

## Section 8 - Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC. The clause number of the SCC is the corresponding clause number of the GCC.

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## 1. Definitions

**The Employer is:** The Chief Engineer, TWAD Board, Madurai.

**The Project Manager is:** Executive Engineer, TWAD Board, Sewerage Division, Rajapalayam.

**The Bank is:** Asian Development Bank

**Country of Origin:** Most recent list of eligible countries as specified in Article 1.1(d) of Contract Agreement

**Bank Guarantee:** A bank guarantee is a promise from a bank or other lending institution that if a particular borrower defaults on a loan, the bank will cover the loss.

**Bank:** means a financial institution (other than Asian development Bank) licensed to receive deposits and make loans.

**Contract Completion Certificate:** Means the certificate issued by the Employer's Representative to the Contractor, stating the date on which Contractor completes his obligations in respect of both the Design Build and the Operation and maintenance Services.

**Contract Completion Date:** Means the date contained in the Contract Completion Certificate as being the date on which the Operational Services have been completed.

**Design-Build:** means all work to be performed by the Contractor under the Contract to Design, build, test and complete the Work.

**Interim Payment Certificate:** means a payment certificate issued under the Contract, other than the Final Payment Certificate..

**Maintenance:** running the plant to meet functional guarantee.

**Maintenance Retention Fund and Maintenance Retention Guarantee:** means the fund and Guarantee respectively provided for or created by deductions from each interim payment during Operation and Maintenance Services, intended for Maintenance of the Facility.

**National:** means any entity owned, controlled, or financially supported by the Government Employer's country.

**Notice:** means a written communication intended as a Notice and issued in accordance with provisions of this Contract.

**Operation Services:** means the Operation and Maintenance of the Facility as set out in the Operation and Maintenance Requirement.

**Operation:** Means the Operation and Maintenance of the facility as set out in the Operation and Maintenance Requirements.

**Operational Service Period:** Means the period from the date stated in Operational Acceptance Certificate to the date stated in Contract Completion Certificate.

**Operational Acceptance Certificate:** Operational Acceptance Certificate is the Certificate issued to the Contractor with the intention that the Contractor's liabilities related to Design-build activity are discharged at this point, save for liabilities for defects and any outstanding works. Issuance of Operational Acceptance Certificate shall be pre-requisite for the Commencement of

Operational Service Activities.

**Representative:** mean either of the representatives as per GCC 17.

**Sections:** means a part of the Works specified in the Contract as a Section (if any).

**Security:** shall mean the same as in Clause 13 of GCC.

**Unforeseeable Physical Conditions:** means natural physical conditions and manmade and other physical obstructions and pollutants, which are unforeseeable by an experienced Contractor prior to bid submission and encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic conditions

## 5. Law and Language

- 5.1 The Contract shall be interpreted in accordance with the laws of: India
- 5.2 The ruling language is: The English language
- 5.3 The language for communications is: The English language.

## 7. Scope of Facilities

- 7.3 The Contractor agrees to supply spare parts for a period of years: 10 years.

The Contractor shall carry sufficient inventories to ensure an ex-stock supply of consumable spares for the Plant. Other spare parts and components shall be supplied as promptly as possible, but at the most within 6 months of placing the order and opening the letter of credit. In addition, in the event of termination of the production of spare parts, advance notification will be made to the Employer of the pending termination, with sufficient time to permit the Employer to procure the needed requirement. Following such termination, the Contractor will furnish to the extent possible and at no cost to the Employer the blueprints, drawings and specifications of the spare parts, if requested.

## 8. Time for Commencement and Completion

- 8.1 The Contractor shall commence work on the Facilities within 14 days from the Effective Date for determining Time for Completion as specified in the Contract Agreement.
- 8.2 The Time for Completion of the whole of the Facilities shall be 24 months from the Effective Date as described in the Contract Agreement.
- 8.3 The Time for Operation and Maintenance of the Facilities shall be 10 years after the issue of Operational Acceptance certificate as described in the Contract Agreement.

Time for Completion for parts of the Facilities: Not Applicable.

## 9. Contractor's Responsibilities

Add the following sentence at the end of Sub-clause 9.1 as:

The Contractor shall also be responsible for Operation and Maintenance of the Plant for a period as stated in Sub-clause 8.3 and comply with requirements of Sub-clause 62 (Operation & Maintenance).

Add the following Sub-paragraph 9.9 as:

The Contractor shall provide the following:

Sufficient, properly qualified operating and maintenance personnel

Shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and

Shall perform all work and services of whatsoever nature, including those required by the Employer to properly carry out Pre-commissioning, Commissioning. Guarantee Tests and Operation and Maintenance.

Smooth and successful running of the plant for the agreed period.

The contractor will be responsible for the functional guarantee of the plant during operation and maintenance period of the plant.

All costs and expenses involved in the performance of the obligations during operation and maintenance period of the plant.

## 11. Contract Price

- 11.2 The Contract Price shall be adjusted in accordance with the provisions of Appendix 7 (Price Adjustment) to the Special Conditions of Contract (SCC)

## 13. Securities

- 13.3.1 The amount of performance security, as a percentage of the Contract Price for the Facility or for the part of the Facility for which a separate Time for Completion is provided, shall be: : **5 % of the Contract price in two securities.**

(a) One for construction component including GST

(b) Another for Operation and Maintenance including GST

However both the securities should be submitted simultaneously within 28 days of the notification of contract award.

- 13.3.2 The performance security shall be in the form of the unconditional and irrevocable Bank Guarantee as per form included in Section 9 (Contract Forms).

If the Bank issuing the Security is located outside the Employer's country, it shall have a correspondent Bank located in the territory of Employer's Country to make it enforceable.

- 13.3.3 a) The performance security of construction components shall be released after Defect Liability Period.
- b) The performance security of Operation and maintenance period shall be released after 12 months from the successful completion of the maintenance period of 10years.

## **18. Work Program**

### **18.3 Progress Report**

Add the following Sub-paragraph “c” as:

(c) monitoring of obligations in Subclause 21.3.5, 22.1.1(c), 22.2.4(a), 22.2.7(d), 22.2.15, 22.2.16 and 47.

## **21. Procurement**

### **21.3 Transportation**

Add the following Sub-clause 21.3.5 as:

21.3.5 The Contractor shall adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction, and reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.

## **22. Installation**

### **22.1 Setting Out / Supervision**

Add the Sub-clause 22.1.1 (c) as:

22.1.1(c) The Contractor shall comply with (i) the measures and requirements set forth in the Resettlement Plan (RP) and Indigenous People Plan (IPP) attached thereto as Appendix 1 & Appendix 2, to the extent they concern impacts on affected people during construction; and (ii) any corrective or preventive actions set out in a Safeguards Monitoring Report (SMR) that the Employer will prepare from time to time to monitor implementation of (RP). The Contractor shall allocate a budget for compliance with these measures, requirements and actions.

### **22.2 Labour**

Add the following paras at the end of Sub-clause 22.2.4(a) as:

The Contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall follow and implement all statutory provisions on labour (including not employing or using children as labour and equal pay for equal work), health, safety, welfare, sanitation and working conditions. The Contractor shall base the employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The Contractor shall provide equal wages and benefits to men and women for work of equal value or type.

The Contractor shall not employ any child to perform any work including work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. “Child” means a child below the statutory minimum age specified under applicable National, provincial or local law

**22.2.5 Working Hours**

- (a) Normal working hours are: Eight hours between sunrise and sunset in compliance with applicable law.

**22.2.7 Health and Safety**

- (d) The Contractor shall throughout the contract (including the Defect Liability Period):
- (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Employer's and Project Manager's employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular;
  - (ii) provide male or female condoms for all Site staff and labor as appropriate; and
  - (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.

The Contractor shall include in the program to be submitted for the execution of the Facilities under Subclause 18.2 an alleviation program for Site staff and labor and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Subclause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for the preparation and implementation this program shall not exceed the amount dedicated for this purpose.

**22.2.8 Funeral Arrangements**

Funeral arrangements: Sub-clause 22.2.8 of GCC shall prevail.

**24. Completion of the Facilities**

Replace the Sub-clause 24.2 with:

Within 7 days after issuance of the notice under GCC Subclause 24.1, the Contractor shall supply the operating and maintenance personnel, raw materials, utilities, lubricants, chemicals, catalysts, facilities, services, and other matters necessary for Pre-commissioning of the Facilities or any part thereof.

Pursuant to the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement, the Employer shall also provide, within the said 7-day of receipt of such notice, Electricity connection and ensure supply of Electricity required for Pre-commissioning of the Facilities or any part thereof.

- 24.3 As soon as reasonably practicable after the Electricity connection has been provided by the Employer and supply of Electricity is made by the Employer, the Contractor shall commence Pre-commissioning of the Facilities or the relevant part thereof in preparation for Commissioning, subject to GCC Subclause 25.5.

## **25. Commissioning and Operational Acceptance**

- 25.2.2 The Guarantee Test of the Facilities shall be successfully completed within 2 months from the date of completion.
- 25.3.3 The Project Manager shall, after consultation with the Employer, and within 7 days after receipt of Contractor's notice, issue a Commissioning Certificate of the facilities along with a notice to commence the Operation and Maintenance services. The contractor has to commence the Operation and Maintenance services within 28 days from the date of Operational Acceptance of the facilities.

## **26. Completion Time Guarantee**

- 26.2 Applicable rate for liquidated damages: 0.05% of the Contract price per day.  
Maximum deduction for liquidated damages: 10% of the Contract price.
- 26.3 No bonus will be given for earlier Completion of the Facilities or part thereof.

## **27. Defect Liability**

- 27.2 The Defect Liability Period shall be 2 years from the date of Operational Acceptance of the Facilities (or any part thereof).
- 27.10 The critical components covered under the extended defect liability are Not Applicable, and the period shall be: Not Applicable.

## **30. Limitation of Liability**

- 30.1 (b) The multiplier of the Contract Price is: 1.25 (one point two five).

## **35. Unforeseen Conditions**

- 35.1 Add the following before last para of Sub-clause 35.1 as:
- In addition to notice of any Unforeseeable Physical Conditions, the Contractor shall provide the Project Manager with a written notice of any unanticipated environmental, resettlement or indigenous peoples risk, or impact that arise during construction, implementation or operation of the Project that were not considered in the Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA), the Environmental Management Plan (EMP), the RP or the IPP, attached thereto as Appendix 1 through Appendix 5.

## **42. Termination**

### **42.2 Termination for Contractor's default**

Add new sub-clause 42.2.2 (e) as:

- 42.2.2 (e): if the contractor is in breach of the provisions stipulated in sub-clause 22.2.4 and 22.2.7, of this special conditions of contract.

## 45. Disputes and Arbitration

45.1 The Dispute Board shall be appointed within 28 days after the Effective Date.

The Dispute Board shall be one sole member.

List of potential Dispute Board members is:

Er.V Arumugam, B.E., S.E., (Retd.,) Ramanathapuram.

45.2 Appointment (if not agreed) to be made by: The Institution of Engineers (India), Tamil Nadu Chapter.

**45.5** *For a contract with a local Contractor:*

In the case of a dispute between the Employer and the Contractor, the dispute shall be settled by arbitration in accordance with the rules of procedure of the Indian Arbitration and Conciliation Act as in force on the date of the Contract.

Place of arbitration: Chennai, State of Tamil Nadu, India.

*For a contract with a foreign Contractor:*

In the case of a dispute between the Employer and the Contractor, the dispute shall be settled by international arbitration conducted in accordance with the Arbitration Rules of the Singapore International Arbitration Centre. The arbitration procedure shall be administered by the Singapore International Arbitration Center.

Place of arbitration: Singapore

## 46. Eligibility

46.1 The Contractor shall have the nationality of an ADB member country. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

46.2 The materials, equipment and services to be supplied under the Contract shall have their origin in eligible source countries and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment and services.

46.3 For purposes of SCC 46.2, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

## 47 Protection of the Environment

The Contractor shall comply with all applicable National, provincial and local environmental laws and regulations.

The Contractor shall:

establish an operational system for managing environmental impacts;

comply with the measures relevant to the contractor set forth in the EMP and any corrective or preventative actions set forth in a Safeguards Monitoring Report'

allocate the budget required to ensure that such measures are carried out. The Contractor shall submit quarterly reports on the carrying out of such measures to the Employer.

#### **48 Operation and maintenance service requirements**

The Contractor shall comply with the Operation Management Requirements as provided for in the Contract and revisions thereof, which are agreed during the Contract Period.

The Contractor shall follow the requirements of the Operation and Maintenance Plan and the operation and maintenance manuals. No significant alteration to such arrangements and methods shall be made without the prior approval of the Employer's Representative.

During the operation service, the Contractor shall be responsible for ensuring that the works remain fit for the purpose for which they are intended.

The operators and maintenance personnel for the Works, including Plant operations, shall have the appropriate experience and qualifications to perform the Operation Service. The names, with details of their qualification and experience of all operation and maintenance personnel shall be submitted to the Employer for approval, and no such personnel shall be engaged prior to receiving such approval.

#### **49 Commencement of Operation Service**

Unless otherwise stated in Employer's Requirements, the commencement of the Operation Service shall be from the date stated in the Operational Acceptance Certificate Issued under this contract.

The Operation Service shall not commence until the Design-Build of the Works or any Sections has been completed in accordance with the provisions of the contract.

Should the Operational Acceptance Certificate, or any Notice attached or pertaining thereto, contain requirement or restrictions over and above those in the Contract, the Contractor shall comply with such requirements.

The Contractor shall thereafter provide the Operation Service in compliance with the Operation Management Requirements and in accordance with the as built Documents and operation and maintenance manuals

If the Contractor wishes to modify a document, which has previously been submitted and approved, the contractor shall immediately notify the Employer's Representative, and shall subsequently submit revised document(s) to the Employer's Representative for review accompanied by a written explanation of the need for such modification.

The contractor shall not implement any proposed modification until such modification has been reviewed by the Employer's Representative, and consent to proceed has been given in writing. However, any such approval or consent, or any review shall not relieve the Contractor from any obligation or responsibility.

**50. Training**

The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the required extent. The programme and scheduling of the training should be agreed with the Employer, and the Contractor shall provide experienced training staff, and all training materials as required for smooth running of the plant.

This training should be carried out during the last 1 year of the 10 years O & M period. The employer will depute his personnel to under this training as required. This training should be sufficient enough so that the employer personnel will be in a position to smoothly operate and maintain the plant once the plant is handed over to them after completion of the 10-year O & M period.

**51 . Delays and Interruptions during the Operation Service**

Delays and interruptions during the Operation Service shall be agreed and determined as follows:

**(a) Delays or Interruptions caused by the Contractor**

If there are any delays or interruptions during the Operation Service which are caused by the Contractor or by a cause for which the Contractor is responsible, the Contractor shall compensate the Engineer an amount equivalent to 0.5% of the Annual Operation and Maintenance Cost for each calendar day of such delay. The amount of compensation due shall be mutually discussed and agreed or determined according to the requirements and the Engineer shall be entitled to recover the amount due by making a corresponding deduction from the next payment due to the Contractor. However, the total amount of compensation payable by the Contractor to the Engineer shall be kept at a reasonable level. There will be no extension of the period of the operation Service as a result of any such delay or interruption.

**(b) Suspension by the Engineer**

The Project Manager may at any time during Operation Service instruct the Contractor to suspend progress of the Operation Service. During such suspension, the Contractor shall protect, store, secure and maintain the Plant against any deterioration, loss or damage.

If the need to suspend the Operation service by the Project Manager is due to any failure of the Contractor or circumstances for which the Contractor is responsible under the contract, the provisions under Sub-clause 56 (a) of SCC will apply.

If a suspension, which is due neither to any failure by the Contractor nor to circumstances for which the Contractor is responsible under the Contract has continued for more than two months, the contractor may request the Project Manager's permission to proceed. If the Project Manger does not give permission within two weeks after being requested to do so, the Contractor may give Notice of termination.

After the permission or instruction to proceed is given, the Contractor and the Project Manager shall jointly examine the works. The Contractor's Representative shall make a written record of all making good required to be carried out by the Contractor. If the suspension is due neither to any failure by the Contractor nor to circumstances for which the Contractor is responsible under the Contract, the Contractor shall be entitled to be paid the Cost Plus Profit of making good the Works prior to re-commencing the Operation Service.

**52. Failure to achieve functional guarantee**

In the event that the Contractor fails to achieve functional guarantee required under the Contract, the Parties shall jointly establish the cause of such failure.

- (a) If the cause of the failure lies with the Project Manager or any of his servants or agents, then, after consultation with the Contractor, the Project Manager shall give written instruction to the Contractor of the measures, which the Project Manager requires the Contractor to take. If the Contractor suffers any additional cost as a result of the failure or the measures instructed by the Project Manager, the Project Manager shall pay the Contractor his Cost plus Profit.
- (b) If the cause of the failure lies with the Contractor then, after due consultation with the Project Manager the Contractor shall take all steps necessary to restore the output to the levels required under the Contract. If the Project Manager suffers any loss as a result of the failure or the measures taken by the Contractor, the Contractor, shall pay the Project Manager the performance damages as applicable.

Unless otherwise stated in the Contract data, if the failure continues for a period of more than one month and the Contractor is unable to achieve the required production output the Employer may either:

- (i) Continue with the operation Service at a reduced level of compensation as given in the terms of payment.
- (ii) If the production outputs fail to reach the desired values required in the Contract Data, give Notice to the Contractor not less than one month prior to terminating the Contract. In such an event, the Project Manager shall be free to continue the Operation Service himself or by others.

### **53. Completion of Operation Service**

Unless the Parties have mutually agreed to prolong the Operation Service, the Service obligation of the Contractor to operate and maintain the Plant under the, Operation Service shall cease at the end of the period stated in the Contract as the Operation Service Period.

Notwithstanding the foregoing, other services to be performed by the Contractor must be completed before the Contractor will be entitled to receive the Contract Completion Certificate in accordance with tender clauses.

Pre-conditions which must be fulfilled by the Contractor before the Contract Completion Certificate will be issued are:

- a) Inspection as required
- b) Testing as required
- c) Updating Operation and Maintenance manuals providing performance records and data as required
- d) Remedying defects found during inspection

Prior to issuance of contract completion certificate a joint inspection committee will be formed for carrying out through inspection of plant with respective civil works, mechanical works, electrical works and ICA works. This committee will prepare programme for all the tests to be carried out and testing procedures to be followed which will be agreeable for both Project Manager and contractor. This committee needs to be formed 6 months prior to the completion of O & M period.

### **54. Joint Inspection Prior to Contract Completion**

Not less than three months to the expiry date of the Operation Service Period, the Project Manager and the Contractor shall carry out a joint inspection of the Works and within two weeks of the completion of the joint inspection, the contractor shall submit a report on the works identifying maintenance work (excluding routine maintenance works and the correction of defects), replacements and other works required to be carried out to satisfy the requirements of the Operation and Maintenance Plan after the Contract Completion Date.

The Contractor shall submit a programme for carrying out such works during the remainder of the Operation Service Period.

Following receipt of the Contractor's report the Employer's Representative may, throughout the remainder of the Operation Service Period, instruct the Contractor to carry out all or part of the works identified in the Contractor's report. Upon satisfactory completion of the items identified in the inspection report the Employer shall instruct the Contractor to commence the Tests Prior to Contractor Completion date

#### **55. Procedure for Test Prior to Contract Completion**

The Tests Prior to Contract Completion ("Tests") are to be carried out by the Contractor who shall provide all necessary labour, materials, electricity, fuel and water, other than Tests are to be carried out in accordance with the requirement.

The Tests shall be carried out towards the end of the Operation Service. These tests include functional guarantee tests, civil works tests, mechanical and electrical works tests. The Contractor shall give Notice to Employer not less than ten days prior to the date, after which the tests shall be carried out. Unless otherwise agreed, such tests shall be commenced within ten days after this date, on the day or days determined by the Project Manager.

The results of the tests shall be compiled and evaluated by the Project Manager and the Contractor. The Contractor shall make the results of any tests, inspections or monitoring available to the Employer's Representative within 7 days of their receipt. Any effect on the results of the tests which can reasonably be shown to be due to prior use of the Works by the Contractor during the Operation Service Period shall be taken into account in assessing such result.

As soon as the Contractor has completed the tests, the Contractor shall notify the Project Manager that the works are Complete and ready for final inspection. Upon the Project Manager being satisfied that the Contractor has satisfied the requirements of the tests regarding such final inspection. The Project Manager shall notify the Employer and the Contractor prior to the issue of the Contract Completion Certificate.

#### **56. Ownership Output and Revenue**

During the Operation Service, any production output and revenue shall be the exclusive property of the Employer

#### **57 . Operation & Maintenance**

The sewage treatment plant so constructed by the contractor will be operated & maintained by contractor for a period of 10 years after the steady state conditions have been achieved along with defect liability. While activities involved in the plant operation & maintenance are given in subsequent paragraphs, it would be duty of the contractor maintaining the plant to keep the grassy lawns & flower beds in the plant area in proper condition & general upkeep of the balance area.

The contractor is also responsible for the following:

Operating the plant with the design capacity maintaining the output quality.

Keeping the down time of any equipment as low as possible .

Maintaining all the plant, equipment and tools and making necessary repairs.

Technical and administrative monitoring of the plant.

The laboratory for maintaining the overall performance of the plant & those of any individual units shall also be maintained & staffed by the contractor. He will be responsible for daily monitoring of the plant in particular & any other unit in general.

General tests such as BOD, COD suspended solids & coliform count etc., for both influent & effluent will have to be monitored on daily basis while any other test such as VSS, TSS, MLSS, ML VSS etc., may also be required to be done routinely. Contractor will be responsible for manpower, chemical consumption & replacement of any broken glass ware.

## **58. Gender and Development**

The Contractor shall comply with the measures set forth in the gender equality and social inclusion action plan, attached thereto as Appendix [ 6 ].

## **59. List of Appendix to Special Conditions of Contract**

**Appendix 1: Resettlement Plan**

**Appendix 2: Indigenous Peoples Plan**

**Appendix 3: Environmental Monitoring Plan**

**Appendix 4: Environmental Management Plan**

**Appendix 5: Initial Environmental Examination (IEE) Report/  
Environmental Impact Assessment (EIA) Report**

**Appendix 6: Gender equality and social inclusion action plan**

**Appendix 7: Price Adjustment**

**Appendix 8: Time Schedule**

# **Appendix 1**

## **Resettlement Plan**

### **(Not Applicable)**

# **Appendix 2**

## **Indigenous Peoples Plan (IPP)**

### **(Not applicable)**

# **Appendix 3**

## **Environmental Monitoring Plan**

**Construction Stage Environmental Monitoring Plan (STP)**

<b>Monitoring field</b>	<b>Monitoring location</b>	<b>Monitoring parameters</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost and Source of Funds</b>
Construction disturbances, nuisances, public and worker safety,	All work sites	Implementation of construction stage EMP including dust control, noise control, traffic management, and safety measures. Site inspection checklist to review implementation is appended at <b>Appendix 7</b>	Weekly during construction	DB Contractor	Staff and consultant costs are part of incremental administration costs
Ambient air quality	1 location (STP, at the boundary of the site downwind direction)	<ul style="list-style-type: none"> <li>PM10, PM2.5 NO2, SO2, CO</li> </ul>	Once before start of construction Quarterly (yearly 4-times) during construction (3 year period considered)	DB Contractor	Cost for implementation of monitoring measures responsibility of DB contractor (13 samples x 5000 per sample = 65,000)
Ambient noise	1 location (STP, at the boundary of the site downwind direction)	<ul style="list-style-type: none"> <li>Day time and night time noise levels</li> </ul>	Once before start of construction Quarterly (yearly 4-times) during construction (3 year period considered)	DB Contractor	Cost for implementation of monitoring measures responsibility of DB contractor (13 samples x 1500 per sample = 19,500)
Surface water quality	2 sampling locations (Kondaneri kanmaai, Alavathmkulam,)	<ul style="list-style-type: none"> <li>pH, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity</li> </ul>	Once before start of construction Half yearly during construction (3 year construction period considered)	DB Contractor	Cost for implementation of monitoring measures responsibility of DB contractor (14 samples x 4000 per sample = 56,000)
Baseline water quality of receiving water body (kothankulam)	3 points (1 at STP discharge location, 1 centre and one periphery near overflow weir)	<ul style="list-style-type: none"> <li>pH, TDS, TSS, DO, BOD, COD, E-coli, Total coliform, Nitrate, Total Phosphates, Oil &amp; grease, Total hardness, Sulphate, Fluoride, Chloride,</li> </ul>	Twice (Pre monsoon and post monsoon during design phase)	DB Contractor	Cost for implementation of monitoring measures responsibility of DB contractor (6 samples x 8000 per

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost and Source of Funds
tank)		Ammonia, Aluminum, Manganese, Iron, Zinc, Nickel, Magnesium, Phenolic compounds, Chromium, Arsenic, Mercury, Cadmium, Lead, Pesticides			sample = 48,000)
Baseline sediment quality in channel	3 points (1 at STP discharge location, 1 centre and one periphery near overflow weir)	<ul style="list-style-type: none"> <li>EC, pH, calcium, magnesium, % of total organic matter, Total organic carbon, N, P, K, Aluminum, fecal coliform, As, Cu, Cd, Cr, Pb, Fe, Mn, Hg, Zn, Ni.</li> </ul>	Once (pre monsoon)	DB Contractor	Cost for implementation of monitoring measures responsibility of DB contractor (3 samples x 10000 per sample = 30,000)

### Operation Stage Environmental Monitoring Plan (STP)

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost and Source of Funds
Monitoring of treated wastewater quality from STP	Inlet and outlet of STP	Parameters as specified by TNPCB in the consent. Concentration of various parameters in treated wastewater shall be within the specific limits as per the discharge standards for STP.	Monthly Once	RJPM Mpty	O & M cost
Water quality of receiving lake	3 points (1 at STP discharge location, 1 centre and one periphery near overflow weir)	pH, Cl, F, NO <sub>3</sub> , TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity,  heavy metals and pesticides	Monthly once during operation  Yearly twice (pre & post monsoon)	RJPM Mpty	O and M costs (water quality will be tested at the internal laboratory part of STP)
Water quality of overflow water	at the start of overflow channel, just downstream of overflow weir	Nematode (should be less than one viable nematode egg per litre) Faecal coliforms (less than 1000 faecal coliforms per 100 millilitres).	Monthly once during operation	RJPM Mpty	O and M costs (water quality will be tested at the internal laboratory part of STP)
Odour monitoring at STP	2 points (downwind direction) with in STP and at nearest house	Hydrogen sulphide (H <sub>2</sub> S)  H <sub>2</sub> S shall not exceed in ambient air: <ul style="list-style-type: none"> <li>• 7 µg/m<sup>3</sup> (30-minute averaging period)</li> <li>• 150 µg/m<sup>3</sup> (24-hour average)</li> </ul>	Half yearly (yearly twice) and as and when based on public complaints (throughout the operation phase)	RJPM Mpty	O and M Costs
	1 point (at the boundary wall of the STP)	Hydrogen sulphide (H <sub>2</sub> S)  H <sub>2</sub> S shall not exceed in ambient air: <ul style="list-style-type: none"> <li>• 7 µg/m<sup>3</sup> (30-minute averaging period)</li> <li>• 150 µg/m<sup>3</sup> (24-hour average)</li> </ul>	Periodically	RJPM Mpty	O and M Costs

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost and Source of Funds
Sludge quality and suitability as manure	STP	Analysis for concentration of heavy metals and confirm that value are within the limits specified in the SWM rules.	Start of operation and Yearly once	RJPM Mpty	O and M costs (testing to be done at an accredited external laboratory)

# **Appendix 4**

## **Environmental Management Plan**

**Design Stage Environmental Impacts and Mitigation Measures (STP)**

<b>Field</b>	<b>Anticipated Impact</b>	<b>Mitigation Measures</b>	<b>Responsibility of Mitigation</b>	<b>Cost and Source of Funds</b>
Design of STP	Deficient treatment due to substandard operation / system malfunction	<ul style="list-style-type: none"> <li>(i) Design the treatment process to meet the applicable discharge standards</li> <li>(i) Ensuring continuous uninterrupted power supply, including a back-up facility (such as generator)</li> <li>(ii) Providing operating manual with all standard operating procedures (SOPs) for operation and maintenance of the facility</li> <li>(iii) Necessary training to ULB staff dealing with STP.</li> <li>(iv) Extended contractor period for O and M, proper transfer of facility to ULB with adequate technical know-how on O and M and hands-on training to ULB staff</li> <li>(v) Provision for online monitoring of crucial wastewater quality parameters at the inlet and outlet of the plant (BOD, pH, ammonia etc.,)</li> </ul>	DB Contractor and PIU	Project cost - DB Contractor
STP treatment efficiency	Change of inlet sewage parameters and deficient treatment quality	<ul style="list-style-type: none"> <li>(i) No industrial wastewater shall be allowed to dispose into municipal sewers</li> <li>(ii) No domestic wastewater from industrial units shall be allowed into municipal sewers</li> <li>(iii) Ensure that there is no illegal discharge through manholes or inspection chambers</li> <li>(iv) Conduct public awareness programs; in coordination with TNPCB</li> <li>(v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated effluent quality complies with the applicable standards</li> </ul>	RJPM Mpty	PIU Costs
Discharge of treated wastewater into lake	Safety and inundation issues	<ul style="list-style-type: none"> <li>(i) Conduct channel baseline water quality and hydrological study, and assess the suitability of STP treated effluent disposal into the channel. This should be in terms of water quality, safety, stability, inundation and erosion risk of channel . Include appropriate measures in the project design for implementation</li> <li>(ii)</li> </ul>	DB Contractor and PIU	Project cost - DB Contractor
	Odour nuisance	<ul style="list-style-type: none"> <li>(i) Providing a green buffer zone of 15-20 m wide all around the STP with trees in multi-rows and land scaping. This will act as a visual screen around the facility and will improve the aesthetic appearance. Treated wastewater will be used for land scaping</li> </ul>	DB Contractor and PIU	Project cost - DB Contractor
	Sludge disposal	<ul style="list-style-type: none"> <li>(i) Prepare sludge management plan (collection, treatment, drying, disposal and periodic testing) and integrate into design, construction and operation</li> </ul>	DB Contractor and PIU	Project cost - DB Contractor

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Cost and Source of Funds
	Noise	(i) Procure good quality latest technology high pressure pumps that guarantee controlled noise at a level of around 80 dB(A) at a distance of 1 m (ii) Use appropriate building materials and construction techniques for pump houses which can absorb sound rather than reflect noise (iii) Use acoustic enclosures – manufacturer specified, for all pumps, motors (iv) Procure only CPCB approved generators with low emission and low noise fitted with acoustic enclosures (v) Provide sound mufflers for ventilators in the plant rooms; and sound proof doors (vi) Provide ear plugs to workers	DB Contractor and PIU	Project cost - DB Contractor
STP	Energy consumption	(i) Using low-noise and energy efficient pumping systems (ii) Efficient Pumping system operation (iii) Installation of Variable Frequency Drives (VFDs)	DB Contractor and PIU	Project cost - DB Contractor
STP	Tree cutting	(i) Minimize removal of trees by adopting to site condition and with appropriate layout design/alignment (ii) Obtain prior permission for tree cutting (iii) Plant and maintain 10 trees for each tree that is removed	DB Contractor and PIU	Project cost - DB Contractor

**Construction Stage Environmental Impacts and Mitigation Measures (applicable for all components)**

<b>Field</b>	<b>Anticipated Impact</b>	<b>Mitigation Measures</b>	<b>Responsible for Mitigation</b>	<b>Cost and Source of Funds</b>
EMP Implementation Training	Irreversible impact to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo training on EMP implementation including spoils/waste management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH and S), core labor laws, applicable environmental laws, etc.	Contractor	Project cost / PMU cost
Air Quality	Dust, emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.	<b>For all construction works</b> (i) Provide a dust screen around the construction sites of pumping and lifting stations and STP (ii) Damp down the soil and any stockpiled material on site by water sprinkling; (iii) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition (iv) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process (v) Cover the soil stocked at the sites with tarpaulins (vi) Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation (vii) Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by open trucks; (viii) Control dust generation while unloading the loose material (particularly aggregate, sand, soil) at the site by sprinkling water and unloading inside the barricaded area (ix) Clean wheels and undercarriage of haul trucks prior to leaving construction site (x) Ensure that all the construction equipment, machinery are fitted with pollution control devices, which are operating correctly, and have a valid pollution under control (PUC) certificate	Contractor	Contractor costs
Surface water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants	(i) All earthworks be conducted during the dry season to prevent the problem of soil/silt run-off during rains (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;	Contractor	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
	<p>during construction can contaminate nearby surface water quality.</p> <p>Ponding of water in the pits / foundation excavations</p>	<p>(iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used;</p> <p>(iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;</p> <p>(v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;</p> <p>(vi) Store fuel, construction chemicals etc., on an impervious floor, also avoid spillage by careful handling; provide spill collection sets for effective spill management</p> <p>(vii) Dispose any wastes generated by construction activities in designated sites;</p> <p>(viii) Conduct surface quality inspection according to the Environmental Management Plan (EMP).</p>		
	Water accumulation in trenches/pits	<p>(i) As far as possible control the entry of runoff from upper areas into the excavated pits, and work area by creation of temporary drains or bunds around the periphery of work area</p> <p>(ii) Pump out the water collected in the pits / excavations to a temporary sedimentation pond; dispose off only clarified water into drainage channels/streams after sedimentation in the temporary ponds</p> <p>Consider safety aspects related to pit collapse due to accumulation of water</p>	Contractor	Contractor costs
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	<p>(i) Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;</p> <p>(ii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimise sound impact to surrounding sensitive receptor; and</p> <p>(iii) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s.</p> <p>(iv) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;</p> <p>(v) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;</p>	Contractor	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		(vi) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.		
Landscape and aesthetics – waste generation	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items.	(i) Prepare and implement a Construction Waste Management Plan (refer Appendix 3) (ii) As far as possible utilize the debris and excess soil in construction purpose, for example for raising the ground level or construction of access roads etc., (iii) Avoid stockpiling any excess spoils at the site for long time. Excess excavated soils should be disposed off to approved designated areas immediately (iv) If disposal is required, the site shall be selected preferably from barren, infertile lands; sites should be located away from residential areas, forests, water bodies and any other sensitive land uses (v) Domestic solid wastes should be properly segregated in biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; create a compost pit at workers camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material shall be collected separately and sold in the local recycling material market (vi) Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed off in disposal sites approved by TNPCB; (vii) Prohibit burning of construction and/or domestic waste; (viii) Ensure that wastes are not haphazardly thrown in and around the project site; provide proper collection bins, and create awareness to use the dust bins. (ix) Conduct site clearance and restoration to original condition after the completion of construction work; PIU to ensure that site is properly restored prior to issuing of construction completion certificate	Contractor	Contractor costs
Socio-Economic Loss of access to houses and business	Loss of income	(i) Inform all businesses and residents about the nature and duration of any work well in advance so that they can make necessary preparations; (ii) Do not block any access; leave spaces for access between barricades/mounds of excavated soil and other stored materials and machinery, and providing footbridges so that people can crossover open trenches	Contractor	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		(iii) Barricade the construction area and regulate movement of people and vehicles in the vicinity, and maintain the surroundings safely with proper direction boards, lighting and security personnel – people should feel safe to move around (iv) Control dust generation (v) Immediately consolidate the backfilled soil and restore the road surface; this will also avoid any business loss due to dust and access inconvenience of construction work. (vi) Employee best construction practices, speed up construction work with better equipment, increase workforce, etc., in the areas with predominantly commercial, and with sensitive features like hospitals, and schools; (vii) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (viii) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.		
Socio-Economic - Employment	Generation of temporary employment and increase in local revenue	(i) Employ local labour force as far as possible (iii) Comply with labor laws	Contractor	Contractor costs
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Follow all national, state and local labour laws (indicative list is in Appendix 2); (ii) Develop and implement site-specific occupational health and safety (OH and S) Plan which shall include measures such as: (a) safe and documented construction procedures to be followed for all site activities; (b) ensuring all workers are provided with and use personal protective equipment; (c) OH and S Training for all site personnel, (d) excluding public from the work sites; and (e) documentation of work-related accidents; Follow International Standards such as the World Bank Group's Environment, Health and Safety Guidelines <sup>1</sup> . (iii) Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the sites;	Contractor	Contractor costs

<sup>1</sup> <http://www.ifc.org/wps/wcm/connect/a99ab8804365b27aa60fb6d3e9bda932/EHS-Guidelines+101-Webinar.pdf?MOD=AJPERES>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		<p>(iv) Secure all installations from unauthorized intrusion and accident risks</p> <p>(v) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(vi) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(vii) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(viii) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(ix) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and</p> <p>(x) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p> <p>(xi) Provide supplies of potable drinking water;</p> <p>(xii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances</p>		
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	<p>(i) Consult PIU before locating project offices, sheds, and construction plants;</p> <p>(ii) Select a camp site away from residential areas (at least 100 m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation</p> <p>(iii) Avoid tree cutting for setting up camp facilities</p> <p>(iv) Provide a proper fencing/compound wall for camp sites</p> <p>(v) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas</p> <p>(vi) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit</p>	Contractor	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		<p>(vii) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers</p> <p>(viii) Camp shall be provided with proper drainage, there shall not be any water accumulation</p> <p>(ix) Provide drinking water, water for other uses, and sanitation facilities for employees</p> <p>(x) Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed</p> <p>(xi) Train employees in the storage and handling of materials which can potentially cause soil contamination</p> <p>(xii) Wastewater from the camps shall be disposed properly either into sewer system; if sewer system is not available, provide on-site sanitation with septic tank and soak pit arrangements</p> <p>(xiii) Recover used oil and lubricants and reuse or remove from the site;</p> <p>(xiv) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market</p> <p>(xv) Remove all wreckage, rubbish, or temporary structures which are no longer required; and</p> <p>(xvi) At the completion of work, camp area shall be cleaned and restored to pre-project conditions, and submit report to PIU; PIU to review and approve camp clearance and closure of work site</p>		
Work Camps and worksites	<p>Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants</p> <p>Unsanitary and poor</p>	<p>(i) As far as possible located the camp site within the work sites (at STP or large pumping station sites); if any camp to be established outside these, then select a camp site away from residential areas (at least 100 m buffer shall be maintained)</p> <p>(ii) Avoid tree cutting for setting up camp facilities</p> <p>(iii) Ensure that a proper compound wall is provided, and erect a wind/dust screen around</p>	Contractor	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
	living conditions for workers	<ul style="list-style-type: none"> <li>(iv) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas</li> <li>(v) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit</li> <li>(vi) Provide proper temporary accommodation with proper materials, adequate lighting and ventilation, appropriate facilities for winters and summers; ensure conditions of liveability at work camps are maintained at the highest standards possible at all times;</li> <li>(vii) Consult PIU before locating project offices, sheds, and construction plants;</li> <li>(viii) Minimize removal of vegetation and disallow cutting of trees</li> <li>(ix) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be allowed as accommodation for workers</li> <li>(x) Camp shall be provided with proper drainage, there shall not be any water accumulation</li> <li>(xi) Provide drinking water, water for other uses, and sanitation facilities for employees</li> <li>(xii) Prohibit employees from cutting of trees for firewood; contractor should be provide proper facilities including cooking fuel (oil or gas; fire wood not allowed)</li> <li>(xiii) Train employees in the storage and handling of materials which can potentially cause soil contamination</li> <li>(xiv) Recover used oil and lubricants and reuse or remove from the site</li> <li>(xv) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for biodegradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market</li> <li>(xvi) Remove all wreckage, rubbish, or temporary structures which are no longer required</li> <li>(xvii) At the completion of work, camp area shall be cleaned and restored to pre-project conditions, and submit report to PIU; PIU to review and approve camp clearance and closure of work site</li> </ul>		

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (viii) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	Contractor	Contractor costs

#### Operation Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
STP operation – malfunction and effect on efficiency	Public health, safety and environmental impacts	(i) Ensure proper knowledge transfer, hands-on training to municipal staff engaged in STP operation has been provided by contractor prior to handover of facility (ii) Ensure continuous uninterrupted power supply (iii) Operate and maintain the facility following standard operating procedures of operational manual (iv) Undertake preventive and periodic maintenance activities as required (v) Maintain the mechanical / electrical parts as per the maintenance plan to avoid any hazards (vi) Conduct periodic training to workers (vii) Ensure that all safety apparatus at STP including personal protection equipment are in good condition all times; and are at easily accessible and identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations (viii) Implement sludge management plan at the STP	PIU / RJPM Mpty	Operating costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		(ix) No wastewater from industrial premises (including domestic wastewater) shall be allowed to dispose into municipal sewers (x) Monitor regularly and ensure that there is no illegal discharge through manholes or inspection chambers; conduct public awareness programs; in coordination with TNPCB (vii) Conduct regular wastewater quality monitoring at inlet and at outlet of STP to ensure that the treated effluent quality complies with the standards (viii) Conduct periodic testing of dried sludge/compost to check presence of heavy metals and confirming stipulated concentrations to use as compost		

# **Appendix 5**

## **Initial Environmental Examination (IEE) Report/ Environmental Impact Assessment (EIA) Report**

### **(Available upon Request)**

# **Appendix 6**

## **Gender equality and social inclusion action plan**

### GENDER ACTION PLAN

Activities	Indicators and Targets <sup>a</sup>	Responsibility	Time
<b>Output 1. Climate -resilient sewage collection and treatment, and drainage systems developed in 6 cities.</b>			
1.1. Provide sewage connections to poor and poor-women headed households	(i) 1,864 km of new sewage collection pipelines commissioned and 297,547 households connected, including 100% poor and poor women headed households identified through GIAC- and ULB-led survey- in the coverage area (2017 baseline: 0)	GIAC with ULB	Years 1–3
1.2. Train existing community-based organizations in slums in coverage area	(ii) Twelve all-female community based organizations trained as water and sanitation committees and 100% participants reporting improved knowledge of benefits of sewerage collection systems and household connections (2017 baseline: 0) (iii) All water and sanitation committee members provided an estimated 2 training/ year (6) in each town (6) -total 36- with certifications in areas of: leadership and management, water conservation, sanitation, health and hygiene (2017 baseline: 0)		
1.3. Build skills for sewer and sanitary workers	(iv) Two-hundred sewer and sanitary workers provided an estimated 1 training/year (3) -total 6- on skills building training in mechanized equipment and safety gear and reporting knowledge of equipment and safety gear with preference to women workers (2017 baseline: 0 women [sewer workers] and 20% women [sanitary workers])	GIAC with ULBs and CMA	Years 2–4
<b>Output 2. Water supply systems in 1 city improved with smart features</b>			
2.1 Provide water connections to poor and poor-women households	(i) 275 km new water distribution pipelines commissioned within 20 new district metered areas and metered connections provided to 30,800 households (100% households in coverage area, including 100% poor and poor women headed households) (2017 baseline: 0)	GIAC with ULBs, and CMSC	Year 5
2.2 Organize water and sewerage connection campaigns in slum areas	(ii) Community members living in notified and non-notified slums (250/ town [6 towns], total 1,500) participated in water and sewerage connections campaigns on: water and sewerage connection procedure and tariff rules (including pro-poor connection and tariff policies)		
2.3 Conduct training program on NRW for implementing agencies with water projects	(iii) All trainings (1/year, total 3) maintain sex disaggregated data on implementing agencies trainees (Target: 75% women technical staff participation) (iv) At least 80% technical staff of implementing agency reporting improved knowledge and/or skills in NRW reduction as a result of training with 75% participation of women technical staff (2017 baseline: 0)	CMSC with GIAC, PIUs, and ULBs	Years 1–3

Activities	Indicators and Targets <sup>a</sup>	Responsibility	Time
<b>Output 3. Institutional capacity, public awareness, and urban governance strengthened</b>			
3.1 Conduct awareness campaigns for water conservation and hygiene targeting local communities in coverage area	(i) Community members (300/city [6 cities], total 1,800) participated in awareness campaigns on water conservation and hygiene, targeting 50% women participation (2017 baseline: 0) (ii) By 2026, minimum 50% of 600 school students, teachers and administrators (100/city [6 cities], at least 50% women); and 18 women SHGs (3/city [6 cities]) reported improved awareness on water conservation and hygiene, based on post awareness campaign sample survey.	GIAC	Year 2 onwards
3.2 Encourage appointment of women staff in technical positions in newly constituted project units	(iii) 10% women recruited to technical positions in newly constituted Urban Data and Governance Improvement Cell and PDMC in CMA. (2017 baseline: 0)	CMA	
3.3 Conduct training on gender-related aspects of project design and implementation targeting CMA and ULB staff	(iv) By 2020, at least 80% of PDMC technical staff trained in the design and implementation of urban infrastructure projects reporting improved knowledge/skills (Target: 75% participation of women technical staff) (2017 baseline: 0) (v) By 2026, 10 CMA and 60 ULB staff (including 100% of eligible women staff) trained and reported knowledge on approaches in integrating gender equality and social inclusion in urban governance, gender action plan implementation, monitoring and reporting on gender equality results (2017 baseline: 0)	GIAC with CMA, with ADB support	Year 1 onwards
3.4 Establish a PPMS to collect sex-disaggregated data from ULBs	(vi) By 2023, new database established at urban data and governance improvement cell, with sex-disaggregated data where applicable, in six cities (2017 baseline: 0)	CMSC in partnership with GIAC, PIUs, PMU, and ULBs	Years 2–5

ADB = Asian Development Bank, CBO = community-based organization, CMA = Commissionerate of Municipal Administration, CMSC = Construction Management and Supervision Consultants, GAP = gender action plan, GIAC = governance improvement and awareness consultants, km = kilometer, NRW = nonrevenue water; PDMC = project design and management cell, PIU = program implementation unit, PMU = program management unit, PPMS = project performance management system, SHG = self-help group, ULBs = urban local bodies.

<sup>a</sup> The estimated number of female beneficiaries in tranche 1 (Output 1 and Output 2) is 163,000 of a total estimated 328,000 beneficiaries.

# Appendix 7 - Price Adjustment

Prices payable to the Contractor, in accordance with the Contract, shall be subject to adjustment during performance of the Contract to reflect changes in the cost of labor and material components, in accordance with the following formula:

$$P_1 = P_0 \times \left( a + b \frac{L_1}{L_0} + c \frac{M_1}{M_0} \right) - P_0$$

in which:

$P_1$  = adjustment amount payable to the Contractor

$P_0$  = Contract price (base price at agreed rate)

$a$  = percentage of fixed element in Contract price ( $a = \%$ )

$b$  = percentage of labor component in Contract price ( $b = \%$ )

$c$  = percentage of material and equipment component in Contract price ( $c = \%$ )

$L_0, L_1$  = Average monthly labor indexes applicable to the appropriate industry in the country of origin for the month in which the base date falls and the Average monthly of the month under consideration for adjustment, respectively

$M_0, M_1$  = Average monthly material and equipment indexes in the country of origin for the month in which the base date falls and the Average of the month under consideration for adjustment, respectively

## Conditions Applicable to Price Adjustment

The base date shall be the date 28 days prior to the deadline for submission of the Bid.

The date of adjustment shall be the mid-point of the period of manufacture or installation of the component or Plant.

The following conditions shall apply:

- (a) No price increase will be allowed beyond the original delivery date unless covered by an extension of time awarded by the Employer under the terms of the Contract. No price increase will be allowed for periods of delay for which the Contractor is responsible. The Employer will, however, be entitled to any price decrease occurring during such periods of delay.
- (b) If the currency in which the Contract price,  $P_0$ , is expressed is different from the currency of the country of origin of the labor and/or materials indexes, a correction factor will be applied to avoid incorrect adjustments of the Contract price. The correction factor shall correspond to the ratio of exchange rates between the two currencies on the base date and the date for adjustment as defined above.
- (c) No Price adjustment shall be payable on the portion of the Contract price paid to the Contractor as an advance payment.
- (D) Department value also to be arrived at by the bidder.

## Appendix 8 - Time Schedule

Sl. No.	Description	% of achievement	Cumulative % of achievement
1.	Up to I Quarter (6 Months)	10	10
2.	Up to II Quarter (12 Months)	30	40
3.	Up to III Quarter (18 Months)	30	70
4.	Up to IV Quarter (24 Months)	30	100