

**Template for preparation of Detailed Project Report (DPR) on Liquid Waste Management (LWM)**

**(for Project proposals that are submitted to Suchitwa Mission in the DBOT model)**

(This Template is only indicative of the minimum requirements in the structure of a DPR in the DBOT model and so is not meant to guide in the basic formatting of the document, which is left to the discretion of the agency that prepares the document)

(TITLE OF THE PROJECT)

DETAILED PROJECT REPORT

ON

SEWAGE/SEPTAGE/EFFLUENT (specify the right one) TREATMENT PLANT OF CAPACITY .…. (Capacity of plant) KLD/MLD

FOR

……… (specify Corporation / Municipality/ GP/ BP)

TO BE SET UP AT (specify the location)

Prepared by

(Name & address of the Agency)

……..(month)..........(year)

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| **1** | **INTRODUCTION** |  |
|  | * Background * Existing scenario * Need for project * Scope of agency and client * Outcome * Location of the project (include map and sketch) * Site investigation details ( Soil properties, Geotechnical report recommendations, Geography, Topography, Rainfall and climate, Groundwater, Survey details (Contours, Levels based on requirement) etc. |  |
| **2** | **APPROACH AND METHODOLOGY** |  |
|  | * Calculation of wastewater generation and capacity determination * Quality analysis of Influent wastewater to determine characteristics such as BOD, COD, TDS, TSS, Total Coliform etc (to be analyzed through a lab approved by Kerala State Pollution Control Board). * Detailed description of the complete Treatment process (primary, secondary and tertiary) * Justification for choice of the Technology by comparison of different Technologies as applicable to the situation * Final achievable wastewater characteristics |  |

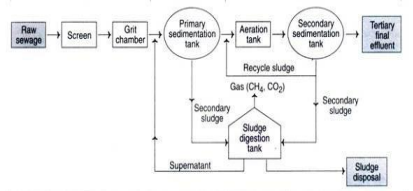
| **3** | **ENGINEERING DESIGN** |  |
| --- | --- | --- |
|  | * Flow diagram for the proposed plant (*refer sample format I*) * Detailed design of all units (*refer sample format II*) * List of civil structures, mechanical and electrical with detailed specifications of all the components. Standby units for all mechanical units are necessary. * Conveyance network * Sludge management plan, * Reuse proposal for treated water, |  |
| **4** | **MILESTONE CHART** |  |
|  | * Detailed specification of civil, electro-mechanical units as in order of execution with milestone payment percentage (*refer sample format III )* * Abstract Estimate ( *refer sample format V*) * Time schedule * Gantt chart showing construction and commissioning of treatment plant (*refer sample format IV*) |  |
| **5** | **OPERATION AND MAINTENANCE PLAN** |  |
|  | * Power Requirement of the Treatment Plant * Cost Estimate for O&M Charges for First year (*Client scope and Contractor's scope detailed separately*) * Operations and maintenance cost for 10 years (*refer sample format VI*) |  |

|  | **ANNEXURES** |  |
| --- | --- | --- |
|  | * Lab report of tested wastewater * Certified A3 Plan of proposed STP showing setbacks from the boundary, pipeline network, etc. prepared as per prevailing building rules * Detailed plan, section, and elevation drawings of individual tanks with clear dimensions * Structural details( reinforcement detailing) * Geotechnical investigation Soil report * Structural Stability Certificate |  |

**SAMPLE FORMAT I**

**Schematic Representation Of The Plant**

Process design and detailed description of waste water treatment components with detailed calculation (detailed flow diagram)



**SAMPLE FORMAT II**

**Engineering Design Of The Components**

Design steps shall be included in this part. All the assumptions and criteria shall be stated. sample design of bar screen chamber and Equalization tank is shown here. design of all the units must be included in the DPR.

**1. Bar Screen**

| **Parameters** | **Value/calculation** |
| --- | --- |
| Average daily flow (assumed) | 120KLD |
| Average hourly flow | 5m3/hr or 0.0014m3/sec |
| Peak hourly flow | 3 x Average flow = 15m3/hr |
| Design flow velocity | 0.3 m/sec (optimal velocity) |
| Cross-sectional area | volume /flow velocity = 0.005 m2 |
| Adjust for the flow-area blocked by the bars | cross-sectional area increased by 50% 0.005m2x 1.5 = 0.075 m2  or multiplication factor = 1+W/G |

|  | G is gap between 2 bars ( here 10 mm) W is width of bar ( here 5 mm) |
| --- | --- |
| Required minimum dimension | 0.1m x 0.1 m |

Bar screen racks made of stainless steel fitted in a frame and placed at an angle of 600  to the horizontal leaning away from the incoming side.

**Bar screen chamber**

| Average hourly flow | 5m3/hr or 0.0014m3/sec |
| --- | --- |
| Retention time | 5 min=0.083 h |
| volume of screen chamber | 5x0.083=0.42 m3 |
| provide a bar screen chamber of size 0.6 m x .1.00 m x1.00 +0.2 m FB | |

**2.Equalization Tank**

| **Parameters** | **Value/ Calculation** |
| --- | --- |
| STP quantity | 120 KLD |
| Hourly average flow | 5m3/hr |
| retention time | 6 hrs (assume) |
| Equalization tank volume | 6x5 = 30 m3/hr |
| Free board | 0.3 to 0.5 m |
| water depth in tank (excluding F B) | 2 to 2.5 m |
| Tank area | 30/2 = 15 m2 |
| **Provide equalization tank of size 4.0 m x 4.0 m x 2.0 m +0.5 m** | |

**SAMPLE FORMAT III**

**MILESTONE CHART (as in order of execution)**

***The number and items in each milestone shall be finalized based on the execution order. The order and category of milestones may be changed according to the respective projects. Kindly limit the milestone number to 7.***

| **Sl.**  **No.** | **Description** | **No** | **L** | **B** | **D** | **Quantity**  **(unit)** | **Milestone payment**  **(in %)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **MILESTONE 1 (Site clearance and excavation)** | | | | | | | |
| **1** | **Site clearance including uprooting of rank vegetation, grass, brushwood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared** | | | | | | .… % |
| a | ……… | …. | …. | …. | …. | …. |
| b | ……… | …. | …. | …. | …. | …. |
| c | ……… | …. | …. | …. | …. | …. |
| **2** | **Earthwork in excavation by mechanical(hydraulic excavator) / manual means in foundation trenches or drains not exceeding 1.5 m in width or 10 sqm on plan including dressing of sides and ramming of bottoms, lift up to 1.5m, including getting out the excavated soil as directed within a lead of 50m. All kinds of soil** | | | | | |
| a | ……… | …. | …. | …. | …. | …. |
| b | ……… | …. | …. | …. | …. | …. |
| c | ……… | …. | …. | …. | …. | …. |
| **3** | **Procurement of materials like machineries, and building materials (aggregates, sand, cement, foam work, etc.) required for achieving further milestones** | | | | | |
| a | ……… | …. | …. | …. | …. | …. |
| b | ……… | …. | …. | …. | …. | …. |
| **4** | **…………** | | | | | |
| a | …….. |  |  |  |  |  |
| **MILESTONE 2 (Completion of civil units)** | | | | | | | |
| **5** | **Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement: 4 coarse sand: 8 graded stone aggregate 40 nominal size)** | | | | | | .… % |
| a | Bar screen chamber | …. | …. | …. | …. | …. |
| b | Collection tank | …. | …. | …. | …. | …. |
| c | Pedestal for units | …. | …. | …. | …. | …. |
| d | ……… | …. | …. | …. | …. | …. |
| **6** | **Centering and shuttering including strutting, etc. and removal of form for: Foundations, footings, bases of columns, etc for mass concrete** | | | | | |
| a | Bar screen chamber | …. | …. | …. | …. | …. |
| b | Collection tank | …. | …. | …. | …. | …. |
| c | ……… | …. | …. | …. | …. | …. |
| **7** | **Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 150 landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral staircases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement: 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).** | | | | | |
| a | Bar screen chamber | …. | …. | …. | …. | …. |
| b | Collection tank | …. | …. | …. | …. | …. |
| c | ……… | …. | …. | …. | …. | …. |
| d | ……… | …. | …. | …. | …. | …. |
| **8** | **…………..** | | | | | |
| a | ……… | …. | …. | …. | …. | …. |
| b | ……… | …. | …. | …. | …. | …. |
| **MILESTONE 3 (Fixing of electro-mechanical units)** | | | | | | | |
| 9 | Providing, fixing & commissioning of fully submersible, centrifugal non-clog type sewage handling pumps capable of handling solids up to 0-20mm for raw sewage transfer from equalization tank to MBBR tanks. The pump shall have CI casting & impeller, SS shaft, TEFC induction motor including lifting arrangement for the pump, flexible pipe with coupling connected to the delivery header etc. complete as required Equalized Waste Water Transfer Pumps:  Flow rate(each) : 12 m3/hr. 2 Hp, 3 phase  Head : 10 m  Solid Handling = 20mm  Type of Pump: Submersible centrifugal type  Make : KSB/KIRLOSKAR/CROMPTON | | | | | …. Nos | .… % |
| 10 | Providing and fixing and commissioning of sodium hypochlorite dosing system comprising of electronic metering pump (with both frequency and stroke length controls to control the dosage rate between 10-100% of rated maximum capacity) virgin HDPE chemical grade tank of 100 ltr capacity, necessary injection fitting assembly foot valve cum strainer and suction and delivery tubing etc. up to the point of injection complete in all respects as required.  Flow rate : 6lph  Make : Miton Roy, E Dose or UKL | | | | | …. Nos |
| 11 | Supply, installation and commissioning of vertical self supporting Multi grade Sand Filter shall be constructed of Fiber Reinforced Plastic as per manufacture standard. The inner distribution system and the under bed draw off system shall be of Hub & Lateral type/Riser tube with distributor on top & bottom strainers of Polypropylene materials. Filter shall be supplied with initial charge of Filter media like special graded sand with supporting media like Fine sand, fine sliex, Core sand and silex etc. The filter shall complete with pressure gauge at inlet & outlet, sample cock PVC face piping/interconnected piping & multiport valves required for Back wash & by pass arrangement and all necessary accessories complete as required.  Top manhole-500mm, Side manhole- 300mm  Multi grade pressure sand filter  Flow rate per filter: 12 Cum/hr.  Vessel Size 1.3 m Diameter with 2 m shell height | | | | | …. Nos |
| 12 | Providing, fixing & commissioning of submersible mixer for Anoxic tank. The Mixer shall have suitable gear box, CI casting & impeller, SS shaft, TEFC induction motor including lifting arrangement for the Mixer. complete as required.  2 Hp, 3 phase. RPM- 0-40  Type: Submersible  MotorMake: KSB/KIRLOSKAR/CROMPTON | | | | | …. Nos |
| 13 | Providing and fixing and commissioning of coagulant dosing system comprising of electronic metering pump (with both frequency and stroke length controls to control the dosage rate between 10-100% of rated maximum capacity) virgin HDPE chemical grade tank of 100ltr capacity, necessary injection fitting assembly foot valve cum strainer and suction and delivery tubing etc. up to the point of injection complete in all respects as required. Alum dosing systen-2 Nos,  Lime dosing system-2 Nos, Polyelectrolyte dosing system-2 Nos  Flow rate : 6lph  Make : Miton Roy, E Dose or UKL | | | | | …. Nos |
| 14 | Control Panel for STP  Providing and fixing dust and vermine proof cubical type motor control panel centre for the various pumps, blower etc. required. It is fabricated from 2mm thick. Make of Switchgear- L&T, Schneider,Siemens, ABB  • MCCB/ MPCB, one for each motor  • Fully automatic DOL / star delta starters suitable for different motors / pumps used in the STP. Up to 7.5 HP DOL may be used and above star/delta starter used with push buttons one for each motor and on/ off indicating lamps.  • Panel type Digital volt meters, on incoming main with rotary selecting switch to monitor voltage between phase to neutral and phase to phase.  • R, Y &B phase indicating lamp (LED type) with 6A control SP MCB for incoming main  • Rotary switch for manual or auto operation for each pump  • The panel should have emergency stop button.  • ON, OFF, TRIP Indication (LED type).  • The panel shall be pre-wired with coded wiring. All interconnecting wiring from incoming main to switchgear, meters and accessories within the switchboard panel shall have suitable copper ferrules  • Make - As per OEM approved standard | | | | | …. Nos |
| 15 | Electrical works for STP and Collection Tanks  Electrical works(including supply, installation and termination of cables of suitable size as per HP of all pumps with all structural supports, clamps as per approved design/specifications, installation will be as per relevant Indian standard and CPWD specification along with control cable of suitable size).(l lot). Any other electrical and mechanical item required to complete the work. Make - Polycab / Finolex / Havells / RR Kabel | | | | | …. Nos |
| 16 | Earthing  Design, supply, installation and commissioning of Overall earthing system for major electrical equipment in STP and MCC Room such as pumps, motors and outdoor lighting.Providing maintenance-free chemical earth pits and connecting them to the panels. copper wire of size 10swg for earthing all the pumps and motors to the nearest earth bar (2 runs for each motor/pump). Chemical earth pits:- Electrode: anti corrosive copper bonded MS rod, Electrode size: minimum 10 mm dia rod with 1m length, Electrode coating: copper coating of minimum 250 microns, Make of Electrode and backfill  Compound: JK Earthing Electrodes, Bharath Copper or Equivalent, Back fill compound: JK Reslow, or Equivalent | | | | | …. Nos |
| 17 | ………………………………………………. | | | | | ………. |
| **MILESTONE …** | | | | | | | .… % |
| **MILESTONE …** | | | | | | | .… % |
| **MILESTONE ‘N’ (**Trial run and commissioning) | | | | | | | .… % |

| **Sd/-**  **Name & Designation of Engineer-In-Charge**  **Name of Agency/Consultant** | **Counter Signed by**  **Sd/-**  **Engineer-in-Charge of LSGI** |
| --- | --- |

**SAMPLE FORMAT IV**

**Time Schedule**

Gantt chart showing the construction and commissioning of the treatment plant

Time schedule for implementation shall be as follows:

a) Construction period: ......... months

b) Electro-mechanical equipment supply: ......... months

c) Startup, trial run and commissioning: ......... months

Hence the total duration will be ......... months

The Gantt chart showing the construction and commissioning of the treatment plant is shown below:

| ACTIVITY | TIME IN MONTHS | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Construction work |  |  |  |  |  |  |
| Electro-mechanical equipment Supply |  |  |  |  |  |  |
| Startup, trial run and commissioning |  |  |  |  |  |  |

**SAMPLE FORMAT V**

**Abstract Estimate**

| **ITEM** | **Amount Rs** |
| --- | --- |
| MECHANICAL WORKS | |
| Mechanical equipment | ......... |
| ......... | ......... |
| CIVIL WORKS | |
| Collection Sump | ......... |
| Bar Screen | ......... |
| Grit Chamber | ......... |
| ......... | ......... |
| PIPINGS & FITTINGS | |
| Bar Screen | ......... |
| Grit Chamber | ......... |
| ......... | ......... |
| ELECTRICAL WORKS | |
| Control Panel | ......... |
| .........  GRAND TOTAL | ......... |
| Rs. ........................... |

| **Sd/-**  **Name & Designation of Engineer-In-Charge**  **Name of Agency/Consultant** | **Counter Signed by**  **Sd/-**  **Engineer-in-Charge of LSGI** |
| --- | --- |

**SAMPLE FORMAT VI**

**Operation And Maintenance Plan**

● Operation and Maintenance cost (with split up of electricity bill separately) ● O&M cost for 10 years

Operations and Maintenance Cost

|  | Electricity Cost  A (Client scope) | Operation and  maintenance cost  (Chemical Cost  +salary+all other Cost) B (Contractors’s Scope) | Total Operation and maintenance cost  A+B |
| --- | --- | --- | --- |
| 1st year |  |  |  |
| 2ndyear |  |  |  |
| 3rdyear |  |  |  |
| 4thyear |  |  |  |
| 5thyear |  |  |  |
| 6thyear |  |  |  |
| 7thyear |  |  |  |
| 8thyear |  |  |  |
| 9thyear |  |  |  |
| 10thyear |  |  |  |
| Total Cost |  |  |  |

**Certified that the proposed O&M cost are prepared as per the minimum rates applicable in the locality**

**Sd/-**

**Name & Designation of Engineer-in-Charge**

**Name of the Agency/Consultant**