

**Environmental, Social, Health and Safety (ESHS) Report**  
**For**  
**Proposed 15 MLD STP at Unnao, District Unnao, State of Uttar Pradesh**  
**Project under,**  
**National Mission for Clean Ganga**



**Submitted To:**



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## List of Indian Standards on Safety & Health

Code No.	Description
IS 3646: 1922 Part 1	Code of practice for interior illumination General Requirements and recommendations for welding interiors
IS 3646: 1968 Part 3	Code of practice for interior illumination – Calculation of coefficients of utilization by the BZ method.
IS 3786: 1983	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents.
IS 5182: Part 1 to 21	Methods for measurement of Air Pollution
IS 8095: 1976	Specification for Accident Prevention Tags
IS 8990: 1978	Code of practice for maintenance and care of industrial safety clothing.
IS 9457: 1980	Safety colors and safety signs
IS 11972: 1987	Code of practice for safety precautions to be taken when entering a sewerage system.
IS 14489: 1998	Code of practice on occupational safety and health audit.
IS 14624: 1998 Part 2	Safety of laser products: Safety of optical fiber communication system
IS 15296: 2003	Industrial Automation systems – Safety of Integrated Manufacturing Systems –Basic Requirements
IS 15551: 2003	Quality Management Systems – Guidelines for Process Improvements in Health Service Organizations
IS 18001: 2000	Occupational Health and Safety Management Systems – Specification



Code No.	Description
	with Guidance for use
SP 53: 1992	Hand operated hand tools – Safety code for the use, care and protection
IS/ISO/IEC: GUIDE51	Guidelines for the inclusion of safety aspects in Standards 1990
<b>Machinery / Operations</b>	
IS 659: 1964	Safety Code for air conditioning (revised)
IS 818: 1968	Code of practice for Safety and Health Requirements in electric and gas welding and cutting operations.
IS 1991: 1988 Part 4	Safety requirements for the use, care and protection of abrasive grinding wheels: Safety guards.
IS 2825: 1969	Code of unfired pressure vessels
IS 3233: 1965	Glossary of terms for safety and relief valves and their parts
IS 3483: 1965	Code of practice for noise reduction in industrial buildings
IS 5903: 1970	Recommendations for safety devices for gas cylinders.
IS 6044: 2000 Part 1	Code of Practice for Liquefied Petroleum Gas Storage Installations – Part 1: Commercial and Industrial Cylinder Installations
IS 7155: Part 1 to 8	Code of recommended practice for conveyor safety
IS 7194: 1994	Assessment of Noise Exposure during work for hearing conservation purpose
IS 8089: 1976	Code of safe practice for layout of outside facilities in an industrial plant
IS 8091: 1976	Code of safe practice for industrial plant layout
IS 8216: 1976	Guide for inspection of lift wire ropes



Code No.	Description
IS 8235: 1976	Guide for safety procedures in hand operated hand tools
IS 8324: 1988	Code of practice for safe use and maintenance on non-calibrated round steel link lifting chains and chin slings
IS 8433: 1984	Code of safe practice for visual inspection of dissolved acetylene gas cylinders
IS 9020: 2002	Power Threshers – Safety Requirements
IS 9474: 1980	Specification for principles of mechanical guarding of machinery
IS 10553: 1983 Part 1	Requirements for chlorination equipment: General guidelines for chlorination plants including handling, storage and safety of chlorine cylinders and drums
IS 10224: 1982	Ergonomic principles in the design of work systems
IS 11006: 1984	Specification for flash back arrestor (flame arrestor)
IS 11016: 1984	General safety requirements for machine tools and their operation.
IS 11461: 1985	Code of practice for compressor safety
IS 12735: 1994	Wire rope slings – safety criteria and inspection procedures for use
IS 13367: 1992 Part 1	Safe use of cranes – code of practice - General
IS 13583: 1993 Part 1	Cranes – Training of drivers: General
IS 14817: 2004 Part 2	Mechanical Vibration – Evaluation of machine vibration by measurements on non-rotating parts – large land – based steam turbine generator sets in excess of 50 MW
IS 14817: 2004 Part 4	Mechanical Vibration – Evaluation of machine vibration by measurements on non-rotating parts – Gas Turbines driven sets excluding aircraft



Code No.	Description
	derivatives.
IS 818: 1968	Code of practice for Safety and Health Requirements in electric and gas welding and cutting operations.
IS 2148: 2004	Electrical apparatus for explosive gas atmosphere – flameproof enclosures “d”
IS 2309: 1989	Code of practice for the protection of buildings and allied structures against lightning.
IS 3043: 1987	Code of practice for earthing.
IS 4691: 1985	Degrees of protection provided by enclosure for rotating electrical machinery.
IS 5216: 1982 Part I	Recommendations on safety procedures and practices in electrical work - General
IS 5216: 1982 Part II	Recommendation on safety procedures and practices in electrical work – Life Saving Techniques
IS 5424: 1969	Specification for rubber mats for electrical purpose
IS 5571: 2000	Guide for selection of electrical equipment for hazardous areas.
IS 5572: 1994	Classification of hazardous areas (other than mines) having flammable gases and vapours for electrical installation.
IS 5780: 2002	Electrical apparatus for explosive gas atmospheres – Intrinsic safety “i” - specification
IS 6381: 2004	Electrical apparatus for explosive gas atmospheres – Increased safety “e”
IS 6539: 1972	Specification for intrinsically safe magneto telephones for reuse in hazardous atmospheres



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Code No.	Description
IS 7577: 1986	Specification for Gas testing flame safety lamps
IS 7724: 1975	Specification for sand filled protection of electrical equipment for use in explosive atmospheres
IS 7689: 1989	Guide for the control of undesirable static electricity
IS 7820: 2004	Electrical apparatus for explosive gas atmospheres – method of test for ignition temperature
IS 8239: 1976	Classification of maximum surface temperatures of electrical equipment for use in explosive atmospheres
IS 8607: 1983 Part 5	General and safety requirements for electrical equipment used in medical practice – protection against explosion hazards.
IS 8923: 1978	Warning symbol for dangerous voltages
IS 8945: 1987	Electrical measuring instruments for explosive gas atmospheres
IS 9249: 1979 Part 1	Safety requirements for indicating and recording electrical measuring instruments and their accessories: common safety requirements for instruments.
IS 9249: 1982 Part 2	Safety requirements for indicating and recording electrical measuring instruments and their accessories: safety requirements for instruments using a mains supply.
IS 9835: 2001	Series Capacitors for power systems – General performance, testing and rating – safety requirements – guide for installation.
IS 11000: 1988 Part 1	Fire hazard testing: Guidance for the preparation of requirements and test specifications for assessing fire hazard of electronic and electrical items, Sec 1 – General guidance



Code No.	Description
IS 11005: 1984	Dust tight ignition proof enclosures of electrical equipment
IS 11713: 1986 Part 1	Guide for physical planning of computer complexes: - Layouts
IS 11743: 1986	Guide on human safety in design, manufacture, use and maintenance of electronic equipment
IS 12459: 1988	Code of practice for fire safety in cable runs
IS 13925: 1998 Part 1	Shunt capacitors for ac power systems having a rated voltage above 1000 V – general performance, testing and rating safety requirements – guide for installation and operation.
IS 13947: Part 5: Sec 2	Low voltage switch gear and control gear – specification – control circuit 2004 devices and switching elements – section 2 : Proximity switches
IS 14231: 1995 Part 1	Cabled distribution systems for television and sound signals – specification – safety requirements
IS 14989:2001	Recommended practices for Seismic qualification of electrical equipment of the safety system for nuclear generating stations
IS 15111: 2002 Part 1	Self-Ballasted Lamps for general lighting services – safety requirements
IS 15451: 2004	Electrical apparatus for explosive gas atmospheres – encapsulation "m"
<b>Transportation</b>	
IS 4357: 1974	Methods for stability testing of forklift trucks
IS 6305: 1980 Part 1 & 2	Safety code for powered industrial trucks
IS 7155 Part 1 to 8	Code of recommended practice for convey or Safety
IS 7631: 1993	Pallets stackers and high lift platform trucks – Method of stability tests



Code No.	Description
IS 7862: 1975	Glossary of terms relating to safety aspects concerning operating areas of industrial trucks.
IS 9618: 1980	Specification for road tankers for Liquefied Petroleum Gas
IS 10311: 1982	General requirements of powered platform trucks and their acceptance criteria
IS 10312: 1982	Safety code for powered tow trucks
IS 12009: 1995	Automotive vehicle – safety requirements for side door of passenger cars – recommendations
IS 12056: 1987	Recommendations for safety requirements for fuel tank assembly of automotive vehicles.
IS 13944: 1994	Automotive vehicles – window retention and release systems for buses - safety requirements
IS 13971: 1994 Part 1	Rough terrain fork lift trucks – Code of practice for safety – application, operation and maintenance
IS 13971: 1994 Part 2	Rough terrain fork lift trucks – Code of practice for safety – general requirements
IS 14283: 1995	Automotive vehicles – accelerator control systems - safety requirements
IS 14665: 2000 Part 1	Electric traction lifts – guidelines for outline dimensions of passenger, goods, service and hospital lifts.
IS 15139: 2002	Automotive vehicles – safety belt anchorages – specification
IS 15140: 2003	Automotive vehicles – safety belt assembly – specification
<b>Civil Engineering Construction</b>	



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Code No.	Description
IS 875: 1987 Part 1	Code of practice for design loads (other than earthquake) for buildings and structures dead loads – unit weights of building material and stored materials (incorporating IS 1911: 1967)
IS 1905: 1987	Code of practice for structural use of unreinforced masonry
IS 2750: 1964	Specification for steel scaffoldings
IS 3696: 1991 Part 2	Scaffold and Ladders – Code of Safety – Ladders
IS 3764: 1992	Code of safety for excavation work
IS 4014: 1967 Part 2	Code of practice for steel tubular scaffolding – safety regulations for scaffolding
IS 4081: 1986	Safety code for blasting and related drilling operations
IS 4082: 1996	Recommendations on stacking and storage of construction materials and components at site.
IS 4130: 1991	Safety code for demolition of buildings
IS 4138: 1977	Safety code for working in compressed air
IS 4756: 1978	Safety code for tunneling work
IS 4912: 1978	Safety requirements for floor and wall openings, railings and toe boards
IS 5121: 1969	Safety code for piling and other deep foundations
IS 5916: 1970	Safety code for construction involving use of hot bituminous materials
IS 6609: 1972 Part 5	Methods of test for commercial blasting explosives and accessories : Part V Safety fuses
IS 6922: 1973	Criteria for safety and design of structures subject to underground blasts



Code No.	Description
IS 7205: 1974	Safety code for erection of structural steel work
IS 7293: 1974	Safety code for working with construction machinery
IS 7323: 1994	Operation of reservoirs – Guidelines
IS 7969: 1975	Safety code for handling and storage of building materials.
IS 8989: 1978	Safety code for erection of concrete framed structures
IS 9706: 1997	Aerial ropeways for transport of material – code of practice for design and construction
IS 9759: 1981	Guidelines for de-watering during construction.
IS 9944: 1992	Natural and manmade fiber rope slings – Recommendations on safe working loads
IS 10291: 1982	Safety code for dress divers in civil engineering works
IS 10386: 1992 Part 4	Construction, operation and maintenance of river valley projects – safety code – Part 4: Handling, storage and transportation of explosives
IS 10386: 1993 Part 7	Safety code for Construction, operation and maintenance of river valley projects – Fire safety aspects
IS 10386: 1983 Part 10	Safety code for Construction, operation and maintenance of river valley projects – Storage, handling, detection and safety measures for gases, chemicals and flammable liquids
IS 11972: 1987	Code of practice for safety precautions to be taken when entering a sewerage system
IS 13063: 1991	Code of practice for structural safety of buildings on shallow foundations on rocks



Code No.	Description
IS 13415: 1992	Protective barriers in and around buildings – Code of safety
IS 13416: 1992 Part 1	Recommendations for preventive measures against hazards at work places – Falling material hazards prevention
IS 13430: 1992	Code of practice for safety during additional construction and alteration to existing buildings
IS 14734: 1999	Balancing machines – enclosures and other safety measures
SP 70: 2001	Hand book on construction safety practices
<b>Chemicals and other hazardous materials</b>	
IS 1260: 1973 Part 1	Pictorial marking for handling and labeling of goods – Dangerous goods
IS 1446: 2002	Classification of dangerous goods
IS 2379: 1990	Colour code for identification of pipe lines
IS 4015: 1998	Guide for handling cases of pesticide poisoning
IS 4155: 1966	Glossary of terms relating to chemical and radiation hazards and hazardous chemicals
IS 4209: 1987	Code of safety in chemical laboratories
IS 11451: 1986	Recommendations for safety and health requirements relating to occupational exposure to asbestos
IS 11457: 1985 Part 1	Code of practice for fire safety of chemical industries: Rubber and plastic
<b>Fire Protection</b>	
IS 1641: 1988	Code of practice for fire safety of buildings (general) : General principles of fire grading and classification



Code No.	Description
IS 1642: 1989	Code of practice for fire safety of buildings (general) : Details of construction
IS 1643: 1988	Code of practice for fire safety of buildings (general) : Exposure hazard
IS 1644: 1988	Code of practice for fire safety of buildings (general) : Exit requirements and personal hazard
IS 1645: 1960	Code of practice for fire safety of buildings
IS 1646: 1997	Code of practice for fire safety of buildings (general) : Electrical installations
IS 1647: 1960	Code of practice for fire safety of buildings
IS 1648: 1961	Code of practice for fire safety of buildings (general) : Firefighting equipment and its maintenance
IS 2189: 1999	Selection, installation and maintenance of automatic fire detection and alarm system code of practice
IS 2190: 1992	Selection, installation and maintenance of first aid fire extinguishers - code of practice
IS 2406: 1963	Code of practice for fire safety of non-industrial buildings
IS 2726: 1988	Code of practice for fire safety of industrial buildings : Cotton ginning and pressing (including cotton seed de-littering) factories
IS 3016: 1982	Code of practice for fire precautions in welding and cutting operations
IS 3034: 1993	Fire safety of industrial buildings: electrical generating and distributing stations – code of practice
IS 3594: 1991	Code of practice for fire safety of non-industrial buildings : General storage and ware housing including cold storage



Code No.	Description
IS 5896: 1970 Part 1	Code of practice for selection, operation and maintenance of special firefighting appliance – combined foam and co crash tender
IS 6382: 1984	Code of practice for design and installation of fixed carbon di oxide fire extinguishing system.
IS 8757: 1999	Glossary of terms associated with fire safety
IS 9668: 1990	Code of practice for provision and maintenance of water supplies and fire fighting
IS 11460: 1985	Code of practice for fire safety of libraries and archives
IS 12456: 1988	Code of practice for fire protection of electronic data processing installation
IS 13716: 1993	Code of practice for fire safety of hotels
IS 14435: 1997	Code of practice for fire safety in educational institutions.
IS 14850: 2000	Fire safety of museums – code of practice
IS 15394: 2003	Fire safety in petroleum refineries and fertilizer plants – code of practice
<b>Personal Protection</b>	
IS 3521: 1999	Industrial safety belts and harnesses – Specification
IS 4501: 1981	Specification for aprons, rubberized, acid and alkali resistant
IS 6153: 1971	Specification for protective leather clothing
IS 7352: 1974	Specification for X-ray lead rubber protective aprons
IS 8519: 1977	Guide for selection of industrial safety equipment for body protection
IS 8990: 1978	Code of practice for maintenance and care of industrial safety clothing



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Code No.	Description
IS 6229: 1980	Method for measurement of real ear protection of hearing protectors and physical attenuation of ear muffs
IS 8520: 1977	Guide for selection of industrial safety equipment for eye, face and ear protection
IS 9167: 1979	Specification for ear protectors
IS 1179: 1967	Equipment for eye and face protection during welding
IS 5983: 1980	Eye protectors
IS 7524: 1980 Part 1	Method of test for eye protectors:- Non - optical tests
IS 8521: 1977 Part 1	Industrial safety face shields – with plastic visor
IS 8521: 1994 Part 2	Industrial safety face shields – with wire mesh visor
IS 8940: 1978	Code of practice for maintenance and care of industrial safety equipment for eyes and face protection
IS 9973: 1981	Specification for visor for scooter helmets
IS 9995: 1981	Specification for visor for non-metal police and firemen's helmets
IS 14352: 1996	Miners safety goggles – Specification
IS 1989: 1986 Part 1	Specification for leather safety boots and shoes – for miners
IS 1989: 1986 Part 2	Specification for leather safety boots and shoes – for heavy metal industries
IS 3737: 1966	Leather safety boots for workers in heavy metal industries
IS 3738: 1998	Rubber boots – Specification
IS 3976: 2003	Protective rubber canvas boots for miners – Specification



Code No.	Description
IS 4128: 1980	Specification for fireman's leather boots
IS 5557: 1999	Safety Rubber boots – Specification
IS 5852: 1996	Protective steel toe caps for footwear – Specification
IS 6519: 1971	Code of practice for selection, care and repair of safety foot wear
IS 7329: 1974	Metal last for safety rubber canvas ankle boots
IS 10348: 1982	Safety footwear for steel plant
IS 10665: 1982	Safety rubber ankle boots for miners
IS 10667: 1983	Guide for selection for industrial safety equipment for protection of foot and leg
IS 11225: 1985	Leather safety shoes for women workers in mines and steel plants
IS 11226: 1993	Leather safety foot wear having direct molded rubber sole – Specification
IS 11264: 1985	Code of practice for manufacture of safety rubber footwear for miners
IS 13295: 1992	Code of practice for manufacture of leather safety boots and shoes for workers in mines and heavy metal industry
IS 14544: 1998	Leather safety footwear with direct molded PVC soles – Specification
IS 15298: 2002 Part 2	Safety, protective and occupational footwear for professional use – Specification for safety footwear
IS 2573: 1986	Specification for leather gauntlets and mittens
IS 4770: 1991	Rubber Gloves – electrical purposes – specification
IS 6994: 1973 Part 1	Specification for safety gloves – leather and cotton gloves



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Code No.	Description
IS 8807: 1978	Guide for selection of industrial safety equipment for protection of arms and hands
IS 2745: 1983	Specification for non-metal helmet for firemen and civil defense personnel
IS 2925: 1984	Specification for industrial safety helmets
IS 4151: 1993	Specification for protective helmets for scooter and motor cycle riders
<b>Respiratory</b>	
IS 8318: 1977	Colour identification markings for air purifying canisters and cartridges
IS 8347: 1977	Glossary of terms relating to respiratory protective devices
IS 8522: 1977	Respirators, chemical cartridge
IS 8523: 1977	Respirators, canister type (gas masks)
IS 9473: 2002	Respiratory protective devices – Filtering half masks to protect against particles – specification
IS 9563: 1980	Carbon monoxide filter self-rescuers
IS 9623: 1980	Recommendations for the selection, use and maintenance of respiratory protective devices
IS 10245: Part 1 to 46	Breathing apparatus
IS 15322: 2003	Particle filters used in respiratory protective equipment – Specification
IS 15323: 2003	Gas filters and combined filters used in respiratory protective equipment – Specification



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# 1. Introduction

Unnao district is district of Uttar Pradesh is roughly a parallelogram in shape and lies between Latitude 26°8' N & 27°2' N and Longitude 80°3' E & 81°3' E. It is bounded on the North by District Hardoi, on the East by District Lucknow, on the South by District Rae Bareilly and on the West by the Ganga which separates it from districts of Kanpur & Fatehpur. The geographical area of the Unnao City is 21.50 km<sup>2</sup> as per Census of 2011. The size of the city has increased more than five times during last ten years. As per Census 2011, Unnao has population of 177,658 persons. By 2011, the total estimated wastewater generated by 177658 populations is 11 MLD in Unnao city. The total water supplied is 13.87 MLD. At present only 11% area is covered by the sewer network. As of now there is no wastewater treatment facility.

15 MLD STP with Sequential Batch Reactor (SBR) technology is proposed in Unnao area. The project area is plain without any trees or vegetation and surrounding area is open land. No residential area is present nearby.

Environmental Health and Safety involves workers in the Sewage Treatment Plant (STP) which are responsible for the day-to-day activity, maintenance, problem solving and machine handling of special problems of municipal, industrial, and other Sewage treatment plants. Occupations can include Sewage Treatment Plant (STP) operator, Senior Operator, Water Resources Specialist, Maintenance Operator, etc. in both municipal and private facilities. Certification is set by the Applied Science Technologists and Technicians.

The workers involved with sewer inspection, maintenance work and sewage treatment plants operation are mostly affected by STP activity. Most of the workers are male between 25 and 55 years of age, including workers employed in government or private contractual facilities.

## 1.1. Source of Sewerage

Presently there is no public sewer system in this town. Soak pits and septic tanks have been constructed in some of the residential and commercial buildings. Sewage / Sullage from the remaining residences / buildings are discharged into the drains which have their out fall into ponds / natural drains creating unhygienic conditions. Sewer generation for year 2020 estimated as 24 MLD and year 2035 as 30 MLD.

Sewage/Sullage from open drains flows into open fields/natural drains and ultimately into Ganga River. It is therefore imperative to check the flow of wastewater/sewage into Ganga River. In Unnao, two major drains namely Shekhpur drain and Eidgah drain exists, which flows as City

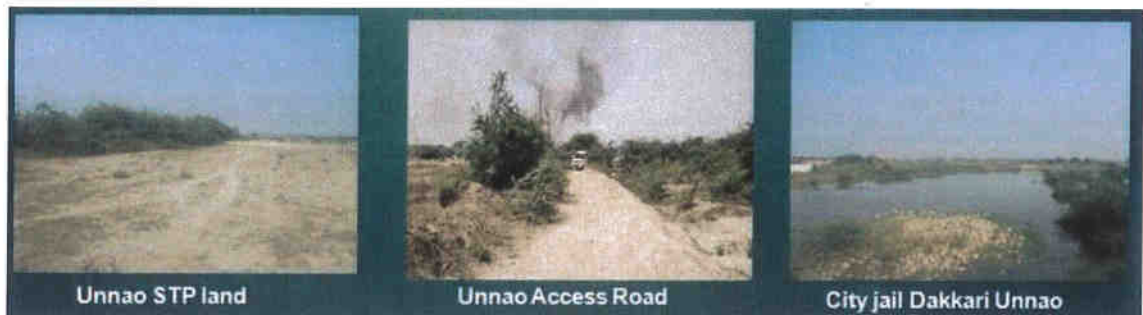


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Jail drain/Dakkari drain. Wastewater/Sewage and Sullage from the Shekhpur and Eidgah drains is conveyed to the Dakkari drain which has out fall into natural drainage, which ultimately discharges into Ganga River. Given these conditions, Interception and Diversion works are to be done on Azad Marg on the main drain carrying sewage/sullage from Unnao Town.

## 1.2. Unnao Sewerage Treatment Plant and Capacity

A 15 MLLD STP at Unnao will be installed on City Jail Dakkari drain collecting sewage from Unnao having flow of 11.41 MLD. The photographs of land for Proposed Unnao STP, Access Road and City Jail Dakkari are shown in Figure 1.1



**Figure 1.1.: Land for Proposed Unnao STP, Access Road and City Jail Dakkari**



## 2. Assessment and Management of Environmental and Social Risks and Impacts

### 2.1. Introduction

The Environmental Management Plan (EMP) is a plan of action for mitigation / management / avoidance of the negative impacts of the project and enhancement of the project corridor. An EMP is site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner where all stakeholders including the project proponents, contractors, sub-contractors, consultant understand the potential environmental risks arising from the proposed project and take appropriate actions to properly manage that risk. Adequate environmental management measures need to be incorporated during the planning phase to minimize any adverse impact and assure sustainable development of the area. EMP has been formulated for mitigation of the adverse impacts and is based on the present environmental conditions. This plan helps in formulation, implementation and monitoring of environmental parameters during and after the commissioning of the project.

Any development, especially related to industries, is usually associated with certain positive as well as some negative impacts on the environment. However, the negative or adverse impacts cannot possibly rule out systematic development. At the same time, adverse impacts cannot be neglected. The impact identification and prediction has been made keeping in view the predicted results primarily based on design details and generated baseline data monitored during study period. In view of the above, project proponent shall maintain the specifications / details / data as provided for preparation of the report or may try to improve further towards environmental betterment during various phases of implementation of proposed project.

The Environmental management plan (EMP) relevant to construction and operation phases is delineated in the foregoing sections. The EMP is required to ensure sustainable development in study area of the proposed project site, hence, it needs to be an all-encompassing plan for which the Government regulating agencies working in the region and more importantly the affected population of the study area need to extend their cooperation and contribution.

Environmental management plan covers the environmental quality control measures which are proposed for this project to achieve the smooth function of STP for the treatment and disposal of wastewater from the city. The aim is also to comply with the environmental standards and



  
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guidelines. Environmental management plan refers to the mechanism to implement the mitigation measures.

In general, the Kanpur River Management Private limited. with assistance from DBO Operator and Engineer/Supervision Engineer is the responsible entity for ensuring that the mitigation measures as suggested in the ESHS. The roles and responsibilities of the involved personnel are described below. Implementation of EMP Specific activities by KRMP in the implementation of EMP involves the following activities.

## 2.2. Implementation of EMP by EMC

It is imperative to establish an effective organization to implement, maintain, monitor and control the environmental management system. A separate environmental Management Cell (EMC) will be formed to look after the environmental related matter of the mine. The structure of EMC is as given in Figure 2.1.

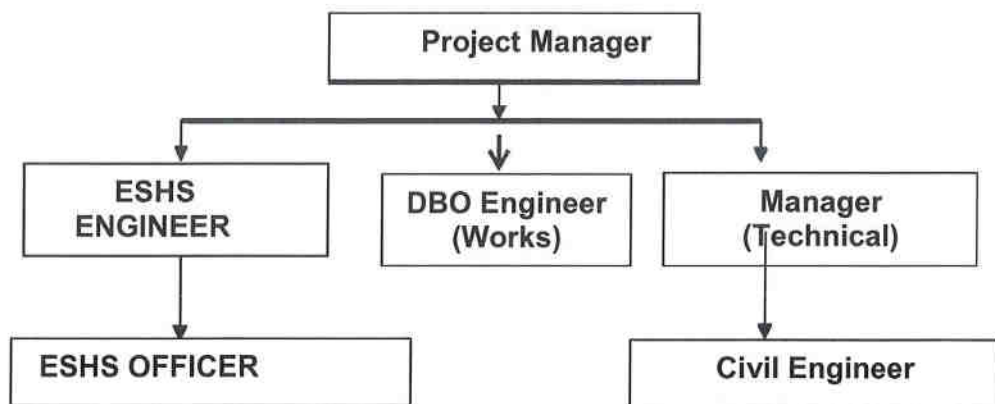


Figure 2.1: Composition of Environmental Management Cell (EMC)

The EMC cell performs the following activities:

- EMC will oversee the environmental control measures that are implemented as per the plan.
- EMC will ensure ambient Field monitoring like air monitoring, meteorological monitoring and noise monitoring in coordination with outside agencies.

- Coordinating the environment related activities within the organization as well as with outside agencies.
- Reporting the status report to the statutory authorities.
- Systematically document and record keeping w.r.t. environmental issues.
- Plantation and their maintenance
- Collection of statistics of health of workers.
- Environmental compliance to the regulatory authorities.
- Communication with the concerned department on the environmental issue.
- Monitoring the progress of implementation of environmental management program.
- Overlook technical optimization in the working of the STP
- Any technical failure or problems will be reported to the STP manager and required repair work will be undertaken for smooth working of the STP

#### **Specific activities by Design Built Operate (DBO) Operator**

The operator shall implement the mitigation measures as recommended in EMP given in this report. "The DBO engineer" shall monitor the compliance of the EMP. DBO engineer will have secondary responsibility for implementation of EMP.

The DBO engineer shall ensure that:

- Ensure that sewer laying process does not create hazardous movement situation. Also ensure that public is pre-warned about the activities, construction area is barricaded, all debris is well managed causing minimum inconvenience to public and other measures are implemented as indicated under EMP.
- Specific area shall be earmarked for intermittent storage of biodegradable and non-biodegradable waste at STP site.
- Tree plantation (minimum two rows) shall be made on the periphery of STP to prevent spread of bad odour and undertake landscaping to enhance aesthetic at STP locations. Feedback from the local residents can also be taken from time to time to cross check the contractor's report. Project management consultants should make inspection visits at construction site to check the implementation of Environment Management Plan as per the contract.

#### **2.3. Operation Management Committee (OMC)**

The overall management of the project will be looked after by Ganga Pollution Control Unit, UPJN and Kanpur River Management Private Limited. The technical and scientific staff will be



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appointed under Chief Engineer. Primary focus of the present study is on construction and operation of treatment units of STP. However, the collection and conveyance system of effluent being integral part of the overall project, a brief account of operation & management plan for the same has been highlighted below.

The O & M of plant is under Kanpur River Management Private Limited for 15 years. The issues relating to plant performance, technical difficulties, operations problems, etc. will be resolved by Operations Management Committee (OMC).

The Operations Management Committee will ensure that the STP operates to its best potential and provide recommendations for up gradations as and when required. Chief Engineer will look after day to day issues of STP operation and conveyance related issues. There will be a team of qualified personnel from Engineering and Science field having experience to operate STP efficiently and effectively. The OMC will ensure to comply with all the directives issued by competent authority time to time for smooth functioning of STP and legal compliance in this regard. Project proponent will set up the laboratory equipped with facilities for carrying out analysis of water and wastewater.

#### 2.4. Environmental Management Plan (EMP) and Implementation

Environmental Management Plan involves functions that determines the objectives, adoption of appropriate mitigation measures, protection of ecosystems, enhancement of the quality of life for those affected, and minimization of environmental costs (Barrow, 1999).

Environmental Management Plan (EMP) has been formulated with an objective to mitigate the adverse impacts of any proposed project. This includes an environmental policy on protection of environment and public safety.

**Table 2.1: Environmental Management Plan**

Activity		Potential Impacts	Duration of Impact	Mitigation Measures
<b>Sewerage &amp; Sanitation</b>				
<b>A. Design &amp; Development stage</b>				
<b>Sewerage</b>	Accidental leakage/burst	Flooding of nearby areas & backlogging	Temporary	Design sewers with adequate flow



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		due to unexpected heavy flow rates.		velocity Regular inspection & maintain sewers
	Flushing sewers at necessary locations	De-silting significant amount of silt, solid waste and slurry, health hazard and offensive smell	Temporary	De-silt between night and morning when flow is low. If human entry is required in sewer line, he is equipped with safety harness, helmet with torch, gloves, waterproof waders, oxygen cylinder with breathing apparatus.  The silt is used for land filling low-lying areas.
<b>B. Construction Phase</b>				
<b>Sewerage (laying sewers)</b>	Excavation, cutting, back filling compaction.	Damage to underground utilities like water, gas line, electricity & telephone conduits etc.	Temporary	Review of available drawings of utilities and concerned authorities should be informed to assist.  All underground utilities shall be protected from injury.  Minimize time for replacement operations & appropriate scheduling especially



		<p>Accidents/damages due to Erosion of excavated trenches while placing pipes</p> <p>Dust generation due to excavation, cutting, back filling and compaction operations.</p>		<p>for water supply line</p> <p>Shoring trench sides by placing sheeting, timber shores, and trench jacks to counter erosion of trench.</p> <p>Minimize dust by wetting cleared areas and soil stockpile.</p> <p>Wet and cover excavated material transported by trucks.</p>
		Noise & vibration disturbances to residents & other people.	Temporary	<p>Carry out construction activity during normal working hours after providing prior intimation to local residents and shop keepers.</p> <p>Construction work near schools, colleges to be carried out during vacations &amp; preferably during night.</p> <p>Work near hospitals to be carried out with priority.</p> <p>Use of less noise generating</p>



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		Temporary flooding due to excavation during monsoon or blockage of surface drains.		<p>equipments ex. enclosed generators with mufflers, instruments mounted on vibration dampening to meet the standards of noise.</p> <p>Workers provided with ear muffs and plugs.</p> <p>Excavated material shall not be stored in storm water run-off channels.</p> <p>Excavated stock piled soil must be bordered by berms to prevent soil loss due to rains.</p>
		Increased traffic inconveniences (emissions, congestions, longer travel time, blockage of access	Temporary	<p>Alternate traffic routing must be adopted. The work in business areas should be completed earlier.</p> <p>Efforts to minimize congestion especially near schools &amp; colleges.</p> <p>Provide temporary crossings / bridges for pedestrians.</p>



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		Settlement of backfilled area after construction	Temporary	<p>Backfilling material shall be free from petroleum products, slag, cinders, ashes and rubbish, or other material.</p> <p>Backfilling activity should follow the construction schedule,</p> <p>Proper compaction to be executed as per the soil specific conditions to retain the original level/alignment and grade as it was prior to excavation.</p>
		Spillage of fuel and oil	Temporary	<p>Store fuel &amp; oil in tanks and drums for excess capacity; forbid pouring into soils or drains; enforce adequate equipment maintenance procedures.</p>
<b>Air pollution</b>		Dust pollution due to excavation, construction material handling, transportation of materials	Temporary	<p>Provide curtains around the site.</p> <p>Sprinkling water at regular intervals over dust emanating</p>



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				<p>areas.</p> <p>Preventive maintenance of construction equipments &amp; vehicles.</p> <p>Use of low fume emitting newer generators &amp; vehicles with well-maintained engines and control devices.</p> <p>The green belt development around STP and plantation of diverse local trees in STP project site would be helpful in reducing air pollution.</p>
<b>Noise Pollution</b>		Noise hazard	Temporary	<p>Use of sound proof insulation for noise generation sources like pumps, generators or using less noise making equipment.</p> <p>Proper maintenance of construction equipment and vehicles to keep them with low noise.</p> <p>No Construction</p>



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				<p>activities during night hours in the neighborhood of hospitals and in day time in the neighborhood of educational institutions.</p> <p>The green belt development around STP and plantation of diverse local trees in STP project site would be helpful in reducing noise pollution.</p>
<b>Construction Waste</b>		Nuisance due to solid waste disposal	Temporary	<p>Ensure that litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises must be collected in rubbish bins and disposed of weekly at registered refuse facility sites.</p> <p>Toilet facility must be provided at construction site and should be maintained properly. Toilets must be emptied regularly at treatment plants</p>



				and every effort must be made to prevent the contamination of surface or sub-surface water
<b>Safety During Construction</b>		Safety hazards to labours and public	Temporary	<p>Comply with the Occupational Health and Safety Act of India</p> <p>Ensure to the site the contact details of the police or security company and ambulance services nearby</p> <p>The handling of equipment and materials is supervised and adequately instructed.</p> <p>Erect warning signs/ tapes and temporary barriers and/or danger tape, marking flags, lights and flagmen around the exposed construction works warn the public and traffic flow of the inherent dangers.</p> <p>Provide to the</p>

				workers adequate safety precautions such as helmets, safety shoes, gloves, dust masks, gumboots, etc.
<b>Labour colony</b>		Nuisance due to absence of facility of sanitation and solid waste management		<p>Labour camps are not required, if the labours are from the native place.</p> <p>The labour colony must not be in an environmentally sensitive area such as in close proximity to a watercourse, on a steep slope or on erosive soils.</p> <p>Camp sites will have adequate provision of shelter, water supply, sanitation and solid waste management as far as practicable.</p>
<b>Environmental monitoring</b>		Need compliance to environmental standards.	During construction phase.	Carry out environmental monitoring of air, noise, wastewater, Surface and ground water from STP area and representative sampling stations



				from surrounding 10 km area from the border of the STP project.
<b>C. Operation Phase</b>				
Sewer line	Leakage/ overflows	Water pollution and possibility of mixing with water supply line	Permanent	<p>Regular monitoring of sewer line and manholes for visible leakages/ overflows.</p> <p>Immediate repair operation for the damaged portion of sewer line.</p> <p>De-siltation of blocked sewers/ manholes with sewage pumping machines</p> <p>Storing and disposal of silt at appropriate refusal area after treatment.</p> <p>Ensure proper covering of manhole and avoid dumping of solid waste to prevent chocking of sewer line.</p>
General waste	Sanitary conditions at construction	Contamination of water resources, blockage of storm drains, bad	Temporary	Ensure regular monitoring of provision of water



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	<p>camps and site</p>	<p>odour, Health hazard and public nuisance</p>		<p>supply, excreta and solid waste management.</p> <p>Waste should be emptied regularly at disposal area until the work is completed.</p> <p>Maintaining proper hygienic environment in and around camps and site by regular surveillance and monitoring of waste.</p>
General Safety	<p>Workers exposed to toxic gases in sewers and hazardous materials in sewage during maintenance work</p>	<p>The toxic gases are likely to contract communicable diseases from exposure to Pathogens present in the sewage.</p>	Temporary	<p>Gases present in the sewer line should be analyzed for hazardous/toxic gases before commencing cleaning operation. Proper gas masks should be provided to workers deployed in such areas.</p> <p>Provision of adequate safety precautions such as helmets, safety shoes, gloves, dust masks, gumboots, etc. during maintenance operation</p>



Environmental monitoring		Need compliance to environmental standards.	During Operation phase.	Carry out environmental monitoring of air, noise, wastewater, Surface and ground water from STP area and representative sampling stations from surrounding 10 km area from the border of the STP project.
Reuse of treated Effluent		Need compliance to environmental standards	During Operation phase.	Treated effluent would be used for irrigation of plantation and green belt in STP area and by farmers for agricultural fields, recharge to groundwater, floor washing, dust suppression
Plantation and Green belt			During Operation phase.	Plantations and green belt would be developed around the STP to control air pollution, to remove odour, and for aesthetic environment.
STP Breakdown		Discharge of untreated sewage leading to river	Temporary	Provision of adequate holding capacity



		pollution.		adequate for storage of sewage to prevent flow of untreated sewage to river.
Absence of storm water diversion arrangement	Flooding due to rain water run off	Rain water may flood the STP area in absence of adequate provision of diverting rain water flow towards STP from periphery area.	Temporary	Suitable drainage provision shall be made to divert the rain water likely to be accumulated from peripheral catchment area of STP, to natural drainage stream or area.
Sludge Disposal		Disposal of sludge leading to contamination of land and water.	Permanent	<p>Efficient Sludge dewatering with minimum land involvement shall be adopted.</p> <p>Provision shall be made for intermittent storage of digested sludge at STP site.</p> <p>The digested sludge shall be utilized as manure or disposed to suitable site as approved by the engineer. If disposal is made for land fill, the site shall be located away from habitation and water</p>



				bodies and shall be pre-approved by concerned authorities like Municipal corporation, Pollution Control Board or urban development authority.
Provision for safety of workers and safe operation of STP		<ul style="list-style-type: none"> <li>• Accidents leading to injury or death of workers (Fall of workers from Height, Fall into deep water tanks, Short Circuiting)</li> <li>• Accidental slip, trip and fall in walk ways or work areas</li> <li>• Fire</li> <li>• Exposure to toxic gas such as chlorine</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Ensure adequate provision of Handrails on both sides of walkways close to deeper tanks and STP need to be ensured;</li> <li>• All electric switches (including unit specific on-off switches installed at respective units) and panels should have adequate protection from rainwater to prevent short circuiting</li> <li>• Proper earthing with installation of earth circuit breakers shall be made</li> <li>• Walk ways designs shall be made with proper slope to</li> </ul>

				<p>avoid accumulation of rain water. Material handling and storage shall be so designed that walk way surface remains free from wet or oil surface situation to prevent slips, trip or fall accidents.</p> <ul style="list-style-type: none"> <li>• Provision of interlock system to either stop STP or divert untreated effluent to holding tanks in case of short circuiting, or mall functioning of STP</li> </ul> <p>Prepare emergency preparedness plan including identification of assembly area in case of fire</p>
Location of STP		<ul style="list-style-type: none"> <li>• Noise/Odour/fly nuisance hazards to neighbouring areas</li> <li>• Cutting of Trees</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Ensure minimum noise generation; at pump station in STP</li> <li>• Minimize Tree cutting if involved.</li> <li>• Tree plantation of at</li> </ul>



				<p>least two rows around the periphery of STP site and landscaping to prevent spread of bad</p> <ul style="list-style-type: none"> <li>• odour with large canopy/ broad leaves trees like Shesum, Neem, Bargad, Teak, Sal, etc.</li> <li>• Accumulated sludge and solid waste to be cleared within 24 hours and spraying of suitable herbicides on accumulated sludge/solid waste to reduce odour.</li> </ul>
Noise and Vibration		Disturbances to residents and businesses	Temporary	<ul style="list-style-type: none"> <li>• Proper handling and regular maintenance of operating machines including pumps, generators, air diffusers, etc.</li> <li>• Quarterly Monitoring of Ambient Noise level to check</li> </ul>

			<p>compliance to standards.</p> <ul style="list-style-type: none"> <li>Quarterly monitoring of ambient noise levels (day and night) at same locations as of ambient air monitoring</li> <li>DG set to be fitted acoustic enclosure.</li> </ul>
Faulty operation of STP		Problems arising due to bad odour, insects, polluted air	<ul style="list-style-type: none"> <li>Maintain the green belt as per provision of design to prevent spread of bad odour with large canopy/ broad leaves trees as suitable.</li> <li>Accumulated sludge and solid waste to be cleared within 24 hours.</li> <li>Quarterly monitoring of Ambient Air Quality with respect to PM10, PM2.5, Sox and NOx, CO and Odour at three locations (at STP site, minimum 500 m away from STP</li> </ul>



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				site in up-wind and down-wind direction of STP area.
General Safety	Workers exposure to hazardous materials/ situations	Serious/health/ safety hazards	Temporary	<ul style="list-style-type: none"> <li>• Ensure availability of PPE for maintenance workers.</li> <li>• Follow safety measures and Emergency preparedness plan evolved at design stage</li> </ul>
Post project environmental monitoring as detailed in Chapter				<ul style="list-style-type: none"> <li>• Compliance to Air Act and water Act, and noise standards</li> </ul>

**Table 2.2: Social Impact Assessment and Mitigation Measures**

Livelihood of local residents	No impact, as there will be no impact on livelihood of any permanent shop-owners, licensed kiosks.
-------------------------------	--



Employment potential	Employment potential would be increased for all class of workers for construction and O & M work of all STP.
Land Acquisition	No impact, as no fresh land is required for any construction
Public access to various resources	There will be some minor inconveniences to the public due to construction like access to their premises, to shops to offices, colleges, schools etc. Notice of work to be circulated, construction should be completed in the given time, debris should be cleared in time
Health issues-due to dust, noise pollution	Dust control methods like water spraying, Noise control methods will be utilized like acoustic covering of generators, proper maintenance of equipments and vehicles, green belt development around STP etc.

## 2.5. Environmental Management System

KRMPL shall conduct all its operations in a manner that is protective of the environment and health & safety of employees, and the community. In fulfillment of this commitment, they shall maintain continuing efforts to:

- Comply with all applicable safety, health and environment laws and regulations.
- Enhance Safety, Health and Environment (SHE) awareness among employees and associated stakeholders through effective communication and training.
- Investigate all workplace incidents and illness in order to promptly correct any unsafe conditions or practices.
- Integrate SHE considerations into business planning and decision making.
- Champion SHE responsibility among our employees in their practices, and promote and value their involvement in achieving the goals of this policy.



## **2.6. Responsibility of Safety during Operation and Maintenance of STP and Associated Structures in Construction Phase**

The Environmental Management Cell has to prepare, establish and implement the construction safety norms as per the site specification and operational phase norms. The workers work as per the instructions of the management. The environmental engineer and civil engineer, acting as Supervisors, are responsible for the implementation of the work in a safe manner, training, and instructions and for the job performance of all personnel under their instructions. He will be held accountable for all accidents and employee actions unless investigation indicates the actions were due to conditions beyond the supervisor's control. They shall also ensure that safety rules, regular inspection of all tools and equipment, including employee's personal tools are understood by the sewage water operators under their supervision.

Under Supervisor the employee is adhere to follows safety standards while working near units like inlet chamber precautions, aerator, sludge thinker, sludge digester etc. The mainly these standers are made for construction as well as STP operational phases. Safety is the definite responsibility of individual to perform assigned duties while at work to ensure safety for them, safety for colleague, protection for public, and company property. It is duties or responsibility of individual or employee to report to the person in charge all unsafe conditions or acts witnessed on the job. He or she need to attend all safety meetings possible and to take an active part in safety work.

## **2.7. Health, Safety and Environment Policy**

### **Objective**

To determine broad parameters of HSE Management at site:

1. To establish and define chain of command for resolution of all hazard and prevention of pollution.
2. Continual HSE performance improvement by directing focus on the key areas for improvement in a consistent manner.

### **Purpose**

This HSE plan explains the Health, Safety and Environment Issues at this construction site and the procedures that shall be followed by all Subcontractors.

### **Scope**



This initial HSE Plan has been prepared to encompass many of the high risk activities and operations which will initially be carried out on construction site and the methods by which control measures are to be put in place to minimize the risk of injury or ill health occurring in our workplace and prevention of pollution.

### Quality, Health safety & Environment Policy

CHECKED  
BY



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A.E.

OFFICE OF EXECUTIVE ENGINEER  
C.D. U.P. JN-UNNAO

RECOMMENDED  
BY

(MOHIT CHAK)  
E.E.

APPROVED  
BY

 19/8/2022

(B.L. GAUTAM)  
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## Quality, Health, Safety & Environment Policy

We, at Shapoorji Pallonji – Engineering & Construction, believe that our long term business success depends on our ability to continually improve the quality of services while protecting people and the environment. Hence, we are committed to meet the expectations of our customers and continuously strive to improve the effectiveness of our Quality, Health, Safety and Environment (QHSE) Management System. To achieve this goal, our impetus will be towards following:

- Provision of safe working environment, prevention of injury, ill health and planning for enhanced emergency preparedness.
- Minimizing adverse impact of our activities on the environment to prevent the pollution and to preserve natural resources.
- Optimal utilization of men, machine, finance and other resources.
- Devising planning systems for effective implementation.
- Strong organizational support through human resource development.
- Development of reliable vendors for a higher degree of Quality Assurance.
- Complying with contractual requirements.
- Communicating openly with stakeholders and making them aware on the QHSE aspects.
- Compliance of applicable legal and other requirements.

  
S. C. Dixit  
Executive Director

Date: 20<sup>th</sup> April, 2015

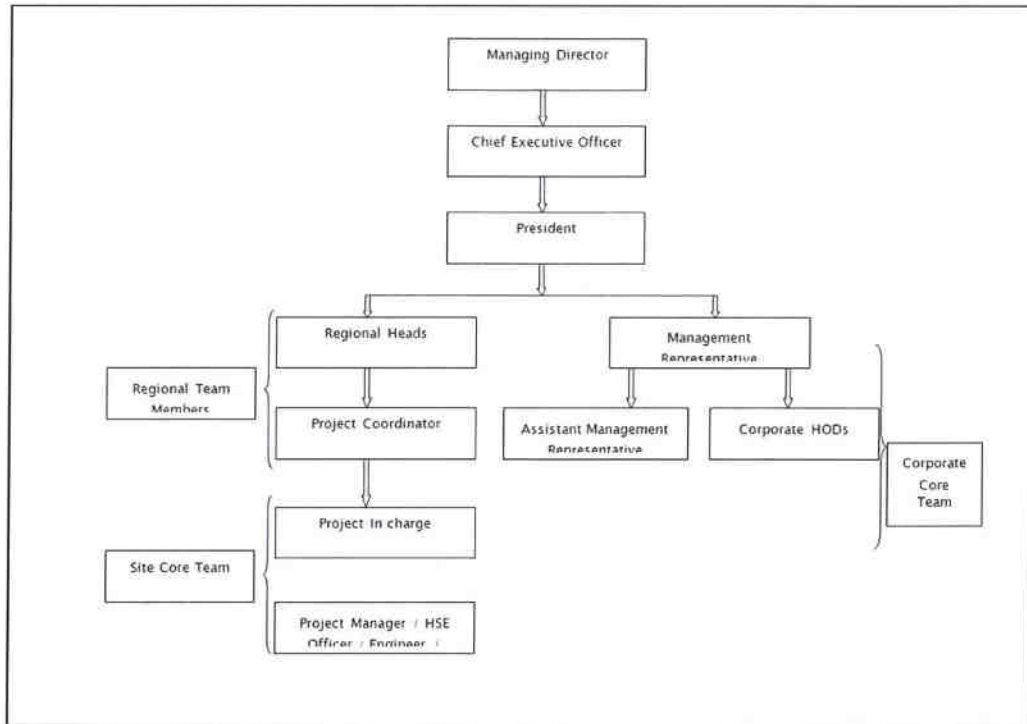
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## Health, safety & Environment Management System Implementation Chart



This is an apex committee of SPCPL for Health, safety & Environment Management System Implementation. The roles and activities of this committee are discussed in detail in SPCPL's "Project HSE Plan" in relation to development of new STPs, rehabilitation of existing STPs and O & M for a period of 15 years under HAM at Kanpur, Uttar Pradesh.

This ESHS report is specially prepared for proposed Unnao STP Construction and operation phase and the same will be monitored.

### 2.8. Labour Accommodation

Labour accommodation is aimed at providing practical guidance and basic standards that should be applied to the planning construction and provision of workers' accommodation at Unnao site. All works shall be undertaken in accordance with India HSE legislation and IS standards.



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## 2.9. General design requirements

When choosing the site intended for workers accommodation shall ensure that the site is at least 300 meters away from any construction works. Only single level buildings shall be built and the space between two buildings shall not be less than 5 meters. In case to build the multi-level facility, detailed drawings/design for the same including safety and firefighting services should be monitored.

All buildings, structures, life safety devices and safe guards and parts thereof of the worker accommodation, shall, as a minimum, meet the requirements of the 'National Building Code of India' and be maintained in a safe condition at all times.

## 2.10. Materials

The worker accommodation units (including kitchen & sanitary facilities) shall be built with concrete blocks or precast cement wall blocks. The flooring shall also be made of concrete and shall be non-slip. Non-flammable materials shall be used and ensure that as far as practicable only sustainable materials are used.

The Contractor shall ensure that all materials used to build the workers accommodations (including roofing material) are weather proof powder coating. The use of only GI sheets for roofing shall be prohibited

## 2.11. Lighting

All areas of the workers accommodation shall be used adequate lighting, if possible solar lighting should be provided. Outdoor lighting shall ensure that suitability for the weather conditions. Light levels as a minimum shall meet the following requirements table no. 2.3.

**Table 2.3: Lighting Lux Level Requirements**

Location	Area / Activity	Minimum/Average (Lux)
General	Passages & corridors inside	100
	Passages outside building	50



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Residential area /units	Bedrooms	100
	Kitchens	150
	Bathrooms & Toilets	100
Emergency areas	First aid room	300
	Recreational areas	200

The outdoor lighting shall allow the pedestrians to distinguish the borders of the sidewalks/corridors, direction changes, crossroads and any obstacles or potential risks.

## 2.12. Electricity

The design, operation and maintenance of electrical systems for the labor accommodation shall meet the requirements of the National Building Code. The provisions of RCD's (residual circuit breaker) are used for protection of the circuits and care to ensure that joints are minimized in the electrical cables. All electrical shall have adequate earthing and shall be maintained with regular periodic checks.

## 2.13. Firefighting Equipment

The workers accommodation shall be provided with adequate fire detection and firefighting equipment (ABCD extinguisher). These shall be provided as per the Fire Prevention & Life Safety Act/National Building Code.

## 2.14. Sanitary Facilities

The sanitary facilities shall not be located at a distance of more than 50 meters from the main accommodation blocks and no closer than 50 meters from any food/kitchen facility. Sewer line facilities shall be provided such a way that it may not pass through the room to access the facility.

Sanitary facilities shall be provided such that there is 1 toilet & 1 bathroom for every 10 people and one urinal for every 20 people. The sanitary facilities shall be cleaned on a daily basis and maintained regularly.



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## 2.15. Kitchens

The kitchen facility consideration the number/groups of people staying in the accommodation and shall allow for multiple groups of people to cook together.

- The kitchen shall be provided with a supply of portable drinking water and appropriate storage areas for different kinds of food.
- The area used to wash utensils shall be separate from the kitchen.
- Gas cylinders should be placed outside the building and shaded from sunlight.
- The kitchen should be equipped with non-toxic pest control means (meshing) to prevent rodent infestation.
- The kitchen area shall be cleaned on a daily basis.

## 2.16. Medical care

Primarily the facilities for labor accommodation need to provide first aid available within premises. The workers staying within the Labour accommodation have access to medical facilities 24hours of the day. If access to this medical facility requires the Labour to travel outside the perimeter of the accommodation need to provide ambulance facility or vehicle is available 24x7. In such cases, provision of a first aid will be available within the labor accommodation.

## 2.17. Washing facility

The washing area (to wash clothes) shall be separate and shall have adequate water supply and not be placed near the kitchen or cooking area.

## 2.18. Waste disposal

Waste that is accumulated from the labor accommodation shall be disposed off in a manner that complies with the Ministry of Environment regulations. The waste is collected and disposed off on a regular basis (no longer than 7 days for Dry waste and no more than 2 days for wet waste) and that no waste is burned. The kitchen and accommodation blocks shall be provided with separate waste bins.



### 2.19. Drinking water

Fresh portable drinking water shall be available for cooking and consumption within the labour accommodation. Water stored in tanks shall be filtered through a filtration system i.e. RO treatment plant needs to install for drinking water facility before it is consumed. Holding tanks shall be cleaned on a monthly basis as a minimum and water tested for drinking.

### 2.20. Accommodation In charge

The Labour accommodation shall have a designated person who is in charge of safely managing the accommodation. The designated person shall be responsible for the day to day running of the accommodation.

### 2.21. Refreshment

The provision for suitable recreation activities (such as volleyball, cricket or football) is available within the worker accommodation.

### 2.22. Trainings

Difficult behavior can inhibit performance in others and in areas in the vicinity of the construction site therefore, periodic training sessions are scheduled for the team to be aware of the surroundings and familiarize one's responsibility.

Emphasis will be given during training sessions on The Sexual Harassment Act, 2013 is a legislative act in India that seeks to protect women from sexual harassment at their place of work.

Workers would be made aware about their roles and responsibilities and would time to time be informed about their contracts and termination clauses if found non-compliance with the rules set to maintain cohesive working conditions and not indulging in any activities which would create nuisance amongst coworkers.

Training programs would include training on HIV/ AIDS based on National Policy on HIV/AIDS and the World of Work Ministry of Labour and Employment Government of India.



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## 2.23. Proposed Labor camp plan

### General guidelines for Location of labor camp: (To be read in Conjunction with Labour Camp layout)

- Camp must be located on elevated ground which is less prone to floods.
- Ensure that the land is not marshy in nature. Locality of the camp should be so selected that there is no rift between the habitats of the camp and nearby community. Land under dispute shall not be selected for labor camp. If possible commuting for shopping or to work shall be minimized.
- If there is danger of intrusion of snakes, carbolic acid must be spread around the labor camp and an area up to five meters from the buildings shall be cleared of any kind of shrubs, holes etc that can house snakes and insects and it shall be maintained by periodic removal of vegetation.
- Availability of underground public utility services like electricity cables, water pipe lines, gas pipe lines and telephone / other lines shall be assessed and proper approval shall be taken from the authorities before excavating the land.
- If passing of overhead high-tension electric line over the labor camp cannot be avoided then a safe distance (minimum 3-5 meters) from the wires shall be ensured.
- Structures in the labor camp should be designed, constructed accordingly and their structural stability certificate shall be obtained.
- Water shall not be allowed to stagnate and water generated shall be collected, treated and recycled.
- If possible, a small grocery shop can be allowed inside the labour camp.

### Details of Unit



#### Accommodation:

- Each block shown in the given sketch is 150\* 30 Sq. Ft. The size can be increased based upon the requirement and size of the team of contractors. This can be done by combining two or four rooms in to one but related changes in design shall be attended and followed.
- Total four blocks are provided for 500 labors, considering 36 sqft/labor.
- Each block is divided into 20 rooms, accommodating 6-7 labors/room without bunker beds.
- Provision of 6 cloth hangers in each room on three faces of walls shall be provided
- A shoe rack for keeping shoes / chappals of labors in the room (can be made from scrap steel) of appropriate size shall be provided at the entry point of the room.
- Provision of hooks in rooms @ 5ft height from the floor for tying the mosquito nets and rope for drying the cloths shall be ensured
- In case there is a provision of bunker beds or multilevel beds, availability of fresh air@ 3 cubic meters per person shall be ensured and related increase in the load on facilities like toilets, water consumption, cooking, dining, requirements of fans, plug points etc shall also be considered and catered for.



- Each room shall be open on at least two sides for sufficient ventilation. There shall be provision of a meshed ventilator, 3 feet x 2 feet in size, located 6-9" below the ceiling on the common wall for ventilation.
- The height of ceiling shall be a minimum of 14 feet. If bunker beds are provided, the ceiling shall be a minimum of 4 feet above the top bunker bed. In case of bunker beds, no ceiling fans are allowed, only wall mounted fans shall be permitted.
- Row type sheds constructed with Structural Steel structure and block work for walls or with Pre-fabricated Aerocon Panels & GI sheet roofing with columns, trusses and purlins and thermocol false ceiling.
- Safe electric fitting with sufficient switches and plugs shall be provided. Every room (for 6 persons) shall have one tube light or LED, one fan and minimum 3 plug points. If bunker beds are used, number of light, fan and charging points shall be increased accordingly.
- The rooms and ceiling should be painted in light (preferably white) color for better illumination.
- The flooring should be made of Plain Cement Concrete.
- Every room shall have a window with grill and door with lock and key.
- Accommodation for bachelors and families shall be separate.
- Plinth of the rooms shall be approximately 300mm above the ground surface.

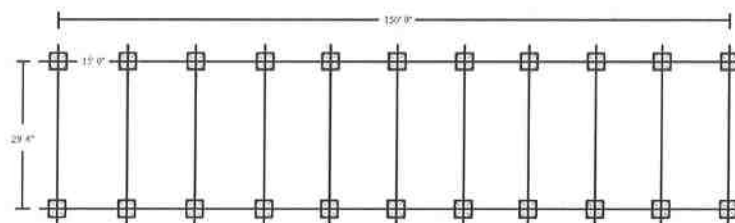


Figure 1 Labor quarters footing drawing

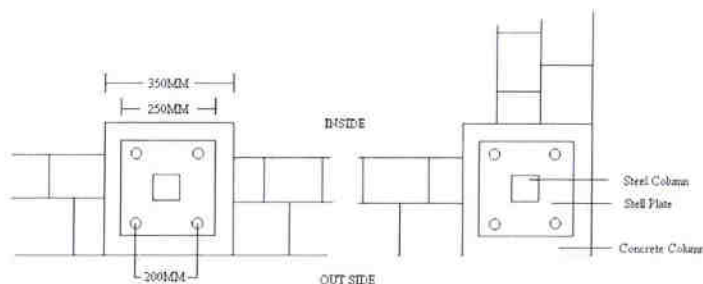


Figure 2 Column and Wall details



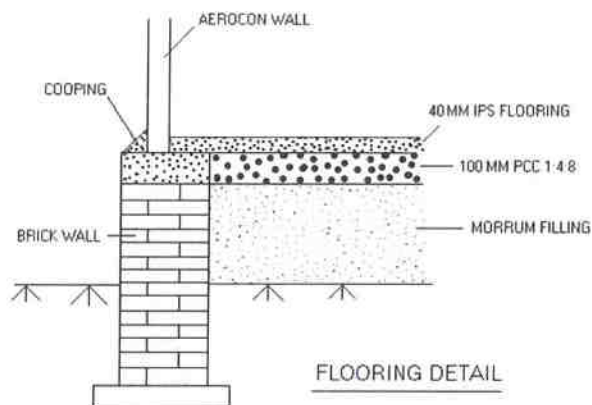


Figure 3 Flooring Details

**Multi storied labor colony:**

- Where space is a constraint provision of multi- storied accommodation shall be made for ground + one or two floors.
- Common balcony and staircase with railings shall be provided.
- The drawings details provided above are not applicable for multi-storied labor camp. Sites must design it separately with assurance on structural stability from competent person.



Figure 4 Multi Storied labor camp

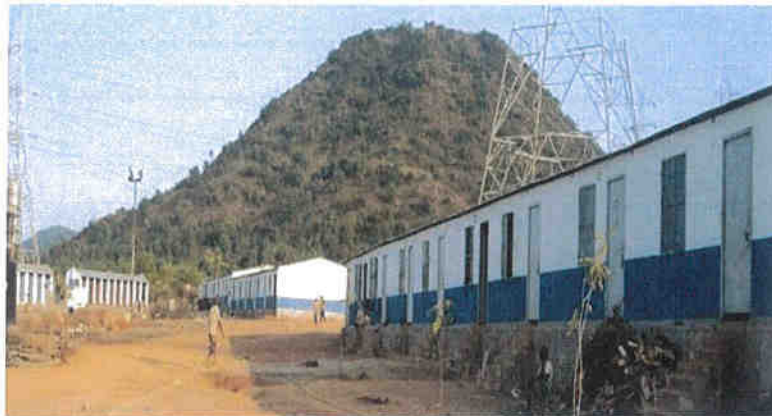


Figure 5 Single Story Labor camp

#### Details of Unit

2

**Toilet Block (Bio- Toilet) – Bio-toilets shall generally confirm to following details –**

- ✓ Size of bio-toilet -4.5' x 4.5'x 1.65' & 8' Super structure height.
- ✓ Material of construction: Sp. Steel/FRP bio-digester, FRP wall, roof & door.
- ✓ A push button type (used in railways) tape inside the toilet shall be provided, a steel mug must be fixed with a flexible chain to discourage the usage of plastic bottles inside the bio-toilets
- ✓ Bio-digester capacity decides the no. of usage of toilet, in model camp it is proposed 1 toilet/ 25 users.
- ✓ Exhaust fan & proper ventilation shall be provided along with one LED light inside the toilet.
- ✓ Flushing arrangement and one tap shall also be made available.
- ✓ Every toilet block shall have sufficient urinals and Water closets (approximate 1 WC per 25 occupants).
- ✓ The drainage system shall be effective for urinals and WCs with provision of septic tank in case of conventional toilets.
- ✓ Bio-toilets shall be encouraged for conservation of water. 1 WC per 25 occupants shall be provided in case of bio-toilet, the output water quality shall be checked regularly. It is encouraged to reuse the output for gardening or shall be reused only for flushing purpose in the bio-toilet.
- ✓ Training shall be provided to workers on do's and don'ts for bio-toilet and display sign for not throwing bottles, gutkha pouches, polythene, clothes, and cigarette/bidi shall be displayed inside.



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- ✓ In case of biotoilet at the camp, the urinal output shall also be connected to bio-digester tank.
- ✓ Separately located toilets and urinals shall be provided for ladies, if required.



Figure 6 Bio-digester

MOVEMENT OF WASTES IN ANTI CLOCKWISE  
DIRECTION IN THE B O DIGESTER TANK

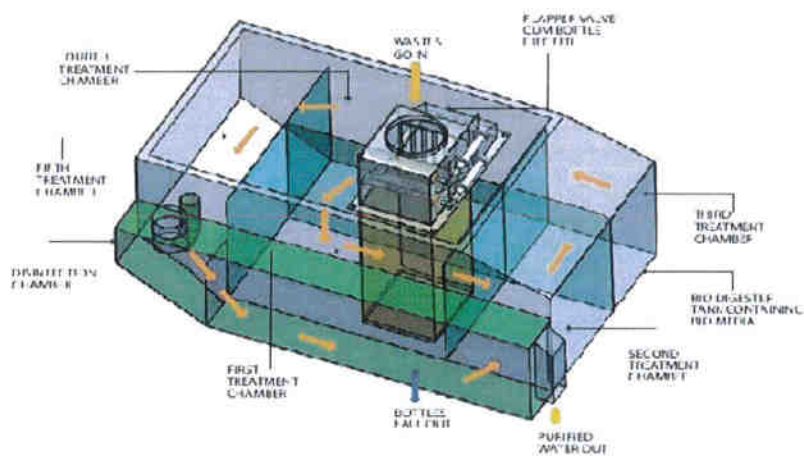


Figure 7 Movement of Waste in Bio-Digester Tank





Figure 8 Bio-Toilet at our labor camp

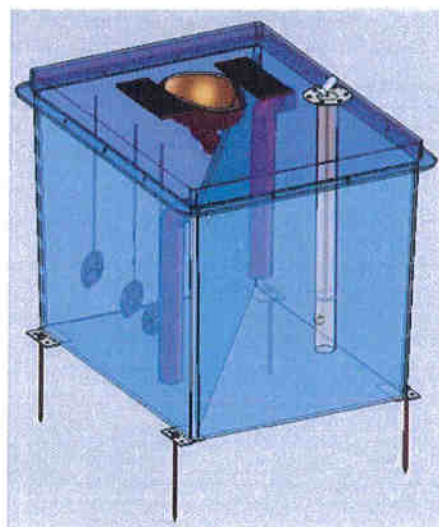
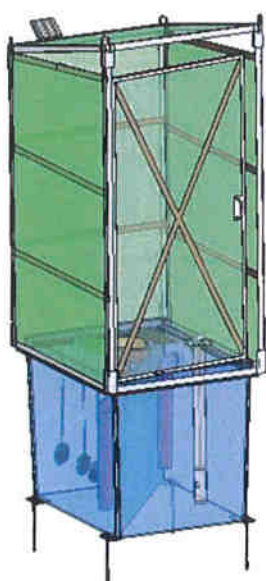


Figure 9 Bio-Digester with Superstructure

**Toilet Block (Conventional Toilet)** – If any site wants to opt for conventional toilets then with all other details remaining same, only septic tank shall be designed and constructed as per the norm.



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### Washing/Bathing Area

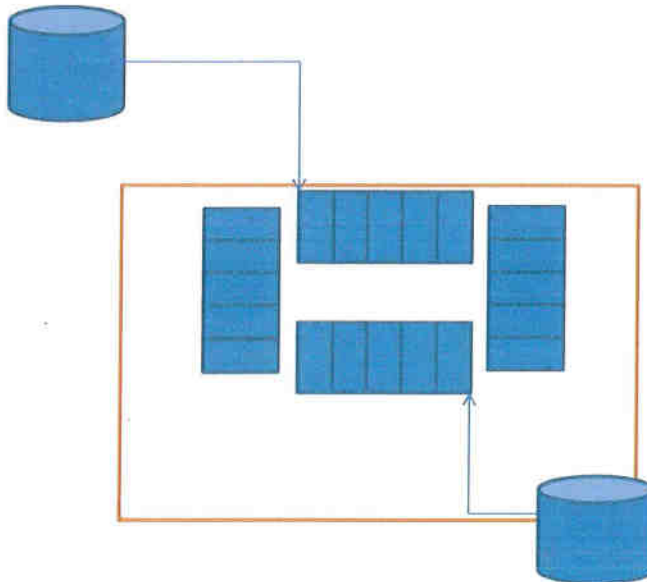
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#### Option-1 (covered, individual enclosures, as shown in the sketch)

- The bathing area shall be constructed on P.C.C floor of area 24 feet x 24 feet with 5 bathroom block on each side and 2 feet gap on each side.
- The water shall be pumped to the portable tank lying on the structurally stable structure above the ground.
- The capacity of tank shall be 50 liters/person with storage capacity of 2 days, for 500 labors it would be 1 lakh liters (2 tanks of 25000 liter capacity are recommended).
- The bathroom shall be completely covered with half gate provided on the 4th face.
- Size of each bathroom shall be 4ft x 4ft x 8 ft fixed with 4 ft high gate fixed at 1 feet from the ground.
- Each bathroom shall be provided with tap at 4 ft height.
- Labors shall be educated not to throw the shampoo pouches/soap cover in the bathrooms & proper screen shall be fixed to prevent all these solid waste going into grey water treatment plant.

#### Option-2 (open, common area)

- A rectangular bathing area of 20ftx20ft should be constructed.
- The bathing water tank should be fitted with taps. The distance between two taps shall be 4 feet.



**Tank for collecting Grey water/ Storm Water**

4

- An underground sintex water tank of 50,000 liters capacity with necessary plumbing and pumping arrangements shall be provided to collect grey water plus storm water during rainy season.

**Tank for collecting water from Bio-toilet/ Septic Tank**

5

- A underground sintex water tank of 20,000 liters capacity shall be provided to collect output water from bio-toilet plus Kitchen water after screening solids from the drains.

**Grey Water Treatment:**

6

- Bathing and washing waste water is termed as grey water and it is encouraged to treat the same in the grey water treatment plant, the treated water shall be reused for dust suppression at the site.
- The washing and bathing area shall be designed in such a way that natural slope is towards the grey water treatment & kitchen and toilet water stream shall not mix with this particular stream.
- The design and flow diagram for grey water treatment is shown below -

**Design details of Grey Water Treatment (further details or any clarification due to change in load or otherwise can be obtained from the Water division headed by Mr. Reby Thomas at SP Centre, Mumbai)**

**Wastewater Details**

Bathing waste Flow 50,000 Liter / Day [ over a period of 12 Hrs.]

Collection period 12 Hrs. in a day.

Hourly Bathing wastewater Flow 4.5 m<sup>3</sup>

**Process Equipment Details**

**1. Collection Sump**

- a. Quantity 1 No.
- b. Volume 9 m<sup>3</sup>/Hr.
- c. Material of Construction (MOC) RCC

**2. Main feed pump**

- a. Quantity 2 No.
- b. Flow 4.5-5 m<sup>3</sup>/Hr.
- c. Head 5 m
- d. NPSH 3 m

**3. Chemical Dosing system [Manual]**



- a. Quantity 2 Nos.
- b. Dosing tank 2 Nos.
- c. Lime Dosing 15 ppm
- d. Alum Dosing 40 ppm

#### 4. Flocculator

- a. Quantity 1 No.
- b. Flow 4.5 m<sup>3</sup>/Hr.
- c. Agitator, MOC - MSEP (Mild Steel Epoxy Painted)
- d. MOC - MSEP
- e. Size 1 m L x 1 m W x 1.2 m SWD

#### 5. Settling Tank with conical bottom

- a. Quantity 1 No
- b. Flow 4.5 m<sup>3</sup>/Hr.
- c. MOC MSEP
- d. Detention 1 Hr.
- e. Size 2.25 m L x 2.25 m W x 2 m SWD

#### 6. Clarified Water Sump

- a. Quantity 1 No.
- b. Volume 4.5 m<sup>3</sup>/Hr.
- c. MOC RCC

#### 7. Filter feed pump

- a. Quantity 2 No.
- b. Flow 4.5-5 m<sup>3</sup>/Hr.
- c. Head 10 m
- d. NPSH 3 m

#### 8. Multi Grade Filter

- a. Quantity 1 No.
- b. Filter Media Silex / Sand
- c. Capacity 4.5 m<sup>3</sup>/Hr.
- d. Size 1000 mm Dia x 1500 mm HOS
- e. MOC MSEP / FRP

#### 9. Treated Water Sump

- a. Quantity 1 No.
- b. Volume 9 m<sup>3</sup>/Hr.
- c. MOC RCC

#### 10. Skid

- a. MOC 200 ISMC – MSEP with wheels
- b. Size 3 m W x 5-6 m L

#### 11. Control Panel



a. Quantity 1 No

The plant will be mounted on MS Skid with wheels for easy mobilization. All suction will be through flexible hose with foot valve.

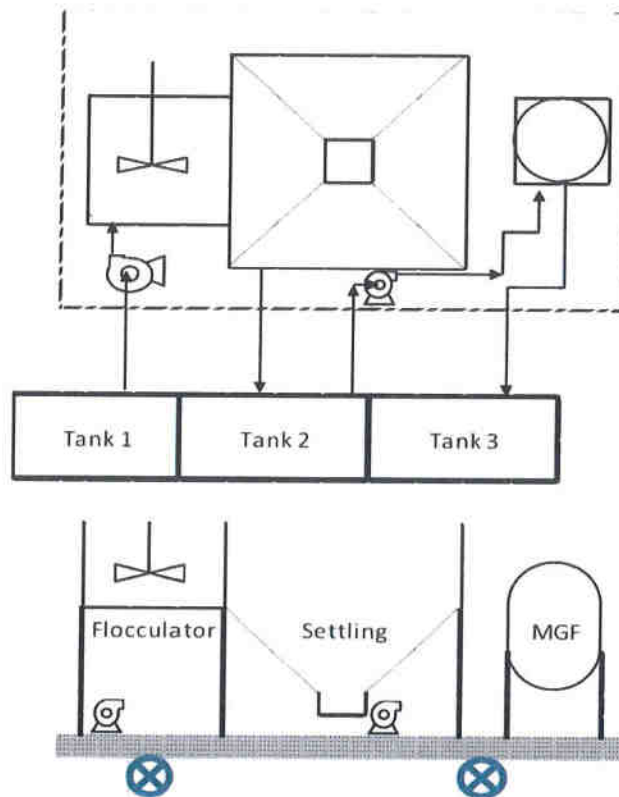


Figure 11 Scheme of Grey Water Treatment



*Signature*  
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#### Electric Room



Preferably, labour camp electrification shall have solar energy as the source of electric energy and a small DG set as back-up for emergencies. To opt for this mode of energy, Solar panels, battery bank and special fixtures will be required for which design shall be obtained from the supplier. Leading supplier of such systems in India are listed below –

M/s Tata Power Solar – Toll free number 18004198777 or forward enquiry through [www.tatapowersolar.com](http://www.tatapowersolar.com)

M/s Su-Kam –

SU-KAM POWER SYSTEMS LTD.  
Corporate Office  
Plot No. 54, Udyog Vihar,  
Phase VI, Sector-37,  
Gurgaon - 122001, Haryana, India

Su-Kam Office NoTelephone:  
+91-124-4170500

Call for Sales Enquiry  
1800 102 7555 (Toll Free)

M/s ABB – Toll free number: 1800 420 0707

M/s Eureka Forbes also deals in this field and can be contacted on 39883333

- Electric room shall preferably be of adequate size to accommodate the DG and panels etc. In general, it may be of 200 sqft size with brick work, concrete flooring and plaster. Earthing pits shall be a part of it. If required, cable trays shall be provided to align the cables.
- The roof, floor and walls shall be leak-proof to avoid any leakage / dampness.
- It shall be equipped with firefighting equipment and with lock & key.
- Earth resistance shall be checked on weekly basis and no. of earth pit shall be done
- In case of solar powered labor camp, room to store batteries of energy bank shall be provided.
- (Details of solar power to be added here)



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**Security Room****8**

- Every labor camp shall have security cabin at the main gate to guard and to ensure safe passage of people, goods and belongings.
- A security guard shall be deployed (24x7) at the main gate.
- The security cabin should typically be 6 feet x 6 feet.

**Main gate****9**

- Only one gate for entry and exit shall be provided.
- The gates could be sliding or single/double leaf gate mounted on rail.
- Dimensions of the gate: Height 7 feet x Length 18 feet.
- The gate should be painted as per guidelines in Brand Manual.
- There shall be a separate small gate for pedestrians of about 4 feet width beside the main gate.

**Freshwater Tank****10**

- 3 sintex water tank of total 60,000 liters (each tank of 20,000 liters) capacity shall be provided to store the fresh water. It should be located close to the main gate. An electric pump and necessary plumbing to pump the water to other areas shall be provided.
- Preferably, the tank shall be underground.

**Camp Boss Room****11**

- An office room for the camp administrator shall be provided near the entrance gate.
- This office room shall be minimum 100 sqft.
- Provision of electrical fittings & fixtures (lights & fan) as well as a table, 4 chairs and cupboard shall be provided.
- A notice board in lock & key shall be provided outside the camp boss room but displaying notices, information etc.

**First Aid room****12**

- A first aid center with trained first-aider shall be provided next to the camp administrator's office.
- The area of this room shall be minimum 100 sqft.
- Provision of a stretcher & first-aid box shall be made.
- In case of female workers, female first aiders shall be made available.

**Cooking Area****13**

- Cooking area shall be separate from other facilities.
- The minimum area shall be 600 sqft so that, at a time, about 10 gangs can cook there food inside the cooking area.
- Openings for exhaust and cross ventilation shall be provided.
- The food preparation area shall be equipped with fire extinguisher for safety.
- Usage of Bio-chulha shall be encouraged for natural resource conservation and smoke free cooking. Bio-chulha uses briquetes and forced combustion with the help of small blower provision results in smoke free preparation of food.
- Adequate storage with lock and key shall be provided to all the gangs for storage of grocery and vegetable.
- Pest control with anti-rodent arrangements shall be conducted regularly in the cooking area.
- Cooking inside the accommodation rooms shall be strictly banned.
- If LPG is used as fuel, periodic checking of supply pipe/ regulator shall be done for leakage detection
- Fuel storage: The fuel storage area shall be close to the cooking area which should be equipped with fire extinguishers and necessary safety arrangements. People shall be trained to use fire-extinguishers.
- Minimum area of fuel storage shall be 100 sqft.
- It shall be kept in lock and key.



Figure 12 Bio-Chulha

Dining Area

14



- Dining area shall be near to the cooking area and shall be minimum 20X40 feet.
- Fixed tables and sitting arrangements should be made preferably made of kadappa stone tables and benches.
- The area shall be sufficient for 80 to 100 labors at a time.
- Hand-wash area with drainage shall be provided.
- Covered Food-waste bins shall be kept near the dining area & waste shall be disposed on daily basis to avoid breeding of flies/mosquitoes. Food waste shall be utilized for bio-gas generation and manure production. Details of which is given below in point number 19.

#### Utensil Washing Area **15**

- Utensil washing area shall be near to the cooking area and shall be minimum 20X20 feet.
- Utensil washing area shall be provided with 10 taps to wash the utensils.
- The waste water stream from utensil washing area shall flow to bio-toilet stream after screening solids from the kitchen water.
- The screened solids shall be diverted to the waste disposal area, where food waste is disposed / treated.

#### Treated Grey water Tank **16**

- An underground and water tight masonry tank of 50,000 liters capacity shall be provided to store treated grey water.
- This water may be used for gardening and dust suppression.

#### Emergency Assembly Area **17**

- Emergency assembly area shall be clearly marked and should be easily accessible to everyone in the labor colony.
- Area: should be able to accommodate the full occupant load of the premises / area (as a thumb rule, not less than 2.25 square feet per person @ 1.5x1.5 feet)
- A notice board displaying the emergency contact numbers shall be provided in this area.
- Each occupant shall be briefed on the location of Emergency Assembly Area, first-aid room and their actions in case of an emergency.

#### Drinking Water **18**

- The water used for cooking and drinking purpose shall be tested and potable as per IS 10500. Water tapes shall be push button type( as used in railways) in the drinking water area
- The sintex water ( 3 layered) storage water tank of 10,000 liter shall be placed at a height of 3 feet on a strong base capable of taking the load. It



- shall be closed from the top and have necessary fittings for inlet and outlet with a lid at the top. The tank shall be equipped with water level controller.
- Water treatment plant may be installed, if required.

#### Waste Disposal Area

19

- The waste disposal area shall be cleaned daily and authorized vendor shall be engaged to dispose off the collected waste.
- Bio-gas plant and food-waste composting shall be encouraged for energy conservation and for food waste management in large labor camps ( More than 1500 Labors). For specific details on size please touch base with Corporate HSE department.



Figure 14 Bio Gas Plant for Food waste conversion to biogas



Figure 13 Organic Waste Converter

#### Recreation Room

20

- A recreation room of minimum 20\*20 ft shall be provided for entertainment of labors
- A TV ( minimum 40 inch) with data cable connection/DVD player shall be provided & be used for entertainment and showing informative videos on HSE/ general topics
- Camp boss shall take care of the discipline in TV room and food, bidi, gutka shall not be allowed inside the TV room, also labors shall not be allowed to sleep inside the TV room
- A big floor mat of minimum 10ft\*10ft shall be provided for watching the TV.
- Indoor games like carom, ludo etc can be provided based on the interests of the labors.

#### Grocery Shop

21

- A grocery shop of 10\*10 Sq ft shall be provided inside the labor camp, the shopkeeper must keep daily use items for labors like soap, washing powder, tooth paste, Hair Oil, comb, shampoo etc. Kitchen items like cooking oil, rice, dal, wheat flour, spices etc shall be available with the shop
- Shopkeeper may keep a provision for preparation of tea and ready to eat snacks, biscuits etc based on the requirement, but cooking shall not be permitted inside the grocery shop

#### Creche

22

- In case of 50 or more female workers, a crèche facility of minimum 20\*10 Sqft shall be provided inside the labor camp.
- Children below 6 years shall be accommodated in crèche and a trained caretaker shall be appointed to take care of children. Proper nutrition, healthcare, hygiene and primary education shall be ensured for the children by the care taker.



### 3. Resource Efficiency and Pollution Prevention

The access road has to be constructed of around 1.5 kms since there are only kaccha road to Unnao STP site. The project area is plain without any trees or vegetation. Surrounding area is open land. No residential area is present nearby.

There are no transmission line and power connection nearby to the proposed site.

#### 3.1. Baseline Environmental Condition

The observations were taken on open proposed land for STP at Unnao. The observed values of air pollutants were found to be within the limits of NAAQ Standard. The Air Quality Index (AQI) was calculated as 100, indicating **Moderate Air Quality**. The meaning is: air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.

There is no residential area nearby and almost no anthropogenic activity around, so the noise levels were very low and ranged from 40.3 – 44.2 dB(A) during day time and 36.8 – 39.4 dB(A) during night time. All the values were observed to be below the standards for Industrial area.

The soil was slightly alkaline and brown black. The fertility was very low with low levels of organic carbon, and available N, P, & K.

#### 3.2. Environmental Management Plan

The construction activity will be carried out by taking all precaution to control pollution of air, noise, water, land. Care should be taken to give sanitation facilities and clean drinking water to the labour colony. All the safety measures should be taken to protect the workers from the risks in construction work.

The waste treatment method will be selected considering the nature of wastewater presently and in future plantation should be planned properly and should be started along with the construction work. The impacts of traffic on the environment should be minimized by application of air control measures and noise control measures.



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## 4. Community Health, Safety, and Security

### 4.1. Health Hazard

Several years, in the STPs field was considered the most hazardous, especially when it involving confined space entry. Presently the employee experiences or faces the several health-related problems due to regular work exposures through treatment plant visit.

At the STP site some of chemical and inhalation related health issues are acute in nature, such as irritations of the throat, eyes and nose. While other problems are chronic in which repeated exposures caused effects upon internal inhalation like lungs problems or allergies. Several studies reported that this STP treatment may generate aerosols or VOCs containing microbiological and chemical present in sewer.

#### 4.1.1. Source of contact

##### 1) Inhalation

This is a major route for gases, fumes, chemicals and infected organisms to enter in the body. Mainly the gases or chemical inhaled into the throat-swallowed and bronchial tubes - lungs. Near aeration tank, dewatering processes (droplets) commonly observed gas or chemicals are air stripped from sewage where workers working in that area. Sludge thickener and other sludge processes (drying, compacting, sludge digester, gas collection tank, and incineration) mainly generated greenhouse gases. These will result the health impact mainly respiratory and gastrointestinal exposure due to inhalation. Again workers may have contact to chemicals while attempting to clean of tank or remove these substances from STP.

##### 2) Skin and Eye Contact

This is also a main route cause of entry in the employee's body; it may lead to exposure of chemicals and disease. The chemicals get easily absorbed through the skin from contact with sewer water or sludge. The high amount of disease organisms can easily trap or enter in the body through cuts, wounds or scratches.



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#### 4.1.2. Exposure of metals or asbestos

It is commonly observed during the mechanical or bar screening most of the needles or metal chips get pricks to the workers during cleaning of bars, diseases may occur because of accumulation of organisms. Metals are generally not air stripped it may accrue in sludge or receiving water. Metals are commonly captivated by activated sludge because they are involved to the active sites of the floc bio-polymers or mix completely.

#### 4.1.3. Exposed to diseases by inhalation

Mostly the inhalation process itself may lead to a respiratory tract infection and mucous membrane; the trapped pathogens get swallowed in the digestive tract or system. It is also possibility of organisms, which may infect the lungs include *Mycobacterium tuberculosis* enteric viruses. It is very difficult to study health impact or effects from aerosols at STP plant area.

Pathogenic bacteria or virus is a most important while wind direction or speed that determines the spread of aerosol. While in air, the chances of survival of the organisms depend upon humid condition, temp., sunlight and fumes. The indicator organisms like *Clostridium perfringens*, *Streptococcus*, *Mycobacterium*, enteric viruses, and the presence of *Fecal streptococcus* is the strongest possibility or indicator for aerosol from sewer water.

Commonly found waterborne diseases include viruses, bacteria and protozoa and its agents

Disease	Agents
<b>1. VIRAL</b>	
Gastroenteritis, Flu	<i>Enteroviruses, Rotaviruses, Parvoviruses, Reoviruses, Astrovirus</i>
Infectious Hepatitis	<i>Hepatitis A, B</i>
Serum Hepatitis	<i>(cirrhosis, liver cancer)</i>
Aseptic Meningitis	<i>Coxsackie viruses, Echoviruses</i>
Respiratory Disease	<i>Adenoviruses, Reoviruses, Coronavirus</i>
Poliomyelitis	<i>Polioviruses</i>
<b>II. BACTERIAL</b>	
Salmonellosis, Typhoid Fever	<i>Salmonellae</i>
Shigellosis	<i>Shigellae</i>



Cholera	<i>Vibrio cholerae</i>
Gastroenteritis	<i>Escherichia Coli, E. Coli O157</i>
<b>III. PROTOZOAN</b>	
Amoebic Dysentery, Ameobiasis	<i>Entamoeba histolytica</i>
Giardiasis	<i>Giardia lamblia</i>
Balantidiasis	<i>Balantidium coli</i>
Meningoencephalitis	<i>Naegleria fowleri</i>
	<i>Acanthamoeba</i>

#### 4.1.4. Municipal Waste Management and Sanitary Landfills

It is common practice in India, the sludge drying beds waste, bar screening waste, sludge are directly removed and landfilled. The bar screening glass, metal, plastic etc, waste need to provide proper treatment facility i.e. Municipal solid waste management facility for further treatment. Pathogenic bacteria or viruses may be adsorbed to solid waste (sludge) components or the sanitary landfill may have some inactivating property (e.g., heavy metals), high temp, approx. 60 during decomposition of waste. During the Landfilling pathogenic microorganism may increase, because formation of the leachates or may be not form depending upon the climatic condition.

#### 4.2. Safety Manual

The STP general safety is mainly concern regarding the Health and safety of person working in-between premises. The operating personnel have been prepared safety manual for use personnel as well as the company. Each employee and supervisor shall be given a copy of this manual. This manual is always/consistently updated to enhance areas relating to the safe operation of STP. This manual need to take management concern while modifying the details related to safety standards. From management or supervisor or employee have some comments or suggestions on for updating information pertaining to the safe operation of equipment may be incorporated into future editions.



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#### **4.3. Safety Meetings or Tool box talk**

It is mandatory to discuss all sorts of STP safety terms will discuss in meetings shall be held on a weekly or quarterly basis as per management concern officials. The management need to conduct a program suitable for the seasonal aspects and discuss any key issues, tool box meeting on daily basis as well as the new amendments or current regulations or contingency plan need to discuss in last meeting. Supervisors and Employee shall be required to take an active participation in the safety meeting or safety program. Each individual should give their input for safe operation of municipal sewage systems.

#### **4.4. Hazard identification and reporting**

In STP, working person should be aware regarding the hazard near the different units and always try to discuss or chase the issues minimization. Before assigning or commencing any work that may be hazardous, they need to take precautionary measures to create a safe procedure. Particularly in STP Unit more than one employee working in the same job, but it is necessary to know all employees working in particular area. While leaving object or equipment need to take extra precaution on oily or greasy surface or any greasy spare parts.

#### **4.5. Guards or barricading**

It is mandatory to maintained safety procedures and machine/piece guards. Guard or barricading shall not be removed from any equipment except while performing maintenance.

#### **4.6. Housekeeping practices**

STP equipment's are bigger in size, and need to be handled with the help of hydra or so on. Materials handling and storing in a neat and proper manner can prevent them from falling off onto running equipment's. Housekeeping practices need to be adopted on regular basis. Scrap parts need to be removed from site to avoid accidents. Jam or stuck part must be replaced with new ones and should be disposed off with the help of approved vendor or proper manner.

#### **4.7. Fire Prevention measures**

As per CPCB or UPPCB norms STP nearby fumes area or no other combustible materials shall not be allowed to keep or accumulate in the vicinity of flaming or blower area, sludge digester or



buildings getting into the machinery or causing a fire. Near Sludge digester or blower no flammable liquids like petrol, kerosene or diesel fossil fuel or near chlorine rooms where the probability to cause a fire. Oil spillage, rags, dried leaves, papers, vehicles etc. should not be allowed at particular area to spontaneously combust nearby flaming.

#### 4.8. Personal Protective Equipment's (PPE)

UP Jal Nigam management or contractor need to provide all necessary PPE like. Full reflective cloths, eyeglasses, Shoes, nose mask, hand gloves, face mask, ear plugs etc. to each individual. Full covered cloth with eye glasses, nose mask, and shoes shall be provided. Whereas for the employee's engaged in particular task, need to provide proper PPE for handling of acids, caustics, dry chlorine and ammonia like liquids for precautionary measures. Please refer Annexure II for PPE checklist.

#### 4.9. Handling Chemicals and gas

The most commonly used chemicals in a STP are chlorine for disinfection of the effluent. The dry chlorine or gas form should be carefully handled while if left open it can cause corrosion. Chlorine gas cautions should be taken during the large volume of gas that can be released to prevent unauthorized tampering of the cylinders. Always check for gas leak using ammonia bottle after changing cylinders. In case of emergency need to keep chlorine gas mask along with all other PPE while entering in to the chlorine room. Please refer Annexure III checklist for the same.

CHECKED  
BY



(R.K. DUBEY)

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C.D. U.P. JN-UNNAO

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U.P. JN. LKO.


(C.M. DIMRI)

S.T.C.

ESHS report for proposed 15 MLD STP at Unnao

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## 5. STP Safe Working Environment and Adequate Procedures

### 5.1. Confined Spaces

This is a challenging task while working in confined spaces including Aerator hopper, sludge digester, gas collector, wet well, manholes, any type of tank that is below ground level or has inadequate ventilation, it has the highest or potential risk for containing deadly gases (like hydrogen sulphide gas). It is mandatory to check prior to entering any confined space, with the help of instrument oxygen and other gases presence inside the tank. All confined spaces need to adopt safety standards or measures to ensure the proper ventilation or ventilation fan must be provided. If a ventilation system or a fan is not present the employee should not enter in the confined space, without an oxygen cylinder or proper retrieval equipment for emergency rescue or ventilation equipment. Please refer Annexure V for the same.



**CONFINED SPACE  
ENTRY BY PERMIT  
ONLY!**



**HYDROGEN SULFIDE  
GAS MAY BE  
PRESENT**

### 5.2. Maintenance of STP

While working near aeration tanks, sludge thickener, compressed air blower and sludge collection tanks one should always take proper precaution. In the premises if employee is working in the tank need to provide PPE wires, PPE ropes (Life Guard), hoses to rescue or avoid fall into a tank. While working inside the STP plant need to use tag system to take extra care, majorly all equipment's are automated, it operates on a time clock and may automatically start at any moment to ensure the equipment completely of in condition. Weekly checking of tanks, instruments and wires should be carried out to avoid DC current shock hazards. While working or inspecting near uncovered aeration tanks, non-barricaded area, and narrow walkways are all



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potential accident areas. It should be properly checked like the rusted grating; it should be replaced with respective or adequate materials for safely working environment. In the premises pump house, blower rooms, scrubbers, chlorine gas room and electrical control rooms need to have adequate lighting facility to perform workers duties in a safe and controlled manner.



**THIS EQUIPMENT  
STARTS  
AUTOMATICALLY**

### 5.3. Artificial Respiration

Respirations equipment's technique of artificial respiration is the most intensive and practical method for emergency during STP works and ventilation of anyone at a glance. Second method is to provide Mouth to Mouth or nose method while the lack of respiration equipment's who has stopped breathing due to a carbon monoxide poisoning,  $H_2S$  gas, drowning, electric shock commonly practices for external air ventilation of anyone working in a plant.



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#### 5.4. General Safety Standards

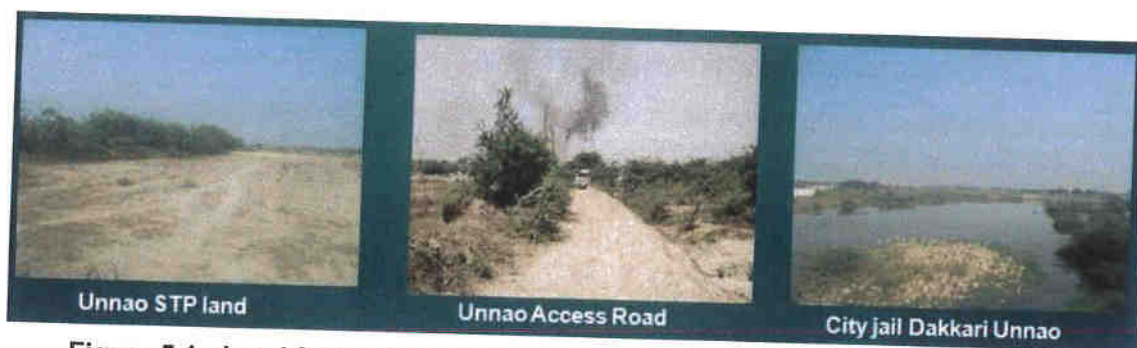
- Fire Protection - Fire training, equipment: NFPA 600 approved, Portable fire extinguishers: NFPA 10, 1910.157 Ex: A/B/C/D/K Type, Automatic sprinkler systems: NFPA 13, 1910.159, fire alarm: NFPA 72, 1910.165
- Compressed Gas-Compressors and Air receivers (1910.169), safety valves < 30 PSI pressure regulators
- Machine Guarding - guard moving, Abrasive wheels, Machinery should be anchored
- Electrical- National Electrical Code: NFPA 70
- Toxic and Hazardous Substances- Asbestos, Arsenic, Cadmium, Chromium, Lead, etc., 29 CFR 1910.1027: Cadmium, 29 CFR 1910.1026: Chromium (VI), HCN, H<sub>2</sub>SO<sub>4</sub>, CaO<sub>3</sub>, NaOH, H<sub>2</sub>S, Cl<sub>2</sub>, etc., SDS/MSDS Manual-HCN toxic gas at WWTP, IDLH: 50 PPM, OSHA PEL: 20 PPM, H<sub>2</sub>S toxic gas at WWTP, IDLH: 100 PPM, OSHA PEL: 10 PPM
- Chemical Hygiene Plan- 29 CFR 1910.1450: Occupational Exposure to Hazardous Chemical in Laboratories
- Hazardous Materials- Class 1 - Explosives, Class 2 - Compressed Gases, Class 3 - Flammable & Combustible Liquids, Class 4 - Flammable Solids, Class 5 - Oxidizing Materials, Class 6 - Poisons, Class 7 - Radioactive Materials, Class 8 - Corrosive Materials.



## 5.5. Traffic Management

The traffic in the STP works area or surrounding plant area performing another operation near tank, screen or sludge thickener need to notice traffic management for accident prevention. The movement of vehicle can distract operators there by decreasing their visual attention or concentration and causing fatigue and error. There are several methods of controlling traffic: (1) re-route the traffic; (2) rearrange the furniture; (3) add partitions; (4) in a private office, close the door whenever possible.

The proposed project area for proposed STP at Unnao is observed open plain land. No construction work has been started. The topography of the proposed STP is flat without much level difference and land is available for construction. The photographs are shown in Figure 5.1.



**Figure 5.1.: Land for Proposed Unnao STP, Access Road and City Jail Dakkari**

Total land available for STP is 5.1 acre. The access road has to be constructed of around 1.5 kms since there are only kaccha road to STP site.

### 5.5.1. Warning Signs and Barricades

The confined space entry personnel need is a traffic jam/barricade in or around the area in which they are trying to perform their dangerous work. When confined space entry is required, the immediate area surrounding the entry point should be properly barricaded and posted with warning signs. A simple traffic cone and hazard tape around the confined space entry port can be effective in warning personnel about the hazard. If it is not possible to erect some type of safety barricade around the confined space area, it may be necessary to station personnel in the exclusion area to direct traffic away from or around the space. It is important to leave the traffic control and warning devices in place until the work is completed.



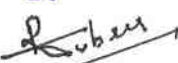
### 5.5.2. Traffic Control Devices

During time the traffic flow is disrupted, the appropriate local authorities must be notified to secure the required approval and or permits. Only an employee possessing a valid Certification/ Card may control traffic for construction and maintenance operations in accordance with State Department of Transportation Regulations. Employees working in or near a road must wear orange vests, hard hats, and safety footwear. Traffic control situations and signing setups will vary with local conditions and the requirements of UP Jal Nigam.

### 5.5.3. Vehicle Traffic and Pedestrian path

Provide adequate protection to vehicle and pedestrian traffic when working in or adjacent to public and plant roads. Use traffic signs, cones, Speed limit and barricades to direct traffic safely around the work site. Ensure that a certified flagman is directing traffic in congested or highly travelled areas. Ensure that all employees working in congested or highly travelled areas wear orange vests so that they can easily be seen by passing motorists. Observe traffic safety rules and always look for traffic before crossing a street or stepping out from the work site.

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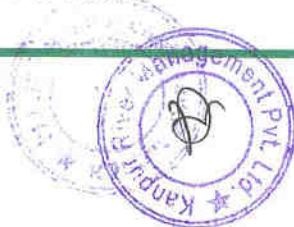


## 6. Concessionaire Applicable Permits and Strategy for obtaining

### 6.1. Temporary Power Connection (During construction period)

New Service Connection procedure is made easy through Web Self Service of Uttar Pradesh Corporation Ltd. where consumer can apply for new service connection online. To apply for Commercial connection consumer, have to select Discom name Madhyanchal Vidyut Vitran Nigam Ltd., for Unnao region power connection.

Screenshot of procedure is as below:



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https://www.uppcionline.com/dispatch/Portal/appmanager/uppccl/wss?nfpb=true&\_pageLabel=uppccl\_s tatic\_home&pageID=ST\_01

**UTTAR PRADESH POWER CORPORATION LTD.**

Home | About Us | Contact Us | Privacy Policy | Terms of Service | Feedback

New Connection Form (Mandatory fields are marked red and must be filled)

First Name: Last Name: Father's First Name: Father's Last Name: Husband's First Name: Husband's Last Name: Mother's Maiden Name: Occupation: Communication Address: Address Line 1: Address Line 2: Zip: Mobile Number: Installation Address: Address Line 1: Address Line 2: Zip: Premise Phone: Is the permanent address same as installation address? Yes No

https://www.uppcionline.com/dispatch/Portal/appmanager/uppccl/wss?nfpb=true&\_pageLabel=uppccl\_s tatic\_home&pageID=ST\_01

Is the permanent address same as installation address? No Yes

Plot Size sq. mts: Covered Area sq. mts: Town Name: Units: kW: Purpose of Supply: Select: Connection Point: Single Point: Adjacent Account No: Place Type: Urban Rural: Connection Type: Postpaid Prepaid: Phase Type: Single Phase Three Phase: Do you want to give Possession Details? Yes No: Documents for Identification: Select: Enclosure Section: NOC: Yes No: Owner Consent Letter: Yes No: Work Completion Certificate: Yes No: GC Fya Verification Code as in image Text is Case Sensitive: Submit: Note: If you are unable to fill the New Connection Form, please contact Customer Care Center.

Consumer can check status of new service connection on home page of UP power Corporation Ltd.

The link for above mentioned service is available at [https://www.uppcionline.com/dispatch/Portal/appmanager/uppccl/wss?nfpb=true&\\_pageLabel=uppccl\\_s tatic\\_home&pageID=ST\\_01](https://www.uppcionline.com/dispatch/Portal/appmanager/uppccl/wss?nfpb=true&_pageLabel=uppccl_s tatic_home&pageID=ST_01)



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## 6.2. Consent to operate under water and Air act

Under the provisions of this Acts, an applicant running or establishing any industry or process, and discharging effluent/emitting pollutants into any water resources or on land/air and polluting thereby the environmental water/air is required to obtain consent, which needs to be obtained in two phases;

Consent to Establish: This consent is to be obtained prior to establishing any industry or process.

Consent to Operate: Once the industry or process plant is established along the required pollution control systems, the applicant is required to obtain consent to operate the unit. This consent is given for a particular period, which needs to be renewed regularly.

Documents required for Consent to Operate:

1. A covering requisition letter stating the status of the industry and activities clearly.
2. Details of production capacity, actual products manufactured in month wise during the last two financial years.
3. Details of changes if any in the quantity of sewage/trade effluent generated and mode of disposal of the same indicated against in the original consent order (If applicable).
4. Details of changes if any in the quantity of emission and number and height of chimney/stacks indicated against in the original consent order (If applicable).
5. Details of changes if any in the name or in the management/ Board of Directors of the company (If applicable).
6. Latest Analysis reports of the treated sewage/ trade effluent samples (If Applicable).
7. Latest Analysis report of the Stack Monitoring, AAQ and Noise Level (As applicable).
8. Compliance report on the conditions of latest Hazardous waste Authorization /Biomedical Waste Authorization issued to the unit (If applicable).
9. Compliance report on the latest consent/renewal of consent order conditions stipulated under Water & Air Acts issued to the unit.



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10. The latest Audited Balance Sheet/Auditor's certificate showing the Fixed Assets, Current Assets and Current Liabilities.
11. Details and mode of payment of Consent fee under Water and Air Act.
12. Status of Water Cess payment along with the details of last bill (If applicable).
13. Details of Online monitoring system installed for effluent and or Emissions as applicable.
14. Complete details of systems adopted for ZLD and details of land in case of on land disposal along with the photographs (If applicable)

The link for above mentioned service is available at <http://niveshmitra.up.nic.in/> and user manual for consent applications is also available at <https://www.youtube.com/watch?v=1qVBO8NSpgM&feature=youtu.be>

### 6.3. Consent for storage of hazardous materials

The Ministry of Environment & Forests, Government of India has laid down the above-mentioned rule under the provisions of Sections 6, 8 and 25 of Environment (Protection) Act 1986 with a view to regulate handling and management of hazardous wastes so that no adverse impact on the environment in general and human health in particular takes place.

Responsibilities of the Occupier and Operator of a Hazardous Waste facility have:

1. The occupier and operator of a facility shall be responsible for proper collection, reception, and treatment for storage and disposal of hazardous wastes.
2. It shall be the responsibility of the occupier and operator of facility to ensure that the wastes are properly handled and disposed off.
3. It shall be the duty of the occupier and operator of a facility to take adequate steps while handling hazardous wastes to:
  - i. Contain contaminants and prevent accidents and limit their consequences on human and the environment and
  - ii. Provide persons working on the site with information, training and equipment necessary for safety



4. It is the mandatory duty to obtain authorization of U.P.P.C.B. under Rule-5 of the said Act by submitting application on prescribed form (Form-1) along with prescribed application processing fee of rupees 7500 and details regarding compliance of previous authorization returns on Form-4 as well as details regarding waste minimization, recycling and reuse and environmental surveillance data.
- iii. Proper labeling and marking of containers used as prescribed in Form-8 and use of appropriate containers for storage and disposal of hazardous wastes shall be followed.
  - iv. It shall be the duty of occupier and operators of a facility to provide information regarding the waste to persons, who collect, store, treat and dispose off the wastes.
  - v. It shall be the duty of occupier and operator of a facility to use of prescribed manifest system.
  - vi. It shall be the duty of occupier and operator of a facility to decide on transport, treatment and disposal facility and to identify the suitable site for disposal sites and submit the proposal to state government for notification. The occupier or operator shall prepare and submit the design of the disposal facility in accordance with guide lines of Ministry of Forest; Government of India for approval of the Board.
  - vii. It shall be the duty of occupier and operator of a facility to provide appropriate safety measures for handling of hazardous wastes.
  - viii. To operate the facility in an environmentally sound manner so that no adverse impact on the environment takes place.

The form for obtaining authorization for collection/ reception/ treatment/ transport/ storage/ disposal of hazardous waste is available at [http://www.uppcb.com/application\\_forms.htm](http://www.uppcb.com/application_forms.htm) and the reference copy of application form is given below.



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## FORM 1

[See rules 5(3) and (7)]

APPLICATION FOR OBTAINING AUTHORISATION  
FOR COLLECTION/RECEPTION/TREATMENT/TRANSPORT/STORAGE  
/DISPOSAL OF HAZARDOUS WASTE\*

From: .....

To:

The Member Secretary,  
..... Pollution Control Board/..... Pollution Control Committee,  
.....

Sir,

I / We hereby apply for authorisation/renewal of authorisation under sub-rule (3) of Rule 5 of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 for collection/reception/treatment/ transport/storage/disposal of hazardous wastes.

## For Office Use Only

5. Code No. ....

6. Whether the unit is situated in a critically polluted area as identified by Ministry of Environment and Forests, .....

## To be filled in by Applicant

## Part A: General

3. (a) Name and address of the unit and location of activity: .....

(b) Authorisation required for ( Please tick mark appropriate activity / activities : .....

- (i) collection
- (ii) reception
- (iii) treatment
- (iv) transport
- (v) storage
- (vi) disposal

(c) In case of renewal of authorisation previous authorisation number and date .....

\* delete whichever is not applicable

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4. (a) Whether the unit is generating hazardous waste as defined in these Rules;  
(b) If so the type and quantity of wastes (in Tonnes/KL.)
5. (a) Total capital invested on the project (in Rupees)  
(b) Year of commencement of production  
(c) Whether the industry works general/ 2 shifts/ round the clock
6. (a) List and quantum of products and by-products (in Tonnes/KL.)  
(b) List and quantum of raw material used (in Tonnes/KL.)
7. Furnish a flow diagram of manufacturing process showing input and output in terms of products, waste generated including for captive power generation and demineralised water.

#### Part B: Hazardous Waste

8. Hazardous Wastes:
  - (a) Type of hazardous wastes generated as defined under these Rules
  - (b) Quantum of hazardous waste generated
  - (c) Sources and waste characteristics (Also indicate wastes amenable to recycling, re-processing and reuse)
  - (d) Mode of storage within the plant, method of disposal and capacity: (provide details).
9. Hazardous Wastes generated as per these Rules from storage of hazardous chemicals as defined under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989

#### Part C: Treatment, Storage and Disposal Facility

10. Detailed proposal of the facility (to be attached) to include
  - (i) Location of site (provide map)
  - (ii) Name of waste processing technology
  - (iii) Details of processing technology
  - (iv) Type and Quantity of waste to be processed per day
  - (v) Site clearance (from local authority, if any)
  - (vi) Utilization programme for waste processed (Product Utilization)
  - (vii) Method of disposal (details in brief be given)
  - (viii) Quantity of waste to be disposed per day
  - (ix) Nature and composition of waste
  - (x) Methodology and operational details of land filling/ incineration
  - (xi) Measures to be taken for prevention and control of environmental pollution including treatment of leachate
  - (xii) Investment on Project and expected returns
  - (xiii) Measures to be taken for safety of workers working in the plant

Place :

Date :

Signature : .....

Designation : .....



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 KANPUR 2025

#### 6.4. Consent Firefighting System

Fire NOC for all industries will be applied through Nivesh Mitra single window portal at

<http://niveshmitra.up.nic.in/>

UP fire services NOC issuance process operational manual is available at

[http://upfireservice.gov.in/upfire/public/images/Applicant\\_manual.pdf](http://upfireservice.gov.in/upfire/public/images/Applicant_manual.pdf)

Please find below the Operational Manual for consent firefighting application:



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Page | 86

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**UP Fire Services**  
**NOC Issuance Process**  
**Operational Manual (For Applicant)**  
(Version: 1.0)



## INTRODUCTION

### Objective:-

The purpose of this document is to guide the applicants about the online NOC Approval System for UP Fire Services. In this NOC Approval System user will apply for Fire NOC certificate for his building, through which user can also track the status of his NOC and later on also download the Fire NOC certificate through the online portal.

### Process Flow:-

**Registration / Login Process:** - Applicants can apply for NOC on web portal of U.P Fire Service in Two Simple Steps:-

**Step 1: New User Registration / Login:** - User can register with the basic information's and details and can login with the credentials shared with them at their registered email id and mobile number.

The screenshot displays the web portal for the Uttar Pradesh Fire Service, Government Of Uttar Pradesh. The page is titled 'Register & Login' and is divided into two main sections: 'Sign up now' and 'Login'.

**Sign up now:** This section includes a sub-header 'Provide valid Email id and Mobile no.' and a form with the following fields: 'Residential name', 'Email', 'Mobile', 'Password', 'Confirm Password', and 'Enter Captcha'. A 'Register' button is located at the bottom of the form.

**Login:** This section includes a sub-header 'Enter Username and password to login.' and a form with the following fields: 'Email', 'Password', and 'Enter Captcha'. A 'Login' button is located at the bottom of the form.



### Step 3: Apply for NOC:-

After successful registration Applicant can login through the Login at the portal, the applicant can fill up the other required details and apply for the NOC and can even track the NOC status at any point of time.

#### User Dashboard:

Uttar Pradesh Fire Service  
Government Of Uttar Pradesh

Search [ ] Search

Menu Home About Us Fire Service Acts & Rules Activities Contact Us NOC Apply for NOC

NOC STATUS

Show 10 entries

NOC ID	Applicant Name	Applicant Address	NOC Type	Applied Date	Status
No data available in table					

Showing 0 to 0 of 0 entries Previous Next

**Steps to Apply for NOC:** Applicant has to fill the NOC application form as Per the NBC 2016. Fields marked with (\*) asterisk are mandatory.

1. Fill up the Form-A, which contains the basic information.
2. Fill up the Form-B, which contains the basic building details.
  - a. Fill up the Block Details and information as asked in the form.
  - b. Upload the required Documents for the NOC Applicant.
3. Preview the Form Filled, before the Final Submission.
4. 'Final Submit' the NOC Form, an UID will be generated which should be noted down to keep track of the NOC status at any point of time.
5. Print the Finally Submitted NOC Form, applicants can go back to their dashboard to track the NOC status.

**Note:** Applicant can partially save their NOC Form prior to the Final Submit and continues with the very same point from where they previously left off.

Initially a temporary Id is generated, only after the Final Submit, NOC-UID is generated, which should be used for Tracking Process.



*Signature*  
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A-10/10R-308025

**Apply for NOC:**

**STEP:-1 : FORM-A ( Basic User Information's )**

Online Application Form Through U.P Fire Service

\* As Per NBC 2018

Building Owner Detail	
Applicant Name *	Mobile / Phone No. *
<input type="text"/>	<input type="text"/>
E-Mail ID *	Applicant Signature No. *
<input type="text"/>	<input type="text"/>
Address *	
<input type="text"/>	

Building Detail	
Type Of NOC Certificate *	Plot No./Volume No. *
<input type="text"/>	<input type="text"/>
Street *	City *
<input type="text"/>	<input type="text"/>
District *	Pincode *
<input type="text"/>	<input type="text"/>
Type Of Occupancy As Per NBC *	Type Of Sub Occupancy As Per NBC *
<input type="text"/>	<input type="text"/>
Height Of Building (In Mtr) *	Plot Area (In Sq. Mtr) *
<input type="text"/>	<input type="text"/>

Next



*Signature*  
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**STEP-2 : FORM-B ( Basic Building Information's )**

प्रारूप-ख-प्रश्नोत्तरी (संलग्नक-2)  
आवेदक द्वारा अनुमोदन, प्रमाण पत्र एवं नवीनीकरण हेतु आवेदन पत्र का प्रारूप

\* As Per NBC 2016

जिल्ला *	जिला क्षेत्र *
Saved District	
खरब आवासीय भाग *	कैद *
खरब आवासीय भाग	कैद

**सामान्य विवरण**

प्लॉट *	इन्सुलेशन/प्लॉट/भवन का आयाम *
Plot Area	100
डिस्ट्रिक्ट *	City *
District	Unnao
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100
डिस्ट्रिक्ट/भवन का आयाम/प्लॉट/भवन का आयाम *	प्लॉट का आयाम *
Plot Area	100

Save



### Step 2 : Account ( Email and Mobile ) Verification:-

An Email verification and Mobile verification OTP will be sent at their registered accounts. Applicants will be redirected to the verification page, where they will authenticate their registered Email Id and mobile number.

1. Only registered user will be able to verify their account, with their registered email id and password.
2. Only verified Applicant can login to their account from login page to access their account, other will be redirected to the verification page.
3. Once the account has been verified , they will be able to apply for new NOC and track its status.



**STEP-3 : FORM-B ( BLOCK DETAILS )**

Block 1  
As Per NDC 2014

**ब्लॉक आधारित विवरण**

**ब्लॉक 1**

एक ब्लॉक का नाम \*  #  अविवरण के अनुसार यह ब्लॉक के अविवरण का चयन

अविवरण के अनुसार यह ब्लॉक के विवरण का चयन का अविवरण (चयन) का चयन \*  चयन

अविवरण के अनुसार यह ब्लॉक के विवरण का चयन का अविवरण (चयन) का चयन \*  चयन

**भवन के चयन और ब्लॉक का नाम (मीटर में)**

चयन (मीटर) \*  चयन (मीटर) \*

चयन-1 \*  चयन-2 \*

**समुच्चय मार्ग (मीटर में)**

समुच्चय मार्ग की लंबाई \*  समुच्चय मार्ग की चौड़ाई \*



*Signature*  
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**STEP:-3 : FORM-B ( BLOCK DETAILS ...continued )**

[illegible]

**STEP:-3 : FORM-B (BLOCK DETAILS ...continued)**

[illegible]

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### STEP:3 : FORM-C ( UPLOAD DOCUMENTS )

#### आवश्यक-पत्र Upload Related Documents

\* As Per NBC 2016

Notes:  
(1) File size should be less than 5 MB.  
(2) Please upload pdf file of map.

#### Upload Building Plans

##### Block 1

Site Plan *	Choose File	No file chosen	Upload
Floor Plan *	Choose File	No file chosen	Upload
Floor with Fire Fighting Plan *	Choose File	No file chosen	Upload
As Fire Fighting Plan *	Choose File	No file chosen	Upload
Front Elevation *	Choose File	No file chosen	Upload
Side Elevation *	Choose File	No file chosen	Upload
Typical Floor Plan *	Choose File	No file chosen	Upload

Previous

Next

#### आवश्यक-पत्र Upload Related Documents

\* As Per NBC 2016

Notes:  
(1) File size should be less than 5 MB.  
(2) Please upload pdf file of map.

#### Upload Building Plans

##### Block 1

Site Plan *	Choose File	site.pdf	Upload	✓
Floor Plan *	Choose File	floor.pdf	Upload	✓
Floor with Fire Fighting Plan *	Choose File	floor.pdf	Upload	✓
As Fire Fighting Plan *	Choose File	floor.pdf	Upload	✓
Front Elevation *	Choose File	front.pdf	Upload	✓
Side Elevation *	Choose File	side.pdf	Upload	✓
Typical Floor Plan *	Choose File	typical.pdf	Upload	✓

Previous

Next





**STEP 6 : ( FINAL SUBMIT: )** : On Final Submit an UID will be generated for the NOC Application, which will be used to track the status of the NOC .

[illegible]

## 7. Annexure I: Check List for Monitoring of Performance of Sewage Treatment Plant (STP) by CPCB

### A. General information for the Town

1. Name of Town/ City and population :
2. Total water supply (MLD) and per Capita water supply (LPCD) :
3. Waste water generation (MLD) :
4. Whether wastewater collection and Sewerage system exists :
5. Waste water treatment (MLD) and Number of STPs :
6. Mode of sewage disposal (Treated Sewage) and % used for irrigation :

### B. Details of Sewage Treatment Plants (Plant- wise)

1. Name / Location of STP and design capacity/year :
2. Estimated cost (excluding land cost) :
3. Date of approval :
4. Funding Pattern/Agency :



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C.M. DIXIT  
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10.11.2019

5. Year of construction/completion and commissioning :
6. Completion cost :
7. Land required (Hectares) :
8. Total cost of land for STP :
9. Process of Sewage Treatment :
10. Flow sheet of STP (to be attached) :
11. Unit-wise capacity :
  - a) Primary settling tank (PST)
    - HRT
    - Adequacy
  - b) Aeration tank HRT
    - DO level (mg/l) (8 hourly)
    - F/M ratio
    - Aeration capacity (number of aerators and HP)
    - Sludge volume index (SVI)
  - c) Secondary settling Tank (SST)
    - HRT
12. Raw sewage characteristics :
  - (COD, BOD, SS, Fecal coliform & streptococci)
  - COD



BOD

SS

Fecal coliform

Streptococci

13. Effluent Characteristics of PST, Aeration tank and SST for inlet and outlet (COD, BOD, SS, *Fecal coliform & streptococci*) with three hourly composite flow based sampling. :

a) Primary settling tank

(PST) COD

BOD

SS

Fecal coliform

Streptococci

b) Aeration tank

COD

BOD

SS

Fecal coliform

Streptococci

c) Secondary settling

Tank (SST)

COD

BOD

SS

Fecal coliform

Streptococci

14. Actual flow (MLD) (on hourly basis for 24 hours) :



- i) Raw sewage  
flow ii) Treated  
sewage
15. Sludge drying beds and there:  
capacity  
i) Sludge drying  
beds ii) Capacity
16. Biogas produced, if any and its:  
composition
17. Gas digester (Operational status :  
and gas utilization)
18. Power generation, if any :
19. %reduction of BOD, COD, SS and:  
Fecal coliform  
COD  
BOD  
SS  
Fecal coliform
20. Reasons for underutilization of  
capacity of STPs if any :
21. Point of treated sewage disposal  
(river / lake / irrigation / land and  
disposal/ pisciculture/  
aquaculture/ any other) :



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22. Additional sewage treatment :  
required, if any

- a) Plan
- b) Capacity proposed

23. Details of bypass arrangement at :

STPs, if any

**C. Resource recovery and revenue  
Generation**

1. Method of sludge disposal  
Land application :  
Revenue earned Sale of sludge

**D. Operation and  
maintenance of Sewage  
Treatment Plant**

1. Agency for operation  
and  
Maintenance of Sewage  
Treatment Plant (U.P.  
Jal Nigam/ Bihar Rajya Jal  
Parishad / West Bengal  
PHE/Municipality concerned/  
any other agency)



2. Power requirement :
  - i) Plant
  - ii) STP compound
3. Status of power availability for:  
uninterrupted and continuous  
running of STP and standby  
arrangement for power, if any
4. Commitment of funds, actual:  
release and shortfall if any, for  
Operation and maintenance of  
STP from respective State  
Govt. or municipality concerned  
(for  
the last 3 years)
5. Status of Skilled/Trained:  
Manpower
6. Availability of spare parts :
7. Difficulties in transfer of assets:  
from implementing agency to  
O&M agency, if any.
8. Institutional mechanism for O&M :
9. Training provided to O&M, if any:
10. Manpower available/as per:  
norms-  
(Mechanical, Electrical, public  
health,



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Chemical, unskilled

11. Annual expenditure on O&M &:  
STP (Salary, power, chemical  
etc.) for the last 3 years
12. Consent from State Pollution:  
Control Board or not
13. Amount of water cess paid, if any :
14. Volume of industrial waste  
being: discharged in to STPs, if  
any.
15. Feasibility of private participation :

#### SIGNATURE OF COMPETENT AUTHORITY

**Note:-**The check list gives indicated list of items which are essential for monitoring performance of ASP. Any additional information or information related in case of units/processes for other type of plants e.g., trickling filter, USAB, waste stabilization ponds etc. may be given by the O&M agencies accordingly.

#### Remarks of Inspection Team

ESHS report for proposed 15 MLD STP at Unnao



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## 8. Annexure II: Personnel Protective Equipment (PPE)

Following types of situations should be gratified:

1. Impact / Penetration / Compression while doing maintenance tasks
2. Chemical Handling
3. Heat/cold and wetting
4. Harmful dust
5. Oxygen deficiency
6. Obnoxious odours of decomposing matter
7. Hydrogen Sulphide presence
8. Light (optical) radiation
9. Biological exposure from raw / treated effluents and sludge handling
10. Noise of machines and vibrations.
11. Electric shock
12. Rain / Storm

General List of PPE:

1. Safety Boots with non-skid soles and Steel Toes.
2. Electrical Hazard safety Toe shoes
3. Gas Masks and Face Shields
4. Oxygen meters for ascertaining type of atmosphere in a confined area.
5. Single-use Ear Plugs / Ear-muffs
6. Safety Goggles
7. Helmets / Hard Hats
8. Latex Rubber/ Butyl Rubber/ Fabric / Chemical Resistant Gloves
9. Overall Clothing
10. Aprons for laboratory Personnel
11. Safety Belts
12. First Aid Box
13. Fire extinguishers
14. Respiratory Protective mask with man pack cylinders



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## 9. Annexure III: Safe Handling of Chemicals

Chlorine gas is mainly used in STP plant as a disinfectant in:

### Handling Chlorine equipment: Changing chlorine cylinders

1. Turn on the light and visually ensure that the room is safe to enter (there may be visible signs of damage).
2. Put on appropriate personal protective equipment (be specific about the type of equipment). This procedure requires a respirator other than an escape respirator
3. Turn on the exhaust ventilation before entering the room.
4. Close the main chlorine container valve.
5. Allow the system to purge itself of chlorine. Ensure that the float drops to the bottom of the feed-rate indicator (rota meter). Verify that there is a high vacuum and that the weigh scale reads zero.
6. Loosen the chlorinator (auxiliary valve or vacuum regulator) and remove it from the empty cylinder.
7. Replace the cylinder cap on the empty chlorine cylinder and remove the cylinder to secured storage.
8. Secure the new cylinder into place.
9. Remove the protective hood from the new cylinder.
10. Ensure that there is no chlorine leaking from the packing gland. Use ammonia vapour from the ammonia test bottle, which contains a strong ammonia solution.
11. Ensure that the cylinder valve is closed. Do not open the valve yet.
12. Remove the cylinder outlet cap and check that the cylinder outlet face is clean and smooth.
13. When no leaks are indicated, open the chlorine cylinder valve no more than half a turn and leave the cylinder wrench on the valve.
14. Open any additional system valves (be specific for your facility) and test for leaks as each stage is charged with chlorine.
15. Check for leaks again with the ammonia test bottle to be sure that everything is in order.
16. Ensure that the alarm system is functioning.
17. Turn off the exhaust ventilation and lights and close.



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### Toxic Effects of Chlorine

Concentration	Effect
0.03 – 0.1 ppm	Range of odour threshold (many specify this as 0.08 ppm)
1 – 3 ppm	May cause mild irritation of the eyes, nose, and throat
3 – 5 ppm	Stinging or burning in eyes, nose, and throat; may cause headache, watering eyes, sneezing, coughing, breathing difficulty, bloody nose etc
5 ppm or more	Severe irritation of the eyes, nose, and respiratory tract
14 – 25 ppm	May be fatal after 30 minutes of exposure
25 ppm or more	Immediate breathing difficulty resulting in pulmonary edema (fluid build-up in lungs), possibly causing suffocation and death 1000 ppm or more Fatal after a few breaths
1000 ppm or more	Fatal after a few breaths

### Exposure Limits of Chlorine

Concentration	Effect
0.5 ppm	Maximum allowable concentration averaged over an eight-hour period
1 ppm	Maximum allowable short-term exposure (15 minutes)
10 ppm or more	Immediately Dangerous to Life and Health as published by National Institute for Occupational Safety and Health in the United States (NIOSH).

### Safety in Handling of Corrosive substances such as Acids, Alkali

#### General Chemicals used:

1. Neutralization / pH correction: Hydrochloric acid, Sodium Hydroxide / Lime.
2. Coagulant / Settling Aids: Aluminium Sulphate, Ferric Aluminium Sulphate, Ferric Sulphate, Ferric Chloride, these may be independent or in combination with Poly Electrolytes (Polymers).
3. For Specific Ion removal, chemicals required as per chemistry of treatment.
4. Nutrients: Urea, Di-ammonium Phosphate.
5. Disinfectant: Chlorine, Bleaching Powder (Sodium Hypo-chlorite), Ozone
6. Adsorption / Absorption: Activated Carbon.
7. Ion Exchange – based on the specific ion to be removed.



#### Few Examples of Corrosive Substances used

1. Sulphuric acid
2. Chromic acid
3. Stannic chloride
4. Ammonium bi-fluoride
5. Bromine
6. Ammonium hydroxide

#### Acute Health Effects:

	Health Effects	First Aid:
Inhalation	irritation of mucus membranes, difficulty in breathing, fits of coughing	Remove person from source of contamination if safe to do so. Get medical attention. Keep person warm and quiet and do not leave unattended.
Ingestion	irritation and burning sensation of lips, mouth, and throat; pain in swallowing; swelling of the throat; painful abdominal cramps; vomiting; shock	Same as above
Skin Contact	burning, redness and swelling, painful blisters, profound damage to tissues, and with alkalis; a slippery, soapy feeling	Remove person from source of contamination and take immediately to an emergency shower or source of water. Remove clothing, shoes, socks, and jewellery from affected areas as quickly as possible, cutting them off if necessary. Be careful not to get any chemical on your skin or to inhale the vapours. Flush the affected area with water for a minimum of 15 minutes. Get medical attention.
Eye Contact	stinging, watering of eyes, swelling of eyelids, intense pain, ulceration of eyes, loss of eyes or eyesight	Areas as quickly as possible, cutting them off if necessary. Be careful not to get any chemical on your skin or to inhale the vapours. Flush the affected area with water



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		for a minimum of 15 minutes. Get medical attention.
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## 10. Annexure IV: Monitoring of Parameters

The following parameters are an essential part of analysis at the on-site laboratory.

1. pH
2. Total Solids (TS)
3. Suspended Solids (SS)
4. Total Dissolved Solids (TDS)
5. Biochemical Oxygen Demand (BOD)
6. Chemical Oxygen Demand (COD)
7. Dissolved Oxygen (DO)
8. Temperature
9. Chlorine Demand
10. Residual Chlorine

### Daily Testing Parameters

Test / Parameter	Inlet Tank	Inlet After Bar screening	Outlet Point	Aeration Tank	Final Discharge
PH	√	√	√	√	√
Temp.	√	√	√	√	√
TSS	√		√	√	√
TDS	√		√	√	√
DO	√		√	√	√
BOD	√		√	√	√
COD	√		√	√	√
Oil And Grease	√	√	√	√	√
Cl <sub>2</sub> Demand	√		√	√	√
Residual Cl <sub>2</sub>	√		√	√	√



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## 11. Annexure V: Confined Space Pre-Entry Checklist

Date and Time issued:	
Date and time expires:	
Job Site space ID.:	
Job Supervisor:	
Equipment to be worked on:	
Work to be performed:	
Standby personnel:	
Ventilation modification:	NA    Yes    No
Mechanical	
Natural ventilation only	
Atmospheric check after isolation and ventilation	
Time:	
Oxygen:    % > 19.5%	Toxic:    ppm < 10 ppm H2S
Explosive:    % LFL < 10%	Carbon monoxide:    ppm < 35 ppm CO
Tester's signature:	
Communication procedures:	



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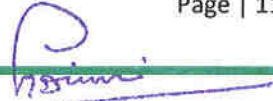
Rescue procedures	
Equipment:	NA    Yes    No
Direct reading gas monitor tested	
Safety harnesses and lifelines for entry and standby persons	
Hoisting equipment	
Powered communications	
entry and standby persons	
Protective clothing	
All electric equipment listed for Class I, Division I, Group D and non-sparking tools	



## 12. Annexure VI: Sewage Treatment Plant Accident Report

Date of this report	Name of person injured
	First aid case      or      disabling(lost time)injury
Date of injury	Time      Occupation
Home address	Age      Gender      Check
Employee or staff injury	on duty      or      Off duty      Visitor injury
Date last worked	Date returned to work
Person reporting	
<b>DESCRIPTION OF ACCIDENT</b>	
Description of Accident (Name machine, tool, appliance, part, gears, pulley, etc.):	
Accident occurred where? If vehicle accident, make simple sketch of scene of accident.	



  
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Describe nature of injury and part of body affected (Amputation of finger laceration of leg, back strain, etc.):	
Were other persons involved? (If yes, give names and addresses)	
Names and addresses of witnesses.	
If property damage involved, give brief description.	
Name and address of physician.	
Treatment given for injuries	
Physician. signatures	Signatures





ANNEXURE VII: Compliance and Responsibility Checklist:

A. The Concessionaire commit to comply and follow points.

- Excavation
- Entry to confined space
- Electrical work (HV/LV)
- Opening manholes, covers, and grills
- Blasting Operations
- Hot work
- Work on plant, machinery and other power driven equipment.
- Working at height
- Working at night

The Concessionaire shall be responsible for the following safety aspects:

- 1) Preventing injury to personnel, damage to plant and equipment and fire.
- 2) Instituting ways to improve existing work methods from safety point of view.
- 3) Legal and contractual requirements affecting safety, health and welfare of his workmen.
- 4) Provision and use of protective clothing and equipment and use of firefighting equipment.
- 5) Suitability of new and hired equipment from a safety viewpoint.
- 6) Identifying potential hazards.
- 7) Changes in safety requirements and fire precautions.
- 8) Carrying out site surveys to see that only safe work methods area in operations health and safety requirements are being observed and welfare and first Aid facilities are adequate and properly maintained.
- 9) Determining the case of an accident or dangers occurrence and recommend means of preventing recurrence.
- 10) Supervising the recording and analysis of information on injuries, damage and production loss.
- 11) Assess accident trends and review overall safety performance.
- 12) Ensure the following:
  - a. All electrical equipment's are securely earthed.
  - b. Standard access platforms and ladders are provide for inspections, operation and maintenance of equipment.
  - c. The equipment are periodically inspected for their condition, maintained properly and operated by trained personnel at design speeds and loads.

B. The Concessionaire shall comply with Applicable Laws, Including all relevant statutory requirements of Government of India including, but not limited to the following –

- 1) Indian Electricity Act, 2003 and Rules, 1956.
- 2) National Building Code, 2005
- 3) Factories Act, 1948.

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- 4) Motor Vehicle Act as amended in 1994, the Central Motor Vehicle Rules, 1989
- 5) The Petroleum Act, 1934 and Rules, 1976
- 6) The Gas cylinder Rules, 2003
- 7) Indian Explosive Act, 1884 along with the explosive substance Act, 1908 and the Explosive Rules, 1983
- 8) The Public Liability insurance Act, 1991 and Rules, 1991
- 9) Minimum Wages Act, 1948 and Rules, 1950
- 10) Contract labor Act, 1970 and Rules, 1971
- 11) Child labor (prohibitions & Regulations) Act, 1986 and Rules, 1950
- 12) Environment protection Act, 1986 and Rules, 1986
- 13) Air (prevention and Control pollution) Act, 1981 amended 1987
- 14) Water (prevention and Control pollution) Act, 1974 amended 1988
- 15) Water (prevention and Control pollution) Rules, 1975
- 16) The Noise pollution (Regulations & Control) Rules, 2000
- 17) Notifications on Control of Noise from diesel generator (DG) sets, 2002
- 18) Recycled plastic usage Rules, 1998
- 19) Notification, Central Ground Water Board Act, January 1997
- 20) Manufacture, Storage and import of hazards chemicals Rules, 1989
- 21) The Hazards Waste (Management and Handling) Rules, 1989
- 22) Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
- 23) Batteries (Management and Handling) Rules
- 24) Fly ash utilization notification, September 1999 as amended in August 2003
- 25) Workmen compensation Act, 1923 along with allied Rules.

C. The Concessionaire shall comply with the requirements given under the various laws and Rules of State and Central Government including the following:

- 1) Public liability insurance Act, 1991 amended 1992
- 2) Public liability insurance Rules, 1991 amended 1993
- 3) Factories Act, 1948
- 4) Uttar Pradesh Factories Rules, 1950
- 5) Workmen's compensation Act, 1923
- 6) Contract labor (Regulations and Abolitions) Act, 1970
- 7) Minimum Wages Act, 1948
- 8) Payment of Wages Act, 1936
- 9) Equal Remunerations Act, 1979
- 10) Child labor (Prohibition and Regulation) Act, 1986
- 11) Inter-State Migrant Workmen's (Regulations of employment and condition of service) Act, 1979
- 12) The Building and other construction workers (Regulations of employment and condition of service) Act, 1996 and the Cess Act of 1996
- 13) The Concessionaire should also abide by the Antiquities and Art Treasures Act, 1972 and the Ancient Monuments and Archaeological sites and Remains Act, 1958 (and its amendment) to protect the cultural heritage of the nation.

CHECKED

BY

*[Signature]*

(P.T. 107)

G.S. 550

RECOMMENDED

BY

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(MOHIT CHAK)

E.E.

ENGINEER

IAO

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BY

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(B.L. GAUTAM)

S.E.-III CIRCLE

U.P. JN. LKO.



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S.T.C.

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## ADDENDUM - 1

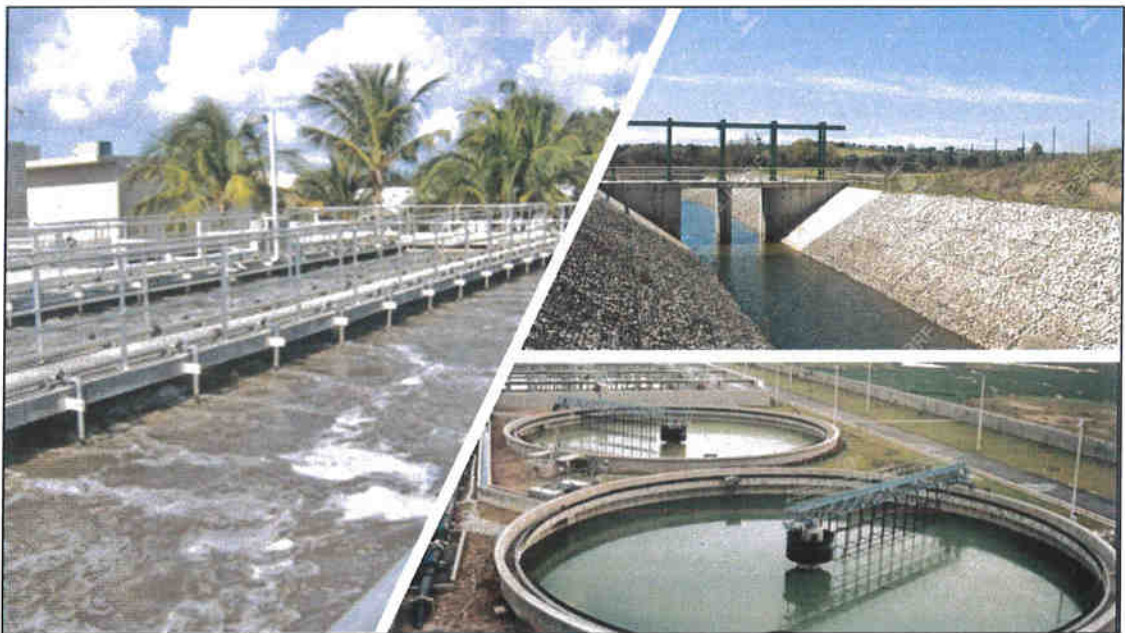
Environmental, Social, Health and Safety (ESHS) Report

For

Existing 15 MLD STP at Unnao, District Unnao, State of Uttar Pradesh

Project under,

**National Mission for Clean Ganga**



*Submitted To:*



**UTTAR PRADESH JAL NIGAM, KANPUR**

Project Engineer – Shah Technical Consultant

*Submitted By:*



**KANPUR RIVER MANAGEMENT PVT LTD**

**CHECKED BY** Addendum in ESHS **RECOMMENDED BY**

**APPROVED BY**

Page | 1

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KANPUR-208025

## ADDENDUM TO THE ESHS REPORTS SUBMITTED BY KRML MUMBAI

This has reference to the letter STC/PE/ KNP/ 40 / General Tech Dated 29<sup>th</sup>

May 2019, in which

Mr. C. M. Dimri, SEC, sought report on following points:

1. Fire Extinguisher Capacity
2. Training Attendance Sheet with Schedule
3. Screening Points
4. Safety Signages Display Board

We are hereby submitting the above points as requested in Addendum 1 to ESHS documents duly signed, stamped with page mark by authorised signatory of KRML.

### I. FIRE EXTINGUISHER CAPACITY

#### A. STANDARD FOR FIRE EXTINGUISHER SYSTEM

As per Section 3 of the Fire Act, the provisions prescribed in the National Building Code, 2005 are mandatory. The Schedule I of the Fire Act is borrowed from the National Building Code of India, 2005. The Maharashtra Fire Prevention and Life Safety Measures Act, 2006 (Fire Act) is in force in the State of Maharashtra w.e.f. 06.12.2008. In view of low hazard category industries including ETPs, the Directorate of Maharashtra Fire Services, Govt. of Maharashtra has optimised the Fire Prevention and Life Safety Measures, wherein, instead of plot size of the industry, built up area is given consideration for application of Schedule I of the Fire Act. The details of provisions required by the ETP/STP, based on the built up area is given below. These guidelines shall be adopted in the STPs at Kanpur for developing Fire Extinguishing System for treatment plant as well as office and other buildings in the STP area.

Type of Building Occupancy	Fire Extinguisher	Yard Hydrant	Automatic sprinkler system	Manually Operated Electric Fire Alarm System	Automatic Detection & Alarm System	Underground Static Water Storage (USWS) Tank (Litres)	Terrace tank (Litres)	Pump near USWS (Fire Pump) with min pressure of 3.5 kg/cm <sup>2</sup> at terrace level	At the Terrace Tank level with Min Pressure of 2.0 kg/cm <sup>2</sup>
Industrial Building (G) including ETP/STP - low hazard (G-1)									
Built up area < 2000 m <sup>2</sup>	R	NR	NR	NR	NR	NR	10,000	NR	180 lpm
Built up area: 2000-3000 m <sup>2</sup>	R	NR	R (see Note 1)	R	NR	15,000 (5,000) (see Note 2)	5,000	450 lpm	180 lpm
Built up	R	R	R (see	R	R	40,000	10,000	900 lpm	450 lpm



area: 3000- 5000m <sup>2</sup>			Note 1)			(10,000) (see Note 2)	(5,000) (see Note 2)	(see Note 3)	
Built up area: >5000m <sup>2</sup>	R	R	R (see Note 1)	R	R	50,000 (10,000) (see Note 2)	10,000 (5,000) (see Note 2)	1620 lpm (see Note 4)	900 lpm

Note:

1. Sprinkler required to be installed in the basement, if area of basement exceeds 200 sq. m. &/or if the height of building is 15 m or above.
2. Additional value given in parenthesis shall be added if basement area exceeds 200 sq. m. & / or if the floor plate is more than 1125 sq. m. & / or if the height of building is 15 m or above.
3. 2 nos. of electrically operated Fire pumps of 900 lpm & 01 no. of electrically operated jockey pump of 180 lpm shall be provided, the dedicated power supply to fire pumps is provided from diesel generator
4. One electric driven main pump of at least 1620 LPM discharge capacity, one standby pump of similar capacity driven by diesel engine and one jockey pump of capacity 180 LPM shall be provided up to 50 hydrants (including those in wet risers and yard) for every unit or tower. In case, the number of hydrants is more than 50, additional main pumps of same capacity shall be provided for every 50 hydrants or part thereof. Separate but interconnected hydrant system(s) with its/their own pump house(s) may be provided with pumping and water capacity notified for each in the Table. Minimum pressure of 3.5 bars shall available at hydrants near Terrace level and also hydraulically most remote hydrant.

#### B. MAJOR COMPONENTS OF FIRE EXTINGUISHER SYSTEM

Fire and explosions are due to the formation and release of flammable gases during processing (e.g., methane, hydrogen). Fire also occurs in the buildings of STPs due to electric short circuit or any other reason like chemical explosion in the laboratory buildings. Therefore, fire alarm systems are necessary at strategic points in these STPs.

Water being the main extinguishing medium, major fires has to be controlled and extinguished by the use of water from fire fighting hoses operated by the regular fire services. This fire fighting water is usually obtained from hydrants installed on public mains or other premises.

Fixed fire fighting facilities, i.e. sprinklers, fire extinguishers and fire hydrants will be present on site.

1. **Automatic Fire Detection and Alarm System:** Fire Alarm system comprising components for automatically detecting a fire, initiating an alarm of fire and initiating other actions as appropriate.

Note: - This system may also include manual fire alarm call points.

2. **Automatic Sprinkler System:** A system of water pipes fitted with sprinkler heads at suitable intervals and heights and designed to actuate automatically, control and extinguish a fire by discharge of water.
3. **Fire Water Hydrant Systems can be of two types:**
  - a) **External Hydrant System,** where the hydrants are installed in the open, like the city or town water mains, or hydrant systems installed in the open areas in industrial or such other occupancies; and



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b) **Internal Hydrant System**, installed in buildings or structures to be protected

#### 4. Fire Extinguishers

There will be a complete inventory of Fire Extinguishers around the site made up of a mixture of types including carbon dioxide, foam, water and powder. The locations and numbers of the appropriate type will be assessed once installation of all equipments is complete. A service and maintenance system will be put in place.

### C. TREATMENT & REUSE OF FIREWATER RUN OFF

The overuse of firewater can carry environmental contaminants such as petroleum products outside bunded areas either directly to the environment (any watercourses and groundwater) or through potentially overloaded wastewater treatment plants indirectly to the environment (mainly rivers and sea). Therefore, the Health and Safety Executive and the Department for Communities and Local Government indicate that the first principle is to contain firewater run-off on site, for example, with the help of bunds. Where this is not possible or unreasonable, contact should be made with the Environment Agency to identify the best option for minimizing the environmental impact. If firewater run-off has already entered the foul sewage network, the sewage operator (usually the water utility company) must be informed so that they can assess the risk to the treatment process associated with the wastewater treatment plant down-stream of the incident.

### D. EXTINGUISHING AGENTS / MEDIA - WATER

Despite the many new techniques which have come to the assistance of firemen, water is still the most efficient, cheapest and most readily available medium for extinguishing fires of a general nature. The method of applying water to a fire varies according to the size of the fire.

For major fires, greater quantities of water are necessary, and the built-in pumps driven by the vehicles engines are often capable of pumping 4500 litres (1000 gallons) per minute (or more) giving the necessary energy to the water to provide adequate striking power.

A variation in the application of water can be made by means of nozzles that produce jets or sprays ranging from large sized droplets down to atomised fog effects. Judicious use of this type of application can not only cut down the amount of water used, minimising water damage, but will ensure that it is used to greater effect.

Some of the special properties which make water as the most efficient and generally accepted extinguishing agent are:

- Water has a high specific heat capacity of 4.2 kJ / kg / per °C
- Water has a high latent heat of evaporation per unit mass, at least 4 times higher than that of any other non-flammable liquid
- It is outstandingly non-toxic
- Its B.P. (100°C) is well below the 250°C to 450°C range of pyrolysis temperatures for most solid combustibles
- Water extinguishes a fire by a combination of mechanisms - cooling the combustible substance, cooling the flame itself, generating steam that prevents oxygen access, and as fog blocking the radiative transfer of heat.



*Prasanna*

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## II. TRAINING ATTENDANCE SHEET WITH SCHEDULE

### A. TRAINING SYLLABUS

Training courses may be run for 6 to 10 working days at a stretch with residential facilities for batches of 10 – 12 individuals at a time. Shorter courses may be arranged for senior engineers.

The emphasis in training should be on the following aspects:

1. **The Course should commence with a quick visit to the Sewage Treatment Plant** where the new and old employees are made conversant with the units / processes that shall be dealt with subsequently in the course syllabus.
2. **Introduction of,**
  - a) **STP /ETP Technologies** –ASP, SBR, MBBR, MVR, RBC, Ponds, UASB
  - b) **Operation and maintenance of STP**
  - c) **Various unit operations and processes** (Separation by Screening, Floatation, Settling / Sedimentation, Filtration, Neutralization, Coagulation, Flocculation, Absorption, Adsorption, Chemical Reactions, Oxidation/Reduction, Dissolution, Ion exchange, Chlorination)
  - d) **Mechanism of removal of pollutants** - COD, BOD, sand particles, waste materials, oil, volatile organics, slurry, nutrients removal etc.
  - e) **Units Operation & Performance** such as Screens (Coarse / Fine Bar screens, Manual / Mechanically operated), Sumps and Pumping Stations including Pumps, Motors and Panels (Centrifugal Horizontal / Vertical Turbine), Valves (Sluice gates, Non return, Reflux), Pipes/Specials and Pipe Joints, Grit Removal Units. Primary Sedimentation / Settling tanks, Scraping Mechanisms, Sludge withdrawal, Sludge Sumps, Sludge Pumps, Aeration tanks and Aerators, Secondary Settling Tanks, Secondary Sludge Sumps, Pumps, Sludge Thickeners, Sludge Digesters, Gas Production, Sludge handling and Drying.
  - f) **Maintenance** of Pumps and Motors, Electrical Panels (Starters, Meters (Energy, Voltage, Amperage, Power factor), Manual or Electrically Operated Trolley Gantry, Blow out Fuses, Valves, Gates, Scraping Bridge Trolley, Aerators, Reduction Gears, Open Air Weather Casings for Motors, Sprocket wheels and Chains for Mechanical Grit and Screen removing devices. d) Introduction to Quality aspects of Raw and Treated Effluent and the importance of each of the quality parameters and corresponding unit operation / process that plays a part in influencing quality parameters.
  - g) **Case studies on treated sewage reuse**
  - h) **Zero Liquid Discharge (ZLD)** – how to approach or achieve and incorporation of suitable technologies in existing treatment facilities to achieve ZLD.
5. **Identification of flaws and troubles with treatment and its trouble shooting** where it is not due to inbuilt flaws in design / design criteria, such as bulking of sludge in the lower layers and floating of sludge lumps in a settling tank, foul smelling in an Aeration Tank, heading up in the Settling Tanks or Aeration tanks, passing of undue flocs in the settled effluent from settling tanks, disruption of operation by failure of main power supply and malfunctioning of scraping mechanism in the clarifiers.
6. **Undertaking segregation of a motor and pump from the manifold at suction and delivery,** its disconnection from the panel, hauling up of both pump and motor to the maintenance platform, disassembling of the pump, replacement of shaft / impeller, reassembly of the pump,



check motor for its characteristics, haul back to the mounting location, couple up / connect the pump and motor and reconnect power and rejoin with suction and delivery manifold.

7. **Undertaking replacement of a mechanical surface aerator** in an Aeration Tank and undertake replacement of a Reduction Gear Assembly including its maintenance.
8. **Removing and Replacing of a Sluice Gate Valve** from a mains and undertaking maintenance of the Sluice Gate Valve.
9. **Maintaining a Power Factor**, methodology and upkeep of the Power Factor Battery Bank.
10. **The role of each of the category of tradesmen on site** in bringing the final effluent quality better than the discharge standards.

A **separate laboratory training course** should be run for only Laboratory Analysts for a period of 6 Working days. It may include:

- a) **Introduction** to items at Serials 1 & 2 above.
- b) **A Standard Laboratory for STP** from technical and environmental point of view
- c) **Standards** - Drinking Water Quality Standard, 2012; Effluent Disposal Standard (CPCB and MoEF&CC)
- d) **Importance of quality and plant performance parameters** e.g. pH, TS, SS, TDS, BOD, COD, DO, Temperature, MLSS, MLVSS and SVI including methods of determination.
- e) **A three day regular analysis programme** in which the participants in pairs are given a sample of effluent for analysis for pH, TS, SS, TDS, BOD, COD, DO, Temperature and a sample of Aeration Tank discharge for determination of MLSS, MLVSS and SVI. The results should be discussed and candidates should be encouraged to express their views as to how these can further be improved.
- f) **Preparing sampling schedule** (locations, numbers, frequency, grab/continuous), **sample preservation methods, statistical tools** Daily training must be followed by a Quiz Test for all cadres before the close of the day and the participants be evaluated based on the outcome of the course results. The participants be presented "Participation Certificates" at the end of the course. This serves as an excellent incentive.

#### B. TRAINING SCHEDULE FOR O&M STAFF

Training Topic	Duration of Training	Days
Visit to the STP	3 hours	First Day
STP / ETP, Technologies – ASP, SBR, MBBR, MVR, RBC, Ponds, UASB	3 hours	
Operation and maintenance of UASB plant	3 hours	Second Day
Various Unit Operations and Processes	3 hours	
Units Operation and Performance	4 hours	Third Day
Mechanism of removal of pollutants	1 hour	
Case studies on treated sewage reuse	1 hour	



Maintenance of treatment units	4 hours	Fourth Day
Zero Liquid Discharge (ZLD)	2 hour	
Identification of flaws and troubles with treatment and its trouble shooting	3 hours	Fifth Day
Motor and Pumps Operation	3 hours	
Quality, Treatment & Reuse of Firewater run Off	1 hour	Sixth Day
Undertaking replacement of a mechanical surface aerator in an aeration tank and replacement of reduction gear assembly including its maintenance	2 hours	
Removing and Replacing of a Sluice Gate Valve	2 hours	
Maintaining a Power Factor	2 hours	Seventh Day
The role of each of the category of tradesmen on site	2 hours	
<b>Total Duration</b>		<b>7 Days</b>

**C. TRAINING SCHEDULE FOR LABORATORY STAFF**

Training Topic	Duration of Training	Days
Introduction to items at Serials 1 & 2 above	3 hours	First Day
A Standard Laboratory for STP from technical and environmental point of view	3 hours	
Standards – Drinking Water Quality Standard, 2012; Effluent Disposal Standard (CPCB and MoEF&CC), interpretation of data	2 hours	Second Day
Importance of quality and plant performance parameters	2 hours	
Preparing sampling schedule, sample preservation methods, statistical tools, preparation of analytical data	3 hours	
A three day regular analysis programme	6 hour/ day	3 days
<b>Total days</b>		<b>5 days</b>



D. TRAINING ATTENDANCE RECORD

Training Course: \_\_\_\_\_

Trainer: \_\_\_\_\_

Description of Course (or attach copy of training course) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

Trainer Signature: \_\_\_\_\_

Attendees Name	Signature



### III. SCREENING POINTS

#### A. ENVIRONMENT SAFETY

- Consent to Establish (CTE) or Consent to Operate
- Consent for storage of hazardous materials
- Consent for Fire-fighting System
- Record of Activity of Environmental Management Cell (EMC) for implementation of environmental management plan during Construction Phase / Operation Phase
- Record of Operation Management Committee (OMC) for implementation of proper O & M of STP
- Awareness among employees of Health, Safety and Environmental Policy of the KRMPL Work Environment with respect to lighting, electricity, sanitary facilities, Kitchens, medical care, washing facility, waste disposal, safe drinking water
- Fire fighting equipment Trainings
- Compliance to Air Quality Standards
- Compliance to Noise Quality Standards and OSHA Guidelines
- Odour problems and odour control methods applied
- Compliance to effluent disposal standard
- Reuse of treated effluent Rainwater harvesting System Sludge drying and reuse
- Record of quality of influent, effluent and sludge quality
- Status of maintenance of STP
- Safety Manual for workers
- Internal traffic management for smooth movements of trucks, heavy vehicles and fire brigade vehicles
- Warning signs at strategic places and at laboratory
- Availability of Confined Space Pre-entry Checklist

#### B. HEALTH SAFETY

- Availability of safety manual and awareness about the same by employees Record of hazard identification and reporting and mitigation measures undertaken Guards or barricading for safety at high places of work
- Status of house keeping
- Safety during handling chemicals and gas
- Prevention of health hazard due to exposure / inhalation of metals, dust & diseased organisms
- Availability of Personal Protective Equipments (PPE) at plant site, laboratory and other hazardous places
- Regular medical check-up of employees
- Personal safety and environmental safety awareness programme
- Availability of First Aid Box and medical facilities in case of any injury or accidents.
- First aid training to employees
- Traffic control devices
- Pedestrian paths for safety of workers



### C. SAFETY REQUIREMENTS

- Proper and preventive maintenance of machinery and equipments,
- Ensure all railings are adequate to prevent falls of employees working on catwalks high above open pits.
- Ensure fall protection in unguarded areas, fall protection is required for any work 6 feet above the ground or a lower level
- Availability of proper tools and protective gears and maintenance experts to handle those Employees should also follow any confined space entry requirements set by OSHA. Confined spaces are areas that an employee can enter, have restricted exit and entry, and are not designed for continuous work.
- Warnings must be predominantly placed in any hazard zones.
- Barricades should be set to prevent unauthorised entry All employees should use slip-resistant footwear.
- Rescue devices like rescue hooks and floatation devices should be readily available in the event someone does fall into a vat.
- Awareness among employees about personal hygiene requirements like frequent hand washing with an anti-bacterial soap, immediate first-aid of any open cuts or skin abrasions Providing location for employees to change after their shift.
- Work clothes should not be worn home
- All employees should follow the guidelines given by the National Fire Protection Association (NFPA), NFPA 820 specifically addresses hazards that wastewater treatment plant face.
- One or more competent employees should be assigned to guide visitors through the treatment plant.



#### IV. SAFETY SIGNAGES DISPLAY BOARD

At each point in STP premises, one or more safety signages display boards needs to be given for selection of suitable one or more for the area.

##### 1. AT STP CONSTRUCTION SITE OR AT INFRASTRUCTURE DEVELOPMENT SITE



##### 2. AT THE ENTRY OF THE PREMISES OF SEWAGE TREATMENT PLANT



3. AT VISITOR'S ROOM ENTRY GATE OF STP



4. AT THE ENTRY POINT OF STP PREMISES / LABORATORY / CHEMICAL STORAGE / HAZARDOUS AREA



5. AT SEWAGE INFLUENT ENTRY POINT TO STP



6. AT SEWAGE TREATMENT PLANT



7. AT CHEMICAL STORAGE AREA OR CHEMICAL RACKS AND STORAGE IN LABORATORY



Warning  
oxidising  
material



CHEMICAL SYMBOL:  
HEALTH & SAFETY



EXPLOSIVE ATMOSPHERE  
HAZARD



BEWARE OF POISON



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8. MULTI NOTICE SYMBOL SIGN / FIRE PREVENTION



## 9. LABORATORY & LABORATORY SAFETY SIGNS



**BURN HAZARD/HOT SURFACE**



**BEWARE OF POISON**



**HAZARD SYMBOL**



**Danger  
Acid**



**Wear  
personal  
protective  
equipment**



10. HAZARD-PRONE AREA



11. AT CONFINED SPACE ENTRY



12. RESTRICTED SPACE ENTRY



13. FIRE SAFETY SIGNAGE





Fire  
assembly  
point

14. EYE WASH STATION



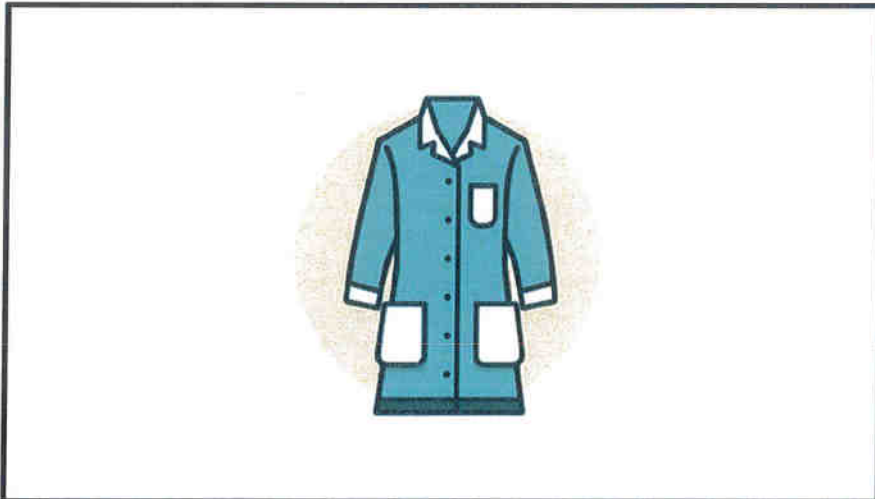
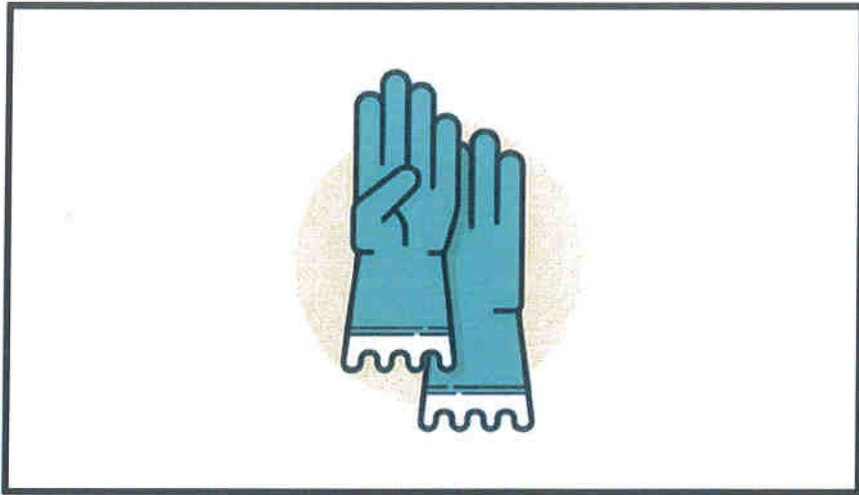
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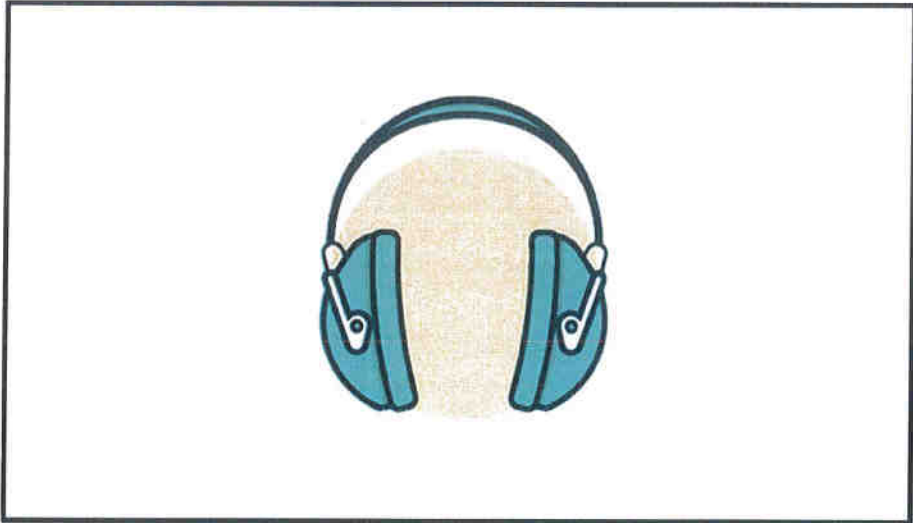
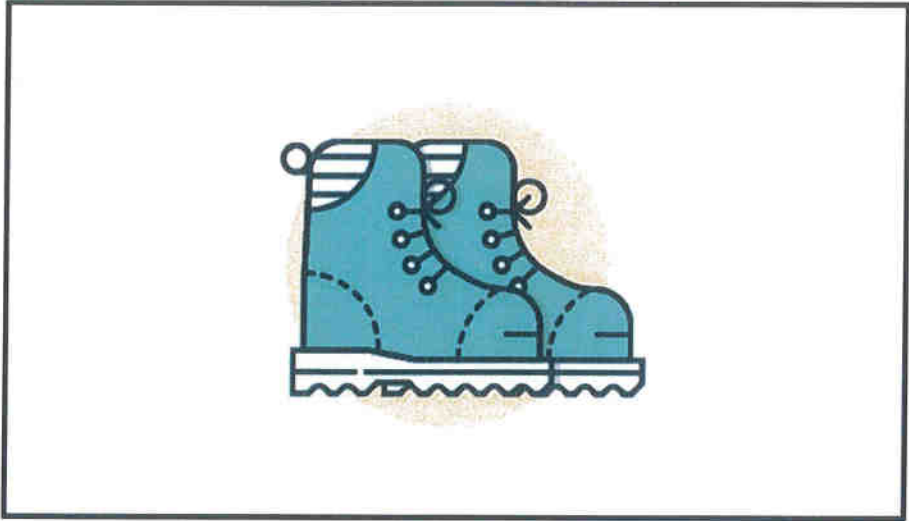


16. SAFETY INSTRUCTIONS TO WEAR PPE



  
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17. AT SEWAGE DISPOSAL AREA



18. AT TREATED SEWAGE IRRIGATION AREA NEAR GREEN BELT OR AT FARMER'S FIELD



19. EMPLOYEE WORK AREA AND NEAR ROADS IN STP AREA




















20. SIGNAGES ON INTERNAL ROADS IN STP PREMISES


















21. ROAD SAFETY TRAFFIC POINTS

21(A): MANDATORY SIGNS

 STOP	 GIVE WAY	 STRAIGHT PROHIBITOR NO ENTRY	 PEDESTRIAN PROHIBITED	 HORN PROHIBITED
 NO PARKING	 NO STOPPING OR STANDING	 SPEED LIMITED	 RIGHT HAND CURVE	 LEFT HAND CURVE
 RIGHT HAIR PIN BEND	 LEFT HAIR PIN BEND	 NARROW ROAD AHEAD	 NARROW BRIDGE	 PEDESTRIAN CROSSING
 SCHOOL AHEAD	 ROUND ABOUT	 DANGEROUS DIP	 HUMP OR ROUGH	 BARRIER AHEAD

21(B): WARNING / CAUTIONARY SIGN BOARDS

			
Right hand curve	Left hand curve	Right hand pin bend	Left hand pin bend
			
Right reverse bend	Narrow bridge	Gap in median	Cycle crossing
			
Pedestrian crossing	School	Men at work	Roundabout
			
Narrow road	Roadwidens	Side road left	Side road right





**HALF FACE MASK  
RESPIRATOR  
MUST BE WORN**

CHECKED  
BY

*(Signature)*

(R.K. DUBEY)  
A.E.

OFFICE OF EXECUTIVE ENGINEER  
C.E.L.U.R. JN. LKO.

RECOMMENDED  
BY

*(Signature)*

(MOHIT CHAK)  
E.E.

APPROVED  
BY

*(Signature)*  
Page No. 27  
(B.L. GAUTAM)  
S.E.-III CIRCLE  
U.P. JN. LKO.



(C.M. DIMRI)  
S.T.C.

*(Signature)*  
Er. C.M. DIMRI  
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CHECKED  
BY

RECOMMENDED  
BY

APPROVED  
BY

R.K. DAS

(MOHIT CHAND)

(GAUTAM)

(C. M. DAS)

### Note for Signage

All the signage as depicted from page no 01 to page no 27 shall be displayed in Hindi at all location, space permits, the same signage in English shall also be displayed.





### **Note for Insurance Policy**

All insurance policies as indicated in the Concession Agreement shall be taken by KRMPL for the entire duration of the Agreement.



