BAN: COVID-19 Response Emergency Assistance Project

Project Code:1270201-224314800

ENVIRONMENTAL MANAGEMENT PLAN

Package

Package No. KHULNAICU/ADB/WD-1: Isolation Centers and Critical Care Units in 17 Medical College Hospitals (Lot 01: Construction of 50 Bed Isolation Unit and 10 Bed ICU/ CCU at Khulna Medical College, Khulna)

Implementing Agency

Health Services Division (HSD)
Ministry of Health and Family Welfare

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Prepared by Health Services Division (HSD) of the Ministry of Health and Family Welfare for the Asian Development Bank.

The Environmental Management Plan is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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I. PROJECT BACKGROUND

1. COVID-19 is a new disease with similar symptoms as influenza but different in terms of severity and community transmission[1]. The World Health Organization (WHO) declared the COVID-19 as a Public Health Emergency of International Concern on 30 January 2020 under the International Health Regulations (IHR) 2005 and recognized it as a pandemic on 11 March 20202[2]. On 23 March 2020, the Government of Bangladesh requested ADB for a support in its preparedness and response to the COVID-19 outbreak. Accordingly, ADB approved a loan of $100 million from its ordinary capital concessional resource for Loan 3918 –BAN(COL): COVID-19 Response Emergency Assistance Project (the project) on 30 April 2020. The loan agreement was signed on 13 May 2020 and became effective on 16 May 2020. The loan completion date is 31 October 2023. The Health Services Division (HSD) of the Ministry of Health and Family Welfare is the executing agency (EA) and the Directorate of Health Services (DGHS) is the implementing agency (IA) of the project.

2. The project will support the procurement of equipment and supplies, the upgrading of health and testing facilities, and build system and community capacities for surveillance, prevention and response to COVID-19. The project's outcome will be the improved Health and wellbeing of COVID-19 affected persons. The project will have three outputs: (i) Output 1: Immediate and urgent needs are met in prevention and control of COVID-19; (ii) Output 2: Infrastructure and related equipment are delivered to support and sustain prevention and management of COVID-19; and (iii) Output 3: Health system and community capacities in combatting COVID-19 are strengthened. In particular, the project will involve civil works supporting the upgrade/extension of existing facilities for the establishment of (i) screening and quarantine areas at points of entry; (ii) critical care and isolation units in existing healthcare facilities; (iii) microbiological diagnostics facilities in existing medical colleges and hospitals across the country.

[1] WHO Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. https://www.who.int/health-topics/coronavirus#tab=tab_1.
[2] WHO. International Health Regulations (2005). 3rd Ed. https://www.who.int/ihr/publications/9789241580496/en.

II. SUBPROJECT DESCRIPTION

3. Khulna Medical College Hospital is one of the largest hospitals in the Khulna Division. It is located in the city of Khulna, near the inter-district Bus Stand at the entrance to the city and 224 kilometers south from capital city Dhaka. Khulna is Bangladesh's third-largest city, after Dhaka and Chittagong. In the south-western part of the country, on the Rupsha and Bhairab Rivers, it covers an area of 59.57 square kilometers (23.00 sq mi); the district covers 4,394.46 square kilometers (1,696.71 sq mi). Khulna is south of Jessore and Narail, east of Satkhira, west of Bagerhat and north of the Bay of Bengal. It is part of the Ganges Delta, the world's largest river delta. The Sundarbans, the world's largest mangrove forest, is in the southern part of the delta. Tidal flat ecosystems also occur adjacent to the city.[13] Khulna is in the northern part of the district, and the Mayur River is the western boundary of the metropolitan area. Khulna Medical College Hospital was established in 1992.

4. Land area of the College and campus is 40.25 Acres. Currently total 800 students are enrolled of which 512 are female and 288 are male. Total 35 departments are running in the College and Hospital. The academic building, adjacent to the hospital, is a four-story building which houses both administrative and academic sections: administration, students' areas, and office of the principal. For educational purposes, there are classrooms, galleries, a library, and an audio-visual unit. There are four large galleries for combined classes and six student residences, along with quarters for staff and officers of the college and hospital.

5. Khulna Medical College Hospital (KMCH) started conducting coronavirus test from 01 April 2020. The test lab was formally inaugurated at the Microbiology department on 01 April 2020. The treatment of the Coronavirus patient also started in the hospital. However, there are some waste collection bins placed inside the hospital but it is recommended to enhance the number and to use separate and labeled colored bins to store the medical wastes as well as to handle them with care and to dump in marked places through securing proper safety measures.

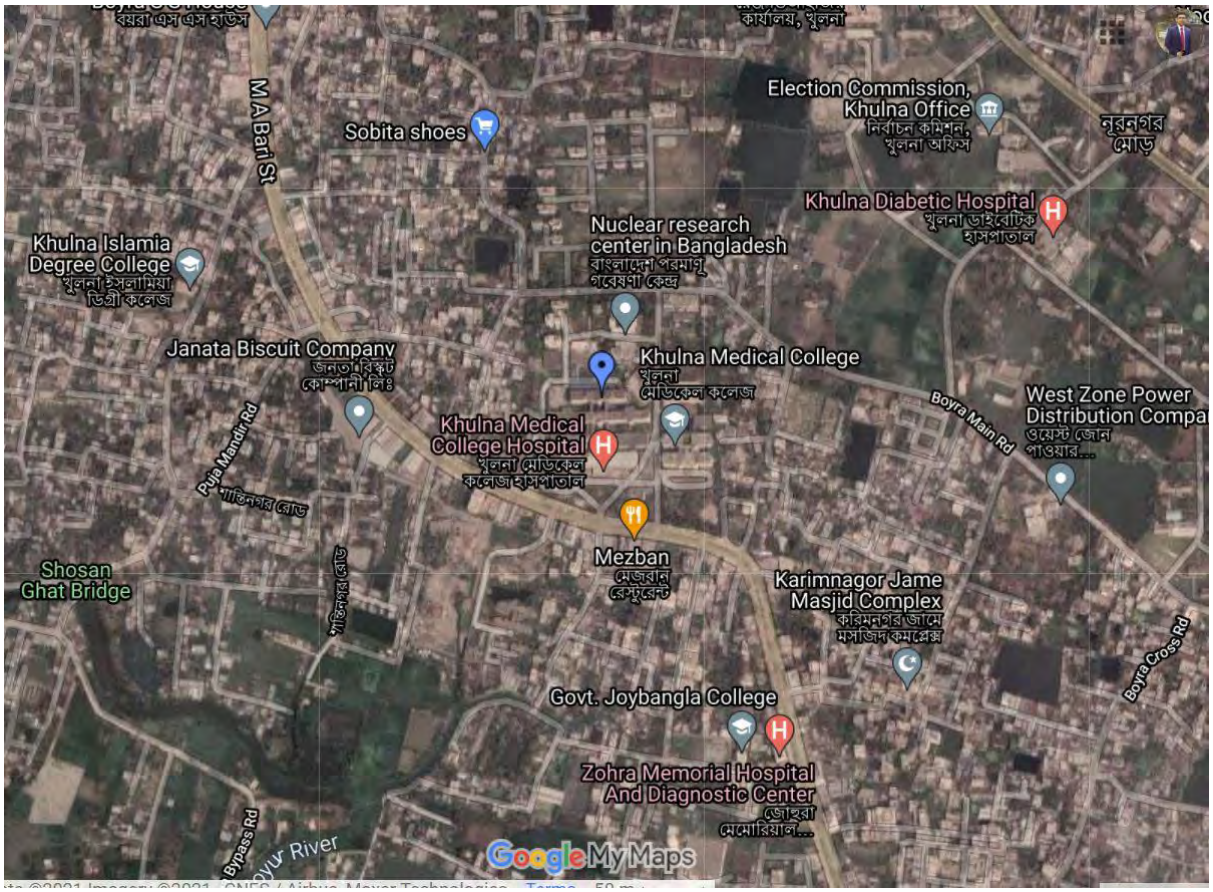


Figure 1: Khulna Medical College Hospital (KMCH)

6. Under this subproject, 50 Isolation Unit and 10 Bed CCU will be established in Khulna Medical College Hospital. The respective medical authority will provide necessary support and supervision and the monitoring process will be done through Public Works Department (PWD). This subproject includes civil construction works, Installation of Service line from existing 1000 KVA Substation, a new set of emergency auto start 100KVA diesel generator, air Cooling system with HEPA filter, CCTV and sound system. Intended Completion Date is: 180 days from the commencement date for Section-1: All civil, sanitary and water supply and electro-mechanical works. A small amount of waste will be generated during construction period and medical wastes will be produced during operation phase of the subproject. The handling procedures of these medical wastes along with other waste are included in Appendix 2. Appendix 1 represent the layout plan of subproject components including the substation.

III. BASELINE INFORMATION

7. **Climate.** The city is humid during summer and pleasant in winter. Khulna has an annual average temperature of 26.3 °C (79.3 °F), with monthly average temperatures from 12.4 °C (54.3 °F) in January to 34.3 °C (93.7 °F) in May. Its annual average rainfall is 1,809.4 millimeters (71.24 in), and about 87 percent falls between May and October.

8. **Air Quality and Noise Level.** Handheld 3016 IAQ laser particle counter, a real time particulate matter monitoring equipment was used for monitoring air quality in Khulna City. After finalizing the monitoring locations, with the help of the monitoring equipment, PM data was measured. Air data monitoring campaigns were conducted frequently at different dates for at least 1-hour duration at every intersection point from June to September, 2019. Concentrations of PM2.5 and PM10.0 found within the BNAAQS for all considered intersection. Duk Bangla location found to carry the highest concentration of PM1.0, PM2.5 and PM10.0 as 26.64 µg/m3, 43.47 µg/m3 and 63.02 µg/m3 consecutively. This can be happened due to the larger vehicular movement at this location. Notun Rasta location showed lowest average concentration of PM1.0, PM2.5 and PM10.0 as 5.82 µg/m3, 13.33 µg/m3 and 34.91 µg/m3 respectively. Highest PM1.0/ PM2.5 appeared at Shibbari More as 0.63 and lowest was at Fulbarigate as 0.43 indicating the contribution of PM1.0 to the concentration of PM2.5. Highest PM2.5/ PM10.0 found at Duk Bangla as 0.69 indicates 69 % presence of fine particles in total particle concentration. Air Quality Index of 1-hr averaging PM concentration data at selected road intersections are presented in Table 2. AQI of PM2.5 and PM10.0 found as good for four locations named as Fulbarigate, Daulatpur, Natun Rasta and Shibbari more while the location named as Duk Bangla found to exhibit the AQI value as moderate. It can be evidenced from the larger vehicular movement at this location as tremendous amount of people used to come to this location for purchasing different goods[3].

9. A study was conducted in the Khulna metropolitan city to determine the status of noise pollution at major traffic intersections and assess the possible effect of noise on regular noise afflicted people. For this research, five busiest roadways and traffic intersections; two mixed zone and three commercial zones were selected purposively and 'ST-8850 Sound Level Meter' was used to record the noise pressure level. Average noise pressure level and some noise parameters (Leq, L10, L50, L90, and Lnp) were measured at different shifts in each location both on working days and holidays. The result evidently specified that noise level in all major traffic circles of Khulna metropolitan city was much higher than the recommended threshold of acceptable noise level set by the Department of Environment (DOE) of Bangladesh. It was observed that the mixed area (Sonadanga, Gollamari) tends to have a higher average noise level than those of the commercial area (Shibbari, Notunrasta, Dakbangla). The noise pollution level (Lnp) in mixed areas varied from 92.77 dB (A) to 104.74 dB(A) on working days and 86.9 dB(A) to 105.5 dB(A) on holidays. On working days, the highest Leq was observed 92.65 ± 4.15 dB(A) in Sonadanga (mixed area), whereas the lowest was 85.13 ± 2.83 dB(A) in Dakbangla (commercial area). However, on holidays the highest level of Leq was found 90.41 ± 2.25 dB(A) in

[3] https://www.researchgate.net/publication/339291808_Assessment_of_Particulate_Matter_and_Noise_Pollution_at_Different_Road_Intersections_in_Khulna_City

Sonadanga, while the lowest levels were 80.43 ± 3.20 dB(A) in Dakbangla. One-way ANOVA with LSD post-hoc test results illustrated that on working days there was a significant difference between the noise pollution levels (NPL) in different shifts of day time ($F = 8.412$, $p < .05$). The respondents of the study area addressed that they were the most affected by annoyance (70%), headache (62%), and hearing loss (46%) due to regular exposure to the traffic noise. Therefore, it is recommended to enhance awareness regarding the cause and effect of noise pollution among the noise producers and oppressed people. Subsequently, administrative measures have to take to attenuate noise pollution and indemnify the quality health of the citizens[4].

10. **Drinking Water Quality.** Valuation of water quality index (WQI) is one of the simplest, easily understandable, and efficacious techniques to evaluate the quality and suitability of water for drinking as well as other purposes. This research was aimed to investigate the drinking water quality of tube wells from different areas in Khulna City, Bangladesh, by developing the WQI. Water samples from 59 tube wells were collected from different locations during the pre-monsoon time. pH, electric conductivity (EC), dissolve oxygen (DO), total dissolved solid (TDS), chloride (Cl−), nitrate (NO3−), and total hardness of the collected water samples were analyzed for the calculation of WQI. The mean value for pH, EC, DO, TDS, Cl−, NO3−, and total hardness was 7.30, 1650 µS/cm, 1.60 mg/l, 1188.7 mg/l, 414.6 mg/l, 0.029 mg/l, and 52.03 mg/l, respectively. The calculated WQI values for individual places were distributed spatially through mapping by using ArcGIS software. Based on the WQI values, the drinking water was categorized into excellent, good, poor, very poor, and unfit for drinking purposes. The calculated WQI values ranged from 40.11 to 454.37 with an average value of 108.94. Among all the groundwater samples, 11.86% were excellent, 54.24% were good, 23.73% were poor, 1.69% were very poor, and 8.47% were unfit for drinking purpose based on WQI. The results showed that the groundwater quality of most of the studied areas of Khulna city could be considered safe and suitable for drinking barring the elevated EC and chloride content in some areas. Since Khulna city is situated in the southwestern part of Bangladesh and gradually approaches toward the base level of the Bay of Bengal which might be the source of salt concentration in the groundwater of Khulna city, Bangladesh[5].

11. **Current Situation of Medical Waste Management:** Generally, hospital wastes are highly harmful and infectious in nature. Management of hospital waste is a crucial need for most of the cities in the world. In Khulna city of Bangladesh hospital waste management (HWM) system had been focused on collection and dumping only. The present improper management of hospital waste in Khulna city may play a vital role for contamination of nearby communities and spread the occurrence of skin diseases, asthma, diarrhea, allergy, eye irritation, etc. The aim of this study was to investigate the existing HWM system and determine the hospital generation rate according to different categories in Khulna city. The study was carried out in six hospitals that produce major portion of medical waste in the city. For this reason, a questionnaire survey was conducted to observe the existing management system, generation rate and type from the hospital authority. Field survey was conducted to categorize and measure the generated waste by weight machine directly to compare with the data from questionnaire survey. The study revealed that the average generation rate of different categories of hospital waste such as general waste, anatomic waste, pathological waste, chemical waste, pharmaceutical waste, infectious waste, sharp waste and liquid waste were 0.138, 0.0028, 0.0091, 0.0036, 0.0009, 0.0334, 0.036 and 0.0205 kg/day/bed, respectively. The study showed that there was no radioactive waste in the selected hospitals of Khulna. Improper segregation, lack of treatment, consciousness and financial support are liable for inappropriate management. Finally, a management system was proposed including proper segregation and storage by selected colored container, proper collection, safe transportation, proper treatment and disposal for improving existing system. Regular

[4] Sultana, A., Paul, A. K., & Nessa, M. U. (2020). The Status of Noise Pollution in the Major Traffic Intersections of Khulna Metropolitan City in Bangladesh and its Possible Effect on Noise-Exposed People. European Journal of Environment and Earth Sciences, 1(5). https://doi.org/10.24018/ejgeo.2020.1.5.58

[5] Mahmud, A., Sikder, S. & Joardar, J.C. Assessment of groundwater quality in Khulna city of Bangladesh in terms of water quality index for drinking purpose. Appl Water Sci 10, 226 (2020). https://doi.org/10.1007/s13201-020-01314-z

monitoring and assessment of hospital waste by hospital and city authority will also be needed for a safe and healthy environment.

IV. ENVIRONMENTAL MANAGEMENT PLAN

12. Environmental Management Plan (EMP) is an instrument for implementing the mitigation plan for the proposed subproject. The plan provides guidance regarding environmental and social issues/parameters, location, frequency, and means of management and mitigation. The EMP specifies the means through which adverse environmental and social impact of the project associated with pre-construction, construction, and operational activities of the subproject are either avoided or mitigated.

13. The basic objective of the EMP is to manage the adverse impacts of proposed project interventions in a way that minimizes the adverse impact on the environment and people at the subproject sites. The specific objectives of the EMP are to –

- Identification of the environmental impacts and recommended mitigation and enhancement measures;
- Define the responsibilities of the subproject proponents in accordance with the project phases (pre-construction, construction and operation);
- Facilitate the implementation of the mitigation measures by providing the technical details of each project impact;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
- Providing a cost estimate for EMP implementation.

14. For civil works, the Contractor will be required to prepare a Site Specific EMP based on this EMP and submit to PIU for approval; carry out all of the monitoring and mitigation measures set forth in the approved SEMP. The SEMP will be implemented for impact management during subproject construction and operation.

15. **Implementation Arrangements:** MOHFW will be the executing agency (EA) while DGHS will be the implementation agency (IA). The project is expected to be completed by April 2023. A project implementation unit (PIU) will be set up in DGHS to provide the technical, administrative, and logistical support necessary for implementation. An inter-ministerial Project Steering Committee is to be constituted under the project of DGHS under the chairmanship of the Secretary, MOHFW, will provide guidance on policy directions and oversee the overall project implementation. The PIU will work directly with the government entity involved in each activity, such as but not limited to: (i) the COVID-19 Emergency Operation Center (EOC) in preparedness and response; (ii) the various coordination committees at Divisional, District, City Corporation and Upazila levels for civil works activities; and (iii) the Institute of Epidemiology, Disease Control and Research (IEDCR) and other relevant institutes under DGHS in contact tracing support and surveillance strengthening activities. The PIU will conduct regular monitoring and evaluation activities and hold quarterly reviews of progress against the indicators. For technical oversight and hands-on support to the PIU for ensuring environmental safeguards, an intermittent environmental specialist will be appointed throughout project implementation up to completion.

16. The contractor will designate their environmental staff who will be responsible in overseeing the implementation and compliance to the EMP during construction phase and maintain a record of complaint/grievance submitted at the project level through the contractor including any actions taken to address the issue. Contractors will also follow the guidelines for COVID-19 preparedness provided in Appendix 3.

17. **Grievance Redress Mechanism (GRM):** MOHFW will ensure that affected persons will have the chance to express their legitimate grievances or to file a complaint about the project by setting up a Grievance Redress Mechanism (GRM) as soon as the loan becomes effective. The GRM shall resolve complaints in a time-bound and transparent manner. The GRM process will be aligned with the process

adopted by MOHFW, while ensuring compliance with the policy principles of ADB SPS 2009. Any cost related to the implementation of the GRM will be part of the administration cost borne by MOHFW. Grievances filed and resolved will be thoroughly documented and included in the monitoring reports submitted to ADB.

18. Complainants or affected persons can seek redress to their complaints in three levels: Level 1: The complaint will be resolved at the activity level through the Site Engineer or Representative by the Contractor within one to two working days and advise the Complainant accordingly. Level 2: The GRM Focal Person will assist the complainant in elevating the complaint to the PIU. The PIU will address the grievance within 7 days through continuous interactions with the complainant to answer queries and resolve the complaint. Level 3: In the event the complainant is not satisfied with the decision after the GRM, the Complainant can access the ADB's Accountability Mechanism (ADB's Office of Special Project Facility or Office of Compliance Review).

Table 1: Environmental Management Plan for Isolation Unit and CCU at KMCH

IEC	Potential Impact	Mitigation Measures	Monitoring Method		Responsibility	
			Method of Collecting and Reporting Data	Location and Frequency	Implementation	Supervision
CONSTRUCTION PHASE						
Waste Management for Construction and COVID Waste	• Soil, water and air pollution from the improper management of wastes and excess materials from the construction sites. • The discarded PPE has posed serious health hazards and can spread the contagion among cleaners and walkers.	• Develop a waste management plan including COVID waste by the help of the environmental consultant and later to update the plan, if required. • Use of colored bins (like yellow) and to put medical wastes in 2-3 layered plastic bag. These wastes need to disinfectant first using chlorine or any other germicides and then safely transport them through marked vehicles in a marked place. • Waste segregation, packaging, collection, storage disposal, and transport will be conducted in compliance with GOB, ADB and WHO COVID-19 Guidelines. • Train on correct use and disposal of PPEs and check that they understand. • Construction wastes (such as piece of rod, wood, bamboo, tin sheet, brick etc.) shall be kept in designated area and sprayed water mist to reduce the dust. • Use PPE for staff handling any hazardous materials seepage of hazardous chemicals in case of any accidental spills. • Do not burn/throw in any wastes to the water bodies/drains. • The PIU will audit any off-site waste disposal required on a monthly basis and institute any remedial measures required to ensure compliance.	• Record of waste type and quantity and the disposal method	Construction camp and work sites during construction period	Contractor	PIU and Environmental Consultant (ES)
Management of Workers Facility	• Lack of proper facilities such as water supply and sanitation facilities may pose health hazards to workers.	• Ensure sufficient stock of soap, sanitizer, washing facility and safe water at work site. Also provision of an appropriate number of toilets and hand-washing points. • At the entrance of the worksite every personnel must wash their hands for 20 second with maintaining a distance of at least 6ft from each other. • Check the availability of medical kits at the site on weekly basis. • Preparation of daily routine checkup including temperature screenings of the workers and staff.	• Visual inspection & consultation with worker; • Health checkup record.	Construction camp site during construction period	Contractor	PIU and ES
Drinking Water Quality	• Groundwater at shallow depths may be contaminated with arsenic and other parameters and hence not suitable for drinking purposes.	• Provide the drinking water that meets national standards. • Select aquifers for drinking water free from arsenic and other contaminants. • Tube wells will be installed with due regard for surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination. Sanitary waste should be adequately disposed-off to avoid groundwater contamination.	• Record of water-borne diseases	Regular monitoring the drinking water source during construction period	Contractor	PIU and ES
Drainage Congestion	• Waterlogging due to improper management of drainage for rainwater/liquid waste or wastewater.	• Regularly inspect and maintain all drains to assess and alleviate any drainage congestion problem. • Stockpile materials away from drainage lines. • Reconstruct internal road-side drains immediately if damaged by any activities.	• Visual inspection & consultation with hospital staff and visitors.	In the project area during construction period	Contractor	PIU and ES
Dust/Air Quality Management	• Dust generation from construction sites, material stockpiles specially earth material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	• During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site. • Water spraying the material stockpiles and access roads when and as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (especially during the dry period and high winds). • Cover haul vehicles carrying dusty materials moving outside the construction site.	• Visual inspection & consultation with hospital staff, doctors, patients and their relatives	On the worksite Weekly monitoring during construction period	Contractor	PIU and ES

IEC	Potential Impact	Mitigation Measures	Monitoring Method		Responsibility	
			Method of Collecting and Reporting Data	Location and Frequency	Implementation	Supervision
		• Fit machinery/vehicles with appropriate exhaust systems and emission control devices.				
Noise and Vibration Management	• Noise may have an impact on workers, patients, hospital staffs, local residents etc.	• Appropriately site all noise generating activities to avoid noise pollution to workers, patients, hospital staffs, local residents etc. • Install temporary noise barriers by screen, tin, wood around generators to reduce noise levels. • Employ best available work practices on-site to minimize occupational noise levels. Use ear plugs in noisy areas of the construction activities. • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures.	• Visual inspection & consultation with hospital staff, doctors, patients and their relatives	On the worksite Weekly monitoring during construction period	Contractor	PIU and ES
Occupational Health and Safety (OHS)	• Construction works may pose health and safety risks to construction workers that may cause severe injuries and deaths. • Lack of first aid and health care facilities in the immediate vicinity. • Health risk of construction workers due to COVID-19.	• Develop and implement an Occupational Health and Safety Plan to ensure competent and consistent attention to worker health and safety throughout the construction phase. • Prepare the health and safety guidance for COVID-19 at work sites and get approval from PMU, and strictly follow the guidance at worksite; • Any worker showing symptoms of respiratory illness (fever, cold or cough) and has potentially been exposed to COVID-19 should be immediately removed from the site and tested for the virus at KMCH; • Workers involved for any short renovation activities at isolation area for COVID-19 will have WHO certified PPE and subsequently dispose the PPE in designated areas. • Provide PPE to workers such as safety shoes, safety helmets, face masks, hand gloves, protective clothing, goggles, full face eye shields, and ear plugs and monitor to maintain them. • Ensure hand washing and other sanitary stations are always supplied with clean water, soap, and disinfectant; • Provide safety measures as appropriate during works such first aid kits, restricted access zones, warning signs, overhead protection against falling debris, lighting system to protect community, hospital staff and patients against construction risks. • Simple poster/signage in Bangla explaining entry procedures. Signage available in hospitals to remind health personnel to wear masks if necessary and wash hands before entering/leaving. • Emergency preparedness and response procedures and equipment (warning signs, fire extinguishers, fire exit etc.). • Train all construction workers in OHS matters, and on the specific hazards of their work and maintain a register of the person present during the training. • Grievance Redress mechanism (GRM) developed to readdress complaints raised by community, health staff, patients and their relatives.	• Visual inspection & consultation with hospital staff, doctors, patients and their relatives • Record of accidents • Obtain record of training • Provision of regular temperature check, using disinfectants and also provision of time-to-time hand wash are required to limit the COVID-19 pandemic.	Contractor' site office and work site during construction	Contractor	PIU and ES
Site Reinstatement	• Damage due to debris, spoils, excess construction materials.	• Remove all spoils wreckage, rubbish, or temporary structures from the construction and camp sites; • All affected structures rehabilitated.	• Visual inspection & consultation with local people	At the end of construction period	Contractor	PIU and ES
OPERATION PHASE						

IEC	Potential Impact	Mitigation Measures	Monitoring Method		Responsibility	
			Method of Collecting and Reporting Data	Location and Frequency	Implementation	Supervision
COVID Waste Management	• COVID waste has posed serious health hazards and can spread the contagion among hospital staff, waste handlers and the community.	• Prepare medical waste management plan that will cover the waste generated from the response to the COVID-19 infection. The plan will follow **ADB's** guidance note on managing medical waste during COVID-19 pandemic as well as any other government regulations. • All medical waste produced during the care of COVID-19 patients must be considered as infectious waste and should be segregated and collected safely in designated colored coded containers. • Use of colored bins (like yellow) and to put Covid wastes in 2-3 layered plastic bag. These wastes need to disinfectant first using chlorine or any other germicides and then safely transport them through marked vehicles in a marked place. • Waste segregation, packaging, collection, storage disposal, and transport will be conducted in compliance with WHO COVID-19 Guidelines. • Train the staffs on color coding and handling of infectious Covid wastes.	• Visual inspection and consultation with hospital staff and cleaners. • Record of waste type and quantity and the disposal method.	Hospital area especially in COVID ward during operation period	KMCH	DGHS
Medical Waste Management	• Poor management of medical waste exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. • Soil, water and air pollution from the improper management of wastes generated from the facility.	• Provision of color coded, covered receptacles in strategic positions of the facility for separate categories of waste and regular cleaning of waste bins. Labels showing the type of waste that should be disposed of in each container should be placed near to the bins to guide staff and reinforce good habits. • Medical wastes generated in the hospital will be treated by in-house facility and then this treated wastes will be disposed of as per a pre-determined SOP in accordance with international good practices. Transport the medical waste with covered vehicle. The records of waste disposal will be maintained as proof for proper management as designed. • Ensure necessary PPE (gown, gloves, face mask, goggles or face shield, gumboots) is provided to all staffs, as required and ensure them to wear PPE when handling and disposing waste according to national and WHO guideline. • Do not burn the wastes openly or throw in to water bodies or do not dispose on soil. • Audit for any off-site waste disposal will be required on a monthly basis and institute any remedial measures required to ensure compliance.	• Visual inspection and consultation with hospital staff and cleaners. • Record of waste type and quantity and the disposal method.	Hospital area during operation period	KMCH	DGHS
Hazards due to Substation & Generator	• Noise and vibration may have an impact on hospital staff, doctors, patients and their relatives; • Accidental spillage of oil and toxic coolants that would contaminate land and water. • Risk of fire and electrocution hazards from substation.	• Have provision to use canopy to absorb 0.7 dB to 0.8dB of noise. • Periodic maintenance of equipment such as transformers and capacitors to minimize noise generation. • Provision of oil-water separator and oil containment structure. • Substation room will be entry restricted and security staff assigned to prevent unauthorized public access. Place warning signs at substation and generator room. • Ensure firefighting arrangement such as fire extinguishers, fire alarms etc. in the substation site. • Use of PPE, proper training, awareness, keeping safe distance from hazardous points, maintaining safety of high switchyard and cable gallery.	• Regular inspection and testing of all safety features and hazard control measures and personal protective features.	Substation room during operation period	KMCH	DGHS
Occupational Health and	• Needle-sticks, surgical cuts, and other injuries posing transmission risk of blood-borne diseases such	• Prepare a health and safety guidance for COVID-19 and strictly follow the guidance at the facility.	• Regular inspection and testing of all safety features and	Hospital area during operation period	KMCH	DGHS

IEC	Potential Impact	Mitigation Measures	Monitoring Method		Responsibility	
			Method of Collecting and Reporting Data	Location and Frequency	Implementation	Supervision
Safety including COVID H&S	as COVID-19, Hepatitis C, HIV-AIDS, etc. • Dermatitis and allergic reactions due to workplace exposures.	• Refer to IFC EHS Guidelines for Healthcare Facilities (2007) and relevant national guidelines and protocols. • Implement suitable safety standards for all workers and facility visitors. • Mandatory use of personal protective equipment and safety gears, where required. • Arrangements for safe drinking water and sanitation facilities. • Provide regular OHS training to healthcare workers. • Provide incentives to staff and create a work-life balance in work schedule.	hazard control measures and personal protective features			
Accidental Releases of Gas and Fluids	• Leakage of infectious or hazardous substances may pose serious health hazards and can spread the contagion among hospital staff and patients, cleaners etc.	• Develop an Emergency Response Plan and follow strictly during emergency incident. • Emergency preparedness and response procedures and equipment (warning signs, fire extinguishers, fire exit etc.). • Wear disposable gloves and, if aerosols are formed, glasses and a respirator for particles. • Cover the contaminated area with a disinfectant in a concentric way, starting at the edge and progressing towards the center of the contamination. • Avoid spraying or pouring the disinfectant from above, which can cause aerosols. • Mop up, and dispose of all waste and contaminated material in the appropriate container (infectious waste). • Conduct monthly safety audit of facility to identify fire risks, electrocution hazards and other unsafe conditions, and assess adequacy of fire extinguishers and first aid provisions.	• Record of regular inspection.	Hospital area during operation period	KMCH	DGHS

19. **EMP Budget:** The contractor should develop a site-specific Occupational Health and Safety Plan following ADB COVID-19 guidelines to ensure competent and consistent attention to worker health and safety throughout the construction phase and it is also suggested to maintain a medical waste management plan for the operation period. The possible mitigation measures of handling medical waste have also been suggested in the EMP. The EMP budget would also include the training cost. The contractor will arrange training for associated personnel and workers during construction phase. These training sessions will include knowledge on the environmental management system, health and safety, emergency response, etc. The EMP implementation cost for KMCH has been calculated and given in Table 2.

Table 2: Cost Estimation for EMP Implementation

Mitigation and Monitoring Items	Unit	Cost/Unit	Total Unit	Total Cost
1. Workers Health and Safety				
Safety Vest	No.	270	70	18900
Helmet	No.	350	70	24500
Safety shoes	No.	430	70	30100
Safety Goggles	No.	280	70	19600
Hand Sanitizer (5 Liter)	No.	2600	20	52000
One time Face Mask	No.	500	30	15000
Thermometer for measuring body temperature	No.	1000	3	3000
Fire extinguisher	No.	1299	10	12990
Megaphone Handheld Loudspeaker	No.	2700	2	5400
First Aid Box	No.	2500	2	5000
Torch Light	No.	1090	5	5450
Sub-total excluding over-head & profit =				1,91,940
Sub-total Including over-head & profit =				2,17,851.9
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				17,663.43
Total for item 1 including over-head, profit and VAT =				2,35,515.33
2. Engineers Health and Safety				
Safety Vest	No.	270	15	4050
Helmet	No.	1140	15	17100
Safety shoes	No.	2000	15	30000
Safety Goggles	No.	2100	15	31500
Hand Sanitizer (5 Liter)	No.	2600	2	5200
One time Face Mask	No.	500	5	2500
Thermometer for measuring body temperature	No.	1000	2	2000
First Aid Box	No.	2500	2	5000
Torch Light	No.	1090	2	2180
Sub-total excluding over-head & profit =				99,530
Sub-total Including over-head & profit =				1,12,966.55
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				9,159.33
Total for item 1 including over-head, profit and VAT =				1,22,125.88
3.Training on Occupational Health and Safety, and COVID-19 Safety Protocol				
Train on correct use and disposal of personal protective equipment (PPE)	No.	20000	3	60000
Leaflet/poster for awareness among the workers, staffs and nearby communities	No.	5	1000	5000
Sub-total excluding over-head & profit =				65000
Sub-total Including over-head & profit =				73775
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				5981.75
Total for item 2 including over-head, profit and VAT =				79756.75
4. Waste Management, Potable Water Supply and Sanitation Facility				
Supply of waste bins/pots for different wastes	No.	2400	50	120000
Cost for drinking water	No.	2	15000	30000
Cost for Sanitation facilities (hand tube well, latrine etc.)	No.	1	35000	35000

Mitigation and Monitoring Items	Unit	Cost/Unit	Total Unit	Total Cost
Cost for safety notices/signboards/protocol at site	No.	5	500	25000
Total excluding over-head & profit=				210000
Total Including over-head & profit=				238350
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				19325.65
Total for item 4 including over-head, profit and VAT =				257675.65
5. Autoclave				
Supply and installation of a 200L capacity vertical autoclave	Nos.	300000	1	300000
Sub-total excluding over-head, profit & VAT =				40500
Sub-total including over-head & profit =				340500
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				27608.08
Sub-total for item 5				368108.08
Total Including over-head & profit				
			Grand Total =	1063181.69
Note: Considering Over-head 3.5%, Profit - 10%, VAT 7.5%				

20. **Monitoring and Reporting:** The PIU of the project, under DGHS, will monitor the progress of EMPs implementation and the compliance performance of their contractors. The PIU will undertake site inspections and document review to verify compliance with the EMPs and progress toward the final outcome.

21. In the current crisis context, MOHFW do not have sufficient capacity and resources available to effectively oversee safeguards issues; the project therefore being supported MOHFW by recruiting an environmental safeguards specialist and a social safeguards specialist within the PIU to manage all environmental and social safeguards issues, reporting to the project director. These two specialists have overall responsibility for safeguards screening, implementation, monitoring and reporting, while the project director is accountable for the project's overall compliance during implementation. Safeguards documents will be reviewed and approved by the executing agency/implementing agency and ADB. The PIU will also obtain all clearances and fulfill any government safeguards-related requirements as applicable. The safeguards specialists will work in close collaboration with the 8 division-level project coordinators, as well as government representatives within the various coordination committees at divisional, district, city corporation and upazila levels, and defined project focal points at each site covered by the project and will coordinate with other relevant government departments to consult and/or obtain endorsement if necessary. Institutional roles and responsibilities are further detailed in the EARF and RIPPF.

22. ADB will review the project performance based on the commitments by HSD, MOHFW as agreed in the legal documents. Monitoring and supervising of environmental safeguards will be integrated into the project performance management system of ADB. The review of project performance will be conducted by ADB until the project completion report is completed. ADB will carry out the following monitoring actions to supervise project implementation:

- Conduct periodic site visits for projects with adverse environmental impacts;
- review the environmental monitoring reports submitted by MOHFW to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;
- work with MOHFW and DGHS to rectify, to the extent possible, any failure to comply with their environmental commitments in the Loan Agreement, and exercise remedies to re-establish compliance as appropriate; and
- Prepare a project completion report that assesses whether the objective and desired outcomes of the project have been achieved.

APPENDIX-1: LAYOUT PLAN OF SUBPROJECT COMPONENTS

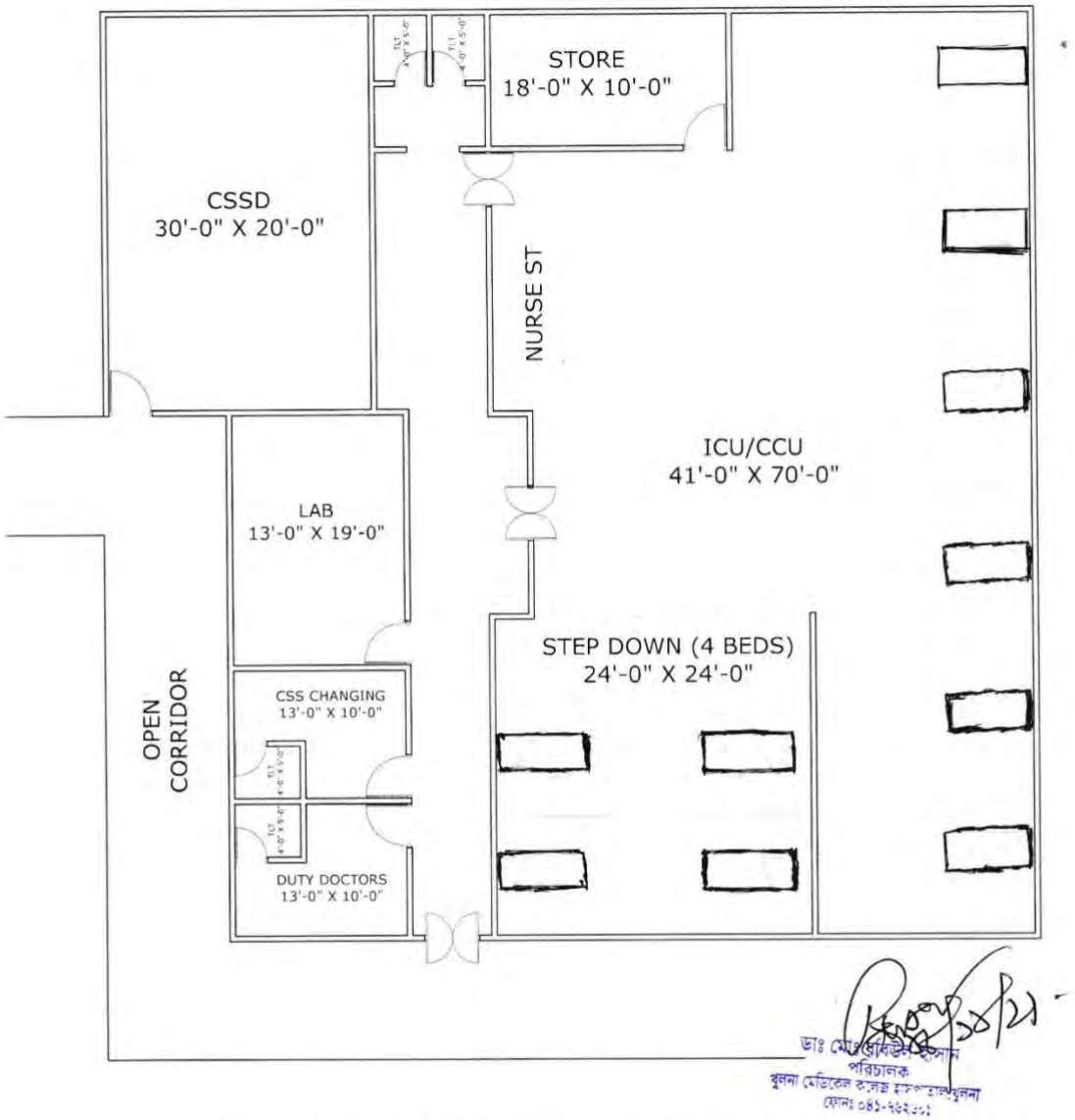
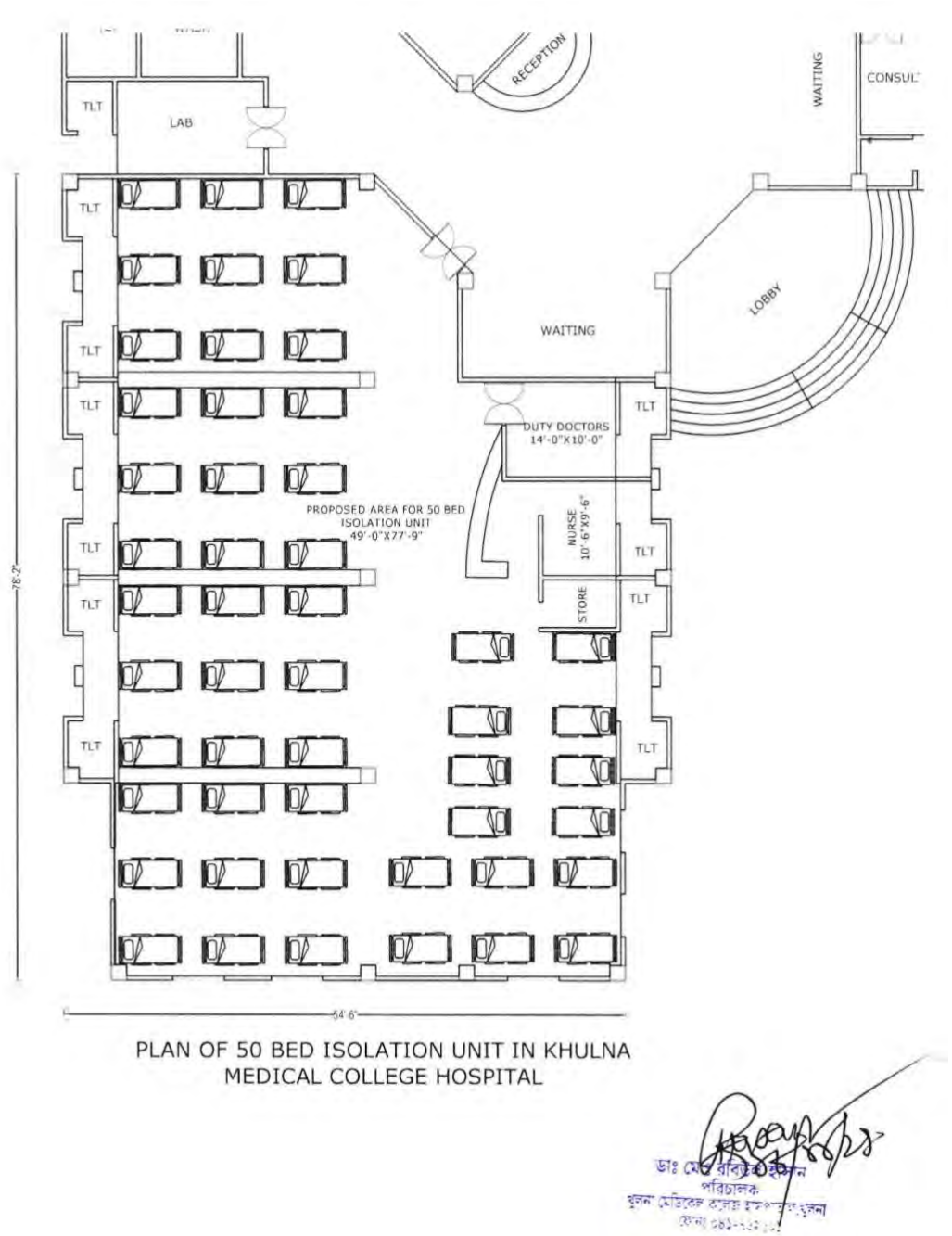


Figure: Proposed Plan for (a) 10 Bed CCU at KMCH



PLAN OF 50 BED ISOLATION UNIT IN KHULNA MEDICAL COLLEGE HOSPITAL

Figure: Proposed Plan for 50 Bed isolation unit at KMCH

APPENDIX-2: SAMPLE MEDICAL WASTE MANAGEMENT PLAN

OBJECTIVE

Medical Waste which is also referred as clinical waste has to be handled and disposed in a proper manner to eliminate the possibility of injury or infection and safeguarding the environment as a whole. The impacts associated with improper Medical Waste Management (MWM) can damage the environment and affect public heath directly and indirectly.

Medical wastes contain both general wastes (app. 75-80%) and infectious wastes (app. 20-25 percent). Medical Waste constitutes a public health hazard, if not managed properly. Although majority of the medical waste is no more dangerous than household/municipal waste, the hazardous waste, if exposed to the people or environment in an untreated form, pose various kinds of danger.

The main objective of the Medical Waste Management Plan (MWMP) is to organize disposal of all wastes generated during construction in an environmentally acceptable manner specially consider the following:

- Health hazards of the project personnel as well as community people should not be occurred;
- Manage the wastes in such a way that environment (specially air, water, surrounding environment etc.) will not be polluted;
- Odor means bad smell should not be generated;
- Always friendly environment at the construction sites and construction camps;
- Any waste should not be disposed into the river and any water bodies to avoid water pollution;
- Any waste should not be burnt

STRATEGIES FOR MEDICAL WASTE MANAGEMENT

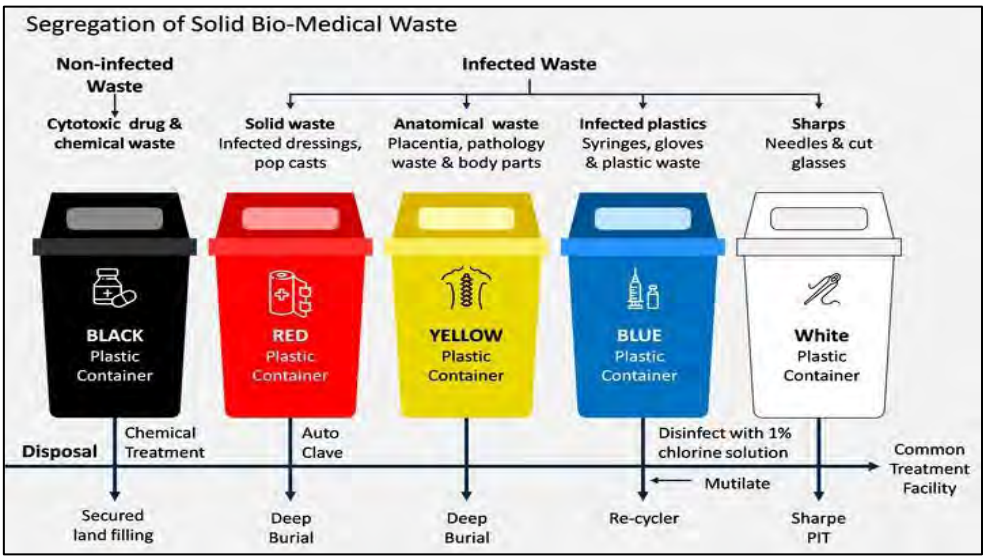
The major components of medical waste management include:

- Proper waste collection and segregation at source – use of standardized color-coded bins for different wastes;
- Waste streams - general, contaminated, cytotoxic/pharmaceuticals, body parts;
- Storage and transport - cold storage for contaminated waste and body parts, transport in safe and leak proof containers;
- Waste treatment – sterilization of contaminated waste (steam autoclave), incineration of cytotoxics, pharmaceuticals and body parts in incinerator meeting relevant standards and statues.

To perform a Medical Waste Management, several stages, need to be followed.

Stage 1: Collecting & Segregating

The biomedical waste has to be collected in containers that are resilient and strong from breakage during the handling process. Do not place sharps, used needles, syringes, or other contaminated tools in common waste disposal or recycle bin because the entire waste will be infectious by doing so. The segregation also needs to be performed between the liquid and solid biomedical waste products. Categorizing the medical waste with correct segregation to isolate and manage each waste in the proper way. For this purpose, the segregations come in colored waste containers, label coding and plastic bags. The simplest way to identify the different types of waste is to collect the various types of waste in separate containers or plastic bags that are color-coded and/or marked with a symbol.



Stage 2: Storing & Transporting

Specific requirements for storage facilities, such as a secure area that is inaccessible to the general public, as well as separated it from areas for food consumption. The storage facilities also have to be accompanied with refrigerator or freezer unit that can be used with medical waste if necessary. Some facilities even provided special vehicles and protective devices to dispose, handling or transport the biomedical waste products. Remember to observe and keep maintaining the protective devices periodically so it won't be a source of transmitting the infections. Further recommendations should be followed by the ancillary workers in charge of waste collection:

- Wastes should be collected daily or as frequently as required and transported to the designated central treatment site.
- No bags should be removed unless they are labeled with their point of production (hospital and ward or department) and contents.
- The bags or containers should be replaced immediately with new ones of the same type.
- Special packaging requirements for off-site transport in general, the waste should be packaged according to the recommendations provided in sealed bags or containers to prevent spilling during handling and transportation. The bags or containers should be appropriately robust for their content (puncture-proof for sharps, for example, or resistant to aggressive chemicals). Bags and containers must be closed whenever they are two-thirds full. Never pile bags or empty them; grasp them from the top (never hold them against the body) and wear gloves.
- All waste bags or containers should be labeled with basic information on their content and on the waste producer. This information may be written directly on the bag or container or on preprinted labels, securely attached. For health care wastes, the following additional information should be marked on the label: waste category, date of collection, place in hospital where produced (e.g. ward), and waste destination.

Stage 3: Treatment of Medical Waste

Incineration at high temperatures (over 1000°C) is one of the few technologies with which all types of health-care waste can be treated properly and it has the advantage of significantly reducing the volume and weight of the wastes treated. There are simple incinerator models for treating small quantities of medical waste. Some are available on the market, and others have to be built with local materials on the spot according to relatively simple plans. These incinerators consist essentially of one or two combustion chambers (the primary and secondary chambers) and a discharge chimney. The combustion and air-borne emission control system is simple. If infectious medical waste is treated in small single-chamber or dual-chamber incinerators on site, fractions of waste such as drugs, chemicals, halogenated materials or wastes with high heavy metal content (such as batteries, broken thermometers, etc.) must not be treated in this type of facility.

Autoclaving is a thermal process at low temperatures where waste is subjected to pressurized saturated steam for a sufficient length of time to be disinfected (60 minutes at 121°C and 1 bar). Where prions (which cause Creutzfeldt- Jakob's disease) are present, a cycle of 60 minutes at 134°C is recommended, since they are exceptionally resistant. Efficiency tests (biological or thermal) must in any case be carried out regularly. Autoclaving is environmentally safe but, in most cases, it requires electricity, which is why in some regions it is not always suitable for treating wastes Small autoclaves are frequently used for sterilizing medical equipment, but the models used for treating healthcare wastes can involve relatively complex and expensive plants (with internal mixing, shredding and drying systems) requiring meticulous design, proper sorting and a high level of operating support and maintenance. Furthermore, the effluents must be disposed of carefully and properly monitored. And lastly, large autoclaves may require a boiler that generates several types of emissions, which have to be monitored. Once wastes have been processed in an autoclave, they are no longer infectious materials: they can be landfilled with municipal refuse. Autoclaving is often used for pre-treating highly infectious waste before it is transported outside the hospital. This thermal process needs electricity and high installation cost.

Microwaving is another emerging technology to treat biohazardous waste, including material from healthcare facilities. Use of radiation to heat materials and destroy pathogens, can be combined with shredding to make material safe for disposal without modification. In microwave systems, disinfection occurs through the action of moisture and low heat. Microwave units usually operate at a frequency of 2450 MHz and the energy generates hot water and steam. It can be installed indoor with solid floor and require large electricity supply. It has the advantage of significantly reducing the volume and weight of the wastes treated up to 60-80% where autoclave can reduce to 50%.

Stage 4: Disposal of Medical Waste

Disposal in a sanitary landfill or waste burial pit: The disposal of untreated health-care waste in an uncontrolled dump is not recommended and must only be used as a last resort. It can be disposed of in a sanitary landfill, subject to certain precautions: it is important that health-care waste be covered rapidly. One technique is to dig a trench down to the level where old municipal refuse (over three months old) has been buried and to immediately bury health-care waste that is discarded at this level under a 2-metre layer of fresh municipal refuse. The following are the essential factors that must be taken into consideration in the design and use of a sanitary landfill

- access must be restricted and controlled;
- competent staff must be available;
- the discarding areas must be planned;
- the bottom of the landfill must be waterproofed;
- the water table must be more than 2 meters below the bottom of the landfill;
- there must be no drinking water sources or wells in the vicinity of the site;
- chemicals must not be disposed of on these sites;
- the waste must be covered daily and vectors (insects, rodents, etc.) must be controlled;
- the landfill must be equipped with a final cover to prevent rainwater infiltration; leachates must be collected and treated.

Purpose-built burial pit could also be used, preferably on the hospital site. Ideally, the pit should be lined with low permeability material such as clay to prevent the pollution of shallow groundwater and should be fenced in so as to prevent scavenger access. Health-care wastes must be buried immediately under a layer of soil after each unloading operation. It is suggested that lime be spread on the waste for added health protection (in the event of an epidemic, for example) or to eliminate odor. The pit should be sealed once it has been filled.

Disposal of liquid wastes in the sewage: There are two recommended ways to handle medical waste fluids: i. Collect fluids in a leak proof container, and solidified for autoclave treatment; ii. Thermally (autoclave) fluids then they be disposed into the sanitary sewer system. An extra precaution should be performed before pouring treated fluids in sewer because they may clog and leak.

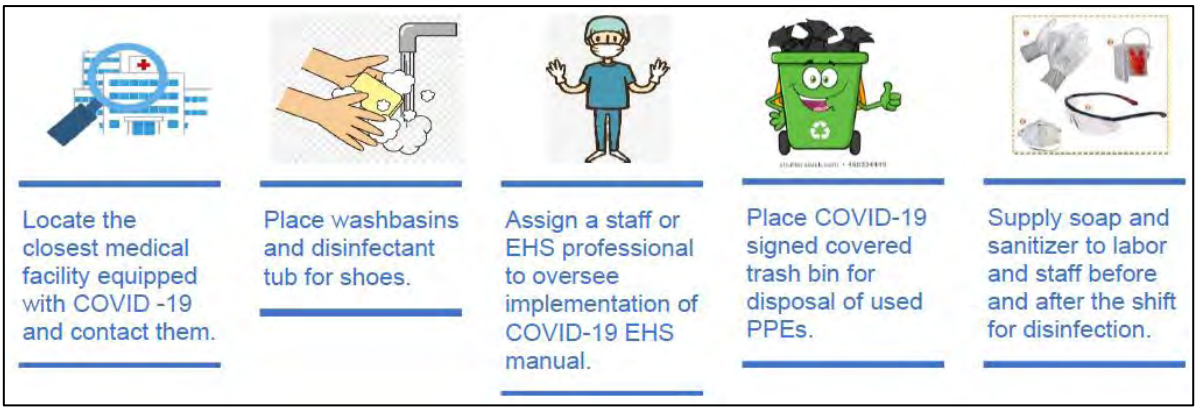
Spill contingency plan: Surfaces contaminated with spilled or leaked biomedical waste must be decontaminated with a solution of industrial strength detergent to remove visible soil before being disinfected by one of the following methods:

- Steam for a minimum of 30 seconds.
- Rinse for at least three (03) minutes with a hypochlorite solution containing 100 parts per million (ppm) available free chlorine (note: one tablespoon per two (02) gallons of water is approximately 100 ppm available free chlorine), or rinse for at least three (3) minutes with an iodine solution containing 25 ppm available iodine.
- Use a chemical germicide that is registered by the Environmental Protection Agency (EPA) as a hospital disinfectant, following recommended dilutions and directions. Liquid waste created by these chemical disinfecting operations shall be disposed of into the sanitary sewage system.
- Employees cleaning spills of biomedical waste must wear appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection. Spills should be reported to the respective Health and Safety Officer.

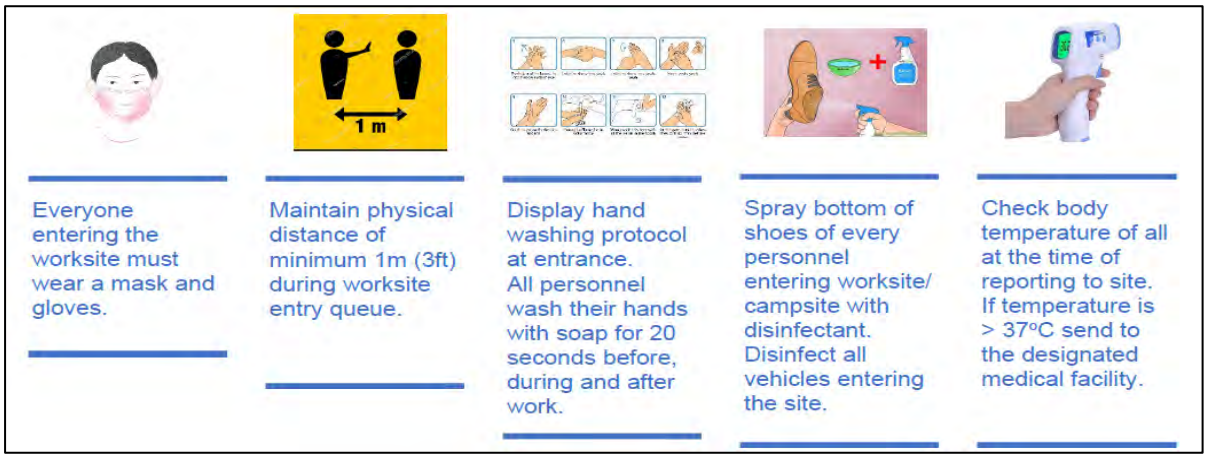
APPENDIX-3: COVID HEALTH AND SAFETY PLAN FOR THE CONSTRUCTION WORK

The contractors shall at all times be responsible to take all reasonable precautions to maintain the health and safety of personnel and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. ADB prepared a COVID-19 Health and Safety Advisory Guidance for Construction Workforce, which may be further updated as the COVID-19 situation evolves. The ADB guidance includes the protocols on the following:

A. Prerequisites for Reopening Worksite: Plan to open/reopen worksite at limited scale (i.e. only essential works at worksite). Map essential/unavoidable works that must be attended at this moment. Identify and engage essential labor force initially. Increase labor force step by step as necessary. Do not engage labor until: i. Conduct risk assessment of worksite and prepare plan as per H&S guideline; ii. Avoid labor intensive works as much as possible; iii. Ensure all to use the Personal Protective Equipment (PPE) as appropriate; iv. Engage health and safety supervisor to implement COVID-19 guideline; v. Engage health worker for daily temperature check and record for workers; vi. Ensure all equipment and vehicles used are routinely disinfected; vii. Provide thermometer, soap, sanitizer, disinfectant, PPE at worksite/camp; viii. Place adequate washbasins, disinfectant tub, dispenser for sanitizer; ix. Engage contractor's EHS staff or assign an existing staff to handle COVID-19 in case if detected; x. Post enough COVID-19 awareness posters throughout the worksites; and xi. Maintain COVID-19 weekly monitoring and reporting mechanism at worksite; including any necessary actions to be taken.



B. Worksite Entrance Protocol: Everyone entering the worksite must wear a mask, gloves and hard shoes. Strictly follow and implement the EHS manual at worksite. The entrance of the worksite/camp site every personnel must wash their hands for 20 second with maintaining a distance of at least 1m (3 ft) from each other.



C. Worksite Management Protocol: A designated EHS and medical person should stay all time during work. The EHS/Medical person should also monitor campsite. He/she will be in charge of ensuring physical distances (minimum 1m) among workers, disinfecting surfaces that are commonly used and investigate worker's/site personnel health and safety.

Ensure physical distance 1m (3ft) all the time at work.
Ensure rotated schedule for break to minimize gathering.

Frequently clean and disinfect highly used tools, machineries, and surfaces (e.g. tables, toilets) by workers.
Use designated trash bin to dispose used PPEs.

Mandatory morning briefing on COVID awareness at site maintaining physical distance.

Display COVID-19 related awareness message in Bangla.

Use alcohol-based wipe to clean tools, equipment, vehicle before and after use.

Discourage gathering at site.
Discourage unnecessary entrance and exit at site.

D. Camp Management Protocol:

1. Provide soap, sanitizer, washing facility and safe water at the workers' dwelling. Encourage frequent hand washing.
2. Ensure separate covered waste bin for disposal of used PPEs.
3. Protect against heat, cold, damp, noise, fire, and disease-carrying animals.
4. Maintain good housekeeping and social distancing in kitchens, meal rooms, canteens.
5. Ensure personal distance at least 1m (3ft) during lunch, dinner and prayer.
6. Ensure ample ventilation at the camp.

E. Work at Site Awareness: Train workers on how to properly put on, use/wear, and take off protective clothing and equipment. The on-site EHS/Medical person should be in-charge of these trainings. These trainings must maintain the WHO's social distancing protocol. Make these trainings mandatory at worksites. Provide 10-15 minutes of a workday for such 'training and encouragement' activities.

Inform the designated ESH/Medical personnel immediately if any person starts showing the symptoms of COVID-19.

Encourage respiratory etiquette, including covering coughs and sneezes. Don't touch nose/eye/ mouth if not washed recently, do not spit.

Encourage the workers at camp to go out for supplies not more than once a week.
Prepare posters for awareness in Bangla.
Place awareness raising posters at worksite & camp.

Shorten toolbox meetings.
Initiate remote meeting protocol to avoid physical contact.

Stay informed. Get news from WHO and Government news outlets.
Ask your EA.
Ask ADB.

Contractor should develop a preparedness and response plan by following the ADB guideline to prevent COVID-19 infection in the workplace. The preparedness plan will be submitted to PMU for approval. In addition to the ADB guideline, the government's Technical Guidance for Social and Institutional Containment and Prevention of Pandemic COVID-19 Infection issued on 11 May 2020 has also to be complied with.