BAN: COVID-19 Response Emergency Assistance Project

ADB Project 54173-001| Loan 3918-BAN

ENVIRONMENTAL MANAGEMENT PLAN

Package

MOHAKHALI/NIPSM/PCR/ADB/WD-17: Construction of PCR Laboratory at National Institute of Preventive and Social Medicine (NIPSOM), Dhaka.

Implementing Agency

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

February 2023

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.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

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. Considering the capacity constraints of the DGHS/PIU and, urgent requirement of emergency medical supplies/equipment, CMSD and PWD have been included as an additional IAs since May 2021. CMSD are entrusted with the procurement of emergency medical supplies/equipment while PWD are assigned with the procurement of civil works to combat the consequences of the pandemic situation.

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. NIPSOM (National Institute of Preventive and Social Medicine) a national public health institute established in 1974 at Mohakhali, Dhaka with the aim to produce post-graduates capable of satisfying the needs to improve the quality of healthcare services. The overall administration and supervision of the Institute is governed by the Ministry of Heath and Family Welfare (MOHFW), Government of Bangladesh. The head of the institute is the Director. The institute consists of 12 departments, namely Biostatistics, Community Medicine, Medical Entomology, Epidemiology, Environmental and Occupational Health, Health Education, Maternal and Child Health, Microbiology, Nutrition and Biochemistry, Population Dynamics, Public Health and Hospital Management, and Parasitology. The institute offers MPH courses in different branches of public health including Public Health Administration, Community Medicine, Hospital Management, Epidemiology, and Preventive and Social Medicine. NIPSOM conducts eight Master of Public Health courses of one year duration and MPhil course of 2 years duration. The Institute was accredited with the University of California in 1978, and Liverpool University in 1982. WHO/SEARO also recognized NIPSOM as an institute of excellence in 1978. The Institute became a member of the School of Public Health Association (1990) and Asia Pacific Consortium for Public Health (APACPH, 1990). So far, the institute has produced more than 1400 graduates, and trained more than 3000 health workers of different categories through short courses. From 1999 the Institute has become affiliated to the Faculty of Medical and Social Sciences, Bangabandhu Sheikh Mujib Medical University, Dhaka. NIPSOM strives for continuous updating of the curriculum to keep pace with international standards. It offers 154 seats for MPH courses. The institute has a rich library having numerous text and reference books, journals, etc.

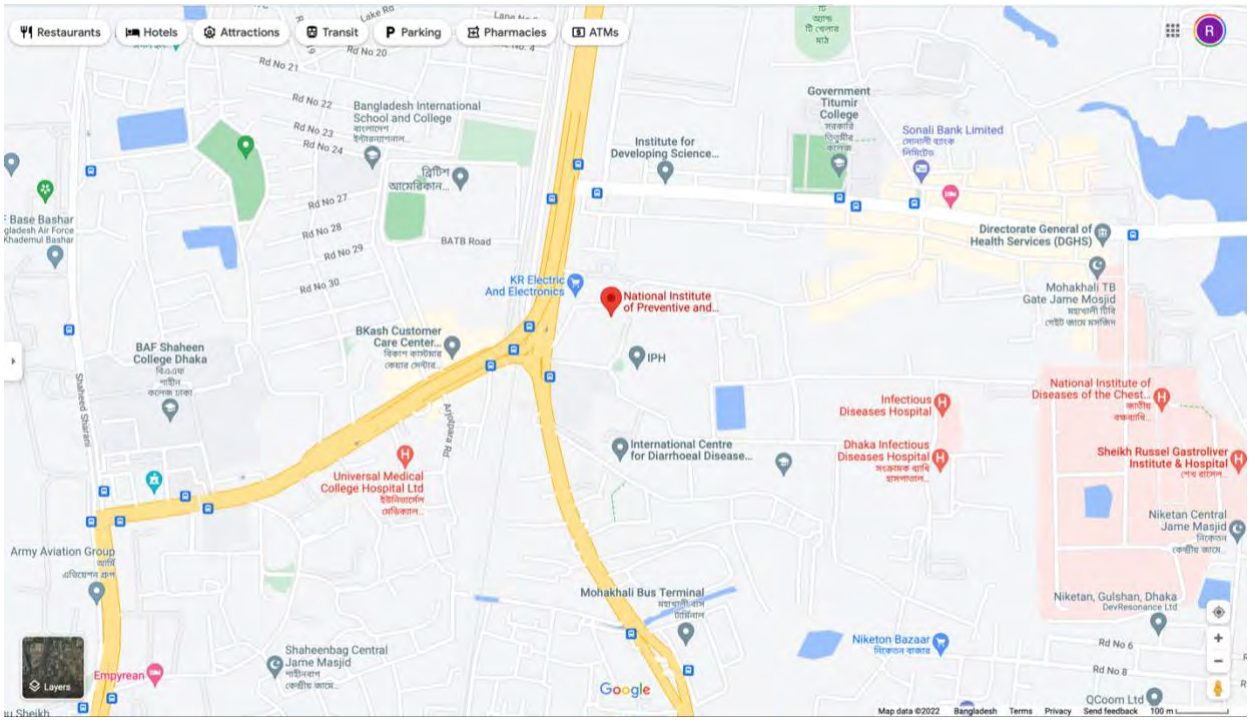


Figure 1: Location of NIPSOM on Google Map

4. Under this subproject, a PCR laboratory including a Microbiology laboratory will be established in NIPSOM. Appendix 1 represents the layout plan of subproject components. The laboratory will be arranged within the constructed buildings; so no further additional vertical or horizontal or a new construction is required for this purpose. Only few civil works related to portioning, floor improvement and other required works will be conducted under this package. Intended Completion Date is 180 days from the commencement date of work. The respective institute will provide necessary support and supervision and the monitoring process will be done through Public Works Department (PWD). 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.

III. BASELINE INFORMATION

5. **Climate.** Dhaka has a tropical savanna climate. The city has a distinct monsoonal season, with an annual average temperature of 26°C (79°F) and monthly means varying between 19°C (66°F) in January and 29°C (84°F) in May. Approximately 87% of the average annual rainfall of 2,123 millimeters (83.6 inches) occurs between May and October. Increasing air and water pollution emanating from traffic congestion and industrial waste are serious problems affecting public health and the quality of life in the city. Water bodies and wetlands around Dhaka are facing destruction as these are being filled up to construct multi-storied buildings and other real estate developments. Coupled with pollution, such erosion of natural habitats threatens to destroy much of the regional biodiversity. Due to unregulated manufacturing of brick and other causes Dhaka is one of the most polluted world cities with very high levels of PM2.5 air pollution.

6. **Air Quality and Noise Level.** In 2019, Dhaka came in with a PM2.5 reading of 83.3 µg/m³ as the yearly average, putting it in the 'unhealthy' bracket of air quality, which requires a PM2.5 reading between 55.5 to 150.4 µg/m³ to be classed as unhealthy. Besides just being a classification, this rating is of course indicative that the air quality is indeed unhealthy to breathe, with numbers going well above the yearly average such as January coming in with a record high of 181.8 µg/m³, putting it into the 'very unhealthy' bracket (150.5 to 250.4 µg/m³).

7. This yearly average reading of 83.3 µg/m³ was enough to put Dhaka in 1st place out of all cities in Bangladesh (of note is that the only city registered for pollution levels in the country was Dhaka, so this first-place ranking was inevitable) as well as being the 21st most polluted city worldwide in 2019, making the level of air pollution in Dhaka quite severe, and of great detriment to its citizens.

8. The highest noise level recorded 104 dB at Sayedabad bus terminal and the lowest 68 dB in Banani and Baridhara residential area. In silent zone, average noise level was 79 dB, in residential zone 72 dB, in commercial zone 90 dB, and in mixed zone average noise level was recorded at 91 dB.

9. **Drinking Water Quality.** The quality of water, from both surface and groundwater sources, has recently being endangered by many factors, natural and man-made, which have caused a deterioration. The quality of the water sources used in Bangladesh is at high risk, especially in the capital city of Dhaka, due to increased pollution resulting from unlimited migration of rural people. Consequently, the existing groundwater-based water supply system is not adequate to fulfil the water demand of the mega-city Dhaka. To alleviate the city's present severe water crisis, the question has been asked as to why the Dhaka Water Supply and Sewerage Authority (DWASA) is not using the rivers around Dhaka as a source of water. In this context, DWASA is seriously considering two options: (i) introduction of a separate water supply system for domestic purposes other than drinking water by pumping available river water around the city; and (ii) installation of a small-scale treatment plant for water supply using river water around the city as a source of raw water**.**

10. **Current Situation of Medical Waste Management.** In NIPSOM laboratory there are separate color bins for collecting different types of waste. Waste is stored in a temporal storage bin until they are finally disposed off to the nearest DCC bin outside the hospital boundary. General wastes are then transported by the NIPSOM authorities to the nearest DNCC bin outside the boundary. On the other hand, the medical waste is collected by the local NGO Prism Bangladesh Foundation.

11. Until 2004 there were no organized form of medical waste collection and disposal in the country including in Dhaka. Since 2005, a local NGO Prism Bangladesh Foundation has been engaged by Dhaka City Corporation for collecting and disposal of medical solid wastes in Dhaka city. Approximately 13.5 tons of medical wastes are collected daily from hospitals and clinics and healthcare facilities in Dhaka city (Dhaka South City Corporation and Dhaka North City Corporation). A study of Dhaka South City Corporation suggests that approximately 50 tons of total solid wastes are collected daily by both Dhaka North and Dhaka South City Corporations. Prism Bangladesh Foundation and Dhaka South City Corporation officials responsible for medical waste collection. Dhaka South City Corporation has allocated a special site at Matuail sanitary landfill area for safe management and disposal of medical waste there. Prism Bangladesh Foundation collects and carries different types of medical wastes from different locations

of Dhaka City to Matuail landfill site, segregate them and manage them further. The wet part of medical wastes is put into an autoclave chamber to disinfect them for further disposal at the landfill. On the contrary, sharp (needle, glass etc.) items, body parts are buried at designated sites of the Matuail landfill. Recyclable plastic items are separated and chemically treated, shredded, and sold as raw materials for plastic factories. All other dry items from medical wastes are incinerated and the ash is buried at the landfill. Matuail sanitary landfill site designated for medical waste management has its autoclave, incinerator, and effluent treatment plant (ETP for treating wastewater) for safely managing medical wastes generated and collected by Prism Bangladesh Foundation in Dhaka city.

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 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) has been set up in DGHS to provide the technical, administrative, and logistical support necessary for implementation. Considering the capacity constraints of the DGHS/PIU and, urgent requirement of emergency medical supplies/equipment, CMSD and PWD have been included as an additional IAs since May 2021. CMSD are entrusted with the procurement of emergency medical supplies/equipment while PWD are assigned with the procurement of civil works to combat the consequences of the pandemic situation. 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 PCR Lab at NIPSOM

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 waterbodies/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 laboratory 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 laboratory 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, laboratory 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 laboratory 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 NIPSOM; • 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, laboratory staff and patients against construction risks. • Simple poster/signage in Bangla explaining entry procedures, wearing masks 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 laboratory staff, doctors, patients and their relatives • Record of accidents • Obtain record of training • Provision of regular temperature check, using disinfectants and 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 laboratory 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 laboratory staff and cleaners. • Record of waste type and quantity and the disposal method.	Laboratory area during operation period	NIPSOM Laboratory	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 laboratory will be treated by in-house facility and then these 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 into waterbodies or do not dispose on soil. • Audit for any off-site waste disposal will be required monthly and institute any remedial measures required to ensure compliance.	• Visual inspection and consultation with laboratory staff and cleaners. • Record of waste type and quantity and the disposal method.	Laboratory area during operation period	NIPSOM Laboratory	DGHS
Occupational Health and Safety including COVID H&S	• Needle-sticks, surgical cuts, and other injuries posing transmission risk of blood-borne diseases such as COVID-19, Hepatitis C, HIV-AIDS, etc. • Dermatitis and allergic reactions due to workplace exposures.	• Prepare a health and safety guidance for COVID-19 and strictly follow the guidance at the facility. • 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.	• Regular inspection and testing of all safety features and hazard control measures and personal protective features	Laboratory area during operation period	NIPSOM Laboratory	DGHS
Laboratory biosafety	• Outbreaks of contaminants may occur if the implementation of laboratory practices and procedures, specific construction	• Prepare a Laboratory Biosafety Guidance for COVID-19 and follow during the operation of this laboratory. • Workers who handle potentially contaminated biological agents must be aware of the risks and master the practices and techniques required to do their jobs safely.	• Record of regular inspection.	Laboratory area during operation period	NIPSOM Laboratory	DGHS

IEC	Potential Impact	Mitigation Measures	Monitoring Method		Responsibility	
			Method of Collecting and Reporting Data	Location and Frequency	Implementation	Supervision
	features of laboratory facilities, safety equipment, and appropriate occupational health programs when working with potentially infectious microorganisms and other biological hazards are not considered.	• Biosafety measures must be observed by everyone because everyone is at risk of carrying pathogenic microorganisms. • All waste generated must be disposed of in strict compliance with specific procedures suited to the type of material.				

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 NIPSOM Laboratory has been calculated and given in Table 2.

Table 2: Cost Estimation for EMP Implementation

Mitigation and Monitoring Items	Unit	Total Unit	Cost/Unit	Total Cost
1. Workers Health and Safety				
Safety Vest	Nos.	50	270	13,500.00
Helmet	Nos.	50	350	17,500.00
Safety shoes	Nos.	50	430	21,500.00
Safety Goggles	Nos.	50	280	14,000.00
Hand Sanitizer (5 Liter)	Nos.	10	2500	25,000.00
One time Face Mask	Nos.	20	500	10,000.00
Thermometer for measuring body temperature	Nos.	2	1000	2,000.00
Fire extinguisher	Nos.	5	1300	6,500.00
Megaphone Handheld Loudspeaker	Nos.	2	2700	5,400.00
First Aid Box	Nos.	2	2500	5,000.00
Torch Light	Nos.	4	1090	4,360.00
Sub-total excluding over-head, profit & VAT =				124,760.00
Sub-total Including over-head & profit =				141,602.60
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				11,481.14
Total for item 1 including over-head, profit and VAT =				153,083.74
2. Engineers Health and Safety				
Safety Vest	Nos.	12	270	3,240.00
Helmet	Nos.	12	500	6,000.00
Safety shoes	Nos.	12	500	6,000.00
Safety Goggles	Nos.	12	500	6,000.00
Hand Sanitizer (5 Liter)	Nos.	2	2500	5,000.00
One time Face Mask	Nos.	5	500	2,500.00
Thermometer for measuring body temperature	Nos.	2	1000	2,000.00
First Aid Box	Nos.	2	2500	5,000.00
Torch Light	Nos.	2	1090	2,180.00
Sub-total excluding over-head, profit & VAT =				37,920.00
Sub-total including over-head & profit =				43,039.20
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				3,489.62
Total for item 2 including over-head, profit and VAT =				46,528.82
3.Training on Occupational Health and Safety, and COVID-19 Safety Protocol				
Train on correct use and disposal of personal protective equipment (PPE)	Nos.	3	2000	6,000.00
Leaflet/poster for awareness among the workers, staffs and nearby communities	Nos.	1000	5	5,000.00
Sub-total excluding over-head, profit & VAT =				11,000.00
Sub-total Including over-head & profit =				12,485.00
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				1,012.28
Total for item 3 including over-head, profit and VAT =				13,497.28
4. Waste Management, Potable Water Supply and Sanitation Facility				
Supply of color-coded waste bins/pots for different wastes	Nos.	10	2400	24,000.00
Cost for drinking water	Nos.	2	10000	20,000.00
Cost for Sanitation facilities (hand tube well, latrine etc.)	Nos.	1	25000	25,000.00

Mitigation and Monitoring Items	Unit	Total Unit	Cost/Unit	Total Cost
Cost for safety notices/signboards/protocol at site	Nos.	5	400	2,000.00
Sub-total excluding over-head, profit & VAT =				71,000.00
Sub-total including over-head & profit =				80,585.00
Add VAT with adjustment factor (VAT-7.5% & Factor-1.08108)				6,533.83
Total for item 4 including over-head, profit and VAT =				87,118.83
			Grand Total =	300,228.67
Note: Considering Over-head 3.5%, Profit - 10%, VAT 7.5% (adjustment factor 1.08108)				

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 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

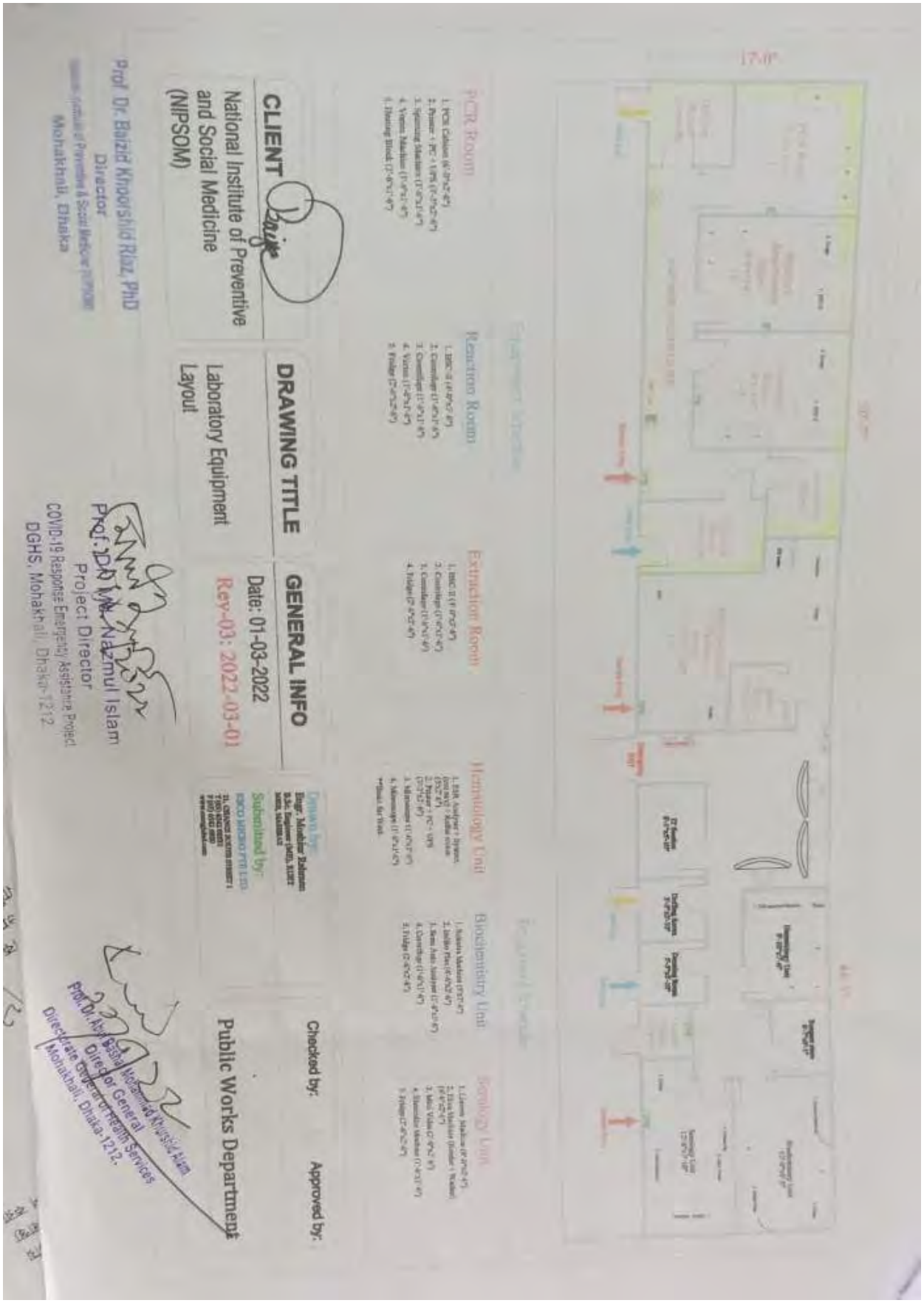


Figure: Proposed Plan for PCR Laboratory at NIPSOM, Mohakhali

APPENDIX-2: SAMPLE MEDICAL WASTE MANAGEMENT PLAN

OBJECTIVE

Medical Waste which is also referred as clinical waste must be handled and disposed in a proper manner to eliminate the possibility of injury or infection and safeguarding the environment. 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

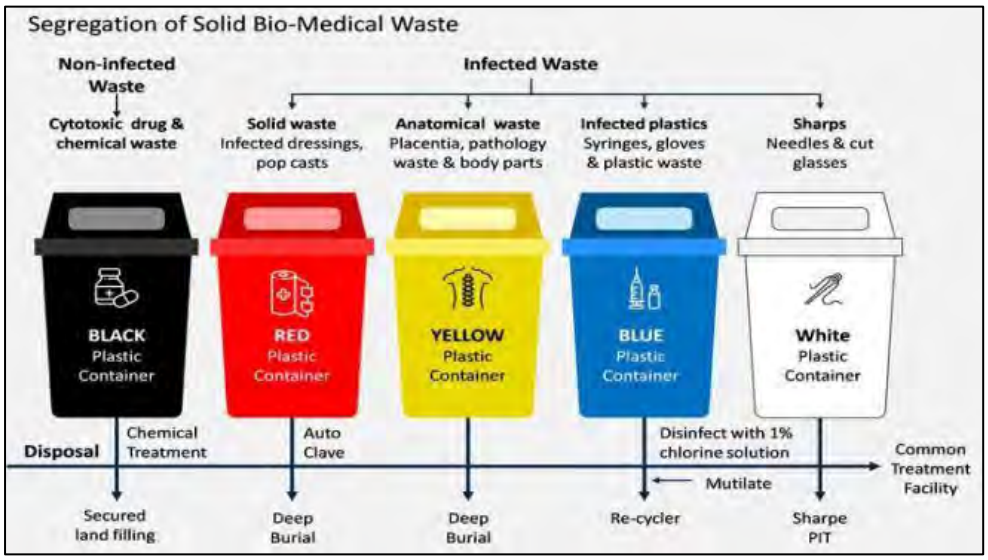
The major components of medical waste management include:

- 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 cytotoxic, 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 must 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 must 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 (laboratory) 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 laboratory 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 must 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 must 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 laboratory. 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 institution 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 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:

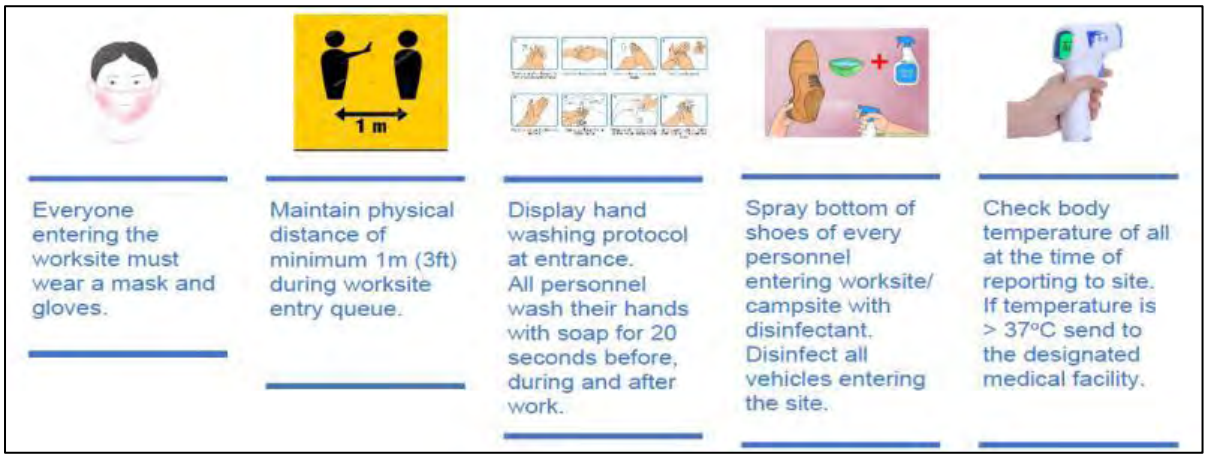
- Steam for a minimum of 30 seconds.
- Rinse for at least three (03) minutes with a hypochlorite solution containing 100 parts per million (ppm) available free chlorine (note: one tablespoon per two (02) gallons of water is approximately 100 ppm available free chlorine), or rinse for at least three (3) 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/laboratory disinfectant, following recommended dilutions and directions. Liquid waste created by these chemical disinfecting operations shall be disposed of into the sanitary sewage system.
- Employee's 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

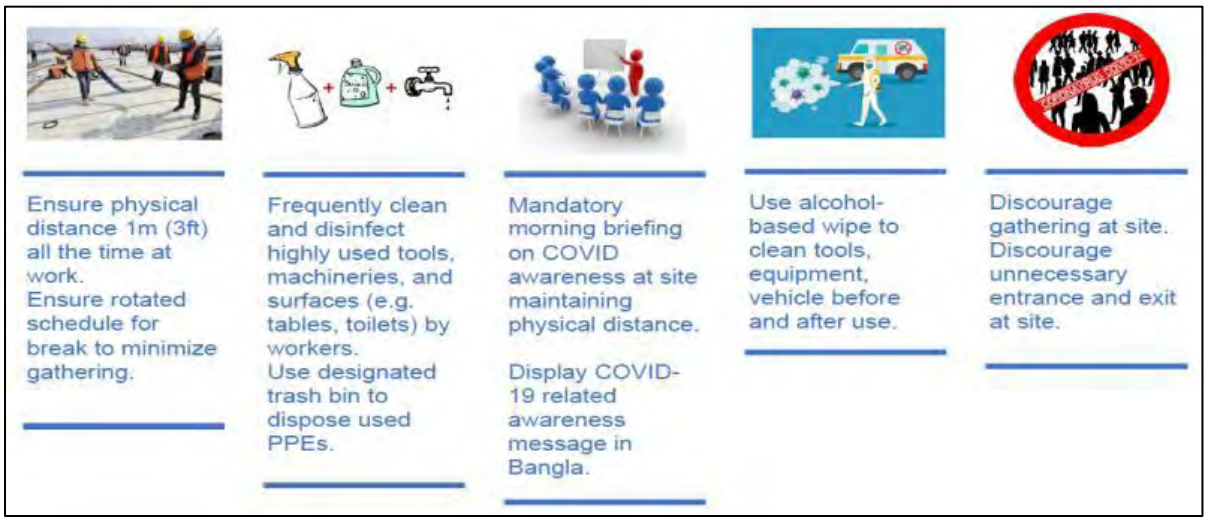
The contractors shall always be responsible to take all reasonable precautions to maintain the health and safety of personnel and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. However, a COVID-19 Health and Safety Advisory Guidance for Construction Workforce prepared by ADB, which may be further updated as the COVID-19 situation evolves by the contractor and get approval from the PIU. The 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.



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.

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.

APPENDIX-4: CORE REQUIREMENTS OF LABORATORY BIOSAFETY

(Source: Laboratory biosafety guidance related to coronavirus disease (COVID-19), WHO)

Good microbiological practice and procedure (GMPP)

1. Best practice

- Never store food or drink, or personal items such as coats and bags in the laboratory. Activities such as eating, drinking, smoking, and applying cosmetics are only to be performed outside the laboratory.
- Never put materials, such as pens, pencils or gum in the mouth while inside the laboratory, regardless of having gloved hands or not.
- Wash hands thoroughly, preferably with warm running water and soap, after handling biological material and/or animals, before leaving the laboratory or when hands are known or believed to be contaminated.
- Ensure open flames or heat sources are never placed near flammable supplies and are never left unattended.
- Ensure that cuts or broken skin are covered before entering the laboratory.
- Before entering the laboratory, ensure that there are adequate supplies of laboratory equipment and consumables, including reagents, PPE and disinfectants, and that these items are suitable for the activities envisaged.
- Ensure that supplies are stored safely and according to storage instructions to reduce accidents and incidents such as spills, trips and falls.
- Ensure proper labelling of all biological agents and chemical and radioactive material.
- Protect written documents from contamination using barriers (such as plastic coverings), particularly those that may need to be removed from the laboratory.
- Ensure that the work is performed with care and without hurrying. Avoid working when fatigued.
- Keep the work area tidy, clean and free of non-essential objects and materials.
- Prohibit the use of earphones, which can distract personnel and prevent equipment or facility alarms from being heard.
- Cover or remove any jewellery that could tear gloves, easily become contaminated or become fomites. Cleaning and decontamination of jewellery or spectacles should be considered, if such items are worn regularly.
- Refrain from using portable electronic devices (for example, mobile telephones, tablets, laptops, flash drives, memory sticks, cameras, or other portable devices, including those used for DNA/RNA sequencing) when not specifically required for the laboratory procedures being performed.
- Keep portable electronic devices in areas where they cannot easily become contaminated or act as fomites that transmit infection. Where close proximity of such devices to biological agents is unavoidable, ensure the devices are either protected by a physical barrier or decontaminated before leaving the laboratory. Technical procedures
- Avoid inhalation of biological agents. Use GMPP techniques to minimize the formation of aerosols and droplets when manipulating specimens.
- Avoid ingestion of biological agents and their contact with the skin and eyes.
- Always wear disposable gloves when handling specimens.
- Avoid gloved hands coming into contact with the face.
- Shield or otherwise protect the mouth, eyes and face during procedures where splashes may occur.
- Wherever possible, replace any glassware with plasticware.
- If required, use scissors with blunt or rounded ends rather than pointed ends.
- Handle any sharps, syringes or needles with care in order to prevent injury and injection of biological agents.
- Use ampoule openers for safe handling of ampoules.
- Never re-cap, clip or remove needles from disposable syringes.
- Dispose of any sharps materials (for example, needles, needles combined with syringes, blades, broken glass) in puncture-proof or puncture-resistant containers fitted with sealed covers.
- Preventing dispersal of biological agents:

- discard specimens and cultures for disposal in leak-proof containers with the tops appropriately secured before disposal in dedicated waste containers;
- consider opening tubes with disinfectant-soaked pad/gauze;
- decontaminate work surfaces with a suitable disinfectant at the end of the work procedures and if any material is spilled or obviously contaminated;
- ensure that the disinfectant is efficacious against the pathogen being handled and is left in contact with infectious waste materials long enough for complete inactivation.

2. Personnel competence and training

General familiarization and awareness training

- General training should include an introduction to laboratory layout, codes of practice, local guidelines, safety manuals, risk assessments, legislative requirements, and emergency response procedures.

Job-specific training

- Training requirements may vary depending on the job functions.
- However, in general, all personnel involved in the handling of biological agents must be trained on GMPP.
- Competency and proficiency assessment must be used and verified before working independently, followed by regular review and refresher training.
- Relevant information such as new procedures must be updated and communicated to applicable personnel.

Safety and security training

- All personnel must be aware of the hazards present in the laboratory and their associated risks as well as safe working procedures, security measures, and emergency preparedness and response.

3. Facility design

- Ample space and a designated hand-washing basin must be provided, with appropriate restriction of access.
- Doors must be properly labelled, and laboratory walls, floors, and furniture must be smooth, easy to clean, impermeable to liquids and resistant to the chemicals and disinfectants normally used in the laboratory.
- Laboratory ventilation, where provided (including heating/cooling systems and especially fans/local cooling split-system air-conditioning units – specifically when retrofitted) should ensure airflows do not compromise safe working. Consideration must be made for resultant airflow speeds and directions, and turbulent airflows should be avoided; this applies also to natural ventilation.
- Laboratory space and facilities must be adequate and appropriate for safe handling and storage of infectious and other hazardous materials, such as chemicals and solvents.
- Facilities for eating and drinking must be provided outside the laboratory, and first-aid-facilities must be accessible.
- Appropriate methods for decontamination of waste, for example disinfectants and autoclaves, must be available close to the laboratory.
- The management of waste must be considered in the laboratory design. Safety systems must cover fire, electrical emergencies, and emergency/incident response facilities, based on risk assessment.
- There must be a reliable and adequate electricity supply and lighting to permit safe exit.
- Emergency situations must be considered in the design, as indicated in the local risk assessment, and should include the geographical/meteorological context.

4. Specimen receipt and storage

- A specimen received by the laboratory must be accompanied by sufficient information to identify what it is, when and where it was taken or prepared, and which tests and/or procedures (if any) are to be performed.
- Consider unpacking the item in the BSC. Personnel unpacking and receiving specimens must be adequately trained on the hazards involved; how to adopt necessary precautions according to

GMPP described earlier; how to handle broken or leaking containers; and how to handle spills and use disinfectants to manage any contamination.

- Specimens must be stored in containers with adequate strength, integrity, and volume to contain the specimen, and that are leakproof when the cap or stopper is correctly applied. Use plastic containers whenever possible that are free of any biological material on the outside of the packaging. In addition, containers should be correctly labelled, marked and recorded to facilitate identification, and made of an appropriate material for the type of storage required
- Inactivation methods must be properly validated whenever an inactivation step is used, before transferring the specimens to other areas for further manipulation, such as PCR analysis.5. Decontamination and waste management
- Any surface or material known to be, or potentially be, contaminated by biological agents during laboratory operations must be correctly disinfected to control infectious risks.
- Proper processes for the identification and segregation of contaminated materials must be adopted before decontamination or disposal.
- Where decontamination is not possible in the laboratory area, or onsite, contaminated waste must be packaged in a leakproof fashion, for transfer to another facility with decontamination capacity.

5. Personal protective equipment

- Laboratory coats must be used in laboratories to prevent personal clothing from getting splashed or contaminated by biological agents. Laboratory coats must have long sleeves, preferably with elasticated or fitted cuffs, and must be fastened when worn in the laboratory. Sleeves should never be rolled up. Coats must be long enough to cover the knees, but not trail on the floor. Where possible, the fabric of the laboratory coat should be splash-resistant. Laboratory coats must only be worn in designated areas. When not in use, they should be stored properly; they should not be hung on top of other laboratory coats or kept in lockers or on hooks with personal items.
- Appropriate disposable gloves must be worn for all procedures that may involve planned or inadvertent contact with blood, body fluids or other potentially infectious materials. They must not be disinfected or reused, as exposure to disinfectants and prolonged wear reduces the integrity of the glove and decreases protection to the user. Gloves should always be inspected before use, to check that they are intact.
- Safety glasses or goggles, face shields (visors) or other protective devices must be worn whenever necessary to protect the eyes and face from splashes, impacting objects or artificial ultraviolet radiation. Eye protection devices can be re-used but must be cleaned each time after use. If splashed, devices must be decontaminated with an appropriate disinfectant.