Draft Initial Environmental Examination

June 2022

Maldives: Responsive COVID-19 Vaccination for Recovery Project under the Asia Pacific Vaccine Access Facility

Prepared by Government of Maldives for the Asian Development Bank.

CONTENTS

ACRONYMS

ADB	-	Asian Development Bank
CBD	-	Convention on Biological Diversity
COVID-19	-	Coronavirus Diseases
EA	-	Executing Agency
EIA	-	Environmental Impact Assessment
EMMP	-	Environmental Management and Monitoring Plan
EPA	-	Environmental Protection Agency
EPPA	-	Environmental Protection and Preservation Act
ESS	-	Environmental Safeguard Specialist
GDP	-	Gross Domestic Product
GHG	-	Greenhouse gas
GOM	-	Government of Maldives
GRC	-	Grievance Redressal Committee
GRM	-	Grievance Redressal Mechanism
HDC	-	Housing Development Cooperation
HPA	-	Health Protection Agency
IA	-	Implementing Agency
IEE	-	Initial Environmental Examination
MECCT	-	Ministry of Environment, Climate Change and Technology
MOH	-	Ministry of Health
MOF	-	Ministry of Finance
MWSC	-	Maldives Water and Sewerage Company
NBS	-	National Bureau of Statistics
PM	-	Particulate Matter
Ppm	-	Parts Per Million
SPS	-	Safeguard Policy Statement
STELCO	-	State Electric Company
STO	-	State Trading Organization
UN	-	United Nations
UNDP	-	United Nations Development Program
UNFCCC	-	United Nations Framework Convention on Climate Change
USD	-	United States Dollars
WAMCO	-	Waste Management Cooperation

EXECUTIVE SUMMARY

This Initial Environmental Examination (IEE) report is prepared to meet the requirements of the Asian Development Bank Safeguard Policy Statement (2009). This IEE is aimed to identify the environmental and social impacts associated with the construction and operation of a central vaccine cold-chain storage facility at Hulhumale.

The central vaccine cold chain facility at Hulhumale is a six-storey building with a footprint of 500 sqm. The facility will include walk-in coolers, provision for management of waste associated with the Expanded Program for Immunization (EPI) and COVID-19 vaccination program related waste. The facility will have parking space for two refrigerated trucks. Furthermore, the facility will include a 100-person capacity auditorium for trainings to be conducted through the EPI.

Some site-specific and temporary environmental impacts are envisaged during construction and operational phase of the central vaccine cold-chain facility in Hulhumale'. The main impact anticipated for construction phase are from dewatering of groundwater for construction of foundation, excavation, other construction activities, construction equipment and machineries and construction waste.

The operational phase impacts are anticipated from the operation of central vaccine cold-chain storage facility, management of vaccine related waste and transport of vaccines via speed boats and refrigerated trucks procured under the project.

An Environmental Management Plan (EMP) has been proposed which should be included as a part of tender document for construction of the central vaccine cold-chain storage facility. A monitoring plan for the safeguards has also been also prepared. Furthermore, a stakeholder engagement plan and a two tier grievance redress mechanism will be adopted.

The project is expected to have environmental impacts which are site-specific which can be managed through monitoring of implementation of the prescribed mitigation measures. These environmental impacts outweigh the positive impacts on the health, safety and wellbeing of the general population of Maldives. Hence, findings of this IEE justifies the project to proceed as proposed.

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I. INTRODUCTION

A. Background

1. The Responsive COVID-19 Vaccination for Recovery Project under the Asia Pacific Vaccine Access Facility (APVAX) for US$ 10 million is provided as a grant to the Government of Maldives (GOM). The proposed project will be implemented from October 2022 to December 2025. The objective of the project is to strengthen the cold chain capacity to store, distribute and manage the COVID-19 vaccines and the Expanded Program for Immunization (EPI) program vaccines efficiently in the Maldives.

2. The main project activities include construction of a six-storey central vaccine cold storage facility in Hulhumale' and procurement of 7 speed boats and 2 refrigerated trucks to be utilized in six regional hospitals and in central Male' region.

3. In addition, the project involves establishment of the National Level Data Center for the health sector and ensure to link between the regional public health agencies. This will include procurement of equipment that are required for expanding the server capacity of the data center and the provision of required human resources to design and fix the software-driven wide area networks. The data center will link all islands, atolls, and the Male` region to receive /share health data.

4. Lastly, the project will strengthen the human resource capacity of the EPI and COVID-19 vaccination program through local and international training of existing staff, capacity building workshops and site-visits.

B. Scope and Purpose of the IEE

5. All projects funded by Asian Development Bank (ADB) shall comply with Safeguards Policy Statement (SPS) to ensure that projects are environmentally sound and designed to be constructed and operated in compliance with applicable regulatory requirements and international good practices.

6. The environmental assessment utilized ADB's rapid environmental assessment checklist (Annex 1 and 2). The rapid environmental assessment shows that the construction of central vaccine cold storage facility at Hulhumale' and supply of speed boats and refrigerated trucks for vaccine transport are not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors. Therefore, the Maldives: Responsive COVID-19 Vaccination for Recovery Project under the Asia Pacific Vaccine Access Facility is categorized as B project under the ADB's SPS.

7. A project is classified as Category B project if its potential adverse environmental impacts are less adverse than those of Category A projects. These impacts are site-specific, few if any of them are irreversible and in most cases mitigation measures can be designed more readily than

for category A projects. An Initial Environmental Examination (IEE) is required for Category B projects as per ADB's SPS.

C. IEE Methodology and Approach

8. This IEE has been undertaken by Mr. Hamdhoon Mohamed, Dhoonham Sole Proprietorship, Environmental Consultant on behalf of the Ministry of Health. The Environmental Consultant conducted field visit to the project location to collect the baseline environmental data and to identify potential positive and negative impacts during construction and operational phase of the project.

9. This IEE examines the direct, indirect, cumulative, and induced environmental impacts of the cold chain facility and risks to the physical, biological, socio-economic environment during their construction and operation phases. The IEE process involved a scoping followed by a detailed assessment where necessary of the potential and perceived environmental impacts and risks of the cold chain facility. It also included the identification of mitigation measures and the preparation of an EMP to be implemented by MOH to address the identified impacts and risks during the construction and operation phases.

10. This IEE was prepared to meet the requirements of ADB's SPS and Environmental Impact Assessment Regulation (2007) under the Environmental Protection and Preservation Act (1993) of Maldives. The IEE is prepared based on preliminary studies and shall be updated based on detailed design prior to contract awards. A national environmental screening was done by the proponent of the project and the result of the outcome is attached in the Annex 10. The outcome of the National Environmental Screening process confirms that no EIA nor IEE is required to meet the national environmental due diligence requirements. However, an Environmental Management Plan has to be submitted for clearance from the Environmental Protection Agency before any works commence.

D. IEE Report Structure

11. The IEE report primarily:

i. provides information on the project and its environmental requirements;
ii. provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the project's area of influence;
iii. identifies and assesses potential environmental impacts arising from the implementation of the project;
iv. recommends measures to avoid, mitigate, and compensate the adverse impacts;
v. presents information on stakeholder consultations and participation during project preparation and implementation;
vi. recommends a mechanism to address grievances;
vii. includes an environmental management and monitoring plan; and
viii. provides conclusions and recommendations from findings of the IEE.

85. The IEE report was elaborated based on the findings from field data collection and stakeholder consultation. IEEs and EIAs prepared for

projects of similar nature particularly building construction were reviewed as secondary data sources.

II. DESCRIPTION OF THE PROJECT

A. Objective of the project

13. The main objective of the project is to strengthen the cold chain capacity of the government of Maldives to store, distribute and manage the COVID-19 vaccines and the EPI program vaccines efficiently in the Maldives.

B. Project Outputs

14. The project outputs are:

i. Capacity of vaccine storage and transport system increased;
ii. Information management of the Expanded Program on Immunization for COVID-19 vaccination strengthened; and
iii. Human resource capacity of Expanded Program on Immunization enhanced.

15. **Output 1: Capacity of vaccine storage and transport system increased:** This output intends to strengthen capacity of the EPI and COVID-19 vaccination cold chain facilities in the country. The EPI and COVID-19 vaccination program includes the provision of vaccines to defined age cohorts and provides protection to 10 vaccine preventable diseases and three additional diseases (COVID-19 to defined age cohorts and yellow fever and meningococcal vaccine for travelers over 15 years). The vaccines are stored at the central stores with at least a 6-month buffer stock and distributed to regional centers for ideally managing a 6-month buffer stock and for further distribution of all vaccines to atoll and island levels in the country. The EPI and COVID-19 vaccine coverage in the Maldives is high at 90-95% for all vaccines and are provided via a well-organized institutional structure that is in place both at Male' and across all regions, atolls, island health centres and the private sector.

16. But with the increasing vaccine numbers and volume due to the COVID-19 pandemic and the decision by the Government to decentralize the vaccine storage to the central and the 6 regions, the Government requires to expand and relocate the central vaccine stores to Hulhumale. This output will support the construction of a state-of-the-art, climate friendly vaccine central storage facility with additional space for dry item storage, maintenance unit, office staff, biomedical unit, vaccine waste management, backup data center, staff training and auditorium.

17. This output will also support the EPI and COVID-19 vaccine distribution system in the country with the provision of 7 speed boats, one each to be given to each of the 6 regions and the central Male region and 2 land vehicles (refrigerated trucks) for medical goods distribution and 2 vans (7-seater) for urban health and immunization services in populated larger islands including Male'.

18. **Output 2: Information management of the Expanded Program on Immunization for COVID-19 vaccination strengthened:** This output 2 intends to strengthen the Information Technology capacity of the EPI Program to efficiently manage the EPI program in the Maldives. Immunization is provided to children at all 185 health centers in every inhabited island in the Maldives. These services are recorded in the immunization register at each health center and the immunization is followed up age appropriately. In addition, the EPI vaccine logistics and supply management system is also currently paper based. The data recording of the immunization register is currently paper-based. But the EPI program, in close collaboration with the WHO and the UNICEF are piloting initiative to digitalize the immunization tracking and logistics and supply management of the EPI program. As the JFPR financed, an ADB managed TA grant is supporting the development of the e-health architecture development process, this output will support the establishment of the National Level Data Center for the health sector and ensure to link. This will include procurement of equipment that are required for expanding the server capacity of the data center and the provision of required human resources to design and fix the software-driven wide area networks. The data center will link all islands, atolls, and the Male` region to receive /share health data.

19. The required software to manage the EPI logistics and supply and for EPI and COVID-19 immunization programs are already developed by the WHO and by the UNICEF and are at pilot testing stage.

20. The output 2 resources will also be used to further support the IT program to ensure that the EPI program is digitally linked to the national health data system. Where required, output 2 resources will be used to support the software development. In addition, output 2 will support to digitalizing individual immunization data (public health data) from the health care center to national levels by supporting to procurement of 450 tablets to be distributed to each of the islands, atoll hospitals and regional level hospitals for the public health staff to enter the public health data including immunization data.

21. **Output 3: Human resource capacity of Expanded Program on Immunization enhanced:** This output intends to strengthen the human resource capacity of the EPI program. The EPI Program and the data center each have only less than 2 staff at the national level and utilize shared staff at the regional and atoll levels. The program has created new cadre positions in the past, but due to non-availability of interested candidates, the posts are currently vacant. Therefore, this output will support the program to address this issue both from a long-term and a short-term perspective. The mission agreed to provide 8 contracted staff to the central EPI program, data center and to the bio-medical services unit for 3 years (during project duration) to fill existing vacant positions immediately. To ensure that this intervention will be sustained, the MOH will also be taken to recruit candidates to the permanent staff positions and these candidates will be offered local and international training to encourage retention of these newly recruited staff in these positions.

22. Further, the project resources will be provided to carry out local and international training of existing staff, workshops, site visits and quarterly meetings to review project implementation progress and will also help facilitate the steering committee and donor coordination discussions.

23. This output, will also support to function the Project Management Unit of the project and will recruit project staff and short-term consultants to provide the required expertise in selected areas like gender, environment and social safeguards, waste management etc.

C. Project Rationale

24. The current central location for the vaccine storage for both EPI and COVID-19 vaccine program is in Male' island. This building has been utilized for the purpose of vaccine storage for past 20 years and currently there are visible signs of structural deterioration such as cracks. The figure 1 illustrates the current central vaccine storage location of vaccines in Maldives.

Figure 1: Central Vaccine storage building in Male'

Source: Asian Development Bank.

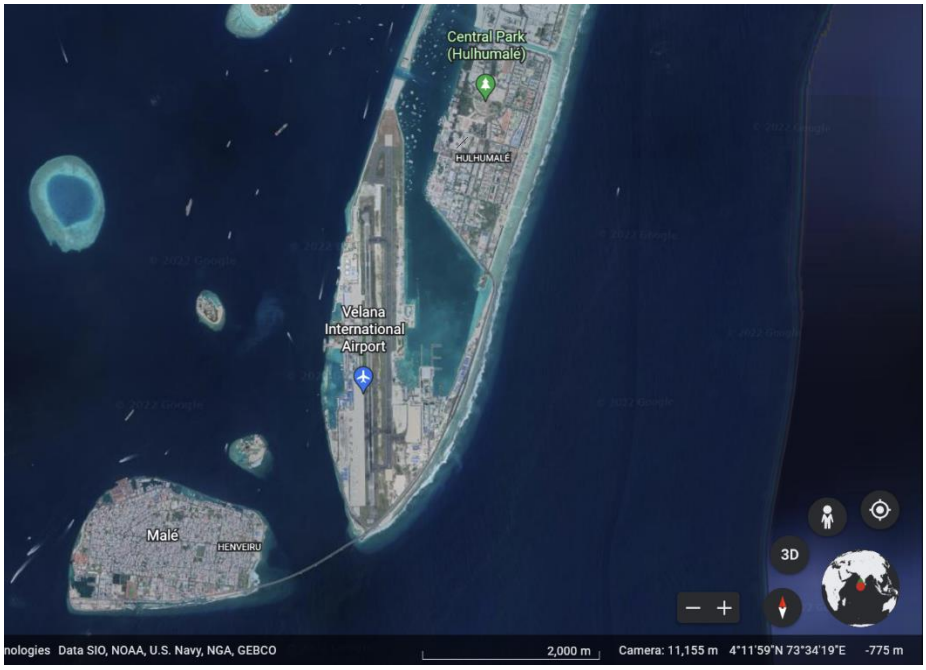
25. The current location of the building is in Male' where the streets are narrow and extremely congested. There are significant challenges in vaccine storage and transportation to regional hospitals and island health centers where the EPI program is implemented.

26. The transport of the vaccine from the central vaccine storage building to other islands are done through a combination of land transportation and private sea boats and ferries. The vaccines are taken to these private boats via vehicles owned by MOH. This incurs significant cost for the GOM to implement the routine EPI and COVID-19 vaccination. Furthermore, these private boats and ferries do not have a proper mechanism to maintain the temperature of vaccine vials which is required for the effectiveness of the vaccine.

27. The project output which will generate the most environmental impacts is the construction of 6-storey central vaccine cold-chain facility at Hulhumale'. All the following sections will be describing information relevant to aforementioned project output.

D. Project Area of Influence

Figure 2: Location of Hulhumale' in Greater Male' Region



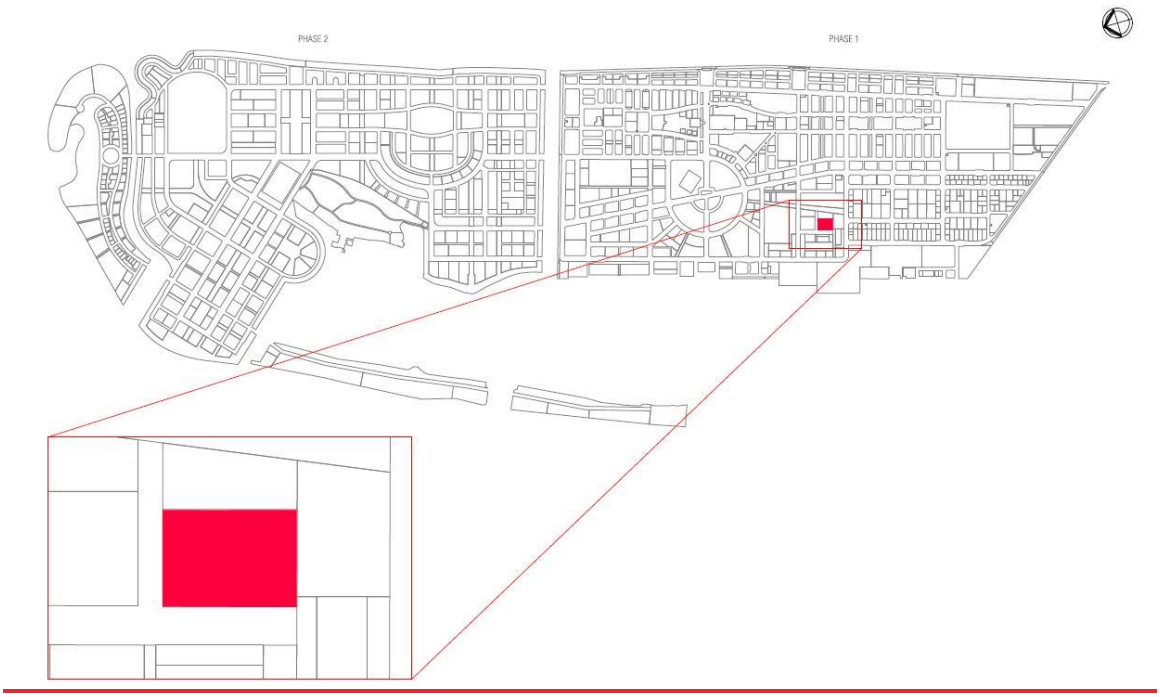
Source: Google map

28. The project is in Hulhumale' island which is a reclaimed island in Maldives since 2005. Hulhumale' is approximately 3.86 km north-east of Male'. Hulhumale' is connected to Velana International Airport and Male' city via the Shinamale' bridge. Hulhumale' is part of the Greater Male' Region for administrative purposes. Figure 2 shows the location of Hulhumale'.

29. The proposed location for the central vaccine cold-chain facility is in the central area of Hulhumale'. Figure 3 indicates the proposed location for the central vaccine cold-chain facility in

Hulhumale'. The geographical coordinates of the proposed location are 4°12'45" N and 73°32'17" E.

Figure 2: Proposed location for the central vaccine cold-chain storage facility in Hulhumale'



Source: Housing Development Corporation Ltd

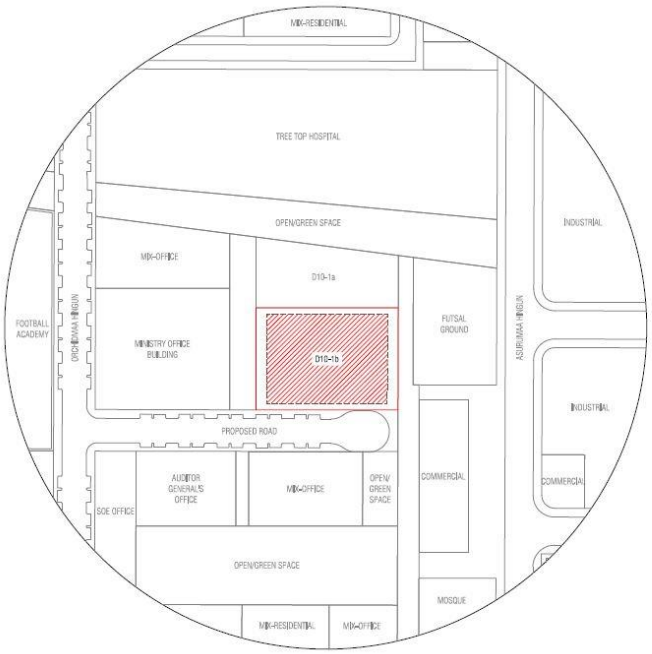
30. The proposed location for the central vaccine cold-chain storage facility is located approximately 60 meters east of the Tree Top Hospital, which is the biggest private hospital in the Maldives. The Tree Top Hospital is located on the northern side of the proposed location. The adjacent plot on the eastern side is currently a construction site where government office buildings are proposed. The western side of the proposed location is a futsal stadium which is currently not being used.

31. The land proposed for the central vaccine cold-chain storage facility is currently owned by the Ministry of Health and has been allocated by Housing Development Corporation (HDC) which is the land management authority for Greater Male' Region including Hulhumale'.

32. The direct influence area of the project which includes an area within the 100m radius of the project site which includes Tree-top Hospital, construction site for government office building and a football stadium.

33. The Figure 4 illustrates the direct area of influence of the project.

Figure 3: Various land use around the proposed location for the vaccine cold-chain storage location in Hulhumale'



Source: Housing Development Corporation Ltd

Figure 4: Area of direct influence of the project

Source: Google map

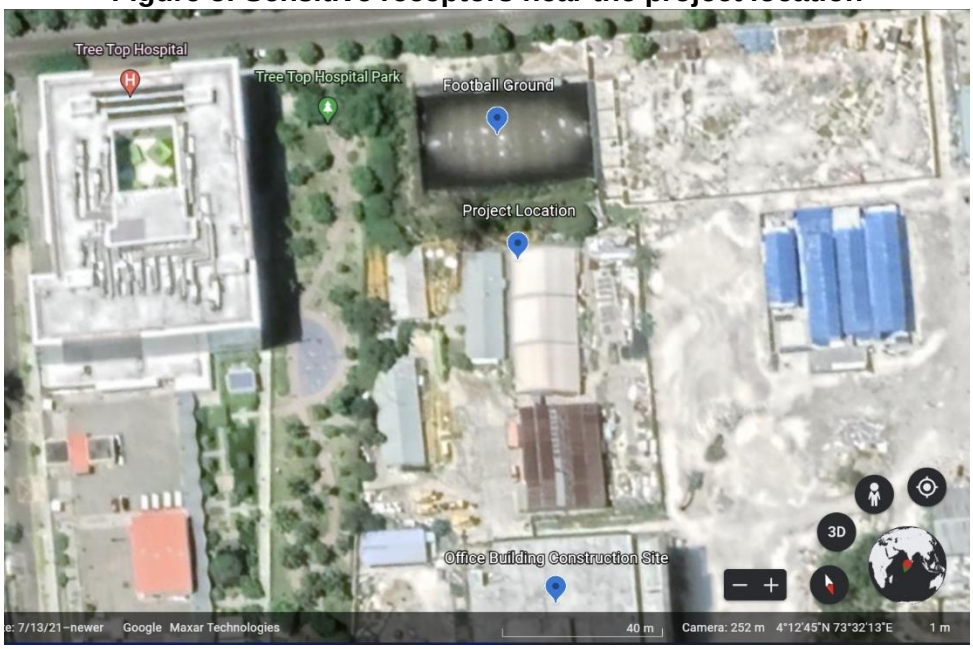
E. Sensitive Receptors near the project site

34. Table 1 enlists the sensitive receptors near the project site based on classification of the value environmental receptors (VERs). Due to the nature of the project activities, only 100 meter circumference from the project location was considered for the analysis. The following Figure 6 illustrates the sensitive receptors near the project location. The figure suggests that there are some structures at the project site. The structures presented were temporary accomodation of the contractor who constructed the nearby Tree Top Hospital. Currently, these temporary structures have been removed and the project location is currently vacant as confirmed during the site visit.

Table 1: Sensitive receptors near the project site

Sensitivity	Receptors	Latitude	Longitude
Extremely Sensitive	Tree Top Hospital (60 m west of the project location).	4°12’42.17”N	73°32’19”E
Highly Sensitive	No residential areas within 100m of the project location).		
Moderately Sensitive	Office building construction site (50 m south of the project location). A football field approximately (30m north of the project location).	4°12’47.00”N 4°12’43.00”N	73°32’19”E 73°32’17”E
Low Sensitive	Industrial Area (The location of the project is within an area allocated for institutional use).		

Figure 5: Sensitive receptors near the project location



Source: Google map.

F. Site Plan and Drawings

35. The total lot size of the plot allocated for the central vaccine cold-chain storage facility is 1,915.54 m^2. However, the space allocated for the central vaccine cold chain storage facility is approximately 957 m^2. The footprint of the building is 500 m^2. The following table 2 shows the area allocated for each of the floor and the allocated uses of each floor.

Table 2: Proposed uses and footprint of the central cold chain storage facility at Hulhumale'

Floor of the building	Footprint	Allocated facilities
Ground Floor	500 sqm	Security, Driver's Room, Loading area, Parking, Waste Collection, Dry Storage, Maintenance room, Generator room, 2 Toilets (Male and Female)
2nd Floor	500 sqm	Vaccine packing, Walk-in Freezer, Storekeeper, Walk-In cooler, Vaccine Consumable Storage, Biomedical office, 2 Toilet (Male and Female).
3rd Floor	500 sqm	Auditorium (100 pax), Training room 1, Training room 2, Training Room 3, Backup Server Room, 2 Prayer Room (Male and Female), 2 Toilets (Male and Female), Pantry
4th Floor	500 sqm	2–8 degree chiller (Pharmaceutical items), -20 to -2 degree freezer (vaccine, injections, and laboratory reagents), Packing and Picking area, 2 toilets,
5th Floor	500 sqm	CMDS logistics office space, Meeting room, Store manager office, 2 toilets, Dispatch Area, Waste auto clave storage room, Sitting area, Rack space for

Floor of the building	Footprint	Allocated facilities
		emergency response items, Room for emergency medicine storage
6th Floor	500 sqm	Terrace

36. The proposed site plan and conceptual drawings for the central vaccine cold chain storage facility in Hulhumale' were compiled by the proponent in close coordination with the Engineering Consultant recruited by ADB for the project development stage.

37. A detailed design will be done by the design and supervision consultancy to be hired by the Project Management Unit for Maldives APVAX project.

G. Major Project Activities during construction phase

38. This section will describe project activities which are anticipated to have a significant impact on the environment.

H. Demolition and site clearance

39. The currently the proposed plot for the construction of central vaccine cold chain storage facility is vacant. There are no requirements for any demolition work. Furthermore, there are no significant vegetation on the proposed plot, hence there will be no requirement for any vegetation clearance as well.

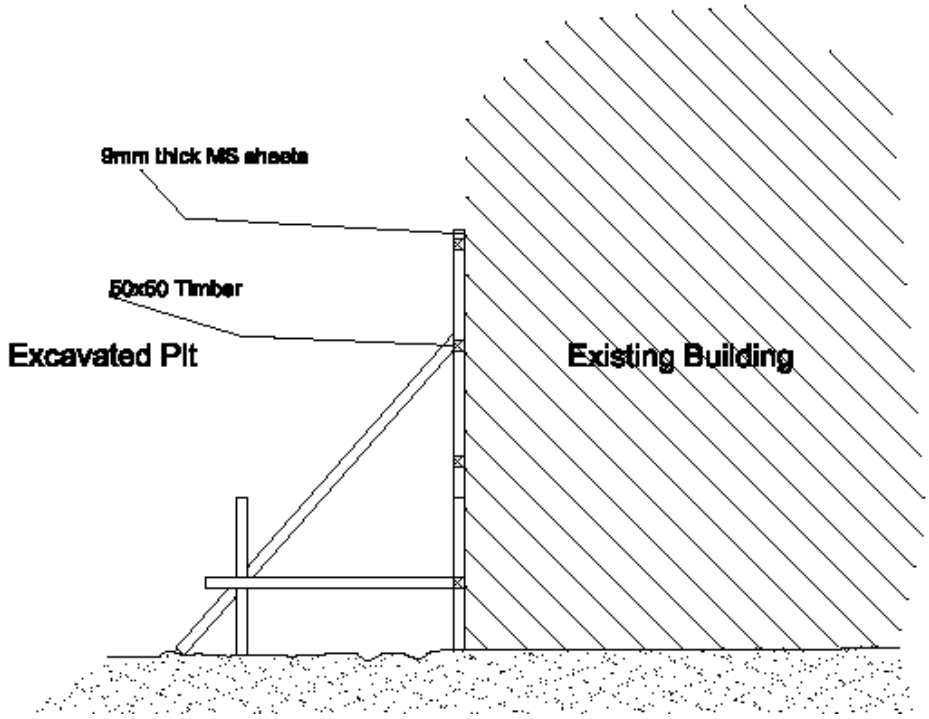
I. Excavation works

40. It has been established that the depth of foundation will be 2 m below the existing ground level. Therefore, maximum depth of excavation will be up to 2.30m. The estimated depth of water table in the area is 1.4m from ground level. As the ground water table is 0.9 m above the proposed foundation depth at nearly all tide levels, dewatering will have to be continuous throughout the period of casting the foundation. Excavation will be undertaken with a backhoe excavator. When all the necessary excavation is complete, a 50 mm thick lean concrete (Grade C15) layer will be laid to provide a level surface to assemble the reinforcement of foundation raft slab and beams.

J. Foundation Protection

41. MS sheets, 9mm thick, are proposed to be hammered into the ground between the proposed and the existing adjacent building wall and 50 x 50 mm MS angle shall be fixed vertically and horizontally at 600 mm intervals. Scaffolding GI pipes, 48mm diameter shall be used at 600 mm spacing to prop the MS sheet wall and the wall shall be braced from all directions. A stepped excavation at 600mm centres shall be done to prevent destabilizing of the soil from underneath the adjacent existing foundation.

Figure 7: Schematic showing typical foundation protection method in place.



Source: Water Solutions Pvt LTD. 2016, Environmental Impact Assessment for proposed 13 storey Building in M. Dhimyaath. Male

K. Dewatering

42. Dewatering is the localized lowering of the groundwater table from its natural level, to create a dry environment for construction works. This is a crucial process for creating the correct working conditions to establish the building substructures.

43. Dewatering will be a continuous process and will be ongoing simultaneously while excavation is being undertaken. The process will be continued throughout until casting of the foundation. It is envisaged that 5 to 6 pumps each with an expected flow rate of 30 liters per second. The wastewater generated during the dewatering process will be released to the existing sewerage network in Hulhumale' which is operated by Male' Water and Sewerage Company (MWSC). It is envisaged that 5 to 6 pumps each with an expected flow rate of 30 liters per second will be used for dewatering. MSWC has the capacity to absorb such volume and it is common practice for MSWC to absorb wastewater generated during the dewatering process in construction projects.

L. Building Foundation

44. For the foundation works, a raft foundation will be used. This is currently the most adopted method of construction in Maldives. It enables to spread the load from a structure over a large area, minimizing the pressure exerted on the base. Beams will then be incorporated into the structure to stiffen the foundation.

45. Excavation in loose sand requires continuous support, and therefore supports will be placed immediately as excavation commences. Sheets would be closely spaced, and horizontal support bracings provided as excavation progresses. Supports and bracings will be placed concurrently with excavation, moving along the periphery of the plot successively. The concrete works for the raft foundation will be done using C30 Grade concrete.

M. Construction materials and machinery

46. All the materials such as cement, aggregate and sand will be delivered to the construction site based on the consumption needs. Steel and plywood will be stored at the contractor's warehouse. Barb bending and carpentry work will be prefabricated at the company work yard or contracted to subcontractors and transported to the site. The quarry material will be purchased from importers such as State Trade Organization (STO). These importers usually import these materials from neighboring countries like India and Sri Lanka. No asbestos-containing materials will be utilized as new construction material.

N. Utilities

47. Water and sewerage facilities will be provided by the MWSC water and sewerage network which is operational in Hulhumale'. Therefore, water will be desalinated water from the main supply. The wastewater generated during the construction and operational phase will be disposed of via the existing sewerage system in the island.

48. Electricity will be provided by STELCO during the construction and operational phase. A Backup generator will be installed for the contingency power supply for the operation of the cold chain equipment as per the requirements of WHO. Frequent backouts are not anticipated in Hulhumale'.

O. Project Management

49. Once the detailed design of the central vaccine cold chain facility is completed, a contractor will be procured based on competitive bidding process by the PMU of the Maldives APVAX project. The contractor will be responsible for all the construction works of the project. Construction works is undertaken entirely in house using company staff of the contractor, most of which are made up of expatriates.

50. All laborers will be accommodated at Company Labor Quarters existing in Male' or Hulhumale'. It is estimated 15–30 laborers will be utilized depending on tasks carried out on site. There will be a consulting engineer hired in addition to an in-house site engineer and site supervisor to manage the project. A full-time health and safety officer will be assigned by the contractor.

51. All operations, work planning for the construction work will be done at onsite. Heavy machinery such as excavator, dump truck, and crane will be used during excavation and casting.

Most of the machineries are rented while some equipment and machinery are owned by the company.

P. Waste Management during construction phase

52. Sand excavated during foundation work will be temporarily stockpiled within the project site. Upon completion of foundation works, sand will be used for back filling.

53. It is estimated that during the construction phase, the project will generate construction wastes around 2–4 tons per day which will be collected on site, transported to the Waste Management Corporation (WAMCO) site at Hulhumale' once a week and finally disposed at Thilafushi. None of the waste will be placed outside the project boundary at any time. Temporary waste storage will be within the project demarcated area.

54. Hazardous waste such as empty oilcans (lube-oil), paint cans or strainers will be kept separate and disposed according to the standards established by relevant government authority.

Q. Road Closure and Traffic Re-routing

55. Hulhumale' being a well-planned city, the proposed location for the central vaccine cold chain storage facility is within an industrial land use zone. There are no major roads adjacent to the project site and the project is not expected to disrupt ingress and egress of the nearby Tree Top Hospital. Hence, no road closure or re-routing of the traffic is expected during the construction stage of the project.

There are two access points to the site. During the time of this report elaboration, two adjacent roads are being constructed by HDC and is expected to be completed prior to the construction phase of the project. The length of these roads is approximately 160m at northern side of the project site and 152m at western side of the project site. These will be used as access roads to other facilities including the adjacent office building which is located within the compound where the project will be located. Based on ADB's definition, these roads are not considered as associated facilities.[1]

R. Work Schedule

56. The project will commence upon completion of the designing stage by the design and supervision consultant of the project. A contract will be hired concurrently during the designing stage.

[1] Per ADB's SPS, associated facilities are projects not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project.

57. A dewatering permit will be applied by the contractor and excavation work will be commenced once the dewatering permit is issued by the Utility Regulatory Authority (URA). The dewatering permit will be issued by URA within a duration of week.

58. Upon completion of dewatering, foundation works will begin and soon thereafter structural works will be carried out. Masonry work and interior works will commence afterwards.

59. The construction of the cold chain facility is expected to be completed within 18 months. A detailed work schedule based on detailed design will be attached to this report.

S. Health and Safety at the project site

60. All precautions will be taken for safety of workers during the construction stage. Barricades, warning signs or devices will be placed on the road during casting or road works (connection of water lines and sewer lines) for safety of pedestrians and vehicles.

61. All workers are given instructions about the health and safety on site. A full-time Environment, Health and Safety Officer will be assigned by the contractor onsite. The Site Engineers and Supervisors will give a brief on daily basis before the work starts to all workers and all proper health and safety precautions will be implemented on site. Safety signs will be used on site, some of which are shown in the following Figure 8.

62. Appropriate personal protective equipment will be provided by the contractor to all the workers, for falling objects, hazardous dust or chemicals, or high working areas and other risks and hazards. All workers and personnel entering the premises will be given hard hats and safety shoes. Emergency response procedures will be established. Emergency first aid kit will be at site for minor injuries. First aid kit will be provided in the temporary office on the ground floor, after completion of ground and first floor slab where all safety clothing and equipment will be held.

63. In the context of the COVID-19 pandemic, all construction works will be carried out following latest national COVID-19 requirements, WHO social distancing and hygiene guidelines, and ADB's Interim Advisory Note on Protecting the Safety and Well-Being of Workers and Communities from COVID-19. A guideline for the workplace safety during COVID19 published by Health Protection Agency (HPA) is attached in the Appendix 12 of this IEE repor

Figure 6: Safety signs to be displayed at the project site

Source: Government of Maldives

T. Accidents and Hazard Scenarios

64. This section is a description of the potential accidents and hazards which may result during the project construction phase and operational phase. The following hazards and accidents assessment is based on the following 3 stages of the building lifecycle, including the construction, use and maintenance of building. Risk levels and probability are qualitatively assessed as High, Moderate and Low as shown in Table 3.

Table 3: Accident and hazard scenarios

Performance Consideration	Risk Level	Risk Probability	Responsible Personnel
Presence of hazardous substances, which impact on construction work e.g., SMF, hydrogen chloride, etc.	High	Low	Project manager, Site Supervisor
Sufficient access / space around new section or building for use of cranes, scaffolding during construction	Moderate	Moderate	Project Engineer

Performance Consideration	Risk Level	Risk Probability	Responsible Personnel
Construction workers will be protected from / proximity to HV electrical, high risk energy sources	High	Moderate	Site Supervisor
Traffic / pedestrian risks are minimized for planned loading & unloading for construction vehicles	High	Moderate	Site Supervisor, Project Manager
Neighborhood construction considerations e.g. school vicinity, site location	Moderate	Low	Project Manager, MHI
Roof design will reduce /eliminate the risk of falls from height during construction	Moderate	Moderate	Project Engineer
Sufficient space is planned for access & to install / major fixed plant or equipment or specialized equipment, plant rooms	Low	Moderate	Project Engineer
Floor loading design has been assessed by engineer to be able to accommodate heavy equipment or plant to be installed in future	Moderate	Moderate	Project Engineer
Floor surfaces – even level with no sudden changes in levels – floor coverings nonslip, suitable for levels of traffic use and suitable for type of tasks to be done	Moderate	High	Project Engineer
Stairs and balcony – edge delineation, slip resistant (SR) stair nosing, construction or design suitable for intended use, handrails, nonhorizontal railings in balcony	Moderate	High	Project Engineer
Window positioning and solar glare	Low	High	Project Engineer
Safe Access to lighting fixtures to change fitting, bulbs	Low	Moderate	Project Engineer
Safe Access to plant rooms – locked, lighting.	Low	High	Project Engineer
Access to roof tops – safe access to within safety zone, minimized manual handling of material, equipment tools.	Low	Moderate	Project Engineer
Accessible window cleaning methods	Low	High	Project Engineer
Accessible gutter cleaning methods	Low	High	Project Engineer
Accessible dirt or rubbish collection points	Moderate	Moderate	Project Engineer Maintenance Officer

U. Major Activities during Operational Phase

65. This section will describe the main activities during the operational phase of the project. They include storage of vaccine, transport of vaccine and other uses of the proposed facility.

V. Storage for COVID-19 and EPI vaccination

66. The vaccine storage for COVID-19 and EPI vaccination will be located in the ground, second and fourth floor of the facility. There will be cold rooms for the installation of walk-in coolers as well as rooms for storage of dry items used for vaccination program.

67. The storage guidelines prescribed in the WHO Guideline for establishing or improving primary and intermediate vaccine stores were followed during the designing of the concept for the central vaccine cold-storage facility in Hulhumale'.[2] Furthermore, the same guidelines will be utilized during the operational phase of the facility.

68. The facility is equipped with back-up generators in case of power failure from the main electricity grid provided by STELCO in Hulhumale'.

69. Once finalized based on detailed design, the floor plan for this storage rooms will be attached as an appendix to this report.

W. Transport of Vaccines

70. The proposed central vaccine cold-chain storage facility will be the main storage for the vaccines in the country. Most of the vaccines are imported to Maldives via air cargo. Due to presence of a link road between the airport and Hulhumale', all the vaccine related cargo will be transported in refrigerated trucks.

71. There are loading and unloading docks in the ground floor of the central vaccine cold chain storage facility which will be used for handling of vaccine during the transportation.

72. There is a parking space within the ground floor of the facility to park the refrigerated trucks. These refrigerated trucks will be procured as part of the project and will be used to transport the vaccines to speed boats for island transfer.

73. The packing of the vaccines for transport to other regional hospitals and health centres will be done at the central vaccine cold chain facility. The vaccine will be transported in ice containers and all the required ice packs will be stored in the facility.

74. The project will follow WHO Guideline for establishing or improving primary and intermediate vaccine stores which has special requirements for refrigerated vehicles. The Guideline requires the following measures: (i) specialized facilities and training are necessary if such vehicles are to be operated safely and effectively, (ii) a refrigerated vehicle must be fitted

[2] Guideline for establishing or improving primary and intermediate vaccine stores.

with a temperature logger, (iii) there should be a weatherproof electrical outlet to power the vehicle's refrigeration unit during loading and unloading operations, and (iv) there should be sufficient space to store delivery crates if these are used in place of cold boxes.

X. Other uses of the proposed facility

75. The facility will have the following provisions apart from the vaccine storage and transport. These include auditorium and break-out rooms for workshop regarding EPI program and other works of Health Protection Agency (HPA), back-up server rooms for data management, office space for EPI program staff, call center or communication room for HPA.

Table 4: Other provisions in the central vaccine cold storage

Floor Number	Uses and Provisions
Ground floor	Security, Driver's Room, Loading area, Parking, Waste Collection, Dry Storage, Maintenance room, Generator room, 2 Toilets (Male and Female)
Second Floor	Vaccine packing, Walk-in Freezer, Storekeeper, Walk-In cooler, Vaccine Consumable Storage, Biomedical office, 2 Toilet (Male and Female).
Third Floor	Auditorium (100 pax), Training room 1, Training room 2, Training Room 3, Backup Server Room, 2 Prayer Room (Male and Female), 2 Toilets (Male and Female), Pantry
Fourth Floor	2–8 degree chiller (Pharmaceutical items), -20 to -2 degree freezer (vaccine, injections, and laboratory reagents), Packing and Picking area, 2 toilets
Fifth Floor	CMDS logistics office space, Meeting room, Store manager office, 2 toilets, Dispatch Area, Waste auto clave storage room, Sitting area, Rack space for emergency response items, Room for emergency medicine storage
Sixth Floor	Terrace

Y. Solar Power in the Central Vaccine Cold Chain Storage Facility

76. To minimize the electricity cost of the facility, an assessment on the potential solar PV rooftop installation will be conducted during the project designing phase. This assessment will determine the roof area available, solar irradiance at site as well as the space available for battery storage. Possible environmental impacts include occupational health and safety risks related to handling and disposal since solar panels may contain heavy metals (i.e., cadmium and lead) which may be harmful if released in the environment. To ensure proper operation of the rooftop solar PV system, regular inspection should be conducted. Regular inspection will ensure that solar panels are clean, free from any damages (i.e., normal wear and tear and corrosion effects), switches and any associated wirings are not damaged, and vents are free from any debris. Environmental impacts will be reassessed once detailed design is finalized.

77. As in all other government buildings in Maldives with solar PV system installations, STELCO will be contacted for necessary operation and maintenance works for the rooftop solar photovoltaics (PV) system installed at the central vaccine cold chain storage facility. On the day-to-day management, existing building maintenance staff of the MOH will be assigned to oversee operations during O&M phase. Mitigating measures are detailed in the Environmental Management Plan and may be updated based on detailed design.

Z. Waste Management during the operational phase

78. The central vaccine cold chain storage facility will have dedicated room in the ground floor for waste storage and collection and in the fifth floor for vaccination related waste management. The waste management room on the fifth floor will be equipped with autoclaves, shredders, chemicals for disinfection. Only vaccine-related waste within the facility (such as expired vaccines) will be treated on-site.

79. The Standard Operations Procedure (SOPs) for Waste Management of used COVID-19 vaccines vials and ancillary supply and WHO guidance on Safe Management of Waste from Health Care Facilities will be followed during the operational phase. The SOP is attached to the Appendix 8 of this report.

AA. Project Inputs and Outputs

80. This section discusses the project inputs and outputs in terms of type of the resource, the quantity of the resource required and the main sources which the resource is obtained.

Table 5: Main project inputs for the construction of central vaccine cold chain storage facility in Hulhumale'

Input resource(s)	Estimated Quantity	Main sources of resource
Construction workers	1 Project Manager 1 Project Engineer 1 Consultant Engineer 1 Local Supervisors 20 Skilled Foreign Laborers 10 Non-Skilled Laborers 3 Security Staff (24 Hours security)	Contractor's permanent staff. Project staff. Labor is expecting mostly registered workers from Bangladesh.
Machinery and equipment	Excavator Concrete Mixer Dump Truck Crane	Sourced from local rentals.
Energy supply (during construction)	30kW	From STELCO mains
Backup energy supply (during operations)	100 kW	Contractor's own equipment

Input resource(s)	Estimated Quantity	Main sources of resource
Cement (Ordinary Portland cement)	5,000 bags	Procured from local supplier
Sand	12,500 bags	Imported from abroad
Aggregates	20,000 bags	Imported from abroad
Plywood (12mm thick),	1250 No.	Procured from local supplier
Timber (Hard wood)	7500 No.	Procured from local supplier
Steel	85 tons	Procured from local supplier
Painting Exterior (Seamaster, or Equivalent Emulsion) Interior (Seamaster or Equivalent Emulsion)	Not yet determined	Procured from local supplier
Masonry Blocks (300x150x150)	65,000 No.	Procured from local supplier
Hydraulics and Drainages	All the UPVC pipes and fittings shall be used high pressure pipes.	Procured from local supplier
Tiling materials	General Floor – 600x600mm Homogeneous tile. Toilet floor – 200x200mm Nonslip Ceramic tile. Toilet wall – 200x300mm Ceramic tile.	Procured from local supplier

81. The main project impacts for the construction and operational phase of the central vaccine cold-chain storage facility at Hulhumale' are presented in Table 6.

Table 6: The main project impacts during the construction and operational phase of the project

Project impacts	Method of generation or quantity	Description
Noise	Localized to the project site	Unavoidable, but could be minimized by limiting working hours to daytime only and completing the project within the earliest possible duration.
Air quality	Minor amounts	Unavoidable, but could be minimized by limiting working hours to daytime only and completing the project within the earliest possible duration.

Project impacts	Method of generation or quantity	Description
Waste generation during operation	Waste generated from EPI program and domestic waste	Unavoidable, creating awareness would ensure reduction of waste generation within the site
Wastewater and sewerage during operation	Collected in septic tank and then connected to MWSC sewer network	Unavoidable

III. ANALYSIS OF ALTERNATIVES

82. This section of the report contains the alternative means for the project in terms of no development option, alternative foundation for the building and alternative location. All the discussions will be focused on the construction of the central vaccine cold chain storage facility in Hulhumale'.

A. The "No Development" option

83. Initially the no development option is discussed to hypothesize whether the project should be taking place first. Sometimes, projects are proposed without much thought given to the socio-economic motivation of such development and the unnecessary impacts it may have on the environment, especially those that are long term. Therefore, carrying out this exercise is important to avoid such a scenario and to ensure that undertaking this project at this stage makes good socio-economic sense without any significant impact on the environment.

84. The following are advantages and disadvantages of "no development" construction of central vaccine cold-chain storage facility in Hulhumale'.

Table 7: Advantages and Disadvantages of No development option

Advantages	Disadvantages
Will not contribute to groundwater degradation	Will be unable to store vaccines for EPI and COVID19 vaccination program in a proper manner.
Will not lead to health and safety concerns at project site	Will be unable to alleviate the challenges in vaccine transport across the country.
Will not contribute to structural issues of neighboring buildings.	
Will not cause any noise and air pollution at project location	

85. A comparison of the no project option with the project going ahead as proposed, indicate that the no-project option is practicable, and environmentally favorable but involves massive losses to the proponent and public of Maldives. A successful public health program such as EPI program implementation is crucial for the well-being of public.

86. There are a few advantages of the no project option from an environmental perspective. However, local environmental impact from this project is site-specific and temporary in nature, and the advantages stated is not significant since most of the environmental impacts can be properly mitigated. Alternatives for components of the project are discussed further.

B. Alternative location

87. Alternative locations are not as important for this project, as the location cannot be changed under any circumstances. The plot proposed for the construction of central vaccine cold-chain storage facility is allocated by HDC to the proponent and due to land scarcity in Hulhumale' an alternative location is not possible for consideration.

C. Alternative source of power for operations

88. Renewable energy in the form of the Solar Photovoltaic (PV) will be utilized to reduce the dependency of the electricity from the existing grid. Table 8 provides advantages and disadvantages of renewable sources of power.

Table 8: Alternatives Sources of power for operation of facility

Power Sources	Advantages	Disadvantages
Renewable source of energy (Solar Photo Voltaic (PV) system)	• GHG emission reduction • Less vulnerability to fluctuation on fossil fuel prices • Relatively low operational cost	• High capital cost • Roof area cannot be used for rainwater harvesting • Requires batteries for nighttime operations.
Nonrenewable sources of energy (diesel power generation)	• Lower capital cost • More reliability • Can be connected to existing electricity infrastructure	• Potential oil spill risk • GHG intensive • Contribute to poor air quality

D. Policy, legal and administrative framework

89. This section of the report will discuss the national legislative and policy framework, multilateral environmental agreements, and requirements under the ADB SPS.

E. National Legislative and Policy Framework

1. Environmental Protection & Preservation Act (Law no. 4/93)

90. The Environmental Protection & Preservation Act of the Maldives (EPPA) provides the legal basis for environmental management in the Maldives including the environmental impact assessment (EIA) process in the Maldives. The EIA process in the Maldives is currently implemented by the Environmental Protection Agency (EPA) which is under the umbrella of the Ministry of Environment, Climate Change and Technology (MECCT).

91. The main clauses of the Environmental Protection & Preservation Act which is relevant for the proposed construction of vaccine cold chain storage facility in Hulhumale' include the following;

i. Clause 2 of the EPPA mandates the Ministry of Environment and Energy to formulate policies, rules and regulations regarding the environment;
ii. Clause 5 of this Act specifically provides for environmental impact assessment (EIA), a tool implemented to attempt to integrate environmental issues into development decisions. According to the Clause, environmental impact assessments are a mandatory requirement for all economic development projects;
iii. Clause 6 of the EPPA gives the Ministry of Environment and Energy the authority to terminate any project that has an undesirable impact on the environment;
iv. Clause 7 of the EPPA refers to the disposal of oil, wastes, and poisonous substances into the Maldivian territory. According to this clause, any type of waste, oil, toxic gas or any substance that may have harmful effects on the environment should not be disposed within the Maldivian territory. If, however, the disposals of such substances become necessary, the clause states that they should be disposed only within the areas designated for that purpose and if incinerated, appropriate precautions should be taken to avoid harm to the health of the population.

Applicability to the proposed project

92. An environmental screening was conducted to determine whether an environmental assessment was required for the project. There is no requirement for an Environmental Impact Assessment (EIA) nor an IEE for the proposed project. However, an EMP is required by EPA before any works commence.

93. The project is expected to generate waste and other environmental impacts, hence adhering to the EPPA is mandatory to ensure addressing environmental impacts caused.

2. Law on public services (Law no. 4/96)

94. Under this law, the public services are electricity, telephone, water, and sewerage services. Relevant articles under this law pertaining to the proposed project are: -

i. Article 3 states that any party can provide general public services only after getting registered in the competent authority and according to its regulations;
ii. Article 4 states that any public service must be provided after a contract agreement has been made between the service provider and the customer. The agreement must be made according to the regulations put forward by the competent authority;
iii. Article 5 states that a transfer of service between customers must be made only after a contract has been made between the customers according to the service providers regulations. If the customer fails to comply with the agreement, the service provider can discontinue service only after approval from competent authority;
iv. Article 7 states that the service provider can permanently discontinue its services according to regulation mentioned in article 3 of this law. However temporary

discontinuation can be made after giving prior notification to the customers and according to the agreement made between the service provider and the customer;

v. Article 8 states that the tariffs for the services must be approved from the competent authority prior to implementation. Further, any amendments to tariff structure also must be approved from the competent authority before implementation; and
vi. Article 9 states that any damage made to service provider's facilities by anyone, he can be charged with 10 prison penalty or banishment. Further, any action against this law (excluding what is mentioned in article 9 (a) of this law) can be charged between MVR 100 to MVR 5000 by the competent authority.

Applicability to the proposed project

95. The utility service provider shall provide its services upon registration at those authorities. Since water and electricity requirement is essential in operating the project, the facility shall adhere to the conditions set by authorities as mentioned in this act.

3. Employment Act

96. The Employment Act of the Maldives was ratified in 2008, with the overall aim to determine the fundamental principles relating to the employment in the country. Through this act two central institutions are formed. They are Labour Relations Authority and Employment Tribunal. According to this Act, Employment Agreement is a legal requirement for any work undertaken unless otherwise indicated in the Act.

Applicability to the proposed project

97. The project involves employment of staff during the construction and operation phase. Hence, the responsibilities and rights of all parties (both the employee and the employer) have to be protected as per the provision under this legislation.

4. Public Health Protection Act (Law no. 7/2012)

98. The public health protection act of Maldives was ratified in 2012 and first amendment was brought to the act in 2020. The Act prescribe the mandate of HPA and have provision the following provisions;

i. Communicable disease
ii. Non-communicable diseases
iii. Environmental Health
iv. Public Health Risks and Hazards
v. Food Safety
vi. Water Safety
vii. Sanitation and waste management
viii. Public Health Emergency

99. The public health protection act provides Director General of Public Health authority to declare public health emergency which was essential for infection control during the COVID-19 pandemic.

Applicability to the project

100. The project is proposed to improve the function of HPA in carrying out the task outlined in this Public Health Emergency Act.

5. Utilities Regulatory Authority Act

101. This Legislation establish a Utility Regulatory Authority (URA) which will be mandated with regulation of waste management sector in the Maldives. Furthermore, waste management facilities need to obtain operational permits from URA prior to any operational works.

Applicability to the project

102. The dewatering permit and concept approval for solar PV installation required for the project will be obtained from URA prior to commencement of these works.

6. Water and Sewerage Act (Law no. 08/2020)

103. The Water and Sewerage Act is aimed to regulate the water and sanitation sector in the Maldives. The legislation also have provisions to protect the groundwater resources in the Maldives and prohibit extraction of groundwater or activities which may contaminate ground water.

Applicability to the project

104. The proposed project will comply with all the provisions of this Act. Mitigation measures have been proposed to minimize and mitigate the impacts on the groundwater. While there are no international regulations on vaccine storage, the storage guidelines prescribed in the WHO Guideline for establishing or improving primary and intermediate vaccine stores will be followed in the design of the central vaccine cold-storage facility in Hulhumale.' The WHO Guideline has provisions for drainage and water supply systems within the facility.

F. Relevant Regulations

1. Environmental Impact Assessment Regulation (2007) and subsequent amendments

105. The Environmental Impact Assessment Regulation 2007, which came to effect in 2007, has been revised and published as Regulation on the Preparation of Environmental Impact Assessment Report 2012 in 8th May 2012 (2012/R-27). The regulation is formulated under the Environment Protection and Preservation Act 9 (EPPA 4/93). The purpose of this regulation is to provide a step-by-step guidance for proponents, consultants, government agencies and public on how to obtain approval for a development proposal.

106. Schedule D of the Regulation on the Preparation of Environmental Impact Assessment Report 2012 has stated a list of development proposals requiring an Environmental Impact Assessment study, which includes sewerage projects. Hence, this EIA report is subjected to the Regulation on the Preparation of Environmental Impact Assessment Report 2012 and follows the guidelines and procedures provided in the regulation. Since 2013 till date, 5 Amendments were made to the 2012 EIA regulation. Table 9 summarizes the major amendments to the EIA Regulations.

Table 9: Subsequent amendments to the Environmental Impact Assessment Regulation

Regulation number	Date of Amendment	Amended Articles	Remarks
2013/R-18	9 April 2013	Article 13 and 20	Procedural amendments
2015/R-174	30 August 2015	Article 4, 7, 8, 9, 10, 11, 13, 14, 17, 18, and 20	Shift of tourism-related mandates to Ministry of Tourism Procedural amendments
2016/R-66	11 August 2016	Article 5, 6, 10, 11, 13, 14, 15, 16, 17, 18, 19 and 20	EPA tasked with all EIA regulation works Procedural amendments including EIA Consultant categories, qualifications.
2017/R-7	19 January 2017	Schedule U	Projects that are exempted from conduct of an EIA.

Applicability to the proposed project

107. The project is expected to generate environmental impacts, hence environmental screening is essential in identifying the environmental assessment to be undertaken. An environmental screening was undertaken by applying to EPA. A Decision Statement was issued by EPA which is included in the Appendix 10 of this report.

2. Waste Management Regulation

108. Waste Management Regulation (2013/R-58) is formulated under the Environment Protection and Preservation Act (Law number 4/93) and was published in 2013. The key purposes of this regulation as stated in the regulation are to;

i. Minimize the direct and indirect negative impact caused to human health and environment due to waste.
ii. Compile the national standards to be maintained in relation to waste management in the Maldives.
iii. Establishing and environmentally friendly, safe and sustainable waste management system through an integrated waste management structure.

iv. Implementing polluters pay principle, and
v. Introducing extended producer responsibility.

109. This regulation provides the standards for the following waste management activities;
i. Waste collection.
ii. Land and sea transport of waste.
iii. Waste treatment.
iv. Waste storage.
v. Management of waste disposal centers.
vi. Landfilling.
vii. Hazardous waste management.

110. Waste generated in the islands of Maldives should be disposed only in areas that are designated and authorized for the purpose by the implementing agency. Dumping of any waste in unauthorized and protected areas under any circumstance is prohibited by the regulation.

111. Protected areas declared under Environment Protection and Preservation Act (Law number 4/93)
i. Mangroves, wetlands, and marshes.
ii. Lagoon area of islands
iii. Reefs.
iv. Lagoons.
v. Sandbanks.
vi. Beaches of islands.
vii. Vegetation line of islands.
viii. Parks
ix. Roads.

112. Dumping of waste or littering to places other than areas authorized by the implementing agency is considered as an offence under the regulation. The list of waste management activities that requires permission from the implementing agency and the procedure for obtaining the permission are specified under the Article 16 of the regulation. Penalties for breaching the guidelines specified in the regulation are stated under the Article 34 of the regulation.

Applicability to the proposed project

113. The project is expected to generate waste, therefore safe disposal of water accumulated during construction and operation at the facilities need to be comply with this regulation. All the waste will be handled and managed according to the guidelines prescribed in the Waste Management Regulation.

3. Regulation for the determination of penalties and obtaining compensation for damages caused to the environment

114. This regulation (2011/R-9) is formulate under the Environment Protection and Preservation Act of the Maldives (Law number: 4/93) and came to effect in 2011. The objective

of the regulation as stated in the regulation is to stop violations of Act 4/93; to prevent the repetition of such violations; to penalize and obtain damages caused to the environment.

115. According to the Article 7 of the regulation, if an incident occurs while conducting a project or other work, that is likely or estimated to cause damage to the environment, proponent or in charge of the project should report to the implementing agency and should take immediate action to stop the damage or cause of the damage.

116. Under the Article 14 of the regulation, any party, from whom the implementing agency requires information relating to an investigation or for other purposes of this regulation, should provide such information.

117. The schedules of the regulation describe the factors to consider when determining the fine to be charged on a party causing damage to the environment and formula to measure the magnitude of the damages caused to the environment.

Applicability to the proposed project

118. The project is expected to cause environmental impacts such as waste, management of sanitation facilities. Even though mitigation measures are proposed in this IEE, environmental damage may occur due to accidents. This project will be subjected to liabilities if ineffective implementation of mitigation measures leads to detrimental effect on the environment.

4. Healthy and Safety Regulation in Constructional Projects (2019/R-156)

119. The aim of this regulation is to enforce adequate health and safety environment during constructional activities in the Maldives. This regulation also mentions penalties associated with violation of any articles of it. As part of this regulation the contractor shall prepare a handbook on health and safety of the project and ensure the workers or labors informed about the handbook.

Applicability to the proposed project

120. Since the project involves constructions, the constructional environment should maintain the requirements of health and safety measures at the site as mentioned in this regulation. The Environmental Management Plan (EMP) is prepared in accordance to the regulations.

G. Regulations on Construction Contractors

121. Under the regulation all contractors working in the construction industry are to be registered. The regulation includes the requirements of contractor's registration, grading, implications on participating in international tenders, insurance, project licenses, Joint venture registrations, responsibilities of the registered contractors and applicable fine for breaching the regulation.

Applicability to the proposed project

122. Since the project involves construction contractors, hence all the contractual works should be guided by the regulations.

H. Relevant Guidelines

Maldives Building Code

123. Maldives Building Code Handbook was published in 2008. The purpose of the document is to set performance standards for buildings to ensure that:

i. People who use buildings can do so safely and without endangering their health
ii. Buildings have attribute appropriately to the health, physical independence, and wellbeing of the people who use them
iii. People who use buildings can safely evacuate from the building as and when necessary, and
iv. Buildings are designed, constructed, to enable it to be used in ways that promote sustainable development.

124. This code consists of two general clauses outlining classified building uses and interpretations and 35 technical clauses which cover aspects such as structural stability and durability, fire safety, access, moisture control, safety of users, services and facilities and energy efficiency.

Applicability to the proposed project

125. The building constructed for the proposed vaccine cold chain storage facility will meet the requirements of building code.

I. Relevant Guiding Policies and Documents

1. Strategic Action Plan 2019–2023

126. The Strategic Action Plan (SAP) of the Government of Maldives is a central policy framework and planning document that guides the overall development direction of the Maldives for the next five years. The SAP consolidates the current Government's manifesto pledges with existing sectoral priorities. The SAP serves as the main implementation and monitoring tool to track the progress of the delivery of the Government's policies and development priorities. The SAP is formally rolled out into the line ministries' day to day operations from 1 October 2019. The SAP consists of 5 Sectors and 33 subsectors. The project specifically falls under 4th Sector "Jazeera Dhiriulhun", subsector 4.6 water and sanitation. Wherein the first policy is to "Ensure access to safe water supplies and adequate sewerage services."

Applicability to the proposed project

127. The SAP outlines on the policy for management of migrant workers in the country. Hence, throughout the implementation of this project, it would contribute to achievement of the SAP goals in the sector.

2. National Water and Sewerage Policy

128. The National Water and Sewerage Policy (NWSP) articulates priorities for the sector. The primary focus of the sector is enhancing the livelihoods of all Maldivians by providing access to safe water and sewerage facilities. The NWSP presents a set of 9 goals and associating objectives and strategies that give precedence to ensuring access to safe water and sewerage services for all. In addition, it emphasizes developments to the sector through research, capacity building, and strengthening of the legal framework, increasing public awareness and water resources protection. Furthermore, developing appropriate infrastructure models to promote financial sustainability to provide water supply and sewerage services are also given prominence.

Applicability to the proposed project

129. The NWSP outlines on the policy for adequate and sustainable management of water and sanitation in the country. One of the possible environmental impacts associated with the project during the operational stage is effective management of sanitation facilities. Hence, the project implementation needs to adhere to the policy guidelines set out in the NWSP.

3. National Solid Waste Management Policy

130. A national policy for the proper management of waste in the Maldives was formulated and published in 2008. This policy guideline applies to all people and to all community, government agencies, industrial and commercial activities undertaking in the Maldives.

131. National Solid Waste Management Policy consists of the following 11 policies:

i. Establish a governance structure for solid waste management which will distribute clearly delineated roles and responsibilities for solid waste management at island, regional and national levels will be established
ii. All waste producers have a duty to manage the wastes they generate
iii. Wastes will be managed and disposed as close as possible to the place of their generation
iv. The waste management system will accommodate the specific requirements of special wastes
v. Waste management planning will be based on verifiable facts and known effective strategies
vi. The waste management system will be financially viable
vii. Consolidated legislation will be introduced to support the implementation of the policy
viii. Private sector participation (PSP) will be facilitated where it is financially viable for both the government and the private sector
ix. Financial incentives and disincentives will be pursued to support good waste management practices
x. Goods that are harmful to the environment or cause public nuisances and unacceptable waste activities will be discouraged
xi. The community participation in and awareness about good waste management practices will be maximized

Applicability to the proposed project

132. Management of waste during construction and operation of the facilities is identified as one the key environmental mitigation measures. Hence, the mitigation measures need to be followed in accordance with the waste policy outlined above.

4. Maldives Climate Change Policy Framework

133. Maldives Climate Change Policy Framework (MCCPF) was the first climate policy launched in 2015. The aim of the policy was to share government priorities for the sector and ensure proper governance mechanism is established. The policy rests on five policy goals which focus on climate financing, mitigation actions, adaptation opportunities, advocacy and capacity building and fostering sustainable development. The vision of the MCCPF is "To recognize the status of Maldives as a nation suffering from the adverse impacts of climate change and built its capacity to ensure a safe, sustainable, resilient and prosperous future". The main policy goals are;

i. Policy 1: Ensure and integrate sustainable financing into climate change adaptation opportunities and low emission development measures
ii. Policy 2: Strengthen a low emission development future and ensure energy security for the Maldives
iii. Policy 3: Strengthen adaptation actions and opportunities and build climate-resilient infrastructure and communities to address current and future vulnerabilities
iv. Policy 4: Inculcate national, regional and international climate change advocacy role in leading international negotiations and awareness in cross-sectorial areas in favor of the most vulnerable and small island developing states
v. Policy 5: Foster sustainable development while ensuring security, economic sustainability, and sovereignty from the negative consequences of the changing climate

Applicability to the proposed project

134. Climate change remains a cross cutting issue within all development issues. Hence, care must be taken to ensure their measures are addressed to introduce climate solutions in designing and construction of the facility.

5. Permits required and obtained

135. The following permits are required as per the above discussed regulations. The following table 10 provide information on the required permits relevant authorities and status of application. These permits need to be obtained by the proponent prior to initiation of any construction work. The Project PMU in collaboration with relevant department of MOH will be responsible for obtaining these permits.

Table 10: The permits required for the project

Name of Permit	Relevant Authority	Timeline for permit application	Current status
Project Development Concept	Ministry of National Planning, Housing, and Infrastructure (MNPHI)	Prior to the construction phase before the detail design is completed by the consultancy firm for designing and supervision of construction works.	ADB consultant team and MOH are designing the concept design and will apply as soon as completed.
Environmental Screening	Environmental Protection Agency (EPA)	Environmental Screening application has been done prior to this IEE report disclosure.	Completed
Construction Permit	Ministry of National Planning, Housing, and Infrastructure (MNPHI)	Prior to construction stage after completion of detailed design.	Pending
Dewatering Permit	Utility Regulatory Authority (URA)	Prior to any dewatering works during excavation for foundation.	Pending
Concept of Solar PV installation	Utility Regulatory Authority (URA)	Prior to any deployment of Solar PV installation	Pending
Permit for back-up generator sets	Utility Regulatory Authority (URA)	Prior to operational phase of the project	Pending

J. Relevant International Conventions, Treaties and Protocols

United Nations Convention on Biological Diversity

136. The main objectives of the Convention on Biological Diversity (CBD) are conservation of biological diversity, sustainable use of the components of biological diversity and fair and equitable sharing of the benefits arising out of the utilizing of genetic resources. Maldives is a member of the convention since it entered into force on 29 December 1993. All the necessary guidelines will be followed, and proper steps will be taken to ensure the project activities poses minimum negative impacts on the biodiversity.

Applicability to the proposed project

137. Maldives is a party to CBD hence, any project implemented in the country should be in line with the main objectives of the CBD.

K. United Nations Framework Convention on Climate Change

138. The main objective of this convention is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. Convention entered into force in 1994. This convention was complemented by the Kyoto Protocol, a legally binding treaty under which member countries have committed to reduce their emissions

by an average of 5 percent by 2010 against 1990 levels. UNFCCC encourages all its member countries to take action to prevent and limit further climate change by developing, gathering and sharing information on greenhouse gas emissions, national polices and best practices and to protect and adapt to the impacts of climate change by launching national strategies.

139. The Paris Agreement formed under the UNFCCC to enhance the objectives of the convention. The aim of the convention as described in Article 2 of the treaty is "enhancing the implementation" of the UNFCCC through:

i. Holding the increase in global average temperature to well below 2° C above pre-industrial level and to pursue efforts to limit the temperature increase to 1.5° C above pre-industrial levels, recognizing that this would significantly reduce the risk and impacts of climate change;
ii. Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and lower GHG emissions development in a manner that does not threaten food production; and
iii. Making finance flows consistent with a pathway towards low GHG emissions and climate resilient development.

Applicability to the proposed project

140. Maldives is a party to UNFCCC hence, any project implemented in the country should be in line with the main objectives of the UNFCCC.

L. Sustainable Developed Goals

141. In 2015 the world leaders agreed towards a new international development agenda known as 2030 Agenda for Sustainable Development: Sustainable Development Goals (SDGs). This new international agenda is a successor of the Millennium Development Goals which was agreed in year 2000. The SDGs comprise of 17 goals.

Applicability to the proposed project

142. SDG covers full range of the development spectrum to ensure sustainable development. Hence projects implemented at global, regional, or local level needs to contribute to the implementation of 17 SDG goals.

M. Safeguards Requirement of ADB

143. All the projects that are undertaken with assistance from ADB (grants, loans, or technical assistance) is mandated to follow on the 2009 ADB Safeguard Policy Statement (SPS). The primary aim of SPS is to ensure that projects or program undertaken by ADB are environmentally and socially sound. Specifically, the objectives of ADB's safeguards are to: (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers or clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

144. ADB's SPS (2009) has three safeguard areas: (i) environment, (ii) involuntary resettlement, and (iii) Indigenous Peoples. Furthermore, all projects are screened by ADB and categorized based on the anticipated level of likely environmental impacts. Table 3 shows environmental categorization of the projects.

Table 11: Environmental categories of the projects in ADB's SPS (2009)

Category	Rationale	Expected Environmental Reporting
A	Project with significant adverse environmental impacts that are reversible, diverse, or unprecedented. Impacts may affect an area larger than the sites or facilities subject to physical works.	EIA is required
B	Projects with potential adverse environmental impacts that are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects.	IEE required
C	Project with no or minimal environment impacts	No environmental assessment is required although environmental implications need to be reviewed.

145. Due to the nature and small scale of this project, the project has been classified as category B for environmental safeguard project. In this case an IEE is required.

N. Environmental Standards

146. **Environmental Standards.** Following the requirements of ADB SPS, the project shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the government regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS. See Appendix 3 for standards to be applied.

O. Assessment of institutional capacity of borrower in complying to national laws and ADB requirements

147. The Ministry of Health being the implementation agency of other donor funded projects have the capacity to complying with donor safeguard policies and national laws and regulations. MOH will implement the monitoring plan prescribed in this IEE report need to be implemented as per the ADB SPS.

148. MOH lacks significant experience in environmental monitoring works hence, it is suggested that capacity building of the Project Management Unit (PMU) staff and other staff working on the project is strengthened.

149. A dedicated PMU staff for implementation and monitoring of the environmental and social safeguards measures will be recruited during the project implementation period. Upon completion of the project, civil service staff of MOH will be trained on monitoring and implementation of EMP and they will conduct the monitoring works during the project operational phase.

P. Existing environment at project location

150. This section of the report will describe the existing bio-physical and socio-economic environment at the project location. On the bio-physical environment, parameters analyzed include air quality, water quality, noise level and ecological features. Information extracted from published data has been used to describe the climatic conditions and socio-economic conditions in the project location.

Q. Field Data Collection

151. Field data collection was conducted during March and April 2022. Ambient Air quality was determined using a Temtop M2000C Air Quality Monitor. The water quality was determined through collection of groundwater samples in bottles and conducting water quality testing from MWSC laboratory. Noise level were determined using a Type two sound meter. For ecological features, visual field observations were made. The figure 9 illustrates the sampling locations within the project location. The table 12 include the GPS coordinates of the sampling locations. These locations were selected

152. All the measurements taken during the field data collection is aimed to establish a baseline for the future environmental monitoring works. The same parameters have been prescribed in the Environmental Management Plan of this report.

Table 12: Detailed Information on the sampling location and their significance

Water and Air Quality Sampling Stations	Latitude	Longitude	Significance	Rationale for Selection
WQ01	4°12'48.17"N	73°32'20.77"E	Location for water sample	Only existing well within the project location
AQ01	4°12'44.60"N	73°32'17.98"E	Location for Ambient Air Quality 1 Noise Level Measurement 1	Location closest to road and football ground

AQ02	4°12'45.40"N	73°32'18.34"E	Location for Ambient Air Quality 2 Noise Level Measurement 2	Location closest to Tree Top Hospital (Highly Sensitive Receptor)

WS = water quality; AQ = air quality

Figure 7: Sampling location within the project location

Source: Google map.

R. Ambient Air Quality

153. The parameters analyzed were particulate matter less than 2.5 µm ($PM_{2.5}$), particulate matter less than 10 µm (PM_{10}), particles per liter and carbon dioxide (CO_2). For the air quality measurements averaging time of 24 hours was used.[3] The following Table 13 includes the air quality measurements.

[3] WHO standard for ambient air quality.

154. The measurements for the air quality suggest that all parameters are within the acceptable range according to the standard to be followed. A detailed information on the environmental standards to be followed by the project is attached in the Appendix 3 of this report.

Table 13: Air quality measurements at project location

Parameter	AQ1	AQ2	Standard to be followed[a]
$PM_{2.5}$ (µ/m3)	3.2	4.1	25[b]
PM_{10} (µ/m3)	4.4	5.7	50[b]
Particles (per liter)	370	508	N/A
CO_2 (ppm)	502	450	N/A

[a] WHO standard for ambient air quality.

[b] WHO Air Quality Guidelines since there is no national standard for ambient air quality in the Maldives. ADB SPS require the government shall achieve whichever of the ambient air quality standards is more stringent. A detail of environmental standards to be followed for this project is attached in the Appendix 3.

S. Groundwater Quality

155. The parameters analyzed for groundwater quality was temperature, salinity, pH, nitrate, phosphate, and sulphate. Water samples were collected from the project location and tested in MWSC Water Quality Assurance Laboratory. Total Petroleum Hydrocarbon (TPH) was not available for testing hence this parameter was not analyzed.

156. Groundwater sample was collected from WQ1 location and a control location (CT1) which was another well in Hulhumale' island.

157. There are no groundwater quality standards in the Maldives hence, National Wastewater quality standards were used.[4] Particularly the standard for Applicable Domestic Wastewater Discharge Standards (Discharge to Land for Surface Recharge of Groundwater) was used as a standard to be followed.

158. All the parameters analyzed were within the acceptable levels according to the standards. These results will be utilized as a baseline for future monitoring works.

159. The following table 14 enlist the results of the groundwater quality testing. The report of the groundwater quality testing from MWSC has been attached in the Appendix 7 of this report.

Table 14: Results of Groundwater Quality Tests

Parameter	CT1	WQ1	Standard to be followed[a]
Temperature (^oC)	21.3	21.2	Not more than 30 ^oC above the receiving water
pH	7.4	7.4	5 – 9.5
Salinity (%)	0.56	0.55	N/A
Nitrate (mg/L)	3.8	1.3	6
Phosphate (mg/L)	0.49	0.41	1

[4] National Wastewater Quality Guidelines, Maldives Environmental Protection Agency. Revision 1. 2007.

Parameter	CT1	WQ1	Standard to be followed[a]
Sulphate (mg/L)	100	85	250

[a] National Wastewater Quality Guidelines, Maldives Environmental Protection Agency. Revision 1. 2007.

T. Noise Level

160. The noise level was recorded during nighttime and daytime using a Type 2 sound meter. The data collected will be used as baseline information for the monitoring works. The same location for the ambient air quality measurement was utilized for the noise level samples.

161. Since there are no national noise level standards in Maldives, the WHO Guidelines Value for Noise Levels Measured Out of Doors was used as a standard to be followed.

162. The field measurement suggests that all the noise level are within the levels prescribed by WHO Guidelines Value for Noise Levels Measured Out of Doors. The following Table 15 provides information on the Noise Levels.

Table 15: Noise Level at project location

Noise Level	AQ01	AQ02	Standards to be followed
Noise Level (Nighttime (22:00 to 07:00) (dBA)	32	38	70 dBA
Noise Level (Day time 22:00 to 07:00) (dBA)	40	47	70 dBA

U. Climatic Condition

163. Maldives island chain is situated at the equator; thus the islands have a tropical climate. Table 16 shows summary of the key meteorological climate observed in the Maldives. The country also experiences extreme weather events, which also allows the country to understand the climate extremes.

Table 16: Summary of the key metrological observation in the Maldives

Climate Parameter	Data/Information	Source
Air Temperature	29^0C	(MHAHE 2001a)
Sea Surface Temperature	28 – 29 ^{0}C	(Edwards et al. 2001)
Humidity	73 – 85%	(MHAHE 2001a)
Rainfall	1,948 mm annually	(MHAHE 2001a)
Wind	7 -12 knots	(MHAHE 2001a)
Waves	2 – 3 meters wave height with period of 18 – 20 seconds	(MHAHE 2001a)
Tides	0.3 m – 1.0 m	(MHAHE 2001a)

164. Five regional locations collect meteorological data. The data collection is undertaken by the Maldives Metrological Service (MMS). Velena International Airport being at the nearest long-term climate data collection region to that of project location, the primary climate data for Velena

International Airport is used for the analysis for this IEE report. Based on the general observation, the Maldivian climate experiences monsoonal reversals.

V. Maldivian Monsoons

165. The Maldives being located at the Indian sub-continental terrain is subjected to monsoonal weather patterns. The Maldivian islands are subjected to reversal monsoonal patterns, indicating presence of two very distinct seasons. The Northeast (NE) Monsoon dry period or locally known as Iruvai occurs during December to February, on the other hand Southwest (SW) monsoon (Hulhangu) occurs during May to September. These two monsoon patterns occur a result of climatic influence, such as change in waves, wind direction. Table 17 below shows the salient features of the seasons observed in the Maldives.

Table 17: Summary of the salient features of Monsoonal climate observed in the Maldives.

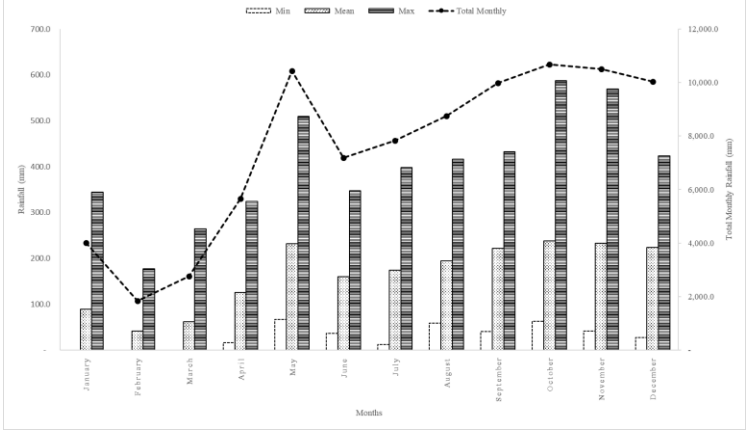
Season	Months	Characteristics
NE Monsoon	December January February	▪ Primary wind direction is from NW towards NE ▪ Higher winds blow from Western sides ▪ Sky is clearer with low cloudiness ▪ Sea is much calmer ▪ Low rainfall, thus its dry period
Transitional Period – *Hulhangu Halha*	March April	▪ Wind flowing direction changes from NW ▪ Wind blows from all directions ▪ Dominating western side winds ▪ Occasional rain and sea roughness ▪ Changes to cloud cover
SW Monsoon	May June July August September	▪ Primary wind direction is SW ▪ Higher winds blow from Western sides ▪ Increase cloudiness ▪ Rough sea conditions ▪ High rainfall, thus its wetter period
Transitional Period – *Iruvai Halha*	October November	▪ Wind flowing direction changes from SW ▪ Wind blows from all directions ▪ Dominating western side winds ▪ Occasional rain and sea roughness ▪ Changes to cloud cover

W. Rainfall

166. Rain is common in the Maldives climate. Majority of the months in a year is dominated by SW monsoon, thus making rainfall a frequent event. The Maldives experiences an average rainfall of 2,124 mm. The Northern islands in the Maldives receive low rainfall when compared to the southern islands. As the project is in the middle zones, the location will receive an average amount of rain annually.

167. The average monthly rainfall data in Hulhulé is 166 mm, with the highest rainfall in October (10,686.6, mm) The lowest rainfall observed is observed for the month of February with a rainfall amount of 1842 mm (see **Error! Reference source not found.**). Comparative analysis of total yearly rainfall from 1992–2019 shows that 2011 there was a significant less rainfall of 1,333.3 mm of rain, when compared to the highest which was observed in the year 2006 (2,711.2 mm).

Figure 8: Monthly Mean Rainfall Distribution from 1975 – 2019 in Hulhulé



Source: Data from Maldives Meteorological Service.

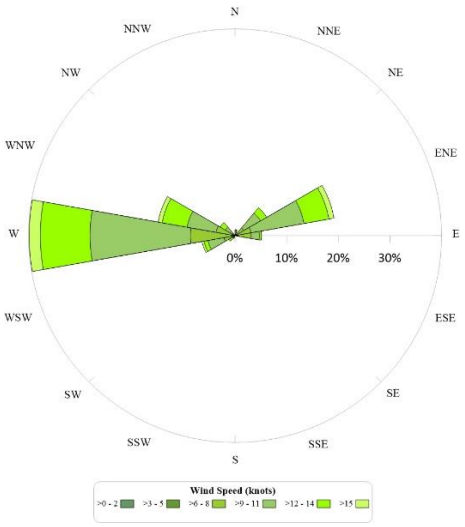
X. Wind

168. Wind is one the key climate factor in the Maldivian monsoon formation. The change or reversal of wind direction and speed results in transformation of local currents around the island. Thus, wind plays a significant role in determining climate system in the Maldives. Additionally, wind remains a geological agent that shapes the coastal dynamics in the islands of Maldives.

169. The monsoon observed in the Maldives is mild as the country is situated on the equator. This reduced monsoonal activity resulted in few or no presence of strong winds, cyclones or gales in the Maldives. However, on the other hand there is occurrence of storms and line squalls during April and May with an intensity of 60 knots.

170. Westerly wind is the dominant wind direction throughout the year. Furthermore, slightly stronger winds are observed from westerly direction during the SW monsoon in contrast to the NE monsoon. According to (Naseer 2003) the speed and direction of wind has remained similar over the last two decades of monsoonal periods in the Maldives with an average wind speed of 7 –12 knots. The author noted that high-speed wind is dominated in the central region with an average speed of 18 m/s. The high wind patterns are observed during the month of May and October.

Figure 11: The average annual wind speed and direction at Hulhulé from 1975–2019.



Source: LaMer Pvt Ltd (2016), "Environmental Impact Assessment Development of Water Supply System at Dhangethi, Adh Atoll", December 2016.

Y. Natural Hazards

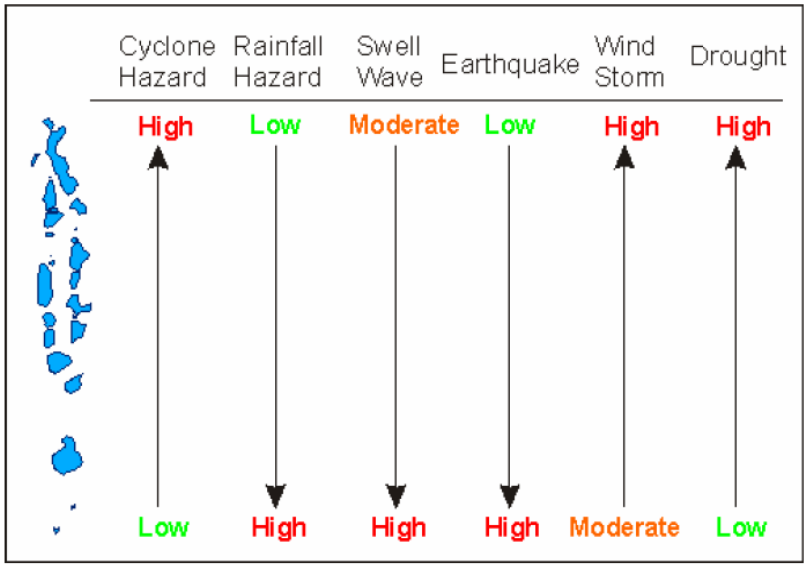
171. An island's inherent vulnerability to environmental and climatic conditions lies in its geographic and geomorphic characteristics. Factors such as location of the island within the atoll, its shape, formation and orientation, the degree of protection offered to the island by surrounding reefs and other islands, presence of mangroves and wetlands at the coast, its natural and manmade coastal protection structures, are all contributors to the resiliency of the island to withstand natural hazards.

172. Natural hazards that may occur at the project location can be broadly classified into geological and meteorological hazards. Based on the different types of hazards identified in Detailed Island Risk Assessment for the Maldives (DIRAM) (UNDP 2008), the following hazards have been predicted to be particularly relevant to the project site in relation to the project components:

i. Windstorm
ii. Flooding due to heavy rainfall/storms
iii. Gravity waves (Swell waves and udha); and
iv. Tsunami

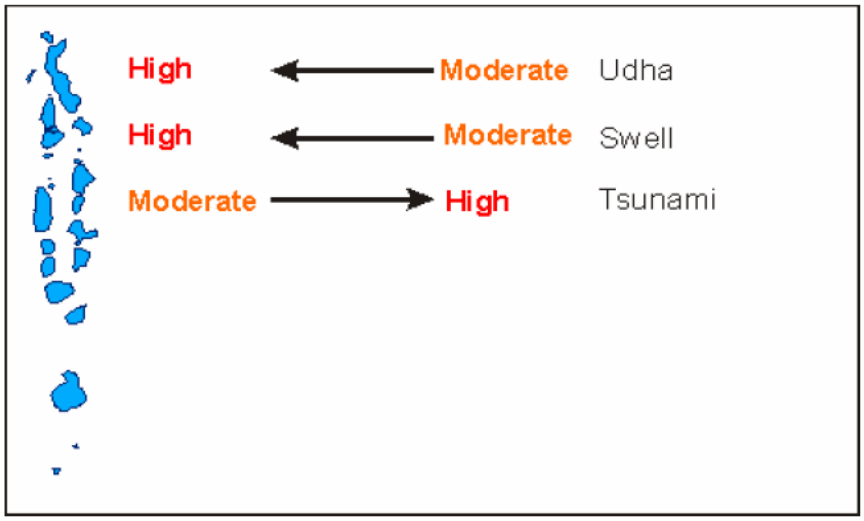
173. UNDP's Detailed Risk Assessment (DIRAM Thulusdhoo) carried out for Thulusdhoo Island which approximately 20 km northeast of Hulhumale' has been applied to predict natural hazards of Hulhumale' where the project site is located. According to the DIRAM, the major natural hazards in the Maldives are strictly controlled by the geophysical and climatic settings and show quite different patterns in their distribution as shown in Figure 12.

Figure 12: Major natural hazards distribution patterns in the Maldives including Latitudinal variation of major natural hazards



Source: United Nation Development Programme. 2006. *Disaster Risk Profile of the Maldives*. New York.

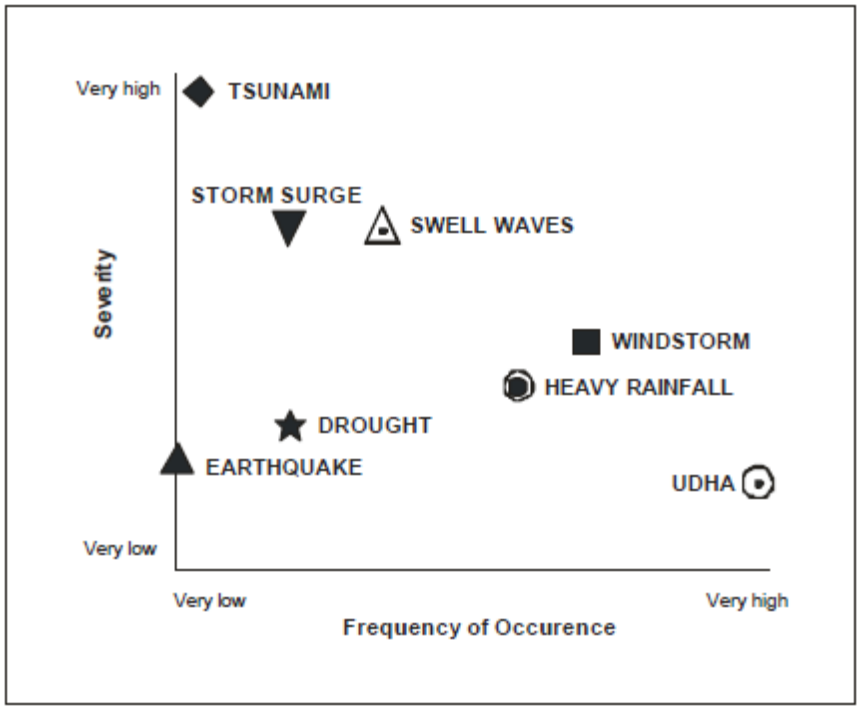
Figure 13: Longitudinal variation of major natural hazards across the Maldives



Source: United Nation Development Programme. 2006. *Disaster Risk Profile of the Maldives*. New York.

174. As can be seen in Figure 12, the tropical cyclones and correspondingly storm surges predominantly prevail in the north of the Maldives. In contrast, swell waves and heavy rainfalls are prominent in the southern and western islands of the Maldives. The southern islands of the Maldives are threatened by earthquakes from the seismic zone of Carlsberg Ridge. Considering the longitudinal variations in hazard distribution the eastern rim islands are subjected to tsunamis and waves of a higher intensity due to their direct exposure to these hazards, whereas the western rim and atoll lagoon islands are protected by the atoll formation patterns. Islands in the south are more exposed to southwest monsoon related surges and long-distance swells originating from the southern Indian Ocean. Islands in the north are more exposed to storm events and their impacts including storm surges and strong wind (UNDP 2008). Hazard severity and frequency of major natural hazards are shown in Figure 14.

Figure 14: Relationship between hazard intensity and frequency of major natural hazards in the Maldives



Source: United Nation Development Programme. 2006. *Disaster Risk Profile of the Maldives*. New York.

175. Hazards, frequencies, and damage potential for the Maldives is summarized in Table 18 (UNDP 2008).

Table 18: Hazards, frequencies, and damage potential for various natural hazards in Maldives

Hazard	Tsunami	Swell waves or Storm Surges	Rainfall flooding	Strong winds
Frequency	Once in 200 years	Once in 10 years	Once in 1 year	Several times a year
Potential Damage	Very high	High	Moderate	Low

Z. Ecology and vegetation at project location

176. Hulhumale' being a reclaimed island, has no native vegetation in the island. Hulhumale' is a highly urbanized area with limited green spaces. The project location is an area allocated for the institutional land use. There are no major vegetation at the project site. Hence, there is no requirement for the vegetation clearance. During the field visit, there were some temporary labor

camps for contractor for construction of the adjacent Tree Top Hospital. According to the contractor, the land will be vacated since the land has been allocated to the proponent by HDC.

Figure 15: The sparse vegetation at the project site.

Top left photo and bottom photos show the temporary labor camp while top right photo shows ongoing construction adjacent to the project site.
Source: Asian Development Bank

177. The Integrated Biodiversity Assessment Tool (IBAT) was used for identifying the protected areas, IUCN red-listed and range-restricted species, and a preliminary list of priority species that could occur within a 1 km study area around the site. IBAT also provides initial screening for critical habitat values. The results from the IBAT show that there are no protected areas and no key biodiversity areas within the buffer distance. The following threatened species are potentially found within 50km of the area of interest: hawksbill turtle (reptilia, critically endangered); green turtle (retptilia, endangered); loggerhead turtle (reptilia, vulnerable); olive ridley (reptilia, vulnerable), Trindade petrel (aves, vulnerable), and matsudaira's storm-petrel (aves, vulnerable). None of these species are found within the proposed project site.

AA. Socio-economic Environment

1. Demography

178. It has been more than 20 years since the first settlement in Hulhumale' in May 2004. At the time of the first settlement, Hulhumale just had 210 apartments, 120 land plots and 34 commercial units. As the first group of people, 200 families (about 1000 people) moved to Hulhumale' at the initial stage. As per the documents available in HDC's website, the current

population of Hulhumale' is expected to be over 50,000. Hence, Hulhumale' population has grown rapidly at a rate of about 2,500 heads per year. The size of Hulhumale' phase-I is 188Ha which is targeted for a population of 80,000 (HDC, 2019). Hence, when Phase-I is fully occupied by residents, the population density in Phase-I will be 42,553 per sq.km. Assuming that the current population is 50,000.0, the current population density is 26,596 per km^2. No statistics was available to identify the sex ratio of the island.

2. Social Environment

179. Hulhumale is a planned city where development master plans are managed and approved by HDC. The island has been zoned and construction of buildings have been strictly regulated. Green zones, play areas, parks and empty spaces are planned. One of the major goals aimed to be achieved in Hulhumale development as per HDC is ensuring that the city remains a sustainable and enjoyable city to all residents and visitors. Hulhumale phase-1 was developed with an open space index of 2.5 to provide a healthy lifestyle to the residents of Hulhumale.

3. Nearby Community

180. The project location is within the land allocated for the institutional land use. There are no communities living nearby. The closest residential area to the project location is Amin Avenue Private Residential Complexes which are approximately 270 m east of the project location.

4. Economic Activities

181. The main economic activities in Hulhumale include tourism, industrial activities, and fisheries. There are 66 guesthouses operational in Hulhumale in 2021. There are 06 factories which include from LPG gas, fishing canneries, cement packing plants. The harbor of Hulhumale is used for ferry operations, safari and liveaboards and fishing boats.

BB. Environmental impacts and mitigation measures

Impact Analysis Matrix

182. This section of the report will describe the potential environmental impacts which are both negative and positive. The impacts will be classified based on the bio-physical and socio-economic environment. The impacts on groundwater and soil, air & noise will be considered for the bio-physical environment at the project location. The impacts on the services and infrastructure and health and safety of the nearby communities will be considered for the socio-economic environment.

183. The following Table 19 is the impact analysis matrix for the project. They include environmental impacts for both construction and operational phase of the project.

Table 19: Impact Analysis Matrix

Project Activity	Bio-physical Environment		Socio-economic Environment	
	Soil and Groundwater	**Air and Noise**	**Services and Infrastructure**	**Health and Safety**
Construction Phase				
Excavation	Potential impacts on the soil environment	Suspension of dust and other particulate matter will decline the air quality in the vicinity of the project site.	• Damage may occur to electricity or telephone cables or water and sanitation pipes which are close to the project site. • Potential threat to nearby buildings and roads.	• Without proper signage, there may be potential accidents of falling into the trenches excavated. • Dust and particulate matter may trigger upper respiratory tract infection and affect asthma patients located in close vicinity to the project site.
Construction Activities	Groundwater may be affected due to disposal of wastewater at the construction site.	• Short-term exposure to dust due to usage of cement on the construction site. • Noise pollution and disturbance for nearby residents of the project site.	• Exposure to noise levels for Tree Top Hospital	• Potential fall of objects and other accidents may occur • Dust and particulate matter may trigger upper respiratory tract infection and affect asthma patients located in close vicinity to the project site. • Exposure to dust from cement and offensive smell from

Project Activity	Bio-physical Environment		Socio-economic Environment	
	Soil and Groundwater	Air and Noise	Services and Infrastructure	Health and Safety
				paints and other chemicals.
Dewatering	Short-term loss of groundwater from the project boundary and vicinity of the project site.	No significant impact	• Short term decline in groundwater quality for the close by plots • Road blockage due to installation of dewatering pipes.	• Potential breeding site for mosquitos.
Operation of construction machineries & vehicles	Potential contamination of groundwater from oil-spill from machineries	Noise disturbances due to operation of heavy machineries	• Damage to roads due to transport of heavy machineries • Road blockage during transport of heavy machineries	• Potential accidents during the operation of the heavy machineries and vehicles.
Construction waste	• Potential to pollute the groundwater • Land degradation	No significant impacts	Additional burden to existing commercial waste management system in Hulhumale'	Potential public health impacts and nuisance.
Installation of Roof-top Solar PV system	• May reduce the potential for rainwater harvesting.	• Expect to improve the local air quality compared to diesel power generation.	Reduction of recurrent electricity cost and demand on the electricity grid.	No significant impacts
Operational Phase				
Operation of Central Vaccine Cold-Chain Storage Facility	No significant impacts	The backup-generator may contribute to air and noise pollution at the vicinity of the facility	• Additional burden to the electricity grid if solar PV installed are decommissioned. • Additional burden on the existing piped water network of the Hulhumale'	• Risk of fire and other emergencies during operation • Training and capacity building of the EPI and COVID 19 vaccine program.

Project Activity	Bio-physical Environment		Socio-economic Environment	
	Soil and Groundwater	Air and Noise	Services and Infrastructure	Health and Safety
Solid Waste Management and Disposal including waste generated from EPI and COVID-19 vaccine program.	Aesthetic impacts and potential groundwater pollution May affect soil and groundwater quality if damaged solar PV panels are not disposed of properly.	No significant impacts	• Additional burden to existing residential waste management system in Hulhumale'	• Potential public health impacts and nuisance. • Occupational health and safety impacts if damaged solar PV panels and improperly handled and disposed of.
Transport of vaccine via the speed boats and refrigerated trucks	Potential risk of ground water contamination during speed boat and vehicle maintenance.	Increased air emissions such as carbon monoxide from vehicles	Additional burden on roads and harbor of Hulhumale'.	CO & particulate matter may trigger upper respiratory tract infection and affect asthma patients living in close vicinity to the project site.

184. The following Table 20 is a summary of project activities which has the greatest impact on both natural and social environment respectively.

Table 20: Summary of project activities which have environmental impacts on both construction and operational phase

Phase of the project	Environment	Social
Construction Phase	Excavation (Negative Impacts) Construction Activities (Negative Impacts) Dewatering (Negative Impacts) Operation of construction machineries & vehicles (Negative Impacts) Construction Waste (Negative Impacts) Installation of roof-top solar PV system (Positive and Negative Impacts)	Excavation (Negative Impacts) Construction Activities (Negative Impacts) Dewatering (Negative Impacts) Operation of construction machineries & vehicles (Negative Impacts) Management of construction waste (Negative Impacts) Installation of roof-top solar PV system (Positive impacts)

Phase of the project	Environment	Social
Operational Phase	Operation of Central Vaccine Cold-Chain Storage Facility (Positive impacts) Solid waste management and disposal (Negative Impacts) Transport of vaccine via the speed boats and refrigerated trucks (Negative Impacts)	Operation of Central Vaccine Cold-Chain Storage Facility (Positive Impacts) Solid waste management and disposal (Negative Impacts) Transport of vaccine via the speed boats and refrigerated trucks (Negative Impacts)

CC. Mitigation Measures for the predicted impacts

185. The following Table 21 provides proposed mitigation measures for the identified impacts. The table 22 provides detail information of most significant mitigation measure for each of the project activity.

Table 21: Proposed mitigation measures for each of the project activity which have potential environmental impact

Project Phase	Project activity	Environmental Impact	Proposed Mitigation Measures
Construction Phase	Excavation	• Potential impacts on the soil environment • Suspension of dust and other particulate matter will decline the air quality in the vicinity of the project site. • Damage may occur to electricity or telephone cables or water and sanitation pipes which are close to the project site. • Potential threat to nearby buildings and roads. • Road blockage • Without proper signage, there may be potential accidents of falling into the trenches excavated. • Dust and particulate matter may trigger upper respiratory tract infection and affect asthma patients located in close vicinity to the project site.	• Only the required area will be excavated, and the work will be completed as soon as possible. • The entire boundary will be shored with corrugated sheets supported by iron beams as a safety measure while preparing the site ready for construction. This will also be used for foundation protection. • The excavated material will be immediately transported out of the project boundary to Thilafushi as the government-approved site for final disposal. • A Health and Safety Plan will be prepared by the contractor to be approved by PMU. Training on the use of PPE, and appropriate PPEs, health, and safety measures, etc. will be provided to construction workers and other site staff. • Emergency response procedures will be implemented.
Construction Phase	Construction Activities	• Short-term exposure to dust due to usage of cement on the construction site. • Noise pollution and disturbance for nearby residents of the project site. • Exposure to noise levels for residents close to the project site. • Potential fall of objects and other accidents may occur • Dust and particulate matter may trigger upper respiratory tract	• Construction work sign boards and fencing will be placed prior to construction phase; • Placement of safety and dust protection nets all around the building plot;. • Excessive noise at nighttime will be avoided as all the construction activities are time bound. Construction activities shall be limited in the morning.

		infection and affect asthma patients living in close vicinity to the project site. • Exposure dust from cement and offensive smell from paints and other chemicals.	• All the construction activities will be conducted within the project boundary hence nuisance related to construction activities will be reduced to the nearby hospital. • All road blocking will be released at shortest possible time upon completion of the work; • First Aid kits will be always maintained at the site. • A Health and Safety Plan will be prepared by the contractor to be approved by PMU. Training on health and safety procedures, including COVID-19 protocol will be provided to construction workers and other site staff. • Appropriate PPEs will be provided to construction workers and other site staff. • Emergency response procedures will be implemented. • No asbestos-containing materials will be used as new construction material.
Construction Phase	Dewatering	• Short-term loss of groundwater from the project boundary and vicinity of the project site. • Short-term decline in groundwater quality for the close by plots • Road blockage due to installation of dewatering pipes. • Potential breeding site for mosquitos.	• The dewatering activities will be commenced only after obtaining the required dewatering permit from the EPA and will be conducted according to the prescribed schedule; • A signage indicating that dewatering is in progress will be placed in order to inform the general public about dewatering activities.

			• The dewatering operations will be undertaken quickly or based on the approved schedule by URA in order to reduce the prolonged environmental impacts on the areas close to the project site. • Dewatering pipeline will be regularly monitored for physical damage and immediately rectify the issue. This will be done if dewatering will be undertaken by contractor's equipment and machinery.
Construction Phase	Operation of construction machineries & vehicles	• Potential contamination of groundwater from oil-spill from machineries • Noise disturbances due to operation of heavy machineries • Damage to roads due to transport of heavy machineries • Road blockage during transport of heavy machineries • Potential accidents during the operation of the heavy machineries and vehicles.	• EPA guidelines will be followed during the operation of the mobile concrete batching plant; • The transport of materials using the vehicles will be done during the off-peak traffic hours; • The materials will be transported in bulk to reduce the need of frequent transportation of the materials and reducing the impacts of noise and dust • The vehicles will be operated only within the project plot and areas designated by the HDC l in order to avoid frequent road blockage.
	Construction waste	• Potential to pollute the groundwater • Land degradation • Additional burden to existing commercial waste management system in Male' • Potential public health impacts and nuisance.	• All the construction waste will be piled and segregated in an allocated location within the project site; • Re-use construction waste where ever possible in order to reduce waste required for disposal; • Regularly transport unusable construction waste to the waste

			collection site in Hulhumale' with assistance from WAMCO. • Avoid transport of construction waste during rainy weather conditions; • Arrange transportation of construction waste such that peak traffic hours will be avoided. • Outsourcing will be done to WAMCO or any other licensed party for waste handling and comply with the waste management regulation all the times; • Waste disposal on-site and within the boundary of the project area will be avoided at all times.
Construction phase	Installation of rooftop solar PV system	• May reduce the potential for rainwater harvesting. • Expect to improve the local air quality compared to diesel power generation. • Reduction of recurrent electricity cost and demand on the electricity grid. • May affect soil and water quality if damaged solar PV cells are handled and disposed of improperly. • May pose occupational health and safety risks	• Ensure solar PVs are installed by trained workers/contractor and workers/contractors are equipped with appropriate PPEs. • All other impacts are beneficial.
Operational phase	Operation of Roof-top Solar PV system	• May reduce the potential for rainwater harvesting. • Expect to improve the local air quality compared to diesel power generation.	• Ensure regular inspection of solar PV panels. • Discard damaged solar panels and store temporarily in a designated area and ensure it is isolated from soil or water.

		• Reduction of recurrent electricity cost and demand on the electricity grid. • May affect soil and water quality if damaged solar PV cells are handled and disposed of improperly. • May pose occupational health and safety risks	• Handlers should be properly trained in disposal and be provided with appropriate PPE. • Maintain records of discarded damaged solar panels. • Ensure that disposal is in accordance with rules and regulations of Maldives on disposal of solar panels.
Operational Phase	Operation of Central Vaccine Cold-Chain Storage Facility	• The backup-generator will contribute to air and noise pollution at the vicinity of the facility • Additional burden on the existing piped water network of the Hulhumale' • Additional burden to existing residential waste management system in Hulhumale' • Proper implementation of the EPI and COVID-19 vaccine program. • Training and capacity building of the EPI and COVID 19 vaccine program on implementation of EMP. • Potential public health impacts and nuisance.	• Solar PV installation to reduce the dependency on the electricity grid. • Waste management equipment will be provided to the central vaccine cold-chain storage facility in Hulhumale' under the project hence, waste generated from EPI and COVID19 vaccination programme will be managed properly within the facility. This includes expired vaccines as well. • Conduct regular trainings on implementation of the EMP.
Operational Phase	Solid Waste Management and Disposal including waste generated from EPI and COVID-19 vaccine program.	• Aesthetic impacts and potential groundwater pollution • Additional burden to existing residential waste management system in Hulhumale' • Potential public health impacts and nuisance. • Solid and hazardous waste from repairs and decommissioning of solar panels	• Piling of solid waste in the floors and by the building will not be allowed; • The building and adjacent areas will be kept clean at all times and free from waste; • WAMCO will be outsourced for waste management and handling. • Waste disposal will be avoided at the project site at all the time.

			• Expired vaccine and other medical waste generated from EPI program will be managed through the equipment procured for the facility and managed within the premises of the facility. • Repair of solar panels, including disposal will be outsourced via solar panel supplier
Operational Phase	Transport of vaccine via the speed boats and refrigerated trucks	• Potential risk of ground water contamination during speed boat and vehicle maintenance. • Increase in air pollutants such as carbon monoxide • Additional burden on roads and harbor of Hulhumale'. • CO & particulate matter may trigger upper respiratory tract infection and affect asthma patients located in close vicinity to the project site.	• Proper and routine maintenance of refrigerated trucks and speed boats. These vehicles undergo a routine check by the Ministry of Transport and Civil Aviation (MOTCA) which authorizes and issues road worthiness stickers for land vehicles or sea worthiness sticker for sea vehicles. Medical waste associated with the operation of the land and sea vehicles will be managed through the equipment procured for the facility and managed within the premises of the facility. • The refrigerated trucks and speed boats will be checked by Ministry of Transport and issue road worthiness or sea worthiness certificate every year. • Parking provisions will be provided with the facility premises so that no burden on existing parking infrastructure will be present. • Allocation of dedication space within the harbor of each regional hospital

			island and Hulhumale for mooring of the speed boats.

Table 22: Detailed information on the proposed mitigation measures for each project activity with potential environmental impact

Project Activity	Proposed Mitigation Measure	Cost	Benefit	Expertise	Required Manpower	Responsibility	Equipment and Technology	Timing
Construction Phase								
Excavation	Shoring of entire boundary with corrugated sheet supported by iron beams	Approximately 20,000 USD	Protection of adjacent buildings	Structural Engineering	2 to 5	Contractor	Corrugated sheets and iron beams	Prior to construction works
Dewatering	Monitoring and management of the dewatering pipelines	Approximately 7,000 USD	Avoid potential flooding of the roads	Environmental protection & plumbing	2-5	Contractor	Pipelines, machineries, management	Prior to construction works
Construction works	Use of health and safety equipment and gear	Approximately 16,000 USD	Avoid accident and increase safety of the workers	Procurement and Project management	2-5	Contractor	Health and safety equipment	During construction phase
Construction machineries and vehicles	Employment of an experienced site supervisor	Site Supervisor Salary	Reduce dust and emission	Project Management	1	Contractor	Site supervisor	During construction phase
Construction waste	Transport waste regularly to the designated construction waste collection site	WAMCO charges	Reduce waste accumulated in the project site	Logistics and transport	WAMCO staff	Contractor	Dump trucks, lorries and pick-ups	During construction phase
Operational Phase								

Project Activity	Proposed Mitigation Measure	Cost	Benefit	Expertise	Required Manpower	Responsibility	Equipment and Technology	Timing
Operation of Central Vaccine Cold-Chain Storage Facility	Solar PV installation to reduce the dependency on the electricity grid.	Approximately 100,000 USD	Emission reduction diesel power generation	Renewable Energy Engineering	PV contractor staff	Proponent	Solar Photovoltaic cells and batteries	During operational phase
Solid Waste Management and Disposal including waste generated from EPI and COVID-19 vaccine program.	Procurement of equipment for waste management and proper of the equipment	Approximately 100,000 USD	Proper waste management of the vaccine program waste	Health Care Waste management	Operator of facility	Proponent	Autoclaves, Shredders, Disinfection chemicals	During operational phase
Transport of vaccine via the speed boats and refrigerated trucks	Proper maintenance of refrigerated trucks and speed boats	Recurrent cost of maintenance	Avoid pollution and long-term sustainability of the speed boats and refrigerated trucks	Mechanics and maintenance	5 mechanics at across different regional island hospitals	Proponent	Vehicle and vessels maintenance	During operational phase of the project
Both Phases								
Capacity Building	Conduct routine training on implementation of EMP	Approximately 2000 USD per training	Proper environmental management and monitoring during both phases	Environmental Management	1 trainer	Proponent	Consumables and training venue	Once during construction phase and every year during operational phase.

IV. INFORMATION DISCLOSURE AND STAKEHOLDER CONSULTATION

A. Introduction

186. Involvement of stakeholders is crucial for the effective implementation of the proposed project. An integral part of this IEE has been consultation with all relevant parties including public consultation, relevant government authorities and nearby constructions sites. This chapter aims to summarize the stakeholder consultations that were conducted and outlines an information disclosure strategy along with a stakeholder engagement plan.

B. Findings of Stakeholder Consultation

187. A series of stakeholder consultations were conducted from March 2022 to June 2022 in the form of physical meetings. A total of 9 sessions were held in which vulnerable groups such as women participated. Table 23 summarizes the main discussions of meetings with each of the stakeholders.

Table 23: Main findings of the Stakeholder Consultations

Stakeholder	Issues and Concerns	Responses provided by ADB
Ministry of Health **Roles and Responsibilities** Policy Formulation and Implementation of Health Sector Projects including development of health sector infrastructure. Meeting information Date: 4 April 2022 Time: 10:00 to 11:00 am Venue: 5th Floor, Ministry of Health. Participants Mr. Ahmed Adil, Minister of State, Ministry of Health Mr. Abulla Ariz, Ministry of Health	• The existing Central Vaccine Storage facility is extremely deteriorated. • There are huge constraints on the space in the current location of vaccine storage. • Preliminary drawings for the central cold-chain storage facility is currently being developed.	• The space allocated by HDC in Hulhumale' is ideal to construct the central vaccine cold-chain storage facility • To maximize the land available for MOH in Hulhumale' a six-storey building is essential.
Environmental Protection Agency **Roles and Responsibilities** The regulatory institution for environment management sector in the Maldives. Participants	• No requirement for an EIA for a 6 storey-building without a basement. • It is highly recommended to submit for a screening form to EPA to confirm the requirements under Environmental Impact Assessment Regulation (2012).	• A screening exercise will be conducted prior to confirmation of the IEE.
Ministry of National Planning, Housing, and Infrastructure **Roles and Responsibilities** Implementation of planning regulations and infrastructure projects in Maldives.	• Detailed survey was conducted by US government to establish American Embassy at 2 floors of the office building constructed by Ministry of National Planning, Housing and Infrastructure.	• A consultative meeting will be arranged with

Stakeholder	Issues and Concerns	Responses provided by ADB
Participants Hamrau Ahmed Fathuhee, Architectural Consultant, Ministry of National Planning, Housing and Infrastructure	• Recommended to have a discussion with Ministry of Foreign Affairs regarding the American Embassy. • The Office Building is expected to be completed by November 2022. • The American Embassy is expected to rent 2 floors for a period of 2 years.	
Housing Development Corporation (HDC) **Roles and Responsibilities** The land management authority for Hulhumale' **Meeting information** Date:19th April 2022 Time: 10:30 to 11:00 am Venue: Project Location, Hulhumale' **Participants** Mr. Ahmed Rizmee, HDC Mr. Shazim, HDC **Meeting information** Date: 02nd June 2022 Time: 12:00 to 02:00 pm Venue: 9th Floor, Ministry of Health **Participants** Mr. Hassaan Abdul Muhsin, Environment Analyst, Housing Development Corporation (HDC).	• The plot for central vaccine cold-chain facility is allocated to MOH. • The land is currently occupied by a Turkish Contractor which constructed Tree-Top Hospital. • The Turkish Contractor will vacate the premises within a month. • The Turkish Contractor is moving to K. Thilafushi where its constructing a Waste To Energy Plan from ADB funding. This project is implemented by Ministry of Environment, Climate Change and Technology. • The planning guidelines and set-backs requirements need to consider during the designing of the facility. • Parking Space for the building need to be considered in the design. • More developments will be coming prior construction phase of the project.	• Planning requirements will be considered during the detail designing of the central cold chain storage facility. • Parking space will be considered during the designing of the central vaccine cold chain storage facility.
Health Protection Agency (HPA) **Roles and Responsibilities**	• Health Care waste equipment will be provided to all regional hospitals through Canadian Aid and World Bank project.	• Important to provide equipment for management of vaccine related health care waste.

Stakeholder	Issues and Concerns	Responses provided by ADB
Implementation of EPI and COVID-19 program in the Maldives. Manages the environmental health related activities. **Meeting information** Date: 8 March 2022 Time: 02:00 to 03:00 pm Venue: 9th Floor Meeting Room, Ministry of Health. **Participants** Ms. Nashiya Abdul Gaffor, Senior Public Program Manager, HPA. Ms. Aminath Shaufa, Director, HPA	• There are plans to update the National Health Care Waste Policy. • EPI program faces significant challenges in transportation of EPI related vaccines. • The EPI program is severely understaffed.	• A need for a proper central vaccine cold-chain storage facility in Greater Male' Region.
Addu Equatorial Hospital **Roles and Responsibilities** One of the regional hospitals in the Maldives where EPI program is implemented. Meeting information Date: 27 March 2022 Time: 10:00 to 11:00 am Venue: Meeting Room, Addu Equatorial Hospital Participants Ms. Aishath Safa, Senior Public Health Officer, Addu Equatorial Hospital Mr. Ahmed Najeeb, Senior Community Health Worker, Addu Equatorial Hospital	• Transportation of vaccine is a key issue due to long distance between the central vaccine cold storage facility in Male'. • Addu is the southernmost atoll in the Maldives. • Cargo Boats which carry goods are currently used for transportation of EPI related vaccines. • COVID-19 vaccines were air freighted through local airlines such as Maldivian and Manta Airlines. • There is limited space within the hospital premises to store the vaccines.	• Procurement of a refrigerated truck for transport the vaccine within Addu atoll. • Provision for air freighting of the vaccine related to EPI. • A need for speed boat to carry the vaccines to S. Hulhumeedhoo island.
R. Ungoofaaru Regional Hospital **Roles and Responsibilities**	• Management of Health Care Waste is a significant challenge. • Transportation of vaccines related to EPI program is a challenge.	• Equipment and proper means of managing health-care waste including waste generated from EPI program.

Stakeholder	Issues and Concerns	Responses provided by ADB
One of the regional hospitals in the Maldives where EPI programs are implemented. Meeting information Date: Saturday, 19th March 2022 Time: 3:00 to 04:00 pm Venue: Meeting Room, R. Ungoofaaru Regional Hospital Participants Ms. Aishath Nilooma, Senior Public Health Officer, R. Ungoofaaru Regional Hospital.	• Private cargo boats are currently used for transport of vaccines. • Distribution of vaccines within the island of Raa atoll is done through atoll ferries.	
Ministry of Finance **Roles and Responsibilities** The executing agency of the project **Meeting information** Telephone conversation. **Participants** Ms. Aishath Nashath, Director, Ministry of Finance	• Any requirement for comments on the IEE needs to share in writing.	• Draft IEE has been shared with MoF for their review and comments.
Tree Top Hospital **Roles and Responsibilities** A private hospital near project location. **Meeting Information** Date: 2 June 2022 Time: 12:00 to 02:00 pm Venue: 9th Floor, Ministry of Health **Participants**	• The green space around the Treetop shall not be affected due to any project intervention during construction or operational phase of the project.	• No project intervention will affect the green space around the Tree Top Hospital.

Stakeholder	Issues and Concerns	Responses provided by ADB
Ms. Nazra Najeeb, Assistant Nursing Director, Tree Top Hospital.		

C. Future Consultations

188. MOH will continue its communications with other stakeholders including Tree Top Hospital representatives, employees, and patients (if possible) and continue to disclose project information throughout project implementation. The contractor will also undertake further consultations to inform the stakeholders of the detailed design and other information prior to commencement and during of construction works.

189. In the context of the COVID-19 pandemic, all consultations will be carried out following latest national COVID-19 requirements and WHO social distancing and hygiene guidelines. If physical meetings are not possible, virtual consultations will be conducted.

D. Information Disclosure Strategy

190. Transparency of all environmental safeguard is important to ensure that environmental pollution or damage is avoided throughout the construction and operations phase of the project. Hence, all the environmental reporting prepared under this project should be available publicly. MOH will disclose in a timely manner the final IEE report, any updates to it, and other environment safeguards documentation by posting them on the MOH website. MOH will ensure that full copies of the IEE and its executive summary are translated into local language. The IEE including its EMP, environmental monitoring report, corrective action plan (if any) will also be available at the MOH office and construction site office. A full copy of the IEE will be provided upon request and will be free of charge. The IEE report will also be disclosed on ADB's website. In case of any updates are made on the IEE, the IEE will be reviewed by ADB prior to disclosure. The same procedure of disclosure will be followed.

191. All semi-annual environmental monitoring reports during construction and annual monitoring report during O&M phase will be reviewed by and ADB and will be disclosed on the ADB website and the MOH website.

192. The following Table 24 presents information to be disclosed on each of the stakeholders identified for the project.

Table 24: Information Disclosure Strategies for Maldives APVAX project

Target Stakeholder	Type of information to be disclosed	Method of Disclosure	Timing of Disclosure	Responsible Entity for disclosure
Utilities Regulatory Authority	• Dewatering Plan • Plans for solar PV installation	• Email communication • Official Letters	• Prior to any dewatering plans • Completion of concept design for solar PV installation • Once every quarter during construction period and operational period	• Contractor • Maldives APVAX PMU and MOH (Proponent)
Environmental Protection Agency (EPA)	• IEE report (and any updates) • Environmental Monitoring Report (EMRs), including corrective action plan (if any)	• Email communication • Official Letters	• Upon finalization of IEE report. • Semi-annual during construction period and annually operational period upon receipt of acceptable monitoring reports	• Maldives APVAX PMU and MOH (Proponent)
Housing Development Cooperation (HDC)	• Progress of design and construction works	• Construction Progress reports • Email communication • Official Letters	• Once every quarter during construction phase of the project	• Maldives APVAX PMU and MOH (Proponent)
Ministry of National Planning, Housing and Infrastructure	• Progress of design and construction work. • Implementation of mitigation measures to prevent structural damage to adjacent buildings.	• Construction Progress Reports • Official Letter	• During construction phase • Upon implementation of mitigation measures.	• Maldives APVAX PMU and MOH (Proponent) • Contractor and Maldives APVAX PMU
Contractor	• IEE report (including EMP) • Environmental Management Plan (EMP)	• Hard copy at project site • As part of the contract	• Prior to any construction work	• Maldives APVAX PMU and MOH (Proponent)

Target Stakeholder	Type of information to be disclosed	Method of Disclosure	Timing of Disclosure	Responsible Entity for disclosure
General Public	• IEE report, including EMP • Grievance Redressal Mechanism (GRM), • Grievance Forms • Contact details Nodal Focal Point of each tier of GRM • Semi-annual Environmental Monitoring Reports during construction and annual Environmental Monitoring Reports during operations phase	• Website • Hard copy at project site and website • Website and social media, Project Sign Board at the project site. • Hard copy at project site and website	• During construction phase • During construction phase • During construction and operations phase • During construction and operations phase	• Maldives APVAX PMU and MOH (Proponent) • Maldives APVAX PMU and MOH (Proponent) • Contractor • Contractor/MOH staff
Nearby Residents and Tree Top hospital management	• IEE report • Grievance Redressal Mechanism (GRM), • Grievance Forms (In Dhivehi and English Language) • Contact details Nodal Focal Point of each tier of GRM	• Website • Hard copy at project site • Website • Hard copy at project site • Social Media • Project Sign Board at the project site.	• Prior to construction activities • During construction phase • During construction phase	• Maldives APVAX PMU and MOH (Proponent) • Maldives APVAX PMU and MOH (Proponent) • Contractor
Regional Hospitals	• Progress on the procurement of the speed boats and refrigerated vehicles. • Procurement Plan of the Maldives APVAX Project	• Official Letters • Official Letters	• Prior to procurement and transportation of vehicles and vessels. • Once every quarter	• Maldives APVAX PMU and MOH (Proponent)

Target Stakeholder	Type of information to be disclosed	Method of Disclosure	Timing of Disclosure	Responsible Entity for disclosure
	• Progress of IT infrastructure development and capacity building works of EPI program			
ADB safeguards team	• IEE Report • Environmental Monitoring Report (EMRs), and any corrective action plans (if any)	• Email communications • Email Communication	• Upon finalization of IEE report • Semi-annually during construction and annually during operational phase of the project upon receipt of acceptable monitoring reports.	• Maldives APVAX PMU and MOH (Proponent) and ADB
Ministry of Finance (Executing Agency of the project)	• Progress of project implementation • IEE Report • Environmental Monitoring Report (EMRs), and corrective action plans (if any)	• Official Letters • Consultative Meetings	• Quarterly during project implementation period • Upon finalization of the IEE report and any updates • Quarterly during the project construction and operational phase.	• Maldives APVAX PMU and MOH (Proponent)
Male Water and Sewerage Company (MWSC)	• Dewatering plan and permit	• Official Letters	• Prior to any dewatering works	• Contractor
State Electric Company (STELCO)	• Plans for solar PV installation	• Official Letters • Consultative Meetings	• Prior to any deployment of solar PVs.	• Sub-Contractor for PV installation • Maldives APVAX PMU and MOH (Proponent)
Sub-contractors such as Solar PV installation contractor and	• IEE Report • Grievance Redressal Mechanism (GRM), • Grievance Forms	• Email communications	• Prior to commencement of subcontractors works	• Contractor

Target Stakeholder	Type of information to be disclosed	Method of Disclosure	Timing of Disclosure	Responsible Entity for disclosure
supervision firm	• Contact details Nodal Focal Point of each tier of GRM			

E. Stakeholder Engagement Plan

193. Proper engagement of the stakeholders at different phases of the project is essential for successful implementation of the project.

194. This section of the IEE report will describe the proposed stakeholder engagement plan for the project.

Table 25: Stakeholder Engagement Plan for the Maldives APVAX project

Stakeholder	Stakeholder Classification	Topics of Engagement	Method	Frequency	Expected Outcome of Stakeholder Consultation
Utility Regulatory Authority (URA)	Government	• Dewatering Permit • Approval of Solar PV installation Plan	• Official Letters • Consultative Meetings • Email Communication	• Annually	• Approved Dewatering Permit • Approved concept of solar PV installation
Environmental Protection Agency	Government	• Environmental Monitoring Reports • Environmental Screening	• Official Letters • Consultative Meetings • Email Communication	• Quarterly	• Outcome of Environmental Screening
Housing Development Cooperation (HDC)	Government	• Site mobilization • Progress of design and construction • Road closure if any • Permits required for dewatering		• Monthly during construction phase and annually during operational phase.	• Permits required • Approval for road closure if any
Ministry of National Planning, Housing and Infrastructure (MNPHI)	Government	• Project Development Concept • Construction Permit • Any changes in design and construction methodology	• Official Letters • Consultative Meetings	• Monthly during construction phase and annually during operational phase.	• Project Development Concept • Construction Permit • Approval for any design changes
Contractor	Private	• Progress of construction works	• Monthly progress meetings	• Monthly	• Smooth Implementation of the project • Any grievance resolved

Stakeholder	Stakeholder Classification	Topics of Engagement	Method	Frequency	Expected Outcome of Stakeholder Consultation
		• Implementation of EMMP • Implementation of GRM			
General Public	Public	• Road closure • Any damage to nearby property • Any grievance	• Public Meetings • Social Media • Website of HDC and MOH	• Need Basis	• Any grievance resolved • General approval for the project
Nearby Residents and Tree Top hospital management	Public	• Road closure • Any damage to nearby property • Any grievance	• Public Meetings • Social Media • Website of HDC and MOH	• Need Basis	• Any grievance resolved • General approval for the project
Regional Hospitals	Government	• Procurement of speed boats and refrigerated trucks • Transport of vaccine during operational period	• Telephone or online meetings • Official Letters	• Quarterly	• Information on status of procurement and transfer of speed boats and refrigerated trucks
ADB safeguards team	Donor Agency	• Implementation of EMP • Implementation of GRM • Progress of Environmental Monitoring works	• Online meetings • Implementation missions	• Semi-annually during construction phase and annually during operations phase	• Comments on EMRs and EMMP implementation.
Ministry of Finance (Executing	Government	• Progress of project implementation	• Consultative meetings	• Quarterly	• Verification of reports prior to ADB submission

Stakeholder	Stakeholder Classification	Topics of Engagement	Method	Frequency	Expected Outcome of Stakeholder Consultation
Agency of the project)		• Financial management of the project • Disclosure of IEE and EMRs			
Male Water and Sewerage Company (MWSC)	Government	• Dewatering Plan • Connection of piped water to the facility	• Consultative Meetings	• Need Basis	• Smooth Dewatering process • Connection of piped water to the central vaccine cold-chain storage facility
State Electric Company (STELCO)	Government	• Deployment of solar PV at the facility	• Consultative Meetings	• Need Basis	• Deployment of solar PV system in the facility. • Electricity connection to the facility
Sub-contractors such as Solar PV installation contractor and supervision firm	Private	• Implementation of GRM • Coordination with the main contractor	• Consultative Meetings	• Need Basis	• Successful coordination with main contractor, proponent, and key stakeholders.

V. GRIEVANCES REDRESS MECHANISM (GRM)

A. Introduction

195. Grievance Redressal Mechanism (GRM) is designed to ensure sustainability, transparency, and involvement of stakeholder throughout the implementation of the project. This would generate significant level of feedback on areas to improve as the project progress during both construction as well as operation phase.

196. This GRM is designed to fulfil the requirement of the ADB SPS. This GRM is designed based on the principles of transparency, predictability, rights compatibility, accessibility, and engagement of stakeholders.

B. Scope and Objective of GRM

197. This GRM is aimed to record, monitor, and resolve grievances/complaints and accommodate where possible any request and suggestions proposed by the project affected parties. The scope of this GRM is to redress any grievances/complaints regarding the environment and social safeguards. Any grievance/complaints which may arise in the project area however not due to a direct or indirect intervention of a project activities will not be addressed under the GRM. The GRM will be implemented during the construction and operations phase of the project.

C. Grievance Resolution Process

198. The GRM built on four stages. The complaint will be followed in two tiers. Figure 16 shows the grievance resolution process.

D. Stages of GRM

199. The GRM comprises of four stages. GRM will also undertake in two tiers, first tier will be at contractor level and second tire at MOH level. Each tier will have different actors for decision making process.

200. **Stage 1: Received the compliant:** This stage involves recording of the complaint that is received on the project. The complaints may range from “issue or complaint’ to an enquiry or suggestions for further improvements. The complaints, enquires or suggestions is also registered at the registry and a case is to be created. At the end of this stage an acknowledgement of the receipt of complaints, enquires or suggestions is issued to the aggrieved party or individual with a case number.

201. **Stage 2: Assessing the Compliant**: At the second stage, the complaint is screened. Regardless of the nature of the complaint it would be categorized as either environmental or social issues. The criteria for determination of environmental issues are noise, pollution, dust, discharge of pollutants, health and safety or other parameters as determined by ESS Consultant of the project. The environmental and social safeguards related complaints/enquires/suggestions will be

taken forward in this GRM. The non-safeguard related issues will be sent to contractor for their action. The outcome of that action will be informed by them accordingly.

202. **Stage 3: Investigation the Complaint:** This stage involves collection of information about the complaints/enquires/suggestions, assessment of the information provided, and verification of the data provided with field investigation (if and where necessary). At this stage the First and Second tier of GRM will operate. After a report prepared by the contractor ESS focal point, the report and its recommendation is sent to either the Grievance Redressal Committee at contractor level (GRC-Contractor) or Grievance Redressal Committee at MOH level (GRC-MOH). Based on the discussion, a decision would be made and agreed by consensus. If corrective actions measures are needed the corrective measures will be informed to the site manager or contractor for their due actions.

203. **Stage 4: Resolving the complaint:** At the end of stage 3 irrespective of the tier the compliant underwent, the aggrieved party or individual will be informed on the outcome and information on the corrective measures will be also communicated if relevant. After such communication the case would be closed, and status of the cases would be updated in the registry.

E. Tier One

204. To lodge a formal complaint under Tier I, compliant form should be submitted (see Appendix 4). These forms can be filed anonymously. Upon submission of the request, a formal acknowledgement from the Contractor shall be provided to the party or individual. If the party or individual want to submit in-person forms shall be available at the site. Any assistance such as filling the form if requested by the aggrieved person, should be guided by the admin office at the site. An acknowledgment receipt then should be signed, sealed, and handed with case number.

205. The admin office at the site, shall keep the registry up to date with cases number and status of the complaint. The formal complaint shall be then screened for environmental or social safeguard issues, based on the criteria's mentioned above. After the screening of the issue, the contractor after consulting with PMU shall prepare an investigation report, which is to be submitted before GRC-contractor. Table 26, shows the role and responsibility of the GRC-contractor.

206. Under Tier I, in 10 working days the outcome of the complaint must be informed to the aggrieved party or induvial. The aggrieved party must acknowledge the receipt of decision and submit their agreement or disagreement with the decision within 5 working days. If no acknowledgement is submitted from the aggrieved party within this period, then the decision will be considered as accepted. If a complaint requires more time to address, this requirement must be communicated to the aggrieved party in writing and the aggrieved party must consent and sign-off the request for the extension to take effect. An extension can be made to an additional 15 working days.

Table 26: Roles and Responsibilities of the GRC-Contractor

Nodal Person	GRC-RDC Membership	Roles and Responsibility
GRM focal point from Contractor	Project Manager of Contractor (*Chairperson*) Site Engineer Representative from HDC NGO Representative PMU ESS focal point	Review the recommendation provided by PMU on the inquiry submitted Identify policy implication associated with the inquiry inquired Provide guidance on the inquire through agreement of the outcome to be informed to aggrieved party or individual

F. Tier Two

207. Tier II can be applied by any party or individual or if the grievance cannot be resolved through Tier 1 to the satisfaction of the aggrieved party or if the issue is outside the jurisdiction of the Contractor, an aggrieved party may submit a complaint on the Tier II Complaint form. If the compliant is made due to unsatisfactorily response at Tier I, the application form and the outcome provided should be submitted. Like Tier I, upon submission of the request, a formal acknowledgement from the MOH shall be provided to the party or individual. If the party or individual want to submit in-person forms shall be available at the MOH. Any assistance such as filling the form if requested by the aggrieved person, should be guided by MOH. An acknowledgment receipt then should be signed, sealed, and handed with case number.

208. MOH will screen the grievance complaint in consultation with the PMU in accordance to the criteria for screening mentioned above. If it is unrelated, the aggrieved party must be notified in writing and the way forward must be outlined to them including the necessary government institutions to follow up.

209. After the screening of the issue, MOH after consulting with PMU shall prepare an investigation report, which is to be submitted before GRC-MOH. Table 27 shows the role and responsibility of the GRC-MOH.

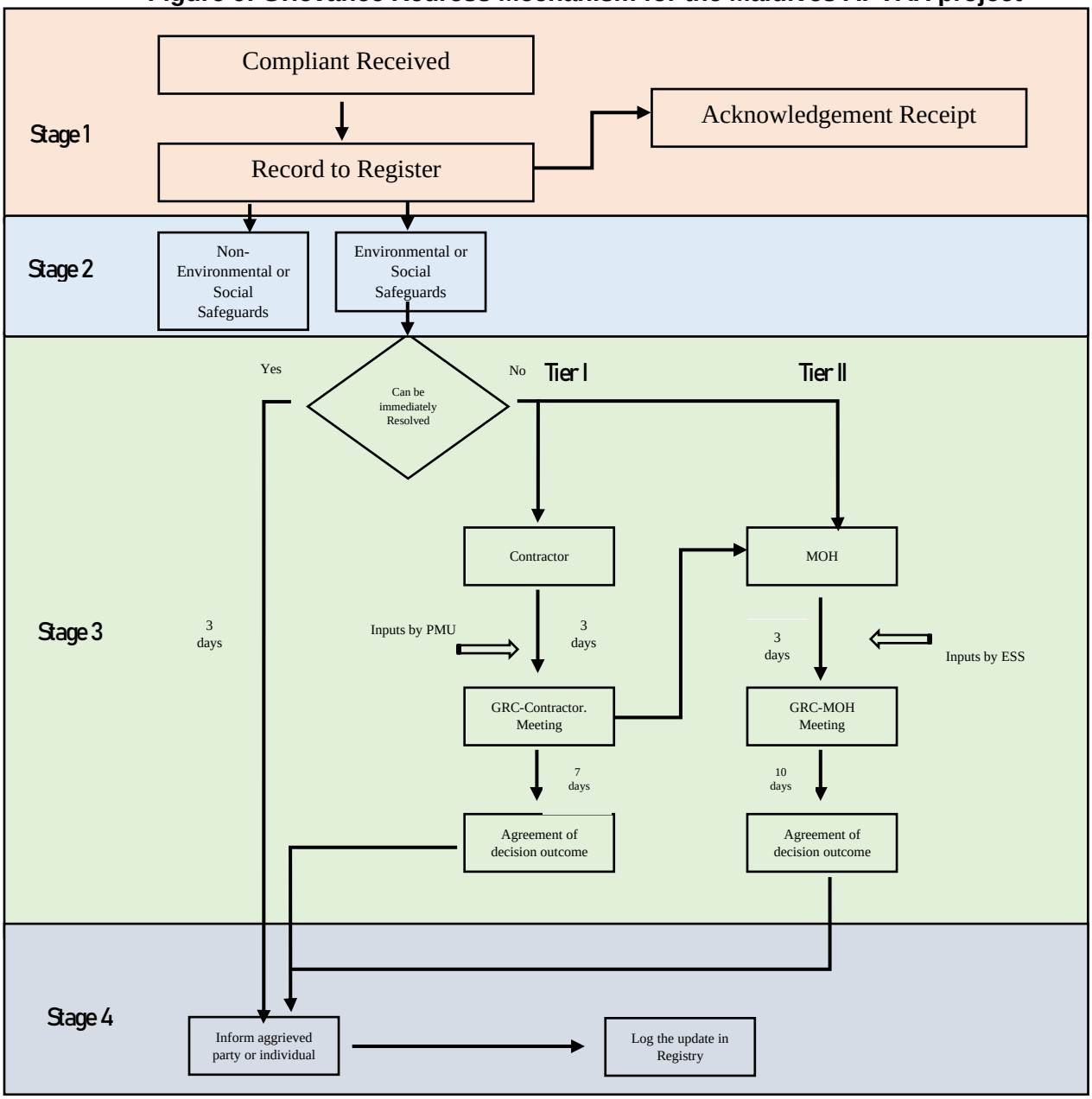
210. Under Tier II, in 15 working days the outcome of the complaint must be informed to the aggrieved party or induvial. The aggrieved party must acknowledge the receipt of decision and submit their agreement or disagreement with the decision within 5 working days. If no acknowledgement is submitted from the aggrieved party within this period, then the decision will be considered as accepted. If a complaint requires more time to address, this requirement must be communicated to the aggrieved party in writing and the aggrieved party must consent and sign-off the request for the extension to take effect. An extension can be made to an additional 15 working days.

Table 27: Role and Responsibilities of GRC-MOH

Nodal Person	GRC-MOH Membership	Roles and Responsibility
GRM focal point from MOH	Representative for MOH*(Chairperson)* Project Manager of Contractor NGO Representative PMU ESS focal point	Review the recommendation provided by ESS on the inquiry submitted Identify policy implication associated with the inquiry inquired Provide guidance on the inquire through agreement of the outcome to be informed to aggrieved party or individual

211. Where an affected person is not satisfied with the outcomes of all the levels of the project GRM, the affected person should make good faith efforts to resolve issues working with the South Asia Regional Department. As a last resort, the affected person can access ADB's Accountability Mechanism (ADB's Office of Special Project Facility or Office of Compliance Review). The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of the project GRM

Figure 9: Grievance Redress Mechanism for the Maldives APVAX project



G. Grievance Registry

212. A grievance registry will be developed under this project. The following Table 28 include the format of the grievance registry.

Table 28: The format for the grievance registry

Sl. No	**Date**	**Name and Full Contact Information of Complainant** If confidentiality is requested, highlight here.	**First Registered By**	**Mode of Complaint**	**Detailed description of complaint**	**Date and content of communication to complainant** (date complaint acknowledged by GRM level 1/2/3, feedback sent, etc.)	**Date of meetings held and outcome/timeline agreed for resolution and action plan** (attach minutes of meetings)	**Status of Redress** (outstanding, overdue, solution agreed upon, solution under implementation, resolved)	**Other Remarks**

H. GRM During Operational Phase

213. During operations phase, the GRM will continue to operate through the MOH. The MOH shall ensure:

i. GRM as described above shall continue to be operationalized
ii. A GRM focal person within MOH will be assigned for environmental and social grievances reporting. This is particularly important during the initial phase of the project operation where the actual impacts of the project will be known on the ground.
iii. Proper recording of grievances and their solutions should be kept with the site office and submitted to national agencies as and when sought.
iv. Any grievances filed and how the grievances have been resolved shall be documented in the annual environmental monitoring reports during operations phase.

VI. INSTITUTIONAL ARRANGEMENTS

A. Introduction

214. This chapter aims to provide overview of the institutional arrangement for project implementation, key stakeholders, and implementation arrangements for environmental safeguards.

B. Institutional Arrangement for Project Implementation

215. ERROR! REFERENCE SOURCE NOT FOUND. following figure 17 shows the institutional arrangements for implementation of the project. The following table 29 describes the key roles and responsibilities of these stakeholders.

Figure 17: Implementation Arrangement for Maldives APVAX project

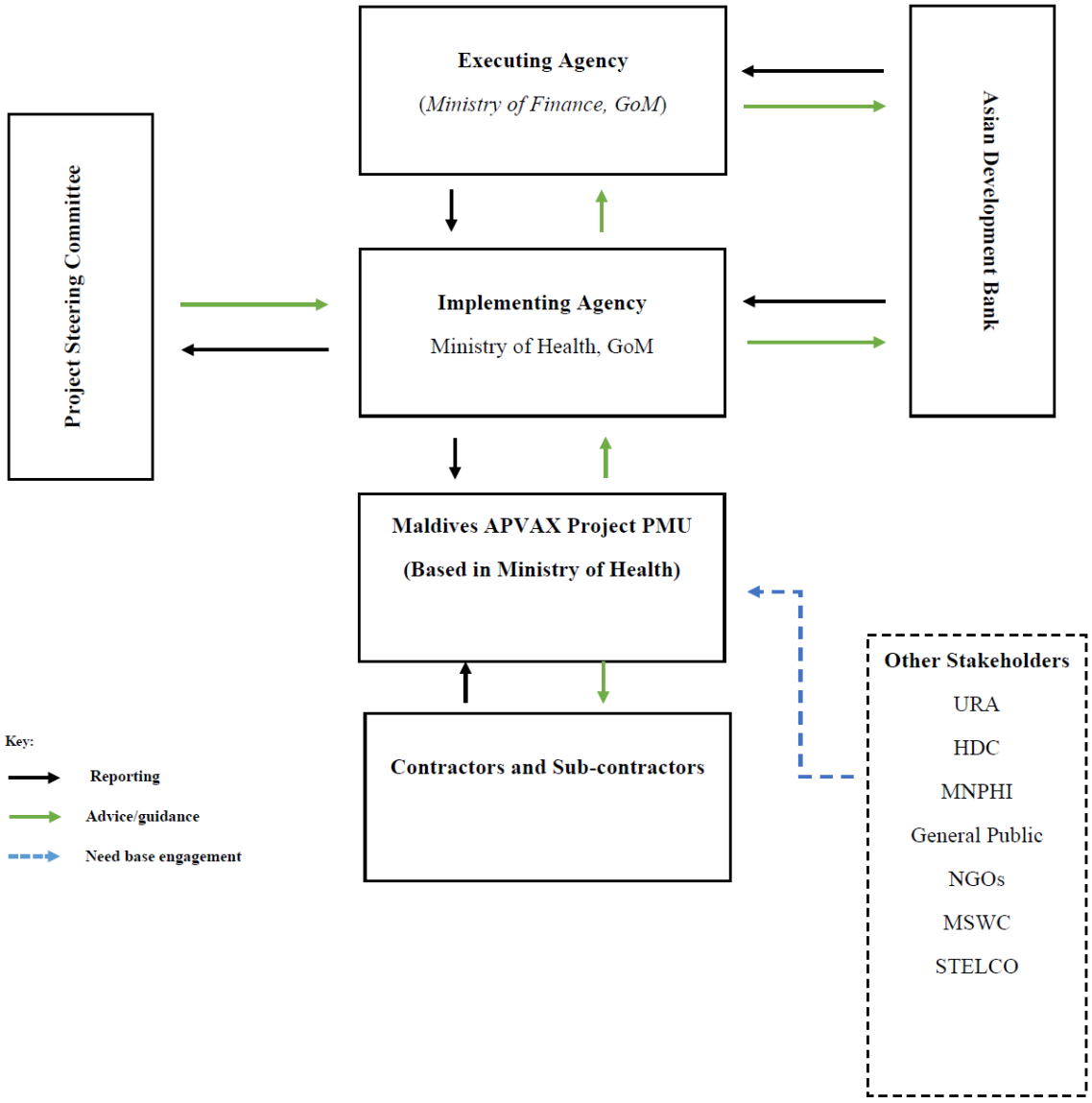


Table 29: Roles and Responsibilities of the stakeholder for implementation of the project

Stakeholder	Role and Responsibilities in project implementation
Ministry of Finance (MOF)	• Executing Agency of the Project • Oversee overall implementation of the project • Coordinate with Implementing Agency and ADB to ensure all the safeguards requirements are complied with
Ministry of Health (MOH)	• Implementing Agency of the Project • Assess and provide overall guidance to the implementation of the project • Provide technical assistance for the PMU for project implementation

	• Liaise with donors to ensure all the requirements of the donor are fulfilled during the implementation stages • Coordinate with Executing Agency and ADB to ensure environmental requirements identified are complied with • Second tier focal point for Grievance Redress Mechanism (GRM) related to the implementation of project • Maintenance of Grievance registry
PMU	• Day-to-day implementation of the project activities • Carry out environmental monitoring works • Focal point for Tier 1 and Tier 2 GRM • Financial Management of the project • Procurement related works of the project
Project Steering Committee (PSC)	• Chaired by the project director will be responsible for decision making on the project related issues. • Monitor progress of project implementation and achievement of project objectives.
Asian Development Bank	• Ensure that project is in line with ADB SPS • Review IEE (and any updates) and EMRs and disclose IEEs/EMRs in accordance with ADB's Access to Information Policy • Monitor the progress of project implementation • Conduct review missions on project implementation • Provide technical guidance, as necessary
Other Stakeholder	• Provide technical guidance and monitor the implementation of the project
Contractors and sub-contractors	• Carry out the physical construction and installation works of the project • Tier 1 focal point of GRM • Ensure that a full-time Environment, Health and Safety officer is assigned, and health and safety plan approved by the PMU is included in the EMP.

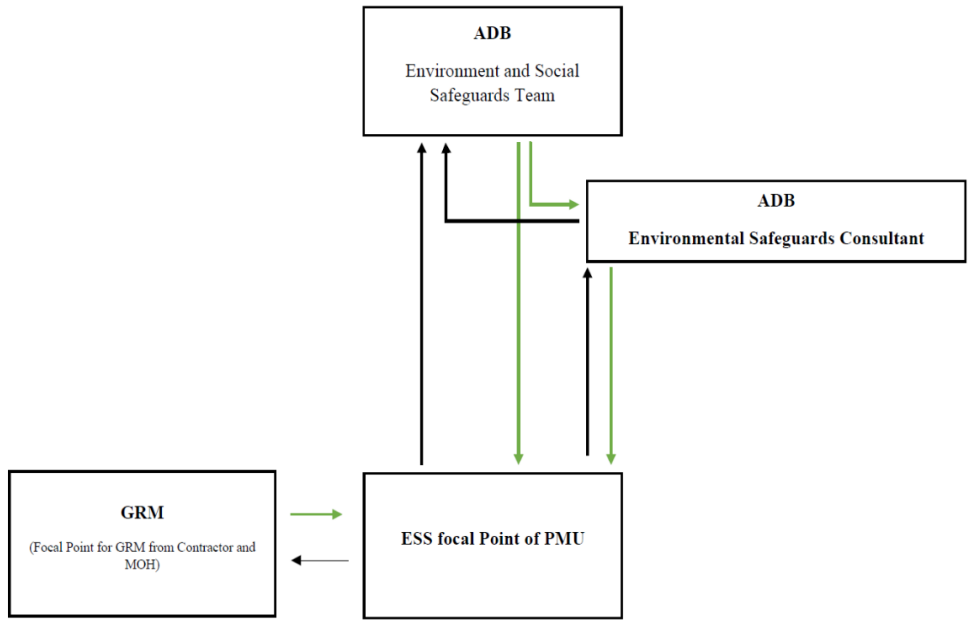
C. Institutional Arrangement for implementation and monitoring of environmental safeguards

216. Even though this IEE attempts to provide measures to address environmental impacts associated with the project, unforeseen impacts may arise during the construction as well as the operation phases. Hence, appropriate environmental safeguard monitoring arrangements should be in place throughout all the phases of project implementation. Figure 18, illustrate the institutional arrangements for environmental safeguard implementation and monitoring.

217. The main objectives of the safeguard implementation and monitoring are

i. Monitoring implementation of agreed mitigation measures as proposed in the EMP
ii. Evaluate effectiveness of the mitigation measures and retrofit of mitigation measures.

Figure 10: Institutional Arrangement for implementation and monitoring of environmental safeguards



ADB = Asian Development Bank, ESS = . GRM = , PMU =

Source: Asian Development Bank

218. The following table 30 describes the roles and responsibilities of each entity for the implementation and monitoring of environmental safeguards of the project.

Table 30: Roles and Responsibilities of implementation and monitoring of environmental safeguards

Entity	Key Roles and Responsibilities
ADB Environmental and Social Safeguards Staff	▪ Guide the Environmental Safeguards Consultant and ESS focal points at PMU on safeguard implementation and monitoring. ▪ Ensure the quality of the Environmental Monitoring Reports (EMRs) and disclose in ADB website in compliance with ADB SPS (2009) and Access to Information Policy.
ADB TA Environment Safeguards Consultant	▪ Provide technical guidance to PMU focal in monitoring the implementation of environment safeguards, including EMP and in preparation of EMRs during construction and operational phase. ▪ Conduct technical capacity building sessions for PMU ESS focal point and other stakeholders on monitoring of safeguards during construction and operational phase.
ESS focal point (staff) at MOH	▪ Ensure adequate budget, institutional/management support, and staff resources are allocated to implement, supervise, and monitor the EMP throughout pre-construction and construction.

	▪ Upon loan effectiveness appoint a suitably qualified and experienced ESS focal (consultant) within PMU who will assist in EMP implementation. ▪ Oversee day-to-day management of the environmental and social safeguards aspects of project implementation during operations phase and ensure compliance with ADB's Safeguard Policy Statement 2009, the project's loan covenants and EMP requirements, and national regulatory requirements with regard to environment and social safeguards. ▪ Prepare quarterly progress reports on environmental safeguards and annual EMRs with guidance from ADB TA Environmental Safeguards Consultant during operations phase for submission to ADB. ▪ Maintain records of all grievances received.
ESS focal point (consultant) of PMU at MOH	▪ Oversee day-to-day management of the environmental and social safeguards aspects of project implementation during pre-construction and construction and ensure compliance with ADB's Safeguard Policy Statement 2009, the project's loan covenants and EMP requirements, and national regulatory requirements regarding environment and social safeguards. ▪ Prepare quarterly progress reports on environmental safeguards and semi-annual EMRs with guidance from ADB TA Environmental Safeguards Consultant during construction phase for submission to ADB. ▪ Ensure that bid documents and contracts are in accordance with the EMP requirements prior to contract award. The contract will explicitly exclude the use of any asbestos containing materials, require the contractor to prepare a Construction EMP (CEMP) and undertake a health and safety (H&S) risk assessment including COVID-19 risks amongst others. ▪ Review and approve in a timely manner the contractor's detailed designs and their CEMP and sub-plans to ensure they are in accordance with the EMP requirements. ▪ Update the IEE/EMP as necessary and locally disclose any updates (i.e. if unanticipated impacts or changes in scope or design occur during implementation). Any updated IEE/EMP must be submitted to ADB for clearance and disclosure on the ADB website before any related works commence or are cleared to continue. ▪ Undertake continuous consultations to inform of progress with project implementation including prior to finalization of detailed designs, giving attention to consultations with women and other vulnerable groups. All ongoing consultation, such as, minutes of the meetings will be documented in the EMRs submitted to ADB. ▪ Upon loan effectiveness, assist the MOH in the establishment of the GRM All grievance-related information will be documented in the EMRs submitted to ADB. Coordinate Tier 1 and Tier Two GRCs. ▪ Maintain Tier 2 and Master Grievance registry.

ESS focal point of contractor	▪ Prepare and submit CEMP and Health and Safety Plan to ESS focal at PMU for review and approval prior to the commencement of works. ▪ Monitor day-to-day implementation of environment, health and safety measures, ensuring that all construction workers including all formal and informal employees and subcontractors understand their responsibilities to implement the EMP and mitigate environmental impacts associated with pre-construction and construction activities. ▪ Undertake environmental monitoring as set out in the Environmental Monitoring Plan during pre-construction and construction and documenting qualitative and quantitative monitoring results to be included in the monthly monitoring report. ▪ Immediately inform MOH in case of any design changes or unanticipated environmental impacts occurring during the project implementation stage before any changes are implemented. ▪ Immediately inform MOH in case of any non-compliance and help them to prepare as necessary a corrective action plan for clearance by ADB. ▪ Ensure that the contact information of the ESS focal point of contractor is shared on the project signboard and to relevant projects stakeholders. ▪ Facilitate the resolution of grievances and maintain records of all grievances received. ▪ Submit monthly monitoring reports to ESS focal (consultant) of PMU.

VII. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

D. Introduction

219. This section of the IEE report will provide information on the Environmental Management Plan (EMP) for the project. This section will prescribe an environmental monitoring program which will be implemented by the contractor under the close supervision of ESS focal point of PMU.

220. It is recommended to include the following EMP (Construction Phase) in the bidding document and contract for construction of central vaccine cold chain storage facility to ensure the compliance of the contractors with the provisions of this EMP.

221. The following table 31 is the EMP for the project.

Table 31: Environmental Management Plan for construction and operational phase of central cold-storage facility for Hulhumale

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
PRE-CONSTRUCTION/CONSTRUCTION PHASE						
LABOUR MANAGEMENT						
Local Workers	Low employment opportunity to locals	Responsible Recruitment of local workers	Local workers shall be prioritized during the recruitment process	Contractor	MOH	
Terms and Conditions	In adequate understanding of the Terms of Reference and scope of the hired workers	Transparent communication process	Clear communication of all the renumerations to works needs to be presented including working hours, insurance and other key benefits	Contractor	MOH	Mitigation cost to be included in the bid document
		Well defined scope and terms within contract	Well documented and recorded contracts with workers	Contractor	MOH	
	Increase of foreign workers without proper work permit	Compliance with Foreign workers regulations	Necessary work visa is ensured to all foreign workers	Contractor	MOH	
	Increased in forced foreign labour	Well defined scope and terms within contract	A standalone clause needs to be included in the contract to ensure recruited workers do not pay any fee/bond/withhold of personal identification documents including passports	MOH	MOF	N/A
Accommodation facilities (mostly	Exposed to health risks	Provide safe accommodations,	The accommodation facilities for all workers	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
applicable for foreign workers)	including COVID 19 outbreak at the accommodation facilities.	clean water, access to proper sanitation facilities and adequate waste management	shall be safe and should have all basic essential services including water, sanitation, and proper waste management. Additionally, hygiene products such as sanitizers shall be installed in site to reduce any COVID 19 outbreaks			
	Inadequate water and food supplies	Provision of Clean Water	Supply enough potable water and sanitation facilities in every workplace and work site at suitable and easily accessible places	Contractor	MOH	
		Food provision	Minimum 03 meals shall be provided to construction staff per day	Contractor	MOH	
Decent Work	Extra-long hours		Worker shall not be forced to work for more than 48 hours per week	Contractor	MOH	
			Worker shall not be made to work for more than 6 days a week consecutively without providing 24 hours for rest	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Worker shall not be made to work continuously for more than 5 hours without providing a break for at least 30 minutes	Contractor	MOH	
	Withholding renumerations or benefits	Compliance with the regulations	Salary should be paid to all permanent contract workers once a month, and should be recorded and maintained	Contractor	MOH	
PROCUREMENT AND MANAGEMENT OF CONSTRUCTION MATERIALS						
Coral and Sand Mining	Significant impact to marine and coastal environment	Compliance with regulations	Include in contract that use of any coral for construction is strictly prohibited	MOH	MOF	
Imported Materials	Introduction of non-native species	Compliance with regulations	Include in contract that any non-native species is strictly prohibited	MOH	MOF	
Health and Safety	Accidents or unforeseen injuries during storage of materials	Location control	Designate loading and unloading location within the site	Contractor	MOH	
		Maintain air quality	Construction materials needs to be properly covered	Contractor	MOH	
		Prevention of hazard risks including fire and oil spills	Flammable equipment and hazardous materials need to be adequately stored.	Contractor	MOH	
	Accidents or unforeseen injuries during	Controls	Avoid overloading of materials to the vessels	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
	storage of materials during transportation	Controls	Ensure coverage of vessels during transportation	Contractor	MOH	
		Traffic flow	Undertake transfer of materials during low traffic hours to minimize nuisance to public	Contractor	MOH	
Damages to public infrastructures	Risk of damages to roads due to heavy transportation of materials	Control, Clean and Repair	Ensure overloading is avoided and clean any accidental spillage during transport. Repair of any damaged roads or infrastructures due to transportation	Contractor	MOH	
SITE MANAGEMENT						
Access to sites	Injuries and accidents for trespassers	Information	Place a proper project information billboard specifying, project name, contractor, financing entities, project value and contact information. Safety signage boards shall be erected	Contractor	MOH	
		Control measures	Adequate, safe and neat fencing shall be erected to cover the entire perimeter of the construction site using cost effective fence materials consisting of	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			chain link fence fabric, concrete post, etc. as specified in the Technical Specifications in order to ensure public are unable to access the site.			
Site clearance	There is no significant flora or fauna at the sites.	Information	There are no shrubs nor trees to be removed. However, in case of any need, careful removal of the shrubs from the sites and necessary permits and will be secured and any conditions (i.e. replanting) will be implemented.	Contractor	MOH	
Mobilization of equipment	Decreased air quality	Maintain air quality	Careful transport of materials to the sites. Delivery trucks will be covered and trucks and mobile equipment will be properly maintained.	Contractor	MOH	
UTILITY SERVICES						
Ground Water	Pollution of groundwater	Source water from MWSC	Do not obtain water for project purposes from any public or community water taps.	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Waste will be properly disposed of through WAMCO.			
Electricity	Electrocution and safety risks	STELCO	Ensure electricity is supplied from STELCO Ensure that a Health and Safety Plan is approved by PMU and implemented by the contractor prior to commencement of works.	Contractor		
GENERAL CONSTRUCTION WORKS						
Pollution Control	Increase waste dumping and pollution	Proper waste management system	Ensure all construction waste are sorted	Contractor	MOH	
			Ensure all waste generated during the construction period is safely disposed at Thilafushi or designated sites for waste disposal by proponent	Contractor	MOH	
Health and Safety	Accidents or unforeseen injuries during constructional period	Workers Safety measures	Ensure safe working environment for workers are provided. These include provision on adequate safety equipment such as safety shoes, helmets	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Ensure safety net during the construction period	Contractor	MOH	
			Protective footwear and protective goggles should be provided to all workers employed on mixing of materials like cement, concrete etc.	Contractor	MOH	
			Provision and availability of a well-stocked and equipped first aid kit and proper mechanism or protocol to attend medical emergencies	Contractor	MOH	
		Signage boards and information	Put up signage with instructions on first aid management, emergency contact and emergency operational procedures in Dhivehi and other language including but not limited to Bangala	Contractor	MOH	
			Prepare a sign board with names and contact information for emergency services such as ambulance, hospitals, police and the fire services and	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			display at the work site. This board also need to have contact information for GRM			
			All workers should be provided with health and safety information appropriate to the work that they undertake	Contractor	MOH	
		Training	Conduct onsite safety training for all laborers during the EMP training prior to the start of construction activities	Contractor	MOH	
			Provide training to laborers on the risks of working in a tropical open project site	Contractor	MOH	
			Provide regular training on implementation of EMP.	Contractor	MOH	
		COVID 19 Hygiene Products	Ensure availability of hygiene facilities within the construction sites including sanitizers, hand washing platforms	Contractor	MOH	
			Establish working environment protocols in accordance with the guidelines set by	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Health Protection Agency to slow the spread of COVID 19 in workplace and construction sites. (see Appendix H)			
		Risk reduction	Special precaution must be undertaken to ensure workers are safe from risk of electrocution. No open electrical wiring or cables shall be kept on site	Contractor	MOH	
		Communication	All communication to workers shall be presented in the local languages and in the case of migrant workers in their local language as well.	Contractor	MOH	
		Emergency procedures	Ensure Emergency Response procedures are in place and communicated to all workers. Always ensure availability of suitable transport to take injured or sick person(s) to the nearest hospital	Contractor	MOH	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			(Hulhumalé Hospital), which is located in Hulhumalé Phase I.			
		Monitoring	Prepare a safety inspection checklist taking into consideration what the workers are supposed to be wearing and monitor and record monthly	Contractor	MOH	
DEMOBILIZATION AND HANDOVER TO PROCESS						
Health & Safety			Remove all excess material, equipment, vehicles from the project site prior to complete demobilization	Contractor	MOH	
			Dismantle all temporary site offices and remove from the site	Contractor	MOH	
			If the storage site has been dilapidated in any way as per the evaluation of the engineer, reinstate it to the original condition prior to demobilization	Contractor	MOH	
OPERATIONAL PHASE						
Ground Water	Pollution of groundwater	Source water from MWSC	Do not obtain water for operation purposes	MOH	MOF	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			from any public or community water taps. Ensure proper disposal of solid and liquid wastes.			
Soil waste	Increase waste dumping and pollution	Proper waste management system	Ensure all waste are placed in the designated areas with adequate safe practices and guidance by WAMCO and HPA, and in accordance with WHO guidelines on waste management. Ensure that appropriate temperature is maintained in cold rooms to prevent vaccine wastage.	MOH	MOF	
Health and Safety	Accidents or unforeseen injuries during storage of materials	Location control	Designate loading and unloading location within the site	MOH	MOF	
	Hazard risks including fire and oil spills	Health and Safety Plan and Emergency Response Procedures	Ensure adequate budget for the Health and Safety Plan and Emergency response Procedures.	MOH	MOF	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Provide training to involved workers on the plans and procedures, including use of PPEs. Provide appropriate PPEs to workers. Flammable equipment and hazardous materials need to be properly labelled and stored. Smoking should be forbidden, and "No Smoking" signs should be displayed throughout the store. The building should be fitted with fire and smoke detectors connected to an external alarm sounder. If possible, the alarm system should have an automatic telephone connection to the fire service.			

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			There should be at least one carbon dioxide or powder fire extinguisher close to the entrance door for extinguishing electrical fires. In addition, there should be at least two carbon dioxide, powder or water extinguishers within 30 meters of any part of the vaccine store for extinguishing other types of fire. Fire-detection and fire-fighting equipment must be inspected regularly, and staff must receive adequate training in fire-fighting techniques and emergency action. There should be regular fire drills. Special precaution must be undertaken to ensure the place is safe from risk of electrocution. No open electrical wiring or			

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			cables shall be kept on site. This needs to be addressed and maintained by MOH Ensure Emergency Response procedures are in place and communicated to all workers. Always ensure availability of suitable transport to take injured or sick person(s) to the nearest hospital (Hulhumalé Hospital). In consultation with National Disaster Management Authority (NDMA), emergency operational plan is formulated, and regular drills shall be conducted.			
	COVID-19 risks	Health and Safety Plan	Ensure availability of hygiene facilities within the sites including sanitizers, hand washing platforms	MOH	MOF	

Feature	Impacts	Method Proposed	Proposed Mitigation Measures	Institution Responsibility		Mitigation Cost (MVR)
				Implementation	Supervisory	
			Establish working environment protocols in accordance with the guidelines set by Health Protection Agency to slow the spread of COVID 19 in constructional sites			
		Monitoring	Prepare a safety inspection checklist taking into consideration what the workers are supposed to be wearing and monitor and record monthly	MOH	MOF	
		Medical Waste Management	Ensure that all the medical waste generated through immunization program and expired vaccines are managed properly.	MOH	MOF	
		Pest Control	Good housekeeping practices must be observed to minimize infestation by insects, rodents, bats or other pests.	MOH	MOF	

VIII. ENVIRONMENTAL MONITORING PLAN

222. Environmental monitoring is the systematic measurement of key environmental indicators over time within a particular geographic area (Joseph et al 2015). It is an integral part of any environmental assessment. It shows how the project has or is impacting the baseline environmental conditions that have been assessed as the part of the environmental assessment. It identifies the degree and magnitudes of the predicted environmental impacts for the project are felt on the environment as a result of project implementation. Thus, it will help in implementing the mitigation measures that are already identified in this report or implement further measures if the impacts are identified to be bigger than anticipated.

Aim and Objective of Environmental Monitoring Plan

223. The aim of the proposed environmental monitoring plan is to provide information which would enable effective impact management. Furthermore, the monitoring plan is aimed to better understand how the predicted impacts have impacted the baseline environmental condition hence the impact prediction and effectiveness of mitigation measures can be better understood. Monitoring activities including laboratory analysis for air quality, noise and groundwater are to be carried out by a suitably qualified, experienced, and licensed third-party monitoring organization. Quantitative monitoring activities may be modified during project implementation, depending on the contractors' performance and analytical results obtained. If performance is worse than expected, corrective action will be identified, and environmental monitoring activities will be adjusted accordingly with MOH approval.

224. Among other things, environmental monitoring plan will measure the following environmental indicators:

i. Ambient Air Quality (vs. IEE baseline)
ii. Noise Level (vs. IEE baseline)
iii. Groundwater quality (vs. IEE baseline)

225. The proposed monitoring will ensure that these measured parameters are kept within the baseline limits and predicted impacts are accurate and mitigation measures has been taken effectively.

226. In addition to quantitative monitoring described above, there will also be supervision and monitoring of compliance with applicable laws and regulations, EMP implementation, compliance with safeguards-related loan covenants, and status of grievance redress mechanism.

IX. ENVIRONMENTAL MONITORING REPORT

A. Reporting Format

227. A detailed template of the Environmental Monitoring Report has been attached to the Appendix 5 of this IEE report.

B. Frequency of Reporting

228. Environmental monitoring will commence from the project's loan effectivity and will be continued during operations phase until a project completion report is issued. Semi-annual monitoring reports will be submitted to ADB semi-annually during construction phase and annually during operations phase. Environmental monitoring reports will be submitted to ADB within 30 days from the end of each reporting period.

C. Unanticipated Impacts and Noncompliance

229. In the event of unanticipated environmental impacts during implementation, the IEE may need to be updated and preparation of a corrective action plan for any non-compliance to environmental covenants or the applicable national requirements may be required. The corrective action plan will be time-bound, budgeted, and agreed between MOH and ADB.

D. Environmental Monitoring Plan and Cost

230. The following monitoring plan will be utilized during the construction phase and the operational phase of the proposed construction of central vaccine cold chain storage facility in Hulhumale.'

231. The funding for the monitoring will be from the project budget during the project implementation period.

Table 32: Environmental Monitoring Plan

Monitoring Requirement	Environmental Indicator	Baseline Data	Technique	Frequency	Cost (USD)	Total Annual Cost
Ambient Air Quality	$PM_{2.5}$, $PM_{10,}$ Particles, CO_2	Baseline Date of EIA	Air Quality Meter	Quarterly	200	1,200
Noise Levels	Decrease or Increase	Baseline Data of EIA	Type 2 sound meter	Every 4 months	200	1,000
Groundwater quality	Temperature, pH & salinity, Nitrate, Phosphate and Sulphate	Baseline Data of EIA	Laboratory assessment	Every 4 months	200	1,800
Total Cost					600	4,000

*Air and noise testing budgeted for the construction period; groundwater testing budgeted for the entire project implementation duration.

X. CONCLUSION

232. The IEE Report aims to address the environmental issues arising during construction and operation of the proposed construction and operation of Central Vaccine Cold-Chain Storage Facility at Hulhumale', as a project activity for Maldives: Responsive COVID-19 Vaccination for Recovery Project under the Asia Pacific Vaccine Access Facility. While the project is exempted

from preparing an EIA nor an IEE, an EMP is required for securing national environmental clearance from the EPA prior to commencement of works. Other local permits and requirements will also be secured. This IEE is prepared in compliance with ADB SPS for a category B project.

233. The components of Maldives Responsive COVID-19 Vaccination for Recovery Project which includes a central vaccine cold chain storage facility and procurement of 7 speed boats and 2 refrigerated trucks are anticipated to have impacts which are site specific and can be readily mitigated with scientifically accepted engineering measures and good housekeeping practices. The anticipated environmental impacts include temporary degradation of air quality, possibility of contamination of groundwater aquifer and temporary increase in noise level. These impacts are anticipated to occur during construction phase and are temporary and site-specific in nature. The IEE provides appropriate the mitigation measures for the identified major environmental impacts and monitoring measures.

234. As the IEE is prepared based on preliminary studies, it is recommended that the IEE and the EMP are updated based on detailed design before contract awards.

XI. REFERENCES

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XII. LIST OF APPENDIXES

1. REA Checklist for Central Vaccine Cold-chain Storage Facility
2. REA checklist for the transport vehicles and vessels
3. Environmental Standards
4. Sample grievance redress form
5. Semi Annual Environmental Monitoring Report Format
6. WHO Interim Guidance on Water, Sanitation, Hygiene and Waste Management for the COVID-19 virus
7. Water Quality Test Report
8. Standard Operational Procedures (SOP) for Waste management of used COVID-19 vaccines vials and ancillary supply
9. Guideline on Workplace Safety During COVID-19
10. Screening Decision on the Construction of a Vaccine Cold Storage Facility in Hulhumale