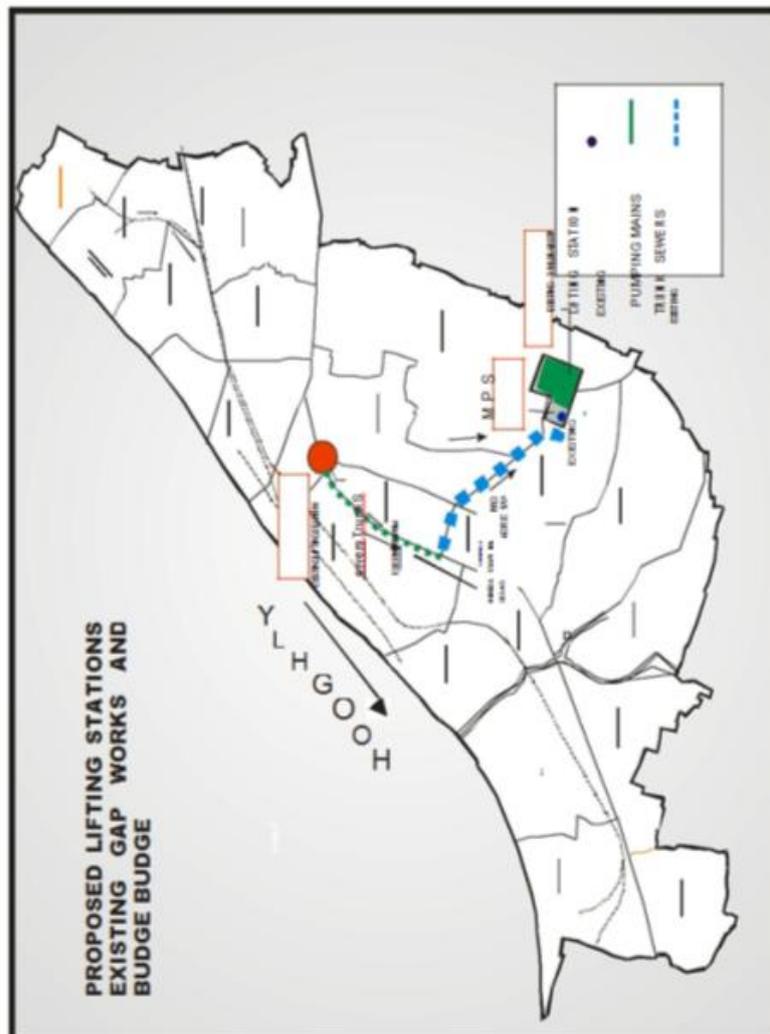
The details of the works are as below:

<b>Lifting Station</b>		
Diameter	5 M	
Inlet level	0.96 M	
Pumps (MPS)		3 x 20 lps -15 M head
	2 x 10 lps – 15 M head	
<b>Pumping Main</b>		
Diameter	250 MM	
Length	870 M	

Sewer Line		
Diameter	400 / 500 MM	
Length	1040 M	
<b>Main Pumping Station</b>		
Diameter	5 M	
Inlet level	0.84 M	
Pumps(MPS)		3 x 30 lps -15 M head
	2 x 15 lps – 15 M head	
<b>Treatment Plant</b>		
Type	Stabilizing Ponds	
Area	About 1 hectare	
Capacity	3 MLD	

A diagrammatic sketch of the existing GAP works is given below. A detailed map of GAP works is included in the drawing section

### GAP works in Budge Budge



In absence of comprehensive sewerage in the town the dry weather foul liquid wastes from the

town finds way to river and particularly from large slums in the town which have latrines directly connected to the open drains in the vicinity. The people are largely depending on septic tanks and pour flush latrines which again continue to contaminate ground water as well as open drains by continuous out flows from septic tanks.

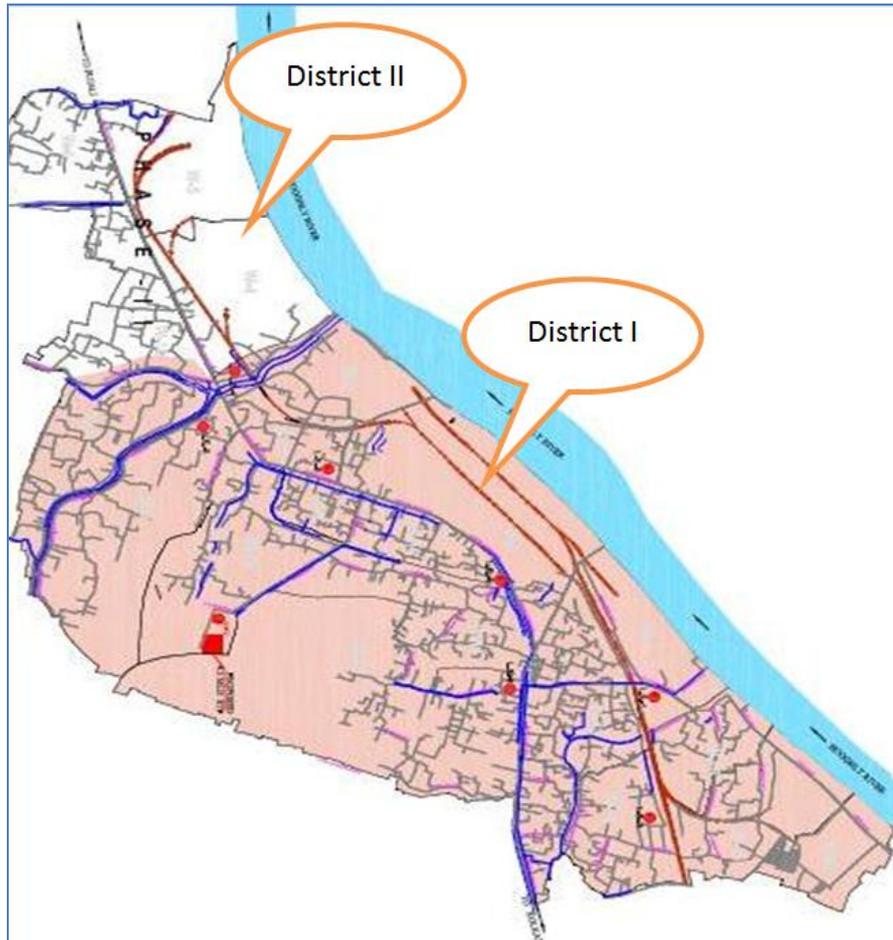
Works completed under Ganga Action Plan Phase II included an Interception & Diversion Scheme that was executed in the town with the view to divert the contaminated flows of city drain to a sewage treatment plant. However the Interception and Diversion sewer with MPS and STP system by KMDA is partially functioning due to inadequate quantum of drainage flow. Further the inability of taking over of the asset by the ULB due to non-availability of O&M fund has made the sewerage system partly operational to render any significant benefit. In the absence of sewerage the town faces regular sanitation problems like:

- Maintenance & Cleaning of septic tanks.
- Maintenance and repairs of pour flush latrines.
- Open defecation in the town and along the banks of the river.
- Serious contamination of open drains by septic tank effluents, open defecation in drains and connection of house toilets with drains particularly in slums.
- Serious contamination of river by drain out falls particularly along the bathing ghats and through open defecation.

It is therefore, a pressing need for a comprehensive sewerage project to maintain the sanitation of the town without any contamination to the river Hooghly and a sewerage project has been proposed along these lines.

Design of Sewerage system in Budge Budge was basically done depending on the available land given by municipality.

**Proposed Sewage line**



<b>Project Title</b>	<b>Sewerage integration work and Sewage Treatment Plant at Budge Budge Town, West Bengal under NGRBA</b>
<b>Location</b>	Budge-Budge Municipal Town, 24(Pgs) South, West Bengal
<b>Implementing Agency</b>	KOLKATA METROPOLITAN DEVELOPMENT AUTHORITY(KMDA)
<b>Proposed Project Components</b>	<ul style="list-style-type: none"> <li>• Gravity Sewer - 132 km including house connection</li> <li>• Main Pumping Station (MPS) –1</li> <li>• No, utilising the existing MPS (MAIN PUMPING STATION)</li> <li>• Superstructure.</li> <li>• Proposed Sewage Treatment Plant (STP) – 1 capacity 9.30mld (2029)</li> <li>• Lifting Stations (LS) –9 no [ 7 LS, 1MPS and 1 EPS)</li> </ul>
<b>Project Cost</b>	<b>145.98 Crore</b>

#### 4. Methodological Approach

The approach to the ESAMP preparation was based on an initial Environmental and Social screening of Budge Budge Municipality. Screening conclusions indicate that Budge Budge is not located near any eco-sensitive area. Further the proposed project will not involve any compulsory acquisition of land or displacement of any of people specifically tribals. However for two lifting stations two lands will be purchased directly from two private land owners.

#### 5. Screening and Compliance

The project has been scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Screening conclusions indicate that:

- Budge Budge is not located near any eco-sensitive area .
- The land required for the 2 lifting stations will be directly purchased from the land owners and the owners have provided their no objections for the purchase.
- This project does not involve any involuntary land acquisition or displacement of any category of people specifically tribal.
- The construction of proposed STP will have marginal environmental impact on the adjoining settlement in terms of dust and noise during construction. The Lifting Stations being located in open grounds will not have any such adverse environmental impact.
- The laying of sewer lines will not produce any significant amount of waste particularly since it will be laid under minimum 3 m width roads. The roads will be reinstated to its original conditions after laying of sewer line.

The project will not require any kind of **Environmental Clearance** as per the **EIA notification**. Temporary traffic disruptions will be avoided through appropriate diversions. There will be no significant adverse impacts in terms of flooding, gas emission, waste discharge, health risks etc. Hence considering the existing ESMF of NGRBA and Operational Policies of World Bank, the project has been considered as a Low impact project.

#### 6. Policy, Legal and Administrative Framework

The following laws and regulations are application to the environmental aspects of the proposed project:

- Policy and regulatory framework of Govt. of India;
- Environmental Policy of the respective State Governments;
- Legislations applicable to the construction activities;
- Environment and Social Management Framework of NGRBA

The Project is seeking financing from World Bank and hence their environmental and social safeguards are also applicable to this Project.

#### 7. Requirement of Environmental Clearance as per EIA notification 14th September 2006:

The proposed project is renovation cum augmentation of sewage treatment plant. Since construction of sewage treatment plant and does not attract EIA clearance the project will not require Environmental clearance from MoEF/SEIAA.

Other Applicable Legislation:

- The Air (Prevention and Control of Pollution) Act, 1981 and Water Prevention and Control of (Pollution) act, 1974 will be applicable;

- The Noise Pollution (Regulation and Control) Rules, 2000 will be applicable;
- The Ancient Monuments and Archaeological Sites and Remains Act, 1958 is not applicable as such
- Contract Labour (Regulation & Abolition) Act, 1970 shall be applicable
- Minimum Wages Act, 1948 shall be applicable
- Child Labour (Prohibition and Regulation) Act, 2000 shall be applicable
- Forest (Conservation) Act, 1980 is not applicable

The project also does not fall within 10 km radius of a wildlife sanctuary area.

## 8. Baseline Environmental and Social Features of Budge Budge

As a part of the study, baseline condition was established through physico-chemical and biological sampling in and around the study area. Social study was undertaken to understand the cultural and social status of the residing community. The baseline information forms the basis to analyse the probable impacts of the proposed project vis-à-vis the present background environmental quality of the core study area. In environmental scenario it reflects the status of environmental entities like status of climate, geological features, air quality, water quality, waste management and existing green cover in the study area.

There is no such natural sensitive area observed in the town however man made sensitive locations like schools, health centres, Budge Budge college.

**Meteorology:** The Budge Budge Municipality lies within the Ganges – Brahmaputra delta. The Municipality is located in South 24 Parganas District. Budge Budge does not depict any undulations in terrain. It has an average elevation of 8 meters (26 feet). The Municipality has a very tropical savannah type of climate, same as Kolkata and is dominated by 3 seasons – summer, monsoon and winter. The annual mean temperature is 26.80 C. The maximum temperature often exceeds 40 C. The temperature does not fall below 10 C. Maximum rainfall occurs during the monsoon in August (306 mm) and the average annual total is 1,582 mm.

**Topography:** The Budge Budge Municipality lies within the Ganges – Brahmaputra delta. The river Ganga flows along the entire west border of the Municipality. The Municipality is located in South 24 Parganas District. Budge Budge does not depict any undulations in terrain. It has an average elevation of 8 meters (26 feet).

**Geology:** The area is a part of the Indo-Gangetic alluvium, one of the three main physiographic divisions of India. The quaternary sediments are deposited unconformable on the Achaean basement.

**Physiography and Soil:** Depending upon the soils and climatic variations, the ULB falls into the category of the Gangetic Alluvial Region in the east, which comprises of Nadia, and parts of Malda, Dakshin Dinajpur, Murshidabad, Bardhaman, Hooghli and 24 Parganas districts. Soils of this area are mostly neutral in reaction. Upland soils are lighter in texture and contain higher proportions of fine sand and silt, which helps water recharge. Here the groundwater potential is very high and the aquifer character is mostly unconfined. The region is suitable for cultivation of all kinds of field and horticulture crops. Soil quality near the dumping ground is contaminated with heavy metal.

**Drainage:** Total length of drain 42.97 km. out of which lined drain is 11.04km and unlined drain 31.93 km. Water logging during rainy season is very prominent. In Budge Budge, the system of Household drainage system is from house drain to internal by-lane to Municipal High drains and finally to river Ganga through various khals like Churial Khal, and Balurghat Nala.

**Air Quality:** The air quality trend reveal that SO<sub>2</sub> concentration is at low, NO<sub>2</sub> concentration is at moderate whereas particulate pollution has reached to critical condition. The Suspended Particulate Matter (SPM) and Repairable Particulate Matter (RPM) concentrations are found at a higher level during the December which may be due to location near to the industrial and market area.

**Noise Quality:** The maximum noise level in the day time in the silence zone is 84.2 dB(A) & minimum is 51.2 dB(A) and the average noise level near Jaichandrapur F.P. School is 68.0 dB(A). The maximum noise level in the night time in the silence zone is 70.8 dB(A) and the minimum is 29.0 dB(A) and the average noise level near school is 46.0 dB(A). These values are crossing the limit of silence zone in the day and night time for both the cases.

The reason of the possible high noise is the following.

- 1) It is in the industrial area. So highly loaded vehicles are moving as well as noise of the machineries.
- 2) The sewer line is in the market area. So it is very noisy around the place.

**Water Quality:** The river Ganga is at about 1 km from the project site. The river quality was found to be polluted in terms of E. coli and faecal coliform and do not satisfy the 'bathing water quality standard as per CPCB water quality criteria.

**Flora and Fauna:** Common trees include *Shorea robusta* (sal), *Toona ciliata* (mahanim), *Diospyros melanoxylon* (kendu/tendu), *Boswellia serrata* (salai), *Terminalia tomentosa* (asan), *Terminalia bellayocica* (bahera), *Terminalia arjuna* (arjun), *Pterocarpus marsupium* (paisar), *Madhuca indica* (mahua).

The fauna reported in the area are mainly avifauna (highest diversity) followed by mammals and reptiles. The commonly reported avifauna in the study area are Common crow, Myna, Eagle, Sparrow, Babbler, Pigeon, Cattle Egrets, Red Vented bulbul, Drongo, Sparrow, Indian Roller etc.

#### Demographic profile

As per 2001 census, population of Budge Budge town was 75,531 the population in census 2011 was 76858. The highest population observed in 2001 in the ward 12, i.e., 4,906 souls while in 2011 maximum population is in Ward 19 (5781). Followed by ward number 12 (5807)

As per the census 2011, out of the total population the percentage of SC/ST was 9 % and 0.08% respectively. Population growth is slow owing to little employment opportunities and migration to Kolkata and other cities.

**Cultural and Heritage Resources:** There is no important cultural and heritage resource notified by Archaeological Survey of India around the project influence area.

The environmental impact assessment of the project was based on screening checklist method that identifies the impact level of various activities during the construction and operation phases. Various environmental factors such as the presence of eco-sensitive region in and around the project area, clearance of tree cover, improper storage of excavation spoils, flooding of adjacent areas, elevated noise and dust levels, damage to existing utilities were taken as checklist criteria for impact assessment of the project. Social criteria included factors such as requirement for land acquisition, displacement of tribes, loss of livelihood and gender issues.

Except two lifting stations for which land will be directly purchased from land owners, other land required for the project are available with the Municipality and I & WD department. No agricultural land in Budge-Budge Municipal Area will be acquired. Consent from the private land owners are attached in Annexure –6.

## 9 Environmental and Social Impacts and their Mitigation

ESAMP intended to identify the environmental and social impacts arising out of this project in the design, construction and post construction phases through technical analysis and people's interactions. Household surveys and Focus Group discussion and consultations were held with stakeholders to identify the impacts of the project on air quality, noise, water quality, waste management, Occupational health and safety and Traffic flow.

While broad and overall impacts were identified based on analysis, FGD-s were held in sensitive locations like

STP, Lifting Stations.

Markets, major Road junctions and major roads, school, health units, identified by the Councillors and Municipal functionaries etc. to order assess the specific issues and work on the mitigation measures.

The specific impacts of the project is given below:

**Table1: Project Component Specific Impact assessment**

Activity	Details	Impact
<b>CONSTRUCTION PHASE</b>		
Construction of Sewers	<p>Laying of pipe line along very important and sensitive road and area like</p> <p>a) M.G Road –main connective road with Kolkata and surrounding municipality is full of market area.</p> <p>b) Ghosh road - this road is used for heavy traffic of local 3 industries and also the stadium road</p> <p>c) D.B.C. Road – This road is the main connecting road of crematorium and feri ghat.</p> <p>Digging of roads, pavements and natural surfaces. Removal of soil and pipe. Storing removed materials beside the trench. Generation of solid waste</p> <p>Heavy machinery will be on the road blocking free flow of traffic Machinery to be operated on 24 hr basis both during day and night</p> <p>By-passing of sewers Proper disposal of silt and slurry during construction Occupational risk to workers</p> <p>The sludge contains heavy metals from Industrial waste water</p>	<p>Temporary disruption of traffic flow</p> <p>There will be disruption due to the movement of vehicles.</p> <p>Noise pollution-Generates heavy noise during night times</p> <p>Possible overflow of sewers</p> <p>As the drain receives both sewage and sullage, the drain sludge will be high in pathogens.</p>
Construction of LS(LIFTING STATION)	Two private land will be purchased and the lands are free from any habitants.	There will be no impacts on the livelihood of the local people.
Construction of STP(SEWAGE TREATMENT PLANT)	STP will be constructed in existing STP campus Site having sufficient space for storing of construction material and equipment's and will not have any impact on the adjacent locality.	No impacts on livelihood envisaged.
Removal of water logging	Diversion of storm water drain Construction of new pumping stations	Possible overflow of sewerage Building materials on road Dust due to construction material LS (Lifting Station)
Special care in health centre	centre, main market, Mosque and a LS (Lifting)	There will be disruption to the movement of vehicles and pedestrian.

<b>Activity</b>	<b>Details</b>	<b>Impact</b>
Renovation of Pumping Stations	Installation of mechanized screenings equipment Installation of grit removal equipment Replacement of pumps	Construction materials on site Dust from construction materials Accumulation of solid wastes at the screens

**Analysis of Alternative:**

**Sewage Treatment Plant**

The project consists of construction of sewage treatment plant based on Sequential Batch Reactor (SBR) technology. The existing STP of 3.0 MLD with stabilization pond technology is constructed within a land area of 1 Ha. The total land available in the existing STP complex is 4 Ha. The proposed STP of 9.3MLD capacity with SBR technology will require 0.5 ha of land and hence easily accommodable in the existing STP site. Even with various other technologies like ASP and USAB the land requirement is about 2.5 Ha and 2.12 Ha respectively and hence even with ASP and USAB the STP complex will have enough space for accommodating the new STP.

**Lifting Stations:**

Out of the 9 Lifting Stations (LSs) that are proposed, Govt. Land is available for 7 LSs and 2 will be located on private lands. The designs are set in such a manner so that the maximum number of govt. lands are available. The major concern which lead to such high number of LS was the limitation in Budge Budge due to the soil condition in Budge Budge and excavation limitation in Budge Budge which is not possible for more than 5m at Budge Budge. The 2 LSs that are proposed in private land was derived from design requirement and for that 2-3 locations nearby was check and the lands with no encroachment has been taken. The “no objection” from the land owners have been acquired and furnished in “Annexure 6”.

**Analysis of Alternative Technology**

Although the project bidding will be technology neutral for estimation purpose SBR technology has been considered. While selecting the technology through treatment costs are important, other factors like effluent quality, process complexity, process reliability, environmental issues and land requirements were also given due consideration and was evaluated and weighted against cost considerations. Accordingly SBR technology (**Refer Annexure 7**) which is the most suitable technology with respect to the available land.

**10. Public Consultation:**

Local people are being adequately consulted as part of the project preparation. Focused group discussions as well as informal discussion with local people as well as project implementation authorities were conducted at different points of time as part of the Environmental Impact Assessment of the project. Most of the people have welcome the project and their views and suggestion are incorporated in the project and EMP.

While in baseline status of social section, it brings out the status of demographic composition of the population, general land-use feature of the wards and also details of the social survey outcomes at various consultations held in different wards of the sewerage district. Details of the consultation questionnaire and people attended during the consultation are captured in the ESAMP report and is placed in Annexure3&4 respectively. The consultation was conducted on 5/12/2012 and the summary of the consultation is given below:

**Table2: Key Issues raised during Social Surveys**

<b>Ward</b>	<b>Critical</b>	<b>No. of</b>	<b>Nature of</b>	<b>Key Issues</b>
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No	points/ location	participants	Participants	
1,11  &13	Pyester More	22	Residents and  Shop Owners	Traffic congestion But nodded in the affirmative regarding the Project Implementation
7,18 & 9	Churial Bazaar More	25	Residents, Shop keepers At Railway Crossing, mobile vendors, shopkeepers	Traffic congestion, dust, noise  Dust and inconveniences in daily activities
14	Budge Budge Railway Station	24		

### 10. Environment and Social Management Plan (ESMP):

As part of the project and EMP the operator shall ensure that:

- The inflow shall continue to receive the current level of treatment during the construction period of new STP. No untreated sewage shall be discharged into the river or land during construction and operation period of STP and network.
- The digested sludge shall be utilised as manure or disposed to suitable site as per criteria defined under EMP and approved by DBO engineer.
- STP design shall be evolved with enough holding capacity to ensure that no untreated sewage is discharged to river during STP breakdown or temporary closure.
- Tree plantation (minimum two rows) shall be made on the periphery of the STP to prevent spread of bad odour and undertake landscaping to enhance aesthetic at STP location.

The detailed EMP and SMP are placed in Chapter 7 and the Key management plan is placed in table-3.

**Table3: Key Environment and Social Management Plan**

Activity	Potential Impact	Mitigation Measure
<b>Design and Development</b>		
STP- New STP at the existing STP site	Discharge of untreated sewage from the existing STP.	<ul style="list-style-type: none"> <li>• The treated water quality shall comply with the prescribed standards.</li> <li>• The existing STP (Sewage Treatment Plant) shall not be demolished till alternate arrangement for treatment of existing sewage is made.</li> </ul>
STP-Untreated water disposal into nearby stream	Pollution of received water body (river) or land due to inefficient treatment or non-operation of STP	<ul style="list-style-type: none"> <li>• The treated water quality shall to comply with the prescribed standards.</li> <li>• Best available STP technology to be provided;</li> <li>• Provision of effective screening at inlet of STP for removal of grit, fine plastics</li> </ul>
Flooding due to rain water run off	Flooding from rainwater	Suitable drainage provision to be made to divert rain water from peripheral catchment area of STP

Activity	Potential Impact	Mitigation Measure
STP Location	Noise and Odour Nuisance	<ul style="list-style-type: none"> <li>• Ensure minimum noise generation at pumping station and STP.</li> <li>• No tree cutting is involved.</li> <li>• Tree plantation of at least two rows around the periphery of SPS site and landscaping to prevent spread of bad odour</li> <li>• Accumulated sludge to be disposed to a site 90m from STP</li> </ul>
Sewerage Network leakage	<ul style="list-style-type: none"> <li>• Flooding;</li> <li>• Backlogging due to heavy flow rates</li> </ul>	<ul style="list-style-type: none"> <li>• Designing sewers with adequate capacity and flow velocity.</li> <li>• Provision of regular inspection and maintenance and monitoring</li> </ul>
<b>Construction Phase</b>		
STP-Excavation	Loss of to spoil due to excavation	<ul style="list-style-type: none"> <li>• Top soil to be separately stockpiled and utilized for green belt</li> </ul>
	Construction waste	<ul style="list-style-type: none"> <li>• All the associated construction waste should be properly managed by storing and disposing off at suitable refusal sites</li> </ul>
	Noise and Vibration	<ul style="list-style-type: none"> <li>• Construction during day time and</li> <li>• Use of low noise and vibrating equipment;</li> <li>• Provision of protective equipment (PPE);</li> <li>• DG set to be fitted with acoustic enclosure</li> <li>• Care to be taken so that overall noise level to the nearby schools health centre like Budge Budge College, Churial Bazaar More, Orient Market, Budge Budge Railway Station, Burning ghat in Ward 1.</li> </ul>
Construction camps-Sanitation	Nuisance due to absence of facility of sanitation and solid waste management	<ul style="list-style-type: none"> <li>• Labour camp if provided, must have adequate provision for shelter, water supply, sanitation and solid waste management as per guideline given in <b>Appendix-1</b>.</li> </ul>
Sewerage Network and Pumping Station	Debris Generation from excavation	<ul style="list-style-type: none"> <li>• Top soil shall be preserved and may be used for agricultural purpose or development of city parks.</li> <li>• Debris need to manage as per plan given in <b>Appendix2</b>.</li> </ul>
	Noise and vibration disturbances to residents and businesses	<ul style="list-style-type: none"> <li>• Construction activities to be carried out in day time with prior intimation to local residents and shop keepers.</li> <li>• Construction work near schools and colleges to be carried out with prior information</li> <li>• Provision of noise barriers in inhabited areas, particularly near sensitive zones like Hospitals, schools etc.,</li> </ul>
	Traffic Inconvenience	<ul style="list-style-type: none"> <li>• Alternate traffic routing must be adopted in consultation with concerned traffic police authorities.</li> <li>• Care should be taken to minimize congestion and negative impacts at schools and Hospitals.</li> </ul>
	Spillage fuel and oil	<ul style="list-style-type: none"> <li>• Care to be taken to store fuel and oil to be stored in drums mounted on a concrete paved platform with slop</li> </ul>

Activity	Potential Impact	Mitigation Measure
		draining to small spills collection pit.
<b>Operation Phase</b>		
STP Treatment and Disposal of Treated Water and Sludge	River, land or ground water pollution due to discharge of untreated or partially treated sewage due to inadequate or inefficient STP operations.	<ul style="list-style-type: none"> <li>• Monitor the treated sewage quality and ensure compliance with PCB standards for effluent disposal into surface water</li> <li>• Undertake periodic audit as per these procedures.</li> <li>• Comply with all applicable condition of consent to operate</li> <li>• Quarterly monitoring of influent sewage, treated sewage, upstream and downstream point of treated sewage disposal point to river</li> <li>• Develop and maintain two rows of green belt as per provision of design to prevent spread of bad odour.</li> <li>• Accumulated sludge &amp; solid waste to be cleared within 24 hours.</li> <li>• Suitable herbicides to avoid odour nuisance</li> <li>• Quarterly monitoring of Ambient Air Quality with respect to PM10, PM2.5, SOx and NOx, CO and Odour.</li> </ul>
	Indiscriminate disposal of sludge leading to contamination of land and soil.	Sludge dewatering with minimum land involvement and use of digested sludge as manure or disposed to the existing SWM disposal site located 90 meters away from the STP site.
Sewer Line	Water pollution and possibility of mixing with water supply line	Regular monitoring of sewer line manhole leakages/ overflows. Immediate shall be carried out to plug the restore the sewer and other utility services if damaged leakages.
Sewage Pumping Station	Bad odour, Health hazard and public nuisance	<ul style="list-style-type: none"> <li>• Ensure minimum noise generation at pumping station and STP .</li> <li>• No tree cutting is involved.</li> <li>• Tree plantation of at least two rows around the periphery of SPS site and landscaping to prevent spread of bad odour</li> <li>• Accumulated sludge to be disposed to a site located near 90m-2km from site</li> </ul>
<b>Social</b>		
Livelihood during Construction	No impact, as there will be no impact on livelihood of any permanent shop-owners, licensed kiosks	But suggested if noticed during construction, then should be compensated according to ESMF
Land acquisition	Except two sites for the SPS all the sites for SPS and STP are Govt. land	The land owners for the two sites have provided their concurrence for the project, details given in <b>Annexure-6</b> .
Inconvenience to	inconveniences to	Public notice to be circulated, construction should be

<b>Activity</b>	<b>Potential Impact</b>	<b>Mitigation Measure</b>
public	the public due to construction like access to their premises, etc.	completed in the given time, debris should be cleared in time
Health issues- due to dust, noise pollution	During construction dust and noise generated, can cause nuisance to people especially elderly and children, but impact is very limited.	Use of acoustics and water sprinkling

During the EMP Implementation the DBO Operator will take care of the health and safety aspects of the labours as per the prevalent practices, details related to the same is given in the EMP table in 7.1.

### **11. Institutional Arrangement for implementing ESAMP**

The contractor/DBO Operator shall be responsible to implement the EMP primarily in assistance with the Project Management Consultant team. The Environmental Specialist from the Independent Engineer/ Supervision Consultant shall monitor the compliance of the EMP and all the design drawings of various civil structures shall be implemented after his approval.

The State, local Government will be responsible for Coordination, Monitoring and evaluation of the Environment Management Plan. It should ensure all the safeguarding plans are in line and acted upon. Contractor shall report the implementation of the Environment Management Plan to the Environmental Expert and the Project management consultant as well as to WBPC through monthly reports. Further a quarterly report is required to be prepared and required to be given to National Mission for Clean Ganga (NMCG) for the progress made in implementing the Environment Management Plan.

### **9. Cost Estimate**

Indicative Cost estimates for ESAM Plan (including (Environmental Monitoring for construction and operation phases) is **Rs 66.06 Lakhs**. Detailed break up is given in table 7.2.