

ADDENDUM - 1

Environmental, Social, Health and Safety (ESHS) Report

For

Existing 210 MLD STP at Bingawan, District Kanpur, State of Uttar Pradesh

Project under,

National Mission for Clean Ganga



Submitted To:



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Project Engineer – Shah Technical Consultant

Submitted By:

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ADDENDUM TO THE ESHS REPORTS SUBMITTED BY KRML MUMBAI

This has reference to the letter STC/PE/ KNP/ 40 / General Tech Dated 29th May 2019, in which Mr. C. M. Dimri, SEC, sought report on following points:

May 2019, in which

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	Under-ground Static Water Storage (USWS) Tank (Litres)	Terrace tank (Litres)	Pump near USWS (Fire Pump) with min pressure of 3.5 kg/cm ² at terrace level	At the Terrace Tank level with Min Pressure of 2.0 kg/cm ²
Industrial Building (G) including ETP/STP - low hazard (G-1)									
Built up area < 2000 m ²	R	NR	NR	NR	NR	NR	10,000	NR	180 lpm
Built up area: 2000-3000 m ²	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 ²			Note 1)			(10,000) (see Note 2)	(5,000) (see Note 2)	(see Note 3)	
Built up area: >5000m ²	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

- 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.

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	
Total Duration		7 Days

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
Total days		5 days

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 KRMPPL 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.

V. 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



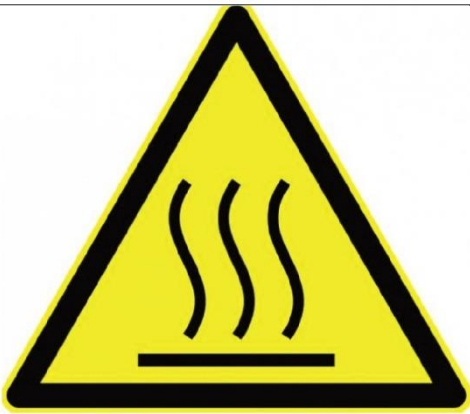
BEWARE OF POISON



8. MULTI NOTICE SYMBOL SIGN / FIRE PREVENTION



9. LABORATORY & LABORATORY SAFETY SIGNS



BURN HAZARD/HOT SURFACE



BEWARE OF POISON



HAZARD SYMBOL

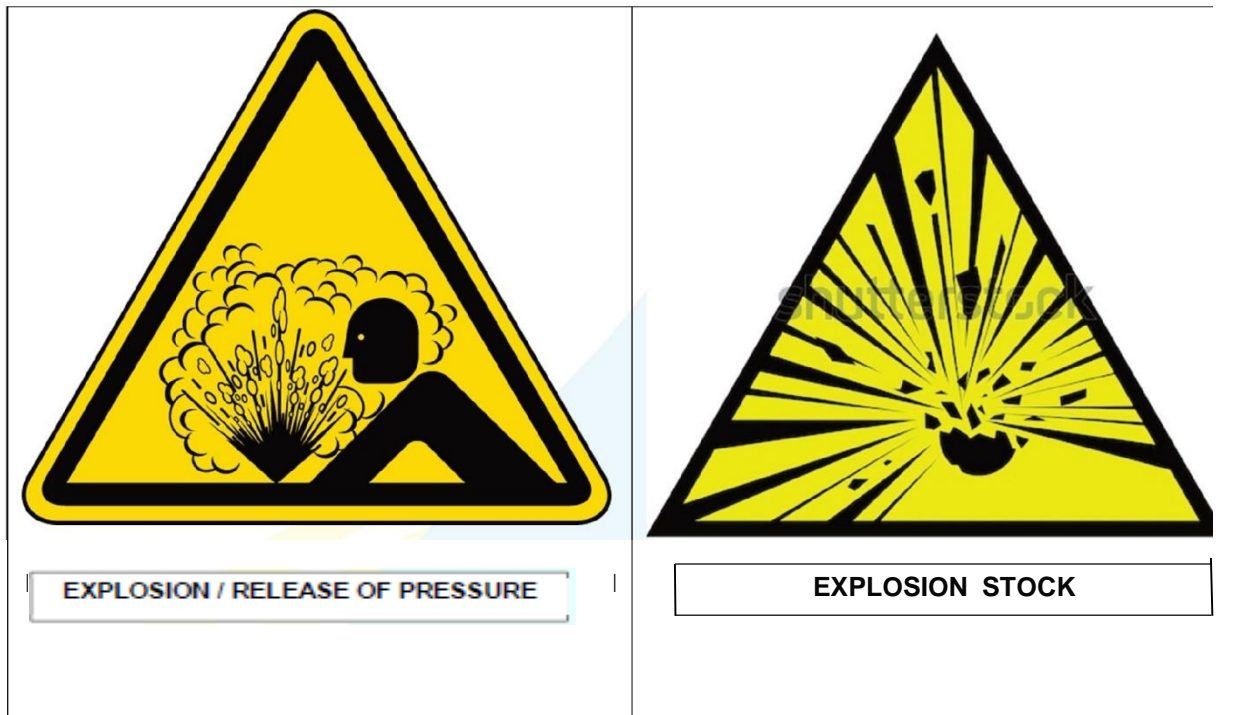


**Danger
Acid**



**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

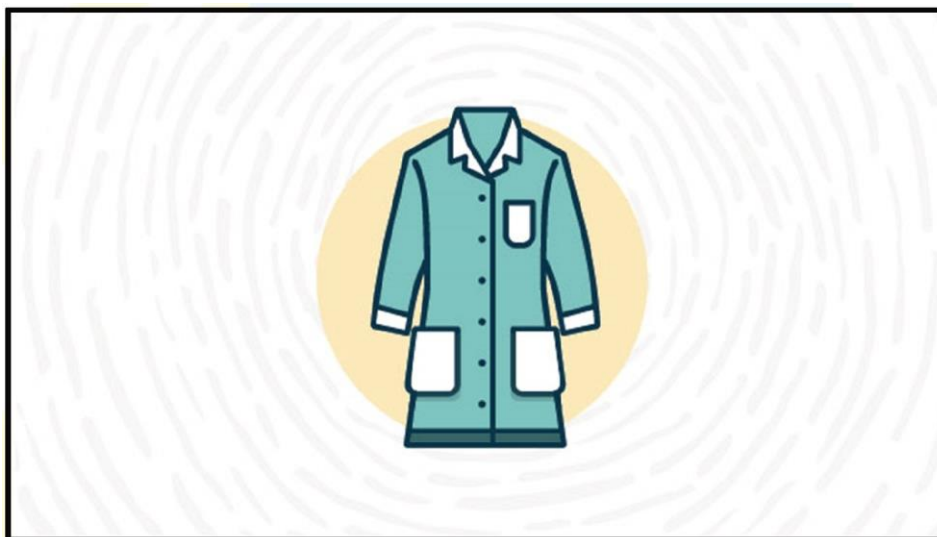


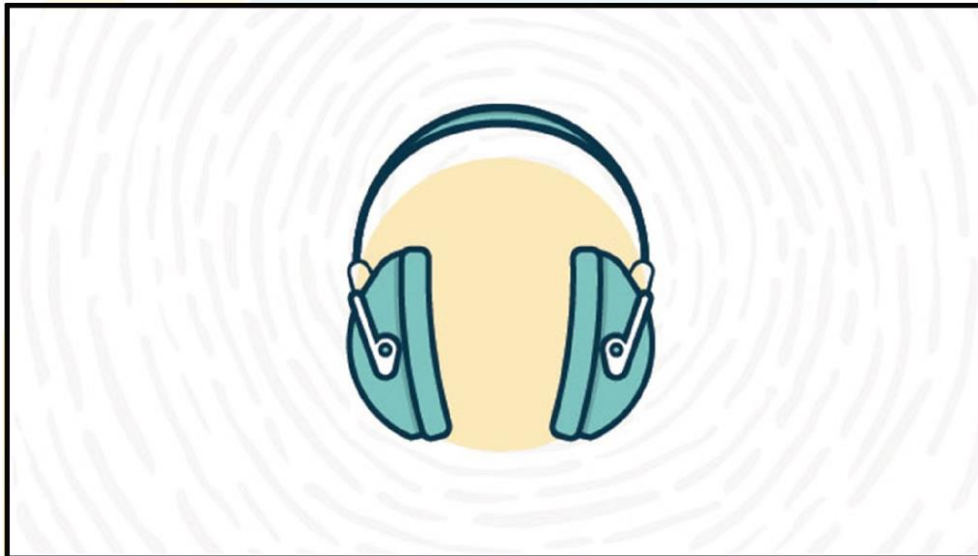
15. FIRST AID KID



16. SAFETY INSTRUCTIONS TO WEAR PPE







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