Initial Environmental Examination

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MLD: Greater Malé Environmental Improvement and Waste Management Project

Island Waste Management Center in Thulusdoo Island

Prepared by the Ministry of Environment and Energy of the Republic of Maldives for the Asian Development Bank.

ABBREVIATIONS

ADB	-	Asian Development Bank
AHs	-	affected households
BPEO	-	best practicable environmental option
CDW	-	construction and demolition waste
dB L_{eq}	-	continuous noise equivalent level, expressed in decibels
DMS	-	detailed measurement survey
EIA	-	environmental impact assessment
EMP	-	Environmental Management Plan
EPA	-	Environmental Protection Agency
EPPA	-	Environmental Protection and Preservation Act of 1993
GRC	-	grievance redress mechanism
HHs	-	households
IEE	-	initial environmental examination
IMO	-	independent monitoring organization
IRC	-	Inter-Ministerial Resettlement Committee
IWMC	-	Island Waste Management Centre
MEE	-	Ministry of Environment and Energy
MPW/100ml	-	most probable number (of bacteria) per 100 millilitres of water
NAPA	-	National Action Programme of Action (for climate change)
NGO	-	Nongovernment organization
O&M	-	operation and maintenance
PMDSC	-	Project Management, Design and Supervision Consultants
PMU	-	project management unit
RWMF	-	regional waste management facility
WAMCO	-	Waste Management Corporation

Contents

Executive Summary

A. Introduction

1. The Greater Malé Environmental Improvement and Waste Management Project (the project) will establish a sustainable solid waste management (SWM) system in the Greater Malé capital region and its inhabited outer islands by (i) establishing a modern waste collection, transfer, and disposal system, (ii) improving community-based outer island waste management systems, (iii) building institutional capacity for sustainable services delivery, and (iv) raising public awareness in reduce, reuse, recycle (3R) behaviors. Physical and non-physical investments are designed to curb climate change and disaster impacts while creating a cleaner environment in Maldives. The executing agency is the Ministry of Finance and Treasury (MOFT). The implementing agency is Ministry of Environment and Energy (MEE) who will establish a project management unit (PMU) comprising officials from MEE and Waste Management Corporation Limited (WAMCO). The PMU will have responsibility for overseeing project management, with support from Project Management, Design and Supervision Consultants (PMDSC).

2. The project will have three outputs: (i) Output 1: Waste collection, transfer, and disposal systems improved and made climate and disaster resilient, (ii) Output 2: Community-based outer island waste management systems targeting poor and women enhanced, and (iii) Output 3: Institutional capacity and public awareness in sustainable waste management strengthened.

3. Output 2 will provide comprehensive support to strengthen sustainable solid waste management in poor outer island communities. It includes (i) a minimum of 22 island waste management centers (IWMCs) with processing equipment (balers, glass crushers, metal presses) developed or upgraded in consultation with community targeting women and incorporating climate and disaster risk measures;[1] (ii) collection equipment for outer islands (bins, refuse collection vehicles, dump trucks) provided; (iii) capacity building of eligible island councils targeting women in waste collection, segregation, composting, recycling, and O&M; and (iv) community awareness and behavior change campaigns in 3R targeting women in outer islands delivered. As subprojects under Output 2 will be prepared after Board approval, each island is required to meet minimum eligibility and selection criteria, including safeguards, to receive support from the project.[2] The criteria are intended to ensure sustainability and is outlined in the Project Administration Manual (PAM). Output 2 will be partially funded by a Trust Fund grant focusing on poverty reduction, which will support islands in the following areas:[3] (i) IWMCs constructed in a minimum of 11 eligible islands, (ii) skills and capacity building in eligible islands targeting women provided, and (iii) awareness campaigns in 3R delivered in all outer islands.

4. This initial environmental examination (IEE) was prepared for Thulusdhoo Island IWMC based on information from the Feasibility Study[4] and according to the ADB's Safeguard Policy Statement (2009) and the applicable legislation of the Republic of the Maldives, namely the

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[1] Out of 32 outer islands, some have existing facilities but are not operational due to inadequate design and insufficient equipment which would be upgraded under the project.

[2] All 32 outer islands will be screened through the selection criteria outlined in the Project Administration Manual (PAM) and Environmental Assessment and Review Framework (EARF). Appraisal and safeguard reports will be approved by Asian Development Bank (ADB) prior to start of any project-related physical activities. Subprojects having resettlement impacts will not be included. IWMCs consist of concrete platforms, small covered sheds, segregated waste processing and storage areas, small office, fencing.

[3] Additional selection criteria for Trust Fund supported islands includes climate change vulnerability, and women participation in island councils, and is outlined in the PAM.

[4] Feasibility Report, 2017 prepared by Water solution and Kocks Consult GmbH for Maldives Ministry of Environment.

Environmental Protection and Preservation Act (EPPA) of 1993, and the EIA Regulations (pursuant to the act) of 2007. This IEE is based on preliminary design and will be will be updated during detailed engineering design and submitted to ADB for review and disclosure. No contracts can be awarded until ADB approves the final IEE.

B. Description of the Subproject

5. The scope of Thulusdhoo IWMC (the subproject) includes (i) construction of a new IWMC, based on a standard layout plan developed by the MEE comprising a secure enclosure with an impermeable concrete floors and facilities for sorting, storage and composting, (ii) provision of standardized durable waste containers, to facilitate easier loading onto transfer vessels, (iii) provision of improved collection vehicles, capable of carrying the new containers, (iv) training for council staff in composting, using simple windrows, (iv) provision of selected equipment and training in their operation and maintenance, and (v) an Information, Education and Communication (IEC) component to address perceptions on solid waste management, communication channels within the island communities, the role of women and scope for public involvement in improved solid waste management activity, in line with 3R.

C. Policy Legal and Administrative Framework

6. The law governing the protection of the environment in the Republic of the Maldives is the Environmental Protection and Preservation Act (EPPA) of 1993 (Act No 4/93) and responsibilities and procedures for conducting environmental assessments, together with the requirements for environmental monitoring of projects, are set out in the EIA Regulations of 2012. Completion of EIAs is the responsibility of project proponents and all EIA work must be carried out by registered consultants. The EIA regulations require all landfills, waste incinerators and large-scale waste storage projects to have full EIAs. The Environmental Management Plan (EMP), prepared following either the IEE or the EIA process, is prepared on a specified format and reviewed for compliance by MEE. For the subproject, all statutory clearances will be obtained prior to commencement of civil works.

7. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments and sets out the requirements for different categories (category A requiring an EIA, category B requiring an IEE, category C requiring a review of environmental implications and category F1 relating to investments through a financial intermediary). The SPS further requires the development of an environmental management plan (EMP) specifying the required mitigation and monitoring and who is responsible for implementation and public disclosure. Emphasis is placed on pollution prevention and control technologies to be incorporated during the design, construction, and operation of the project and adhering to recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.

8. This IEE was prepared to meet requirements of both Maldives EPPA and ADB SPS. The IEE will be included in the bid and contract documents. This IEE will be submitted to ADB for review and approval prior to issuance of bid documents. As this IEE is based on preliminary design, it requires updating based on detailed engineering design. No contracts can be awarded until ADB approves the final IEE. EMP implementation will be reported by MEE on a semi-annual basis until ADB issues the Project Completion Report.

D. Description of the Environment

1. Physical Resources

9. In common with all islands in the Maldives, Thulusdhoo is a reef island that has formed by a process of deposition of shallow-water carbonates and successive coral deposits from coral colonies. Underlying rock is variable in consistency, reflecting the growth patterns of the coral, which forms dense colonies (coral heads) and large voids between the heads. The unconsolidated sand and gravel on top of the rock layer is subject to seasonal conditions, particularly monsoons as well as wave action, to continual erosion and accretion, making infrastructure around the island's coast vulnerable to erosion. Soils are sandy in texture with a significant silt component, have poor nutrient status and are alkaline.

10. The climate is tropical maritime featuring two monsoon seasons, the southwest monsoon between May and September (Halhangu), and the drier northeast monsoon between December and February (Iruvai). The southwest monsoon is the stronger and monthly rainfall typically exceeds 200mm towards the end of the southwest monsoon period. Cyclones are a regular occurrence in the Indian Ocean, occurring mainly between April and December, although those that have affected the Maldives occur between October and January.

11. Temperatures are relatively constant and range between 25oC and 30oC, with the hottest period occurring in March/April and the coolest, December/January. Monthly rainfall fluctuates between around 20mm in February to over 300mm in May and is over 200mm for most of the year.

12. The tidal regime is semi-diurnal – two high and two low tides a day. The range between high and low reaches approximately 1m and for neap tides.

13. Freshwater sources are rainwater collected from roofs and groundwater that accumulates through infiltration of rainwater into a freshwater lens that forms in underlying strata.

14. Marine waters around the islands are used extensively for fishing and recreational diving. The quality of water both in and around the islands is influenced by sewerage discharge, illegal dumping of solid waste and industrial activity. Pollutants from industrial activity and waste, particularly hazardous waste, can accumulate in the sediment on the lagoon or sea floor. Significant fishing recreational diving and other water supports such as surfing take place in the water around Thulusdhoo.

15. Air pollution sources such as vehicle emissions, and emissions from other plant and machinery including diesel power generators, and industrial activity are limited, as the island has a limited number of vehicles, and two light industrial installations. Noise pollution is similarly limited, and ambient levels of wind and wave noise are high.

2. Ecological Resources

16. Coral ecosystems are extensive throughout the Maldives and have strong conservation significance. Corals are adapted to low nutrient levels, and in areas where sewage, grey water and food waste is released, which usually have relatively high phosphate and nitrate levels, algal growth will often flourish and suppress coral growth. Thulusdhoo has a low population (1,400 residents), there is therefore little immediate threat to coral colonies around the island from these sources. Pelagic fish form an important part of the local economy, both through commercial fishing

activities and game fishing. The islands have a diverse avifauna, including a significant seasonal population of migratory birds as the islands are important wintering grounds for many species that follow the Central Asian Flyway. Waste is a common attractant to birds and a risk to birdlife when toxic or otherwise dangerous waste is ingested, and also when it causes habitat damage. Thus reducing uncontrolled dumping of waste or losses during transfers will reduce the risk on bird life. Present day vegetation cover on the islands is substantially influenced by human habitation and has little biodiversity conservation significance.

17. There are 42 protected areas in the Maldives to prevent over exploitation, and improve conservation and preservation. The nearest protected area to Thulusdhoo island is 6km away, a wetland on Huraa Island.

3. Socio-Economic Factors

18. The population of Thulusdhoo according to the 2014 census is 1,408 and is predicted to rise to 2000 by 2035. The island is the capital of Kaafu Atoll. Economic activity on Thulusdhoo is dominated by the presence of a soft drink bottling plant, a boat building business and guest houses and restaurants to serve tourism. The island also has administrative activity, through its role as the capital of Kaafu. Access to education, in keeping with the national average is good, with enrolment in primary education close to 100% and literacy rates at about 98%.

19. The population of Thulusdhoo have relatively easy access to major health facilities in Malé. Existing waste management practices, particularly regular burning of household waste including plastics, poses a mild risk to people living on the vicinity who regularly breathe air that contains smoke from the burning waste.

E. Anticipated Environmental Impacts and Mitigation Measures

1. Method of Assessment

20. The potential impacts of the subproject and mitigation measures have been identified through review of the Feasibility Study prepared for the project, discussion with the designers and stakeholder consultation. Design is to be finalised and this will require corresponding updating of the IEE.

2. Environmental Impacts Related to Location

21. A proposed site for the IWMC has been identified by the island council and is subject both to approval from the Ministry of Housing and the national EIA process. The proposed site is distant from residential areas, but close to the shore.

22. Due to the proposed location close to the shoreline, the risk of loss of waste or leachate from piled household waste or composting will be mitigated by (i) ensuring that waste enters and leaves the IWMC on the landward side of the facility (ii) that detailed design includes both a system for collecting and containing leachate from piled household waste awaiting collection and from composting and (iii) that site security and management is ensured by the island council. The measures must ensure no deterioration of water quality near the IWMC.

23. The site is to be on reclaimed land which has not been colonised by mature vegetation. No impact on vegetation is envisaged.

24. The surrounding land is partly reclaimed land, and not inhabited though likely to be developed for residential and recreational use. While improved management of the IWMC will reduce odour and attraction to pests such as rodents, the effect on existing land use can be mitigated by (i) ensuring security, regular cleaning operations and maintenance takes place and (ii) planning of further developments such that receptors such as dwellings are not placed close to the facility, and preferably separated by a belt of trees or open space.

25. Due to low levels of traffic on Thulusdhoo, the transport of waste to and from the facility is not expected to impede traffic. No private property will be affected, and land acquisition will be required and there is therefore no impact.

3. Environmental Impacts Related to Construction

26. The methods to be used for site preparation and construction of the IWMC are to ensure sound environmental management and safety at all times, and to be defined by the Contractor in a Contractor's EMP submitted to the PMDSC for approval. These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practice: (i) handling of construction waste (ii) release of silt from excavations, (iii) water pollution, (iv) air and dust pollution, (v) community health and safety risks, and (viii) occupational health and safety. Impedance of traffic and noise/vibration effects are not likely to be significant due to the low population level and distance of the proposed site from residential areas.

4. Environmental Impacts Related to Operation

27. The IWMCs and management of them are intended specifically to address existing poor practices of open incineration of waste and to ensure safe and efficient handling, collection of recyclables and shipment of waste to the RWMF at Thilafushi. Impacts will include (i) addressing existing smoke nuisance and health risk and damage to the habitat in the existing dump area, and pest issues (ii) reduced losses of waste from the use of containers, though risks of breakages or mishandling of containers will be mitigated by providing operation and maintenance training (iii) potential Occupational health and safety risks, including from the handling of compost and accidents associated with operations, which are to be mitigated by training in handling of compost and of machinery, and sound supervision and management of operation of the facilities.

28. In terms of wider, global impacts, IWMCs are to be established, where they do not exist or are not operational, on each inhabited island in Zone 3. Effective institution of sound management of the IWMCs will provide a demonstration of good practice, of value to island councils and workers on other islands who need to develop capacities for improved waste management.

F. Analysis of Alternatives

29. The main alternative is to rehabilitate and extend the existing and currently disused facility, however construction on a new site, more distant to existing dwellings reduces potential health and nuisance impacts to nearby homes.

30. The improvements envisage the use of containers to receive and transport waste. An alternative is an "open" system. The use of containers provides a much higher level of control, and greatly limits the risk of waste being lost to the sea during handling.

31. Under the “no project” scenario, the existing practice of open incineration of household waste will continue, as volumes of waste rise, and the opportunity to support the council as well as schools and the wider community through the ICT component will be foregone.

G. Information Disclosure, Consultation and Participation

32. Initial consultations were conducted during November 2017 with a representative of MEE and representatives of the island council, providing an understanding of the intentions and existing actions of the island council. The preparation of the project must include consultation with stakeholders, cover disclosure of proposed project plans including siting and layout of the IWMC, and the views and concerns of these parties should be recorded and addressed in subproject preparation and design. The IEE, once completed based on design and a Dhivehi translation of the executive summary will be provided to island officials for public disclosure. Similarly, the updated IEE based on detailed design will be shared with stakeholders, as will results of monitoring. Stakeholders will be kept informed of the construction program including activities and made aware of the grievance redress mechanism. Consultations will take place regularly to gain feedback and ensure that impacts are being adequately managed.

H. Environmental Management Plan

33. This IEE incorporates an EMP which includes mitigation measures, monitoring program and institutional responsibilities of PMU, PMDSC, Thulusdoo island council and contractor to ensure mitigation and monitoring takes place during the pre-construction, construction and operation phases, and meeting the requirements of the Government of the Maldives and ADB SPS. The EMP is to be updated based on detailed engineering design and site-specific conditions and will be included in the updated/final IEE to be submitted to ADB for review and disclosure prior to award of contract.

34. The contractor is required to submit to PMU for approval a Contractor’s EMP (CEMP) based on the EMP. No works can be started until PMU approves the CEMP. A copy of the CEMP shall be kept on work sites at all times for reference. Non-compliance with, or any deviation from, the conditions set out in CEMP constitutes a failure in compliance.

35. The contractor will be required to establish a system for managing environmental impacts, carry out monitoring specified in the CEMP and take corrective or preventative actions as necessary.

36. Support will be provided to MEE by the PMDSC for overseeing CEMP implementation.

37. The environmental monitoring system for the subproject will cover compliance monitoring and community feedback, which provide a means of gauging whether the IWMC is operating effectively.

38. EMP compliance monitoring will be undertaken by the PMU, with support of the PMDSC. PMU will prepare reports to be sent to ADB on a semi-annual basis until ADB issues the project completion report. To facilitate monitoring and enable responses to emerging issues, monthly reports will be prepared by the PMUs.

I. Conclusion

39. The overall finding of the IEE is that the subproject will result in significant environmental benefits, as it is conceived and designed to address environmental issues associated with existing practices of poor waste disposal including open burning of household and food waste. No further environmental assessment is therefore required, beyond the issues to be reviewed during detailed engineering design. However this IEE and EMP must be updated to reflect the detailed engineering design and result of consultations conducted after project preparation up to design stage. The classification of Category B is confirmed.

I. INTRODUCTION

1. The Greater Malé Environmental Improvement and Waste Management Project (the project) will establish a sustainable solid waste management (SWM) system in the Greater Malé capital region and its inhabited outer islands by (i) establishing a modern waste collection, transfer, and disposal system, (ii) improving community-based outer island waste management systems, (iii) building institutional capacity for sustainable services delivery, and (iv) raising public awareness in reduce, reuse, recycle (3R) behaviors. Physical and non-physical investments are designed to curb climate change and disaster impacts while creating a cleaner environment in Maldives. The executing agency is the Ministry of Finance and Treasury (MOFT). The implementing agency is Ministry of Environment and Energy (MEE) who will establish a project management unit (PMU) comprising officials from MEE and Waste Management Corporation Limited (WAMCO). The PMU will have responsibility for overseeing project management, with support from Project Management, Design and Supervision Consultants (PMDSC).

2. The project will have three outputs:

3. **Output 1: Waste collection, transfer, and disposal systems improved and made climate and disaster resilient.** This will include (i) an efficient waste collection strategy designed and applied in Malé and Hulhumalé in consultation with local communities targeting women; (ii) waste collection and transport equipment (trucks, bins, containers) for Malé, Hulhumalé and Villimalé provided; (iii) transfer stations in Malé and Villimalé constructed and transfer station in Hulhumalé designed; (iv) Construction and demolition waste processing plant and ELV dismantling workshop constructed; (v) waste vessel harbor at Thilafushi rehabilitated; (vi) 3 vessels for waste transport from outer islands to Thilafushi provided; (vii) heavy equipment (bulldozers, excavators, roll trucks) for controlled dumpsite management at Thilafushi provided; and (viii) construction of 2 administrative buildings for WAMCO at Malé transfer station and Thilafushi waste vessel harbor. All facilities designed will consider climate change and disaster resilient features.

4. **Output 2: Community-based outer island waste management systems targeting poor and women enhanced.**[5] This output will provide comprehensive support to strengthen sustainable solid waste management in poor outer island communities. It includes (i) a minimum of 22 IWMCs with processing equipment (balers, glass crushers, metal presses) developed or upgraded in consultation with community targeting women and incorporating climate and disaster risk measures;[6] (ii) collection equipment for outer islands (bins, refuse collection vehicles, dump trucks) provided; (iii) capacity building of eligible island councils targeting women in waste collection, segregation, composting, recycling, and O&M; and (iv) community awareness and behavior change campaigns in 3R targeting women in outer islands delivered. As subprojects under Output 2 will be prepared after Board approval, each island is required to meet minimum eligibility and selection criteria, including safeguards, to receive support from the project.[7] The criteria is intended to ensure sustainability and is outlined in the Project Administration Manual (PAM). Output 2 will be partially funded by a Trust Fund grant focusing on poverty reduction,

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[5] There are 32 outer islands in the project area eligible for support under Output 2.

[6] Out of 32 outer islands, some have existing facilities but are not operational due to inadequate design and insufficient equipment which would be upgraded under the project.

[7] All 32 outer islands will be screened through the selection criteria outlined in the PAM and EARF. Appraisal and safeguard reports will be approved by ADB prior to start of any project-related physical activities. Subprojects having resettlement impacts will not be included. IWMCs consist of concrete platforms, small covered sheds, segregated waste processing and storage areas, small office, fencing.

which will support islands in the following areas:[8] (i) IWMCs constructed in a minimum of 11 eligible islands, (ii) skills and capacity building in eligible islands targeting women provided, and (iii) awareness campaigns in 3R delivered in all outer islands.[9]

5. **Output 3: Institutional capacity and public awareness in sustainable waste management strengthened.** This will include (i) capacity building support to eligible WAMCO staff (including all eligible women staff) in waste collection, controlled dumpsite management, strategic and financial planning (tariffs, diversified revenue stream), and disaster risk management provided;[10] (ii) a recycling market study conducted;[11] (iii) public awareness and behavior change campaigns in 3R targeting the poor and women in Greater Malé delivered;[12] and (iv) project management, design, and supervision consultant support provided.

6. This initial environmental examination (IEE) was prepared for Thulusdhoo Island IWMC based on information from the Feasibility Study[13] and according to the ADB's Safeguard Policy Statement (2009) and the applicable legislation of the Republic of the Maldives, namely the Environmental Protection and Preservation Act (EPPA) of 1993, and the EIA Regulations (pursuant to the act) of 2007. This IEE is based on preliminary design and will be will be updated during detailed engineering design and submitted to ADB for review and disclosure. No contracts can be awarded until ADB approves the final IEE.

II. DESCRIPTION OF THE PROJECT

7. **Existing situation.** The island has an IWMC, built with support from the Australian and Canadian Red Cross[14] which is currently disused. At present, waste is brought by islanders to an area adjacent to the IWMC and set alight. Construction and demolition waste is separated and piled nearby. The Island Council has commenced, in late 2017, an initiative to promote separation of food waste which is placed in the sea a cage to contain floating waste as decomposes or is eaten by fish. There is at present a limited waste collection system, primarily for food waste. The IWMC has facilities for composting but is not used, nor is composting practiced on a community scale at any other location, although the council has intentions to commence this and two workers employed by the council have been sent to Fenfushi to gain experience in compositing. The council has identified a new site for a new IWMC at the edge of a 33 ha area of newly reclaimed land (Figure 1 and Figure 2), and has submitted an application for a permit to use the site as a new waste management facility. However, the council is as yet unaware of the concept of an IWMC and of the MEE standard design. Detailed planning, including site access, operation and maintenance provisions and treatment is yet to take place. The specific siting of the IWMC will ensure that it will follow the selection criteria in the EARF. Once decision is made and detailed design is determined, this IEE will be updated and submitted to ADB for review and clearance.

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[8] Additional selection criteria for Trust Fund supported islands includes climate change vulnerability, and women participation in island councils, and is outlined in the Project Administration Manual (accessible from the list of linked documents in Appendix 2.)

[9] Upon confirmation from the government and the approval of Trust Fund.

[10] Disaster risk management capacity building will include preparation of a SWM disaster action plan outlining prevention, preparedness, response and recovery tasks. DRM risk awareness activities will include first responders (police, fire fighters) on Thilafushi.

[11] The recycling market study will cover plastics, construction and demolition waste, and other primary recyclables.

[12] Public awareness and behavior change activities under Outputs 2 and 3 will be implemented through a Public Awareness and Community Capacity Building consultant recruited by the PMU.

[13] Feasibility Report, 2017 prepared by Water solution and Kocks Consult GmbH for Maldives Ministry of Environment.

8. The scope of the Thulusdoo IWMC (the subproject) will comprise:

(i) Construction of a new IWMC, based on a standard layout plan developed by MEE comprising a secure enclosure with an impermeable concrete floors for waste handling including sorting, composting, secure storage, measures for exclusion of pests, indoor office space, roofed areas and provision for equipment for crushing and packaging the waste. The preliminary design indicates a footprint of 30m by 30m, which is to be varied depending on the size of the population on the respective island.[15] Figure 3 shows the layout plan per Feasibility Study prepared by Water Solutions / Kocks Inginieure in 2017.[16] The Feasibility Study considered a planning process based on project waste generation, composting rate and sorting rates for recyclables. The subproject will follow the selection criteria for planning and designing of the IWMC discussed in detail in Appendix 1, which will include due diligence on the suitability of the reclaimed land where the IWMC will be located.

(ii) Provision of standardized durable waste containers, to facilitate easier loading onto transfer vessels with less loss of waste to the surrounding area and sea water, and to assist separation into different fractions.

(iii) Provision of improved collection vehicles, capable of carrying the new containers,

(iv) Training for council staff in composting, using simple windrows

(v) Provision of equipment such as balers for plastics, metal presses, wood chippers and glass crushers, and training in their operation and maintenance

(vi) An Information, Education and Communication (IEC) component to address perceptions on solid waste management, communication channels within the island communities, the role of women and scope for public involvement in improved solid waste management activity, in line with the "3 Rs". The scope of IEC component will be determined in the early stages of the project and may include (i) promoting the adoption of practices at the household level that reduce waste generation (including in particular reduced use of disposable plastics) and the separation of compostable and recyclable waste, (ii) eliciting participation in community level activity (iii) support to the activities of environmental clubs that have been formed in the schools, (iv) the use of social media to promote important messages and foster understanding (v) support to the council in the management of solid waste, particularly through partnerships with resorts, nongovernment organization (NGOs) or other islands, (vi) setting up a dynamic knowledge portal, (vi)i supporting the establishment of partnerships between the island and nearby resorts on sustainable waste management and (vii) encouraging use of locally produced compost.

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[15] World Bank Group's Environmental, Health and Safety (EHS) Guidelines requires IWMCs to consider standard design of 110% volume and bunded for impermeable storage to avoid contaminated runoff entering the surface or groundwater.

[16] Consultancy Services for Feasibility Study for an Integrated Solid Waste Management System for Zone III (including Greater Male) and Preparation of Engineering Design of the Regional Waste Management Facility at Thilafushi, Final Version December 2017, Water Solutions and Kocks Consult GmbH for Ministry of Environment and Energy

Figure 1: Aerial view of Thulusdhoo indicating the location of the existing open dump site and the approximate location of the proposed new IWMC

Figure 2. Actual ground photos taken at the proposed IWMC site.

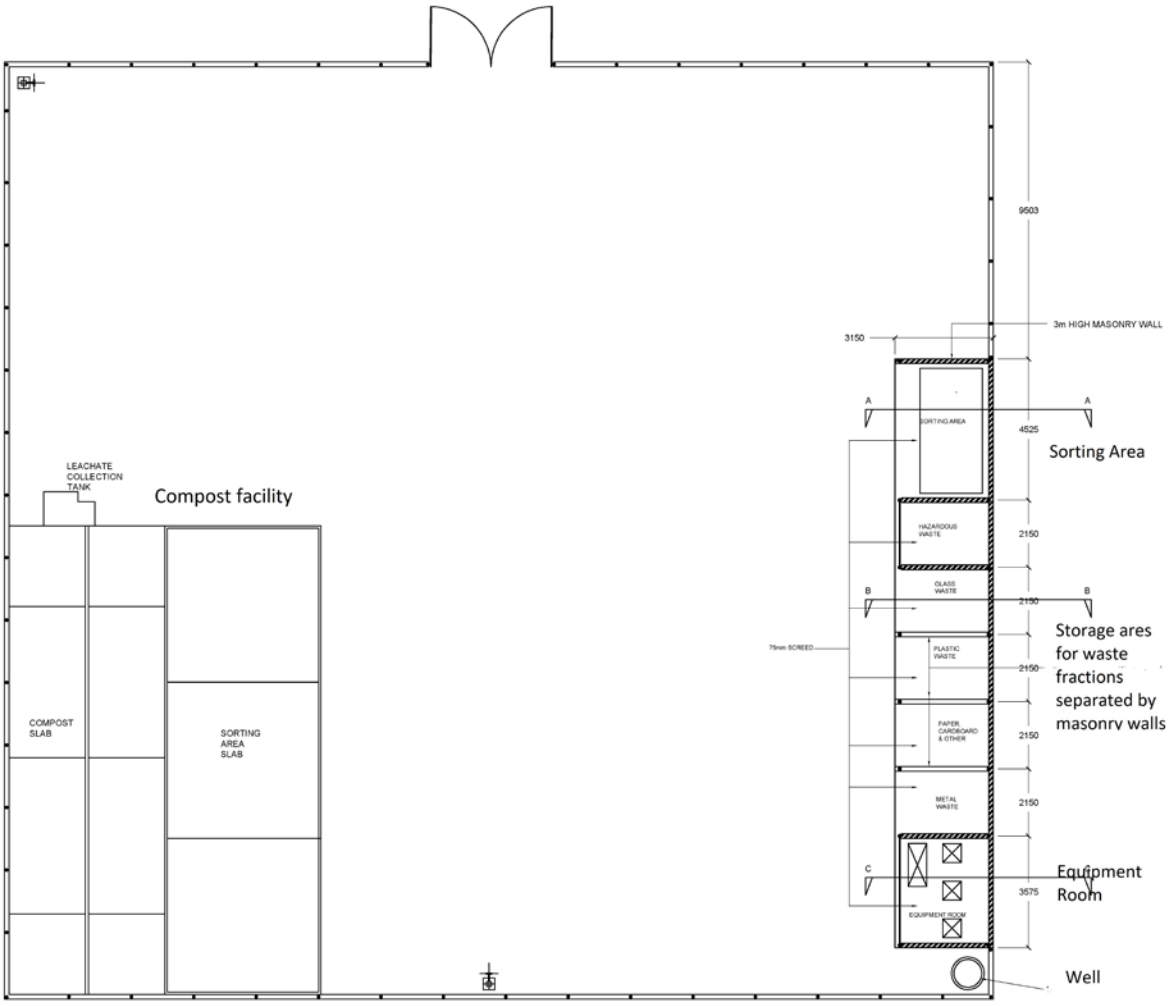


Figure 3: Outline Layout plan for the IWMC
Source: MEE. Dimensions in millimetres (mm)

III. POLICY LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Applicable National Laws, Rules and Regulations

9. The law governing the protection of the environment is the Environmental Protection and Preservation Act (EPPA) of 1993 (Act No 4/93). The law is brief and sets out the principles for sustaining and extending the benefits of the environment of the Maldives for the people and coming generations. The EPPA confers powers on the MEE to issue regulations and formulate policies for environmental protection and preservation. Such regulations include:

(i) Environmental impact assessment (EIA) regulations of 2007, updated in 2012 (Regulation No. 2012/R-27);
(ii) By-law on Uprooting, Cutting and Transportation of Plants and Trees (2006);
(iii) Regulation on Stone, Coral and Sand Mining (undated);
(iv) Regulation for the Protection and Conservation of the Natural Life and character of Old Plants and Trees in the Maldives;
(v) Dewatering Regulation (213/R-R1697);

(vi) Environmental Damage Liabilities Regulation (2011/R-9); and
(vii) Waste Management Regulation (2013-R58).

1. National Solid Waste Management Policy of 2008 and 2015

10. The National Solid Waste Management Policy was developed in 2008, by the Ministry of Environment, through consultations with the community and evaluation of existing waste management practices and scope for improved efficiency. The policy was then revised and adapted, and a new policy formulated and adopted in 2015.

11. The policy is in line with government commitment to provide the resources required for waste management in all inhabited islands of the Maldives and is founded on the following 10 principles:

(i) Each person should be responsible for waste generated at the individual level and should comply with rules and regulations established locally;
(ii) All household waste should be managed in accordance with the requirements of the local council;
(iii) Each inhabited island should prepare and submit an island waste management plan for the island;
(iv) Waste collection should be undertaken on a fee-based system for all waste producers, including households and industries;
(v) Agreements with government agencies in different inhabited islands to ensure management of waste in the islands;
(vi) Establishment of a waste management system in each inhabited island that is appropriate for the needs of the population and quantity and type of waste generated;
(vii) Establishment of regional waste management facilities (RWMF) in each waste management zone;
(viii) Establishment of arrangements to transport all residual waste to a RWMF
(ix) Promote adoption of waste management practices that generate revenue and to apply revenue to waste management at the island level; and
(x) Undertake waste management training and awareness campaigns at the national level.

2. Waste Management Regulation (No. 2013/R-58)

12. The Waste Management Regulation of the Maldives was enacted under Article 3 of the EPPA in 2013 and is implemented by the Environmental Protection Agency. The regulation focuses on the following five areas:

(i) Waste management standards: Defines standards for waste collection, transfer, treatment, storage, waste site management, landfills and managing hazardous waste;
(ii) Waste management Permits: Defines approval procedures for waste management sites;
(iii) Waster transfer: Defines standards and permits required for waste transport on land and sea, including trans-boundary movements;
(iv) Reporting: Defines reporting and monitoring requirements and procedures; and
(v) Enforcement: Defines procedures to implement the regulations and penalties for non-compliance.

3. Other relevant legislations

13. **Cultural Heritage**. Items of cultural heritage significance are protected under the Law of Historical and Cultural Properties of the Republic of Maldives of 1979 (Law number 27/29) and its implementation is currently under the Ministry of Education. UNESCO state that there is a lack of rules and regulations, constraining the implementation of the law and that there is also no national inventory of heritage properties (no site has yet been inscribed under the World Heritage List). A new law is under preparation and awaiting completion as of June 2017.

14. **Health and Safety**. Legislation covering occupational health and safety is currently included in the Employment Act (2008), Chapter 8 "Work Place Safety and Employer Health". This requires employers to implement measures for the safety and protection of employees at the work place, including safe work place, procedures, safe equipment and materials, provision of protective equipment, safety training to employees, conducting health checks where work involves chemical or biological materials that may cause a hazard, providing medical care as well as first aid for employees injured while at work. The law also sets out employee's obligations with regard to safety at work.

15. **Land use and acquisition**. The Land Act (2002) covers matters relating to land including land use, land ownership, and permissible uses of land belonging to island councils, which includes environmental protection. The land act and processes relating to the project are described in the Resettlement Framework (RF).

16. **Decentralization.** The Decentralization Act of 2010 (Law 7/2010) devolves responsibility to island councils to carry out key functions related to their mandate to foster the social and economic well-being and development of the community and establish a safe, health and ecologically diverse environment. These functions include preparation of island development plans and implementing development projects planned and assigned by the government in line with the island development plans formulated by the islands. Services by the island councils under the Act including management of waste such that is disposed of in a safe manner at the island level and do not create inconvenience to the community.

B. Environmental Assessment Requirements

17. Responsibilities and procedures for conducting environmental assessments, together with the requirements for environmental monitoring of projects, are set out in the EIA Regulations of 2012. All projects that may have an impact on the environment are referred to the Minister of Environment and Energy (EPPA 5(a)).

18. The EIA Regulations assign primary responsibility for undertaking environmental assessment of projects to the project proponent and set out procedures, rights and responsibilities for the preparation and approval of EIAs. The MEE undertakes review and approval of environmental assessment reports.

19. Project proponents are defined in the EIA regulations as a person, department or agency that is seeking to carry out or proposes to carry out the development proposal and in this case is the MEE, as implementing agency for the project. The EIA regulations include a schedule (Schedule D) of investment project types that require an EIA. For waste projects, these are landfills, waste incinerators and large-scale waste storage projects. The IWMC for Thlusdhoo island however is a small-scale project and does not involve landfilling or incineration and therefore is not a schedule D project and as such does not require an EIA.

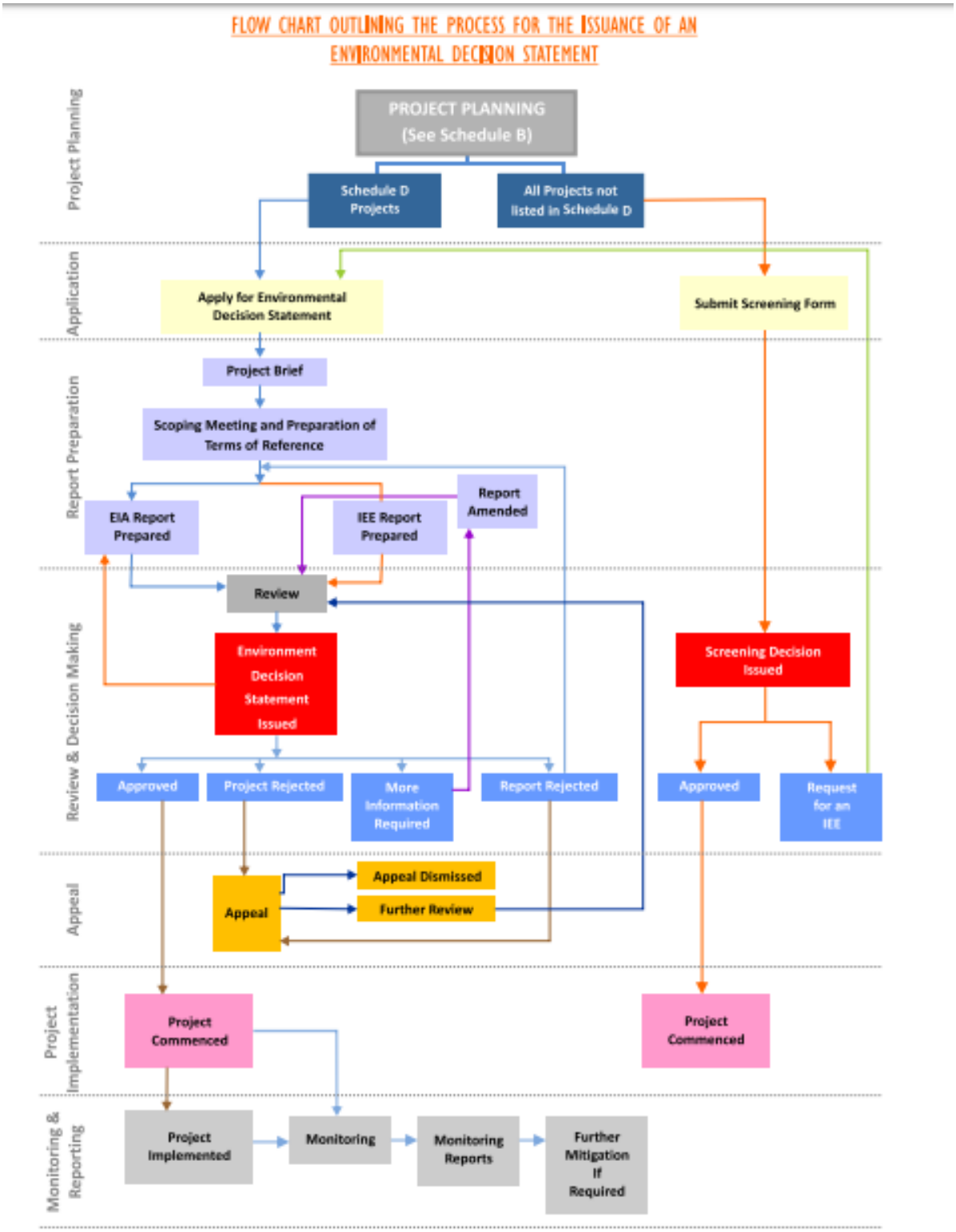
20. For the subproject, as one that is not included schedule D, a screening form is submitted in a specified format on the basis of which the MEE decides whether an Environmental Management Plan is required or if further information is required, in which case an Initial Environmental Examination (IEE) will be carried out. The IEE is completed according to a specified format. If the IEE finds that the project may cause a significant environmental impact, a full EIA is required, prior to preparation of an Environmental Management Plan (EMP). If an EIA is not required, an EMP is then prepared to address the impacts identified in the IEE.

21. The Environmental Management Plan, following either the IEE or the EIA process, is prepared on a specified format and reviewed for compliance by MEE.

22. The MEE issues the decision in the form of a decision note issued to the proponent, which sets out specific binding requirements for the conduct of the project on the basis of review of the EIA report.

23. Summary of application stages and steps is outlined in Figure 4 below.

Figure 4: Flow Chart of Maldives Environmental Impact Assessment Process[17]



[17] Source: Environmental Assessment Regulations (2007), Schedule A

24. The timelines for clearance and approvals are as follows:

(i) On completion of a screening form for non-schedule D projects – 10 working days for a screening decision from MEE;
(ii) For review of compliance of an EMP by MEE – 7 working days;
(iii) For review of a project brief on Schedule D projects – 5 days to confirm the date of a scoping meeting;
(iv) For consideration of Terms of Reference drafted by the project proponent following the scoping meeting – 10 days to confirm the Terms of Reference;
(v) For the review of a completed EIA report for completeness – 2 working days;
(vi) For circulation of an EIA report to other ministries and to the public for comment – 10 working days; and
(vii) For issuance of a decision or to request revisions, following circulation of the EIA report and receipt of comments – 28 working days.

C. Applicable International Environmental Agreements

25. In addition to national laws, rules and regulations, the government of Maldives is also a signatory to various applicable international conventions. Those applicable to the subproject as a waste facility close to the shore, are those relating to pollution and biosafety and are:

(i) UN Convention on the Law of the Sea – UNCLOS (1982);
(ii) International Convention for the Prevention of Pollution of the Sea by Oil (1982);
(iii) Washington Declaration on Protection of the Marine Environment from Land-Based Activities;
(iv) Cartagena Protocol on Biosafety (Maldives acceded on 2 September 2002); and

D. ADB Policy

26. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

27. **Screening and categorization**. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.
(ii) **Category B.** A proposed project is classified as category B 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 is required.
(iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.
(iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

28. **Environmental management plan.** The SPS further requires the development of an EMP specifying the required mitigation and monitoring and who is responsible for implementation.

29. **Public disclosure**. ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:[18]

(i) final or updated IEE upon receipt; and
(ii) environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

30. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the project the PMU will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

Table 1: Applicable WHO Ambient Air Quality Guidelines[19]

Table 1.1.1: WHO Ambient Air Quality Guidelines[7],[8]

	Averaging Period	Guideline value in µg/m³
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter $PM_{2.5}$	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

[7] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.

[8] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

Table 2: World Bank Group's Noise Level Guidelines

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[18] As per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

[19] World Bank Group's General Environmental, Health, and Safety Guidelines: www.ifc.org/ehsguidelines

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

[54] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

31. All statutory clearances will be obtained prior to commencement of civil works. IEEs will be prepared for each package involving civil works and EMP to be attached in the bid and contract documents. IEE will be submitted to ADB for review and approval prior to issuance of bid documents. Monitoring of EMP implementation by the executing agency is reported to ADB.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Geology, Topography and Soils

32. In common with all islands in the Maldives, Thulusdhoo is a reef island that has formed mainly at the periphery of Kaafu Atoll by a process of deposition of shallow-water carbonates and successive coral deposits at the tidal level which gradually rose to reach the present-day level of the island. The underlying rock is variable in consistency, reflecting the growth patterns of the coral, which forms dense colonies (coral heads) and large voids between the heads. The unconsolidated sand and gravel on top of the rock layer is subject to seasonal conditions, particularly monsoons as well as wave action, and the beaches in their natural state are dynamic subject to continual erosion and accretion, making infrastructure around the island's coast vulnerable to erosion.

33. The island's soils are mainly sandy in texture, with a significant silt component formed as sand grains have ground against each other. Much of the inland part of the island has topsoil with an organic matter content, supporting thick vegetation in places as well as homes and gardens. The soils are free draining when uncompacted, have poor nutrient status and are alkaline. Surface relief is extremely low and below 2m above sea level.

2. Climate

34. The Climate is tropical maritime, featuring two monsoon seasons, originating over the Indian Ocean to the southwest between May and September (Halhangu), and the Bay of Bengal to the drier northeast between December and February (Iruvai). The southwest monsoon is the stronger and monthly rainfall typically exceeds 200mm towards the end of the southwest monsoon period and is lowest in February. Cyclones can occur, with the higher risk period being between October and January. The island can also experience "edge effects" of larger more distant

cyclones. The United Nations (2007)20 estimate that there is a 10% probability of a level one storm on the Saffir-Simpson scale occurring over Kaafu Atoll in a 10-year period. Storms in the level one category are described as being “very dangerous” with wind speeds likely in the range of 119 – 153 kph, and pressures below 100hPa, but not lower than 980 hPa.

35. Temperatures are relatively constant and range between 25oC and 30oC, with the hottest period occurring in March/April and the coolest, December/January. Monthly rainfall fluctuates between around 20mm in February to over 300mm in May and is over 200mm for most of the year.

36. The prevailing winds are predominantly westerly for much of the year, with easterly winds rare and southeasterly winds almost non-existent. Winds are influenced by the monsoon patterns and west-south-westerly and westerly winds are the strongest over the year.

37. The tidal regime is semi-diurnal – two high and two low tides a day. The range for spring tides is approximately 1m and for neap tides, 0.3m while the extreme range between highest high water and lowest low water is 1.32m at the tidal gauge for the Malé area, on Hulhulé Island some 21km from Thulusdhoo. Table 3 below gives the average tide levels at Hulhulé.

Table 3: Average tide levels at Hulhulé[21]

Tidal level	Water level from mean sea level (m)
Highest High Water (HHW)	0.62
Mean Highest High Water (MHHW)	0.34
Mean High Water (MHW)	0.33
Mean Low Water (MLW)	-0.36
Mean Lowest Low Water (MLLW)	-0.37
Lowest Low Water (LLW)	-0.72

38. Wave heights are also influenced by variations in atmospheric pressure and strong winds. Atmospheric pressure at sea level around Kaafu Atoll typically varies between 1011 and 1017 hPa, and an increase in air pressure of 1 hPa typically lowers the water level by 1cm. Lower pressures can occur in storm events, and may drop below 1000 hPa, entailing an increase of around 10cm or more, adding to effective storm wave heights.

39. Surface currents reflect tides and wind, and generally follow the monsoon pattern, with westward currents dominant from January to March, and the reverse between April and December.

3. Freshwater Resources

40. Natural freshwater sources on the island comprise rainwater collected from roofs and groundwater that accumulates through infiltration of rainwater into a freshwater lens that forms in underlying strata of the island, though the integrity of the lens and the quality of its water are

[20] United Nations Office for the Coordination of Humanitarian Affairs - Regional Office for Asia and the Pacific (OCHA ROAP) (2007) Maldives: Composite Hazard Map.

[21] Source: University of Hawaii Sea Level Center Database, quoted in the Second National Communication of the Maldives to the United Nations Framework Convention on Climate Change. Ministry of Environment and Energy, 2016.

threatened by the level of extraction and by pollution from human waste where proper sanitation facilities are not used. Islanders make use of commercially produced, bottled water to meet drinking water needs.

41. If applicable within the subproject location, baseline quality measurements for surface water and groundwater (from freshwater lens) will be undertaken by the contractor prior to commencement of construction works.

4. Marine Resources

42. Significant fishing recreational diving and other water supports such as surfing take place in the water around Thulusdhoo and the island is considered to be a surfing destination for tourists. The water quality is influenced by sewerage discharge and illegal dumping of solid waste (including from neighboring islands and passing vessels). Baseline marine water quality measurement around the vicinity of the subproject location will be undertaken by contractor prior to commencement of construction works.

5. Marine Sediment

43. Pollutants from industrial activity and waste, particularly hazardous waste, can accumulate in the sediment on the lagoon or sea floor. Boat building takes place on Thulusdhoo, albeit on a small scale, and can include pollutants such as aromatic benzene compounds, while more industry as well as waste management takes place on Thiafushi Island at the southern edge of the atoll, some 31km away.

6. Air Quality

44. Air pollution sources include vehicle emissions, emissions of other plant and machinery including diesel power generators, and construction activity, as well as industrial activity, all of which are limited on Thulusdhoo. Levels of ambient air quality studied on the more populated islands of Greater Malé at the south of the atoll by AECOM in 2010 on Malé, Hulhulé and Hulmumale[22] and compared with World Health Organization (WHO) standards for ambient air, finding that the pollutants of potential concern did not exceed WHO guideline levels in terms of the average 24hr mean. For specific ambient air quality baseline at the subproject location, the contractor will conduct measurement prior to commencement of construction works.

7. Noise

45. Sources of noise pollution are similar to those for air quality, again very limited on Thulusdhoo, while wind and waves can contribute significantly to ambient noise levels. For specific ambient noise level baseline at the subproject location, the contractor will conduct measurement prior to commencement of construction works.

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[22] AECOM in association with Water Solutions (2011). Expansion and Modernization of Malé International Airport: Social and Environmental Impact Assessment, prepared for GMR Malé International Airport Private Limited.

B. Ecological Resources

1. Marine Ecosystems

46. Coral ecosystems have significant ecological significance and occur within lagoon waters and on the periphery of the islands. The corals are vulnerable to pollutants in the water, changes in radiation, changes in turbidity and in nutrient levels. Corals are adapted to low nutrient levels, and in areas where sewage, grey water and food waste is released, which usually have relatively high phosphate and nitrate levels, algal growth will often flourish and suppress coral growth. Thulusdhoo has a low population (1,400 residents), there is therefore little immediate threat to coral colonies around the island from these sources. Coral health can be gauged by established survey methods, such as the reef check protocol supported by the international NGO Reef Check[23] which provide standards to assess the coverage of coral and other substrates on the sea bed.

47. Pelagic fish form an important part of the local economy, both through commercial fishing activities and game fishing. Fishing activity focuses on areas known to be abundant and these occur throughout the Maldives waters, usually distant to the coast.

2. Avifauna

48. The Maldives has a diverse range of birds, including a significant seasonal population of migratory birds. The islands are important wintering grounds for a large number of migratory species that follow the Central Asian Flyway, a flyway covering a large continental area of Eurasia between the Arctic Ocean and the Indian Ocean, and comprising several important migration routes, extending from the northernmost breeding grounds in Siberia to the southernmost non-breeding wintering grounds in West and South Asia and the Indian Ocean Territory including the Maldives. Floating waste is a known hazard to birdlife on the atoll particularly when toxic waste is ingested or when articles such as plastic bags and string can cause birds to be debilitated or where they cause damage to the digestive system, or when it damages a natural habitat. These can travel considerable distances and therefore such waste released from more populated islands or from vessels can reach islands such as Thulusdhoo and cause damage. The habitat of the white-breasted waterhen (Amaurornis phoenicurus) is known to be threatened by floating, uncollected solid waste.[24]

3. Terrestrial Ecosystems

49. The present-day vegetation cover on the islands is substantially influenced by human habitation and has little biodiversity conservation significance. Vegetation is dominated by pan-tropical species such as coconut (Cocos nucifera), Goats foot creeper (Ipomea pes-caprae), hibiscus (Hibiscus tiliaceus) and beach colophyllum (Calophyllum inophyllum).

4. Protected Areas

50. There are 42 protected areas in the Maldives designated under the EPPA and covering around 24,500ha, or 0.2% of national territory totalling more than 24,494 hectares (0.2% of the

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[23] Hodgson, G., W. Kiene, J. Mihaly, J. Liebeler, C. Shuman, L. Maun and J. Hill. 2006. Reef Check Instruction Manual: A Guide to Reef Check Coral Reef Monitoring Published by Reef Check, Institute of the Environment, University of California at Los Angeles.

[24] Common Birds of the Maldives. Live & Learn Environmental Education. www.livelearn.org.

national territory) designated under the EPPA 4/93 to prevent over exploitation, and improve conservation and preservation, including banning of export of important baitfish as aquarium fish, protection of threatened marine species such as sharks, sea turtles, giant clams and black coral and also to enhance and sustain dive tourism.

51. Three protected areas occur in the vicinity of Thulusdhoo. The IUCN has not set a category for any of the sites.

Table 4: Protected Areas in the Vicinity of Greater Malé

Name	Type	Area	Notes	Location relative to Thulusdhoo Island
Lankan Thila (designated in 1999)	Reef	200	Favoured as a dive site for sea life and rock features.	Approx 8km to the South-Southwest (Atoll edge)
Thanburudhoo Thila (designated in 1995)	Reef	57	Deep lagoon area	Approx 8.5km to the Southwest (lagoon site)
Huraa Mangrove	Wetland / water body	4	Important natural mangrove habitat.	Approx 5km south on neighbouring island

C. Socio-Economic Factors

1. Population Levels

52. The population of Thulusdhoo according to the 2014 census is 1,408 predicted in the feasibility study for of an integrated Solid Waste Management System for Zone 3 to have reached around 1,461 at present day levels and to rise to 2000 by 2035. The island is the capital of Kaafu Atoll, and also has a number of guesthouses, serving a tourism market.

2. Economy

53. Thulusdhoo's economic activity is dominated by the presence of a soft drink bottling plant, and also a boat builder. The island also has administrative activity, through its role as the capital of Kaafu although by default administrative functions for the atoll are usually done on Malé. The island has some tourism, primarily a collection of guesthouses and it is also the nearest inhabited island to some resorts in the area. Access to education, in keeping with the national average is good, with enrolment in primary education close to 100% and literacy rates at about 98%.

3. Public Health

54. Thulusdhoo in general benefits both from relatively easier access to major health facilities in Malé and from the advances made in the sector over recent decades, which feature a rapid decline in maternal mortality rate, and eradication or heavy reduction of the incidence of a number of infectious diseases including leprosy, measles and lymphatic filariasis. However existing waste management practices, particularly regular burning of household waste including plastics, poses a mild risks to people living on the vicinity who regularly breathe air that contains smoke from the burning waste.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Method of Assessment

55. The potential impacts and mitigation measures have been identified through a site visit, interviews with stakeholders and review of designs for the IWMC and associated facilities. The ADB Rapid Environmental Assessment Checklist for Solid Waste Management was used to screen the subproject for environmental impacts and to determine the scope of the IEE investigation. The completed checklist is attached in Appendix 2. The proposed subproject component will interact physically with the environment. The PMU will reassess the findings in the checklist and update this IEE upon completion of the detailed engineering design. The detailed monitoring program (locations, parameters, frequency of sampling) will be included in the updated IEE based on detailed engineering design.

B. Environmental Impacts Related to Location

56. A proposed site for the IWMC has been identified by the island council and is subject both to approval from the Ministry of Housing and the national EIA process. The proposed site is distant from residential areas, but close to the shore and therefore containing leachate from stored waste and composting is important.

57. **Effects on the surrounding seawater and marine ecosystems**. The IWMC is located to be located close to the shoreline. The risk of loss of waste or leachate from piled household waste or composting will be mitigated by (i) ensuring that waste enters and leaves the IWMC on the landward side of the facility (ii) that detailed design includes both a system for collecting and containing leachate from piled household waste awaiting collection and from composting and (iii) that site security and management is ensured by the island council. The measures must ensure no deterioration of water quality in the vicinity of the IWMC. The feasibility of using bioremediation of runoff water and leachate should be assessed during preliminary design, taking account of soil types and conditions, volumes and characteristics of runoff water and leachate and space requirements for bioremediation. Further, the subproject will adopt World Bank Group's Environmental, Health and Safety (EHS) Guidelines which will require the proposed IWMC to consider standard design of 110% volume and bunded for impermeable storage to avoid contaminated runoff entering the surface or groundwater.

58. **Effects on vegetation**. The site is to be on reclaimed land which has not been colonized by mature vegetation. No impact on vegetation is envisaged.

59. **Surrounding land use**. The surrounding land is partly reclaimed land, and not inhabited though likely to be developed for residential and recreational use. While improved management of the IWMC will reduce odor and attraction to pests such as rodents, the effect on existing land use can be mitigated by (i) ensuring security, regular cleaning operations and maintenance takes place and (ii) planning of further developments such that receptors such as dwellings are not placed close to the facility, and preferably separated by a belt of trees or open space.

60. **Impedance of traffic**. Due to low levels of traffic on Thulusdhoo, the transport of waste to and from the facility is not expected to impede traffic.

61. **Loss of land and effects on property**. No private property will be affected and land acquisition will be required and there is therefore no impact.

C. Environmental Impacts Related to Construction

62. **Construction method**. The methods to be used for site preparation, and construction, as well as associated arrangements to ensure sound environmental management and safety at all times, are to be defined by the Contractor in a Contractor's Environmental Management Plan (CEMP) submitted to the PMDSC for approval. The CEMP must adhere to EHS general guidelines 1 to 4 (environmental, occupational health and safety, community health and safety and for construction and decommissioning).

63. **Impedance of traffic**. Construction vehicle movements are not expected to impede traffic, as levels of traffic on the island are very low.

64. **Noise pollution and vibration**. Construction operations, particularly excavations and compaction will cause noise and vibration, which will be potentially be a temporary use to some residents. To mitigate the impacts the contractors will be required to (i) identify households that are likely to be affected by noise and vibration (if any), (ii) provide information to these households on scheduled work (iii) limit construction activities to normal daylight working hours (iv) adhere to the planned work schedule and (iv) ensure that all construction equipment and vehicles are kept in good working order with working exhaust mufflers.

65. **Waste Generation**. Construction waste will include packaging of equipment, fuels, lubricants, materials, equipment and food and some rubble where existing structures need to be demolished. Some specialist lubricants and paint for marking may be hazardous. Contractors will be responsible for removing waste to Thilafushi. Approval from the PMDSC must be obtained prior to importing materials rated as hazardous under the Globally Harmonized System of Classification and Labeling of Chemicals.

66. **Release of silt**. Excavations to form foundations for structures will involve making temporary stockpiles of material that will either be removed or re-used. To prevent the release of silt into drains or the sea contractors will be required to ensure that (i) excavated areas are rapidly refilled on completion of works, (ii) to place silt fences around temporary piles of excavated material and (iii) avoid excavation in wet weather to the extent practicable.

67. **Water pollution**. The use of vehicles and plant can cause risks of water pollution, in the event of leaks and spills of fuel, lubricants, hydraulic fluid or other fluids used for vehicle operation. To reduce risks and limit impacts the contractor will be required to ensure that vehicles and plant are maintained in sound operable condition, free of leaks and that the condition of vehicles and equipment is regularly checked. The contractor will prepare and submit a plan for spill management, including provision of spill kits, training/briefing of workers on procedures on handling spills and allocation of responsibility within the contractor's team for ensuring that spill kits are available and that workers know how to use them.

68. **Air and dust pollution**. Potential sources of air pollution are exhaust fumes from vehicles and plant, dust from transport of construction and waste materials and areas around work sites where soil and debris are deposited. The effect will be limited due to the largely open environment where dust and fumes will be rapidly dispersed by wind. However, emissions will be mitigated by ensuring that vehicles and equipment to be well maintained and tuned and fitted with exhaust baffles.

69. **Community health and safety risks**. The use of plant and machinery, use of compressed air lines and cables and excavations are potentially hazardous but most work sites are within the transfer station areas where public access is restricted. The contractor will ensure that restrictions to access are enforced and provide notices to the public identifying hazards and, where warranted, erect safety barriers/covers around areas of open excavation.

70. Contractors shall establish their community health and safety plans following international best practices and the World Bank Environmental, Health and Safety (EHS) guidelines on construction and decommissioning activities25. As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

(i) Implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;
(ii) Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;
(iii) Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
(iv) Implement measure to prevent proliferation of vectors of diseases at work sites.

71. **Occupational Health and Safety**. To reduce day to day risks associated with working with heavy equipment in trafficked areas, contractors will be required to appoint health and safety officers for each site and to ensure regular briefing of the construction workforce on health and safety issues. Contractors shall establish their occupational health and safety plan to be adopted at each site following international best practices and the World Bank EHS guidelines on construction and decommissioning activities.[26] As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

(i) Communication and Training
    (a) Training of all workers on occupational health and safety prior to construction works;
    (b) Conduct of orientation to visitors on health and safety procedures at work sites;
    (c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;
    (d) Proper labeling of equipment and containers at construction and storage sites; and
    (e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station.

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[25] http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES
[26] Ibid.

(ii) Physical Hazards
- (a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
- (b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
- (c) Use of bracing or trench shoring on deep excavation works;
- (d) Adequate lighting in dark working areas and areas with night works;
- (e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
- (f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
- (g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits.

(iii) General Facility Design and Operation
- (a) Regular checking of integrity of workplace structures to avoid collapse or failure;
- (b) Ensuring workplace can withstand severe weather conditions;
- (c) Enough work spaces available for workers, including exit routes during emergencies;
- (d) Fire precautions and firefighting equipment installed;
- (e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
- (f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
- (g) Good working environment temperature maintained;
- (h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
- (i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

D. Environmental Impacts Related to Operation

72. **General**. The IWMCs and management of them are intended specifically to address existing poor practices of open incineration of waste and to ensure safe and efficient handling, collection of recyclables and shipment of waste to the regional waste management facility (RWMF) at Thilafushi. Existing impacts that are addressed including smoke nuisance and health risk, damage to the habitat in the existing dump area, and reduced pest issues.

73. **Use of containers**. While containers provide a more efficient system of handling and loading waste, reducing potential losses into the sea, any breakages or mishandling of containers

will result in significant discharge of waste into the sea. Operation and maintenance training must provide for instruction on maintenance of containers, loaders, cranes and vessels and sound operation including licensing of vehicle and plant operators and restrictions on operation during stormy weather.

74. **Pests**. Although improvements will reduce access to them, the transfer stations will still be subject to pests such as birds and rodents. Numbers of these can be kept down by improved operation regimes, including site hygiene and regular cleaning of surfaces.

75. **Contaminated Runoff**. Contaminated runoff or leachate entering the surface water, marine water, or groundwater may arise during the operation of the IWMC. These may contain traces of contaminants such as nutrients, metals, pathogens and hazardous chemicals that may contaminate surface water, seawater, and groundwater. Leachate from composting will have a high nutrient content. In order to mitigate these impacts, the project will adopt World Bank Group's Environmental, Health and Safety (EHS) Guidelines which will require the proposed IWMC to consider standard design of 110% volume and bunded for impermeable storage to avoid contaminated runoff entering the surface or groundwater. Other mitigating measures would be: (i) inclusion in the design of IWMC a leachate well for recovering and management of leachate; and (ii) training of site operators in leachate management including re-circulation and/or collection in dedicated containers

76. **Occupational health and safety**. Potential hazards to workers arise from the handling of compost, when workers can breathe micro-organisms that cause respiratory and other disorders, and accidents associated with the operation of collection trucks and loading containers into the vessels that take the waste to the RWMF at Thilafushi. Risks are mitigated by training in handling of compost and of machinery, and sound supervision and management of operation of the facilities. The operators of these transfer stations shall implement measures following international best practices and the World Bank EHS industry sector guidelines for infrastructure: waste management facilities[27].

E. Global, Transboundary and Cumulative Impacts

77. The IWMCs are to be established, where they do not exist or are not operational, on each inhabited island in Zone 3 under the project and also elsewhere in the country. Operation of the IWMC and efficient removal of waste to the RMWF will reduce risks to the island and marine environment. Effective institution of sound management of the IWMCs and of waste collection and handling will provide a demonstration of good practice, of value to island councils and workers on other islands who need to develop capacities for improved waste management.

78. Capacity building for the island council will assist in the build-up of capabilities required to further improve and manage waste management facilities throughout the Maldives.

VI. ANALYSIS OF ALTERNATIVES

A. Alternatives for the Island Waste Management Centre

[27] Ibid. Industry Sector Guidelines: Infrastructure; Waste Management Facilities

79. As stated in section 2, there is an existing but disused IWMC on Thulusdhoo. The alternative of rehabilitating and extending this facility and putting it back into operation has not been pursued, as the preferred site is on reclaimed land, more distant to existing dwellings.

B. Alternatives within the Project Scope

80. Improvements to waste management on Thulusdhoo envisage the use of containers, to receive waste from delivery trucks and transfer it to vessels. An alternative to this is an "open" system where trucks are offloaded mechanically, or they tip the waste to a central area or directly onto awaiting vessels. The use of containers however provides a much higher level of control, and greatly limits the risk of waste being lost to the sea during the offloading and loading processes.

C. The No Project Alternative

81. Under the "no project" scenario, the existing practice of open burning of household waste will continue, even as volumes of waste generation grow with population and economic growth. It is unlikely that composting will be done on a community scale, foregoing the opportunity to reduce the volume of plant waste that can be composted and re-used. While the island council has made moves and/or expressed intention to raise public awareness on waste reduction and separation, the opportunity to support the council as well as schools and the wider community through the information and communications technology component will also be foregone.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Consultations and information disclosure during design

82. Consultations took place between the TRTA consultants, a representative of MEE and representatives of the island council during a visit on 6th and 7th November 2017. These consultations enabled the TRTA consultants and MEE to understand the intentions and existing actions of the island council to improve waste management on the island and to gauge capacity development needs. Points arising from the consultation were as follows:

(i) At present, waste is taken to a location near an existing disused IWMC and burned. The smoke is a nuisance, drawing complaints from the public and in particularly from guesthouse operators.
(ii) Widespread littering and dumping takes place and is a concern to the public and to the council, both because of the accumulation of rubbish on the beach and release of floating waste which is perceived to affect the appeal of the island for tourism.
(iii) The island council are not aware of the role of an IWMC in improved handling and transfer of waste, or of the importance of avoiding the burning of waste.
(iv) An existing initiative is to encourage separation of food waste, and to dispose of this in a metal cage in seawater, newly installed and accessed by a jetty.
(v) The council has held a ten-day information campaign to encourage separation of waste.
(vi) Construction and demolition waste is treated separately from general household waste and dumped nearby. It is accumulating and also of concern to the public.

83. It is stressed that this IEE is prepared as an example, or "blueprint" and the preparation of the support to IWMC development on each island must include consultation with stakeholders, including community representatives, foreign nationals residing on the island, private sector (this

should include guesthouse operators, restaurant/café operators and industry) and NGOs. The views and concerns of these parties should be recorded and addressed in subproject preparation and design. The outcomes of consultations should be summarised in this section of the IEE.

B. Further Information Disclosure and Public Consultation

84. This IEE, once completed on the basis of design and a Dhivehi translation of the executive summary will be provided to community officials for public disclosure. Similarly, the updated IEE based on detailed design will be shared with stakeholders, as will results of monitoring. Stakeholders will be kept informed of construction activities that are likely to cause noise and dust nuisance and will be made aware of the grievance redress mechanism and consultations will take place regularly to gain feedback and ensure that impacts are being adequately managed.

85. In future public consultations, PMU will carry out meaningful consultations with affected persons and communities under the project. PMU will ensure to undertake a consultation process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

86. **Information, Education and Communication**. The Information, Education and Communication (IEC) component will address perceptions on solid waste management, communication channels within the island communities, the role of women and scope for public involvement in improved solid waste management activity, in line with the 3R. This will potentially include adopting practices at the household level that reduce waste generation (including in particular reduced use of disposable plastics) and the separation of compostable and recyclable waste, and eliciting participation in community level activity.

87. The IEC will also support island councils in the management of solid waste, particularly through partnerships with resorts, NGOs or other islands to support initiatives to manage solid waste safely and sustainably. Resorts could provide technical training to islands, help in repair of SWM equipment, joint transport of waste to treatment centers, and carry out joint awareness programs on SWM. Strategies may include:

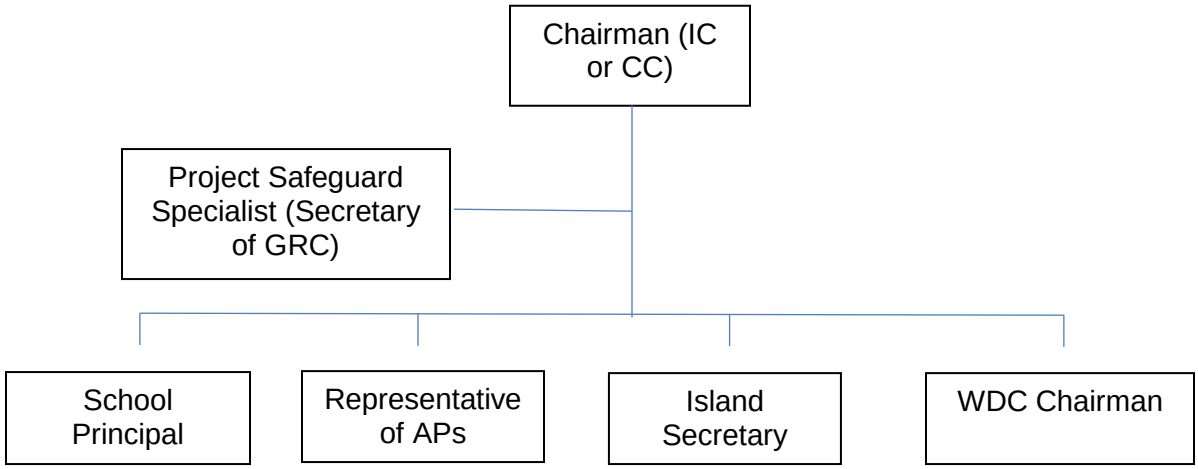
(i) Involvement of environmental clubs that have been formed in schools;
(ii) Use of social media, particularly those in common use already such as “facebook” and “viber”;
(iii) Setting up a dynamic knowledge portal;
(iv) Sharing information on the project, its activities and roll out schedule of the project components;
(v) Partnerships between resorts and neighbouring islands on sustainable waste management;
(vi) Promoting 3R practices, including reduction of plastic water bottles through use of reusable glass bottles and/or large, reusable bottles for drinking water; and
(vii) Encouraging use of locally produced compost.

VIII. GRIEVANCE REDRESS MECHANISM

88. A grievance redress mechanism (GRM) will be established to receive and facilitate the resolution of affected person's concerns, complaints, and grievances on negotiated/voluntary land donation or involuntary land acquisition, relocation, income restoration, environmental management and other construction and operation related issues. The GRM is willing to be proactive and accessible to all APs to address their concerns, grievances and issues effectively and swiftly, in accordance with ADB SPS, 2009.

89. **First Tier**: City Council/Island Council – grievances will be registered informally by contacting the city/island councils. If the grievance cannot be resolved informally then the APs can register a formal complaint. The council must screen the grievance to determine whether the concerns raised in the grievance are within the scope of the project. The council will determine solutions to the issues either by (i) discussing internally, or (ii) joint problem solving with aggrieved parties, or (iii) a combination of both options. If the complaint is resolved within a week, the council must communicate the decision to the aggrieved party formally or informally. Should matter be unresolved and/or the AP be unhappy with the result, the complaint will be referred to the next tier. The grievance redress committee (GRC) includes the island's representatives as well as project officers related to each island, as shown in the figure below.

Figure 5 : Grievance Redress Committee (GRC) Composition for First Tier



90. **Second Tier**: The AP can elevate the grievance to the second tier, and submit a complaint on a letter addressed to MEE. MEE will forward the letter to the PMU. The PMU will be responsible to resolve the complaint within 15 days and communicate the decision to the aggrieved party. The 99. PMU screens the grievance and determines if it is related to the project. If unrelated, the AP is notified in writing. If it is relevant to the project, the PMU will hold discussions with the MEE on the matter and if necessary, (i) arranges visit the site and hold on-site discussions and/or (ii) refers the matter to the project steering committee. The PMU then decides on the action that will be taken by the project to address the grievance, and the decision will be conveyed to the AP in writing.

91. The affected persons can also direct contact (in writing) the ADB Project Officer at ADB headquarters. The complaint can be submitted in any of the official languages of ADB's

Developing Member Countries. This may be done at any time by sending the written complaint to the following address:

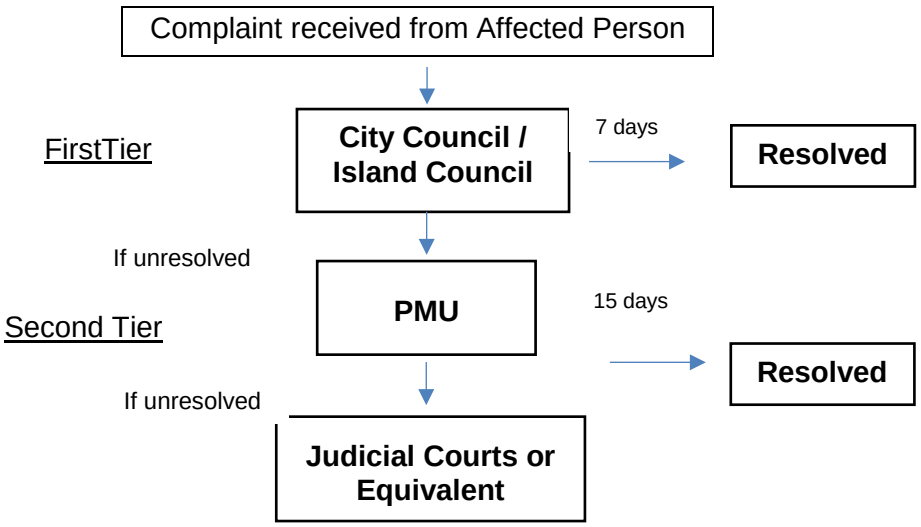
Project Officer – Greater Malé Environmental Improvement and Waste Management Project
South Asia Urban Development and Water Division
South Asia Regional Department
Asian Development Bank
6 ADB Avenue, Mandaluyong City 1550
Metro Manila, Philippines

92. The APs can also use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB. The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the Project Information Document to be distributed to the affected communities, as part of the project GRM.

93. The GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage through the Maldives judicial or appropriate administrative system. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

94. The flow diagram of resolving complaints under the GRC is shown in Figure below.

Figure 6: Grievance Redress Mechanism Diagram for Complaints Resolution



95. The GRM will include group meetings and discussions with APs to address general and common grievances. These meetings and discussions will be announced in advance, conducted at the time of day agreed on with APs (based on their availability), and facilitated by the PMU and PMDSC at least are assisted to understand the grievance redress process, to register complaints and with follow-up actions at different stages in the process. Records will be kept by the PMU to keep track of all grievances received, both informal and formal, including contact details of complainant, date when the complaint was received, nature of grievance, agreed corrective actions and the date when these were effected, and final outcome. A Sample Grievance Registration Form is attached in Appendix 3.

96. All costs involved in resolving the complaints (meetings, consultations, communication and reporting, and information dissemination) will be borne by the PMU.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Objectives

97. This EMP sets out the needs for environmental management of transfer station improvements within the GMEIWMP in terms of institutional responsibilities to ensure mitigation and monitoring takes place during the pre-construction, construction and operation phases, meeting the requirements of the Government of the Maldives and the ADB's SPS.

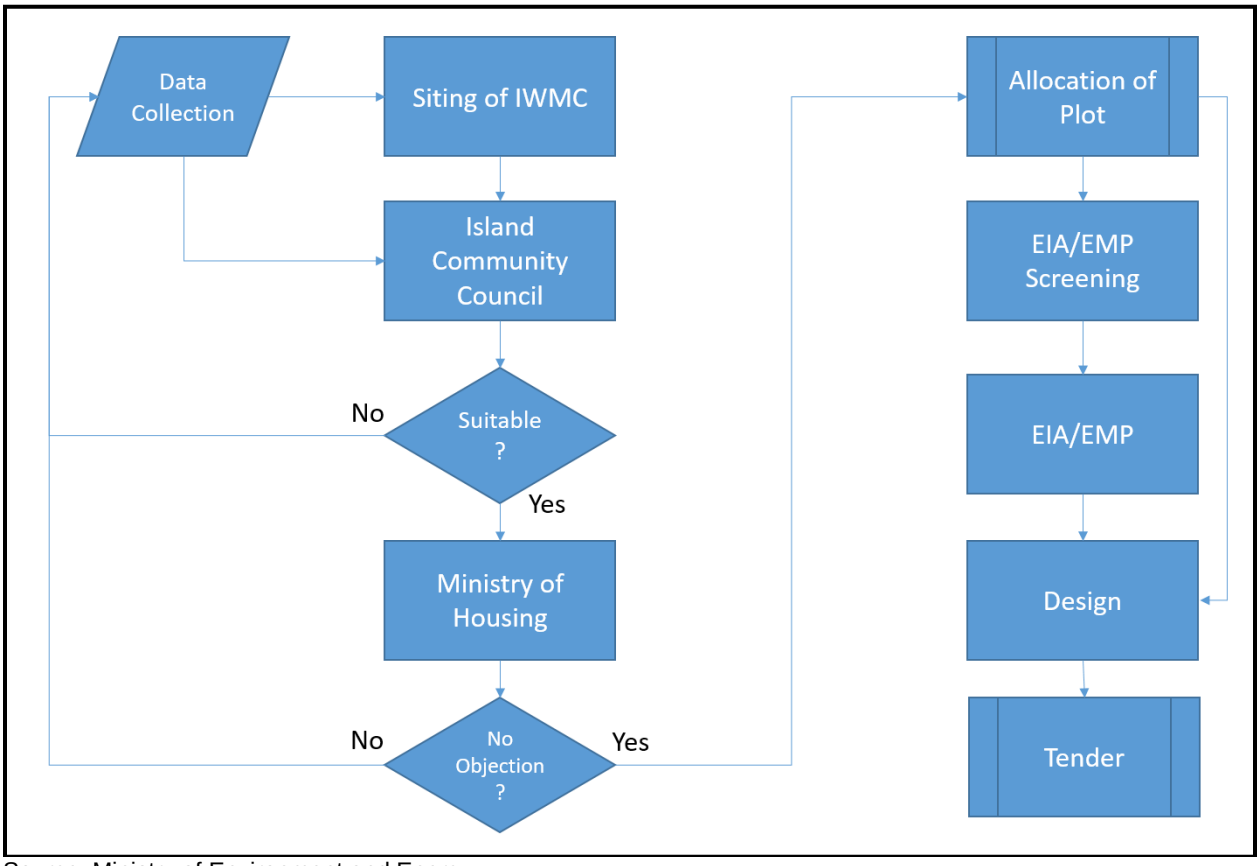
98. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

99. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

B. Institutional Arrangement

100. The planning, design and construction of IWMCs is set through a process that covers data collection, consultations, involvement of the island council, approvals, EIA preparation, design and tender. A flow diagram for this process is given in Figure 7. This IEE will be updated to reflect the findings of the EIA carried out as part of this process, and also detailed design.

Figure 7: Island Waste Management Centre Planning Process



Source: Ministry of Environment and Energy

101. **Implementation arrangements**. The executing agency is the Ministry of Finance and Treasury (MOFT). The implementing agency is MEE who will establish a PMU comprising officials from MEE and WAMCO. The PMU will be strengthened with external experts in the areas of finance, procurement, technical areas, contract management and safeguards. The project steering committee chaired by Minister, MEE will provide overall guidance and strategic directions to the project. Consultant firms will be recruited under the project to support engineering designs, supervision, project management, institutional capacity strengthening, and community awareness.

102. **Project Management Unit.** The Director General of the Solid Waste Department of MEE informed a dedicated full-time PMU for the ADB Zone 3 waste management project will be established (pending approval by MOFT) with eight staff as follows: (i) Project Director (part-time, Director General of Department), (ii) Project Manager (full time), (iii) Procurement Specialist, (iv) Finance Specialist, (v) Safeguard Specialist, (vi) Civil Engineer, (vii) IEC Specialist, and (viii) administrative assistant. The Project Director is a government official empowered to take official decisions, while remaining PMU staff are contracted staff recruited from the market. The PMU will be supported by consultants for project management, capacity building, monitoring, and technical design and supervision support. The proposed PMU contract staff are to be recruited competitively without further delay in phases.

103. **Terms of Reference for PMU Environment Officer.** Key tasks and responsibilities of the PMU environment officer are as follows:

(i) confirm existing IEEs/EMPs are updated based on detailed designs, and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
(ii) confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by island councils and contractors
(iv) establish a system to monitor environmental safeguards of the project, including monitoring the indicators set out in the monitoring plan of the EMP;
(v) facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g., location clearance certificates, environmental clearance certificates, etc.), as relevant; e. supervise and provide guidance to the island councils to properly carry out the environmental monitoring as per the EARF;
(vi) review, monitor, and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
(vii) consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
(viii) ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public.
(ix) address any grievances brought about through the grievance redress mechanism in a timely manner\
(x) with assistance from the PMDSC, provide orientation to PCU and PIU staff in environmental management arrangements for the project.
(xi) provide inputs to progress reports and the project completion report.
(xii) visit worksites during construction and provide guidance relating to supervision and compliance monitoring.
(xiii) visit completed works and assist with establishing environmental monitoring procedures for the operation phase of the improved infrastructure.

104. **Consultants**. The PMDSC includes an environmental safeguards specialist. The PMDCSC shall (i) prepare, review and update the IEEs prepared during project preparation stage; (ii) prepare/update IEEs for Output 2 (IWMCs for 32 outer islands); (iii) ensure EMPs are included in the bid and contract documents; (iv) ensure all statutory clearances are obtained prior to award of contracts; (v) facilitate meaningful consultations and carry out disclosure of safeguard documents as necessary; (vi) monitor EMP implementation; (vii) prepare environmental and social mentoring reports; and (viii) prepare corrective action plan/s as required to ensure compliance with ADB SPS, 2009 and national laws and regulations. The consultants recruited for strengthening capacity for sustainable solid waste management in the Greater Malé region, recruited under a capacity building transaction technical assistance (TRTA) package, will provide implementation support including application of selection criteria, and environmental monitoring while support in community consultation will be provided by the PACCB consultants.

105. **Terms of Reference for PMDSC Safeguard Consultants**. The Social, Environmental and Occupational Health and Safety Expert in PMDSC will:

(i) ensure compliance with ADB safeguard requirements.
(ii) screen and categorize IWMCs for inclusion in the project.
(iii) ensure no Category A subproject per ADB SPS definition

(iv) provide guidance on safeguards and issue instructions to the Contractors.
(v) assist in obtaining all necessary permissions and complying with statutory requirements.
(vi) prepare necessary IEE and EMP for each IWMC that will be considered in the project.
(vii) submit IEE and EMP to PMU for submission to ADB.
(viii) ensure IEE and EMP is included in the bid and contract document and such items are included in BOQ.
(ix) review the Contractor's Environmental Management Plan (CEMP) for adequacy in terms of compliance with the requirements of the EMP and instruct amendments and additions as necessary.
(x) monitor and ensure compliance with ADB SPS and contractors' implementation of the EMPs.
(xi) as part of the EMP, prepare a project focused Occupational Health and Safety Plan (OHS) to be adopted by the Client and the Contractor.
(xii) ensure that relevant provisions in contracts on OHS are abided by the contractors during the construction works.
(xiii) facilitate meaningful consultations and carry out disclosure of safeguard documents.
(xiv) prepare environmental and social mentoring reports.
(xv) prepare corrective action plan/s as required to ensure compliance with ADB SPS, 2009 and national laws and regulations.
(xvi) assist in GRM implementation.
(xvii) conduct Safeguards Orientation to contractors prior to mobilization
(xviii) develop and conduct regular safeguards trainings (see indicative institutional capacity development program) to ensure PMU, island councils and other stakeholders have common understanding of ADB SPS requirements during all phases of project implementation.

106. **The Contractor.** The contractor will have the following roles and responsibilities:
(i) complies with all applicable legislation, is conversant with the requirements of the EMP, and briefs staff about the requirements of same;
(ii) ensures any sub-contractors/ suppliers, who are utilized within the context of the contract, comply with the environmental requirements of the EMP. The Contractor will be held responsible for non-compliance on their behalf;
(iii) provides environmental awareness training to staff;
(iv) bears the costs of any damages/ compensation resulting from non-adherence to the EMP or written site instructions;
(v) conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment;
(vi) ensures that its staff or engineers are informed in a timely manner of any foreseeable activities that will require input from the environment and safety officers (or equivalent);
(vii) appoints one full time environment and safety officer (or equivalent) for implementation of EMP, community liaising, reporting and grievance redressal on day to day basis; and
(viii) receives complaints/grievances from the public, immediately implements the remedial measures and reports to the PMU and PMDSC.

Figure 8: Project organizational structure

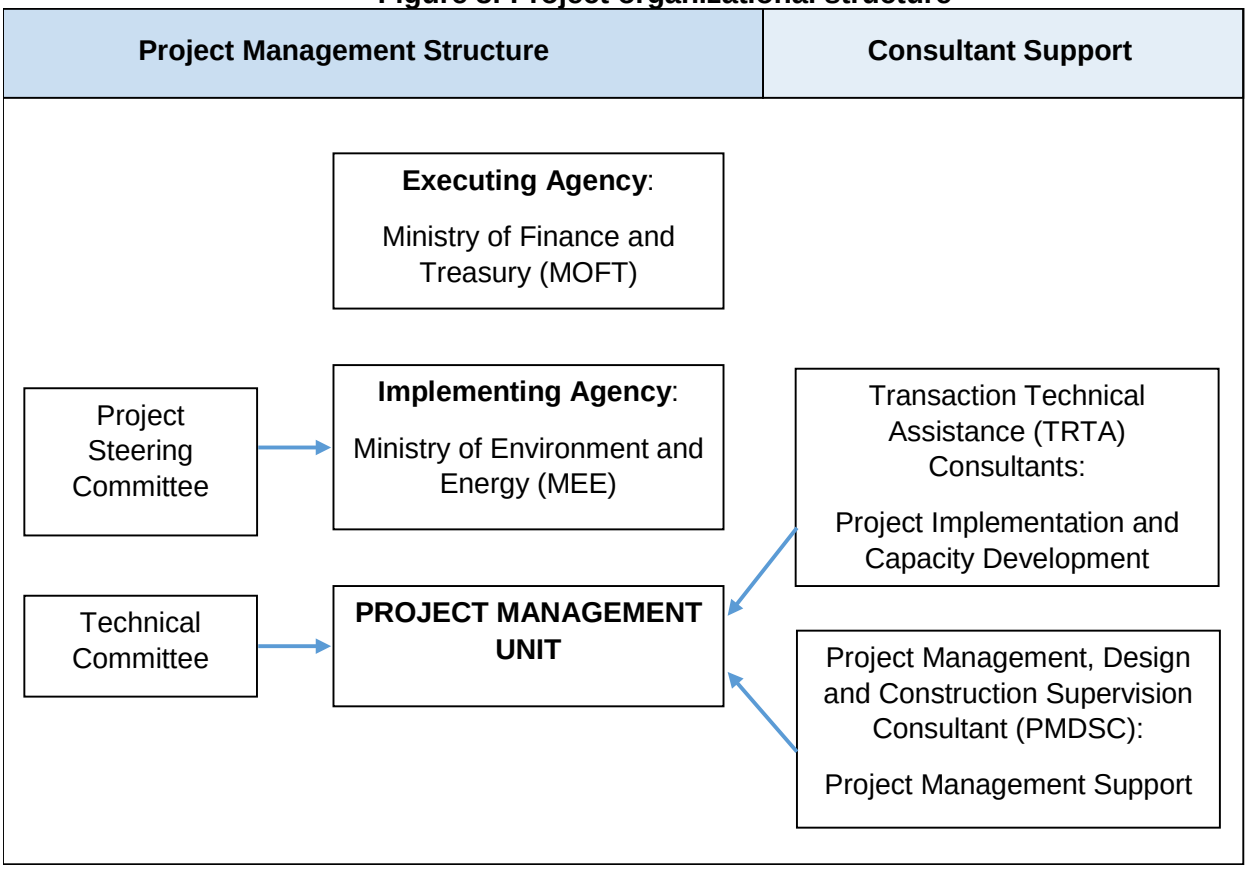


Table 5: Roles and Responsibilities of Project Implementation Organizations

Project Implementation Organizations	Management Roles and Responsibilities
Executing agency Ministry of Finance and Treasury (MOFT)	Guide and monitor overall project execution. Financial oversight. Ensure flow of funds to the implementing agency and timely availability of counterpart funding; ensure adequate budget for successful implementation of the project. Monitors compliance with project legal Agreements Procurement oversight. Responsible for approving procurement. Review and coordinate evaluation of bids for works, goods, and consultant services. Maintaining project accounts and project financial records; Review and sign withdrawal applications before submitting to Asian Development Bank (ADB). Approve project management unit (PMU).
Project steering committee [Chair: Minister, Ministry of	Provide policy direction to facilitate project implementation. High-level troubleshooting.
Environment and Energy (MEE)]	Meets quarterly (or as needed) to review project performance and resolve issues.
Implementing agency 1 (MEE)	Overall day-to-day project management, monitoring, and evaluation.
PMU in MEE	Responsible for overall project management, implementation and

	monitoring; Reviews the reports submitted by (project management, design and construction supervision consultant) PMDSC with respect to detailed design, costs, safeguards, financial, economic, and social viability Prepare, with the support of PMDSC, bidding documents, request for proposals, and bid evaluation reports; Serves as point of contact with ADB, maintains project documents, and submits timely reports (quarterly progress reports and project completion report) to ADB by consolidating relevant inputs from PMDSCs and island council; Consolidates expenditures and prepare withdrawal applications for direct payment, reimbursements and us of imprest advance; Opens and manages imprest account for ADB Grant; Organize project orientation for participating island councils by elaborating scope of the project and sharing about their obligation and including maintaining separate accounts for their respective contributions; Establishment and maintaining of project website by disclosing progress reports, safeguard monitoring reports and design reports; and Collect supporting documents and submit withdrawal applications to ADB via MOFT. Monitors and ensures the compliance of covenants, particularly timely submission of audited project accounts and compliance with safeguard requirements;
Technical committee	Advise and facilitate to resolve technical issues.
WAMCO	Operator for collection, transport, and disposal of waste services in project area Manage regional waste management facilities
Island Councils	Operators of solid waste services on outer islands Responsible for management and O&M of Island Waste Management Centers
ADB	Conducts project review missions, midterm review mission and project completion review mission to assess project implementation progress of all outputs, compliance of grant covenants including actions required in terms of safeguards (environmental impacts and social mitigation measures applicable); timeliness of budgetary allocations and counterpart funding; project expenditures; progress with procurement and disbursement; Post on ADB website the updated project information documents and safeguards documents as per disclosure provision of the ADB safeguards policy statement. Reviews executing agency and implementing agency's submissions for procurement of goods, equipment, works and services and provides comments and no objection on the submissions Checks Statement of Expenditure on sampling basis

C. Institutional Capacity Development Program

107. The PMU, to be established by the MEE, will be responsible for the implementation of safeguards and ensuring that they comply with ADB requirements as well as the EPPA. The body responsible for approving environmental impact assessments and issuing of permits is the Environmental Protection Agency (EPA), which is under the Ministry of Environment and

Energy.28 Capacities were assessed by the PPTA consultants during interviews that took place in July and September 2017. The EPA has few trained technical staff and at the time of capacity assessment work undertaken by the PPTA consultants, all senior members of the EPA's waste department were away from the office for study, which is indicative of a low staffing resource level. The agency relies on external consultants for functions such as environmental monitoring for projects, however this is usually confined to the construction phase. The EPA does have one team of field staff a laboratory and a boat for fieldwork, but laboratory operations and travel is constrained by budget constraints. The situation is reflected in other departments of the MEE.

108. The PMDSC will provide assistance during the project for the implementation of safeguards in compliance with ADB SPS 2009 requirements and with the requirements of the EPPA. This provision responds to lessons learned for project design to include support to PMU staff in project implementation particularly in procurement, contract management, and safeguards. The PMDSC will provide assistance to the PMU for overseeing EMP implementation.

109. Besides the IEC component which includes some capacity building measures for ICs (e.g. increasing outreach of IEC, closing feedback loop), the Transaction Technical Assistance (TRTA) for Strengthening Capacity for Sustainable Solid Waste Management in the Greater Malé Region will provide both implementation and safeguard guidance and assistance towards the PMU. Since recycling is of a major concern, a market sounding will be carried out during the TRTA to increase the knowledge in this regard and to inform the institutional stakeholders (mainly MEE, WAMCO and ICs) about the potential for recycling of certain waste components.

110. Included in the capacity development for the island communities is a package to enhance the awareness and knowledge relating to solid waste management aspects and the O&M of the IWMCs which will help to facilitate a proper operation of and a well-defined input for the IWMCs (source separation of compostable fraction).

D. Impacts and Mitigation

111. Table 6 summarizes the potential impacts and mitigation measures in relation to location, construction and operation identified in the IEE.

[28] Note that EPA, while it comes under MEE, has a governing board which is a statutory body.

Table 5: Environmental Management Plan

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Pre-Construction Stage						
Compliance with EHS guidelines for Waste Management Facilities	Island as a whole and surrounding waters	Design to comply with EHS Guidelines for Waste Management Facilities	Compliant with PMDSC company quality control standards	PMDSC service cost	PMDSC	MOFT / MEE / ADB
Acceptance of local stakeholders	Island as a whole and surrounding waters	Meaningful consultations to be undertaken during planning and design, obtaining feedback and responding to it.	Consultations with representatives of the community undertaken in a non-coercive environment and documented.	PMU cost / PMDSC service cost	PMU / PMDSC	MOFC / MEE / ADB
Ensuring compatibility of design with updated EMP	Island as a whole and surrounding waters	Updating IEE/EMP to reflect agreed final detailed design that is responsive to feedback	Subject to peer review by PMU / PMDSC	Design cost / PMDSC service cost	PMU / PMDSC	MOFC / MEE / ADB
Effects on surrounding seawater and marine ecosystems	Sea surrounding the IWMC	(i) Ensuring that waste enters and leaves the IWMC on the landward side of the facility; (ii) detailed design to include both a system for collecting and containing leachate from piled household waste awaiting collection and from composting; and (iii) site security and management to be ensured by the island council. The feasibility of bioremediation of runoff and leachate is to be assessed during the design phase. The measures must ensure no deterioration of water quality in the vicinity of the IWMC.	Each item to be addressed in detailed design	Project funds	D&B designer	MEE

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Odor and attraction to pests	Nearest residential area	(i) Ensuring security, regular cleaning operations and maintenance takes place; and (ii) planning of further developments of the reclaimed land such that receptors such as dwellings are not placed close to the facility, and preferably separated by a belt of trees or open space.	Inclusion of regular O&M tasks in job descriptions and implementing them. Plans for further developments on the reclaimed land to address the need for separation from the facility	Island council	Island council / planners	MEE
Planning for construction stage mitigation	Island as a whole and surrounding waters	Preparation of a Contractor's Environmental Management Plan detailing methods of complying with EMP (Note: to include identification of sensitive receptors including households potentially affected by noise, odor and dust)	Approval by PMDSC	Construction Cost	Contractor	PMDSC
Construction stage impacts						
Air and noise pollution, and vibration	Nearest residential area	(i) providing information on operations; (ii) limiting construction activities to daylight hours; (iii) adhering to schedule; (iv) maintaining construction equipment and vehicles in good operable order; and (v) gathering baseline data for noise level and ambient air quality within the project vicinity.	No complaints registered via the GRM in respect of noise and vibration, or any such complaints addressed	Construction Cost	Contractor	PMDSC

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Construction waste	IWMC area	(i) All solid waste must be disposed of at the RWMF/Thilafushi; and (ii) importation of any materials rated as hazardous under the Globally Harmonized System of Classification and Labelling of Chemicals to be subject to approval by PMDSC, which will be conditional on stating adequate arrangements for disposal.	Site free of construction waste on commissioning. Written PMDSC approval available for any hazardous chemical in use	Construction Cost	Contractor	PMDSC
Release of silt	IWMC construction site	(i) Excavated areas to be rapidly refilled on completion of works; (ii) use of silt fences around temporary piles of excavated material; and (iii) avoid excavation in wet weather to the extent practicable.	No instances when silt release is uncontrolled	Construction Cost	Contractor	PMDSC

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Water pollution	IWMC construction site	(i) vehicles and plant are to be maintained in sound operable condition, free of leaks. The condition of vehicles and equipment will be periodically checked; (ii) prepare and submit a plan for spill management, including provision of spill kits, training/briefing of workers on procedures on handling spills and allocation of responsibility within the contractor's team for ensuring that spill kits are available and that workers know how to use them; and (iii) gather baseline data on water quality on all bodies of water (inland, marine, and groundwater) around the project vicinity.	Vehicles to have at all times at a minimum: (i) intact and securely fitted exhaust pipes and mufflers (ii) operable brakes (iii) no fuel or lubricant leaks	Construction Cost	Contractor	PMDSC
Community health and safety hazards	IWMC construction site and immediate surrounds	(i) Restriction of access to work site; (ii) warning notices to the public on hazards; and (iii) barriers when warranted. Contractors to adopt the World Bank EHS Guidelines on Community Health and Safety, particularly those that relate to construction works.	Barriers and notices to be in place at all times	Construction Cost	Contractor	PMDSC

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Occupational health and safety hazards	IWMC construction site	(i) Contractors to appoint health and safety officers for each site and to ensure regular briefing of construction workforce on health and safety issues. (ii) Adequate personal protective equipment to be provided to the workforce. Contractors to adopt the World Bank EHS Guidelines on OHS, particularly those that relate to construction works.	Member of the Contractor's staff nominated as health and safety officer to be present on site. Appropriate protective equipment to each construction operation to be worn at all times (including steel toe capped boots at all times, hard hats when working near machinery or roofing work, eye protection for welding)	Construction Cost	Contractor	PMDSC
Impacts During Operation						
Risks of loss of containers and contents	Dock area	O&M training to include instruction on maintenance of containers, loaders, cranes and vessels and sound operation including licensing of vehicle and plant operators and restrictions on operation during stormy weather	Corrective action to be taken in the event of any instance involving dropping or breaking of containers or loss overboard.	Training budget	Implementation consultants / Contractor	MEE
Pests: Rodents and birds	IWMC area	Maintenance of site cleanliness, minimizing storage time for putrescible waste, provision of enclosures for putrescible waste.	Inclusion of regular O&M tasks in job descriptions and implementing them. Plans for further developments on the reclaimed land to address the need for separation from the facility	Operation Cost	Island council	MEE

Impacts	Location	Mitigation Measures	Performance Standard	Source of Funds	Responsibility for Implementation	Responsibility for Supervision
Operator occupational health and safety	IWMC and dock area	(i) Operators trained to recognize risks and hazards. (ii) Personal safety equipment issued and worn. (iii) Health and safety recognized as primary employer responsibility. Contractors to adopt the World Bank EHS Guidelines on OHS for SWM projects/Waste Management Facilities.	Allocation of responsibility for safety standards to a full time member of staff. Appropriate protective equipment to each construction operation to be worn at all times (including steel toe capped boots at all times, face masks when handling compost)	Operation Cost	Implementation consultants / Contractor Island council	MEE
Community Health and safety issues	IWMC and surrounding area	(i) Inclusion of perimeter fence and gate in the design. (ii) Restriction of entry to workers and authorized personnel. (iii) Exclusion of burning (iv) Maintenance of site hygiene to deter pests.	Perimeter fence intact and site secure at all times No burning whatsoever	Operation Cost	Island Council	MEE

EHS = Bank Environmental, Health and Safety, IWMC = island waste management centre, MEE = Ministry of Environment and Energy, OHS = occupational health and safety, PMDSC = project management and design supervision consultant, SWM = solid waste management.

E. Environmental Monitoring

1. Monitoring Plan

112. The design of the environmental monitoring system is based on an analysis of the key environmental performance issues associated with each stage of the project, set out in Table 7 below.

Table 6: Analysis of Environmental Monitoring Needs

Phase	Key Environmental Performance Issues	Environmental Performance Indicator	Means of Monitoring
Design/ Preconstruction	Inclusion of mitigation measures in design/build and/or detailed design documentation and construction activities	Compliance with environmental management plan (EMP) design measures	Compliance monitoring
Construction	Adherence to provisions in the EMP to mitigate construction impacts	Compliance with EMP	Compliance monitoring
	Direct effects on communities from impacts such as accidental damage, dust generation, noise generation and safety	Views and opinions of communities Contractor's records relating to minor and major pollution and health and safety incidents (with a target of zero incidents)	Community feedback Grievance redress mechanism
Operation	Effectiveness of island waste management centre, collection system and removal to regional waste management facility (RWMF)	Cessation of practice of burning of waste, regular removal to RWMF, limited odor, effective pest control	Site observations Community feedback

113. Two areas of environmental monitoring are identified: compliance monitoring and community feedback, which are in addition to monitoring measures in the Design and Monitoring Framework for the project. These provide a means of gauging whether the stations operate more efficiently and with less loss of waste into the sea.

114. Compliance monitoring is required during detailed design and construction of the transfer station facilities, to ensure that mitigation specified in the EMP is carried out to an adequate standard. Compliance monitoring is a function of the PMU and its cost of this monitoring is part of the running cost of the PMU.

115. Community feedback provides for the monitoring of environmental indicators gauged by public perception. Appropriate indicators are:

(i) Reduced incidence of nuisance of smoke from burning waste
(ii) Clean area surrounding the IWMC
(iii) Effectiveness of waste handling (regular collection and removal to RWMF)

116. Costs of environmental assessment and monitoring during construction are project costs. Environmental monitoring during operation is carried out by the island council, and costs will be met from O&M budgets prepared and managed by the island council.

Table 7: Environmental Monitoring Plan

Impact to be Monitored	Means of Monitoring	Construction Phase			Operation Phase		
		Frequency	Responsible Agency	Indicative Annual Cost	Frequency	Responsible Agency	Indicative Annual Cost
General Construction Impacts	Community Feedback	To be established by PMDSC	PMU	Included in project management and consultancy cost	To be established by PMDSC	Island Council	Operational Cost
Compliance with EMP	Inspections	As set up by supervising engineers	PMU / PMDSC	Included in project management and consultancy cost	To be established by PMDSC	Island Council	Operational Cost
Occurrence of floating waste	Community Feedback	To be established by PMDSC	PIU	To be determined in design ICT component of Project 1	To be established by PMDSC	Island Council	Operational Cost

EMP = environmental management plan, ICT = information and communications technology, PIU = project implementing unit, PMDSC = project management and design supervision consultant, PMU = project management unit.

2. Reporting

117. EMP compliance monitoring will be undertaken by the PMU, with support of the PMDSC. Effects will be monitored by means of community feedback and laboratory testing. Consistent with reporting requirements set out in the Project Administration Manual (PAM), PMU will prepare reports to be sent to ADB on a semi-annual basis (suggested outline is attached as Appendix 4). Semi-annual reporting to ADB shall be from construction phase to operation phase when ADB issues a project completion report. To facilitate monitoring and enable responses to emerging issues, monthly reports will be prepared by the PMU.

X. CONCLUSION

118. The overall finding of the IEE is that the Project will result in significant environmental benefits, as it is conceived and designed to address major environmental issues associated with existing difficulties in waste handling and transfer and the rapidly growing volumes of waste that are projected in coming decades. It will not have significant adverse environmental impacts and potential adverse impacts are manageable through the effective implementation of the EMP.

119. The classification of Category B is confirmed. No further environmental assessment is therefore required. However, this IEE will be finalized based on the final detailed design and this classification shall be reassessed or reconfirmed accordingly.

Criteria for Planning and Design for Subprojects

Criteria		Remarks
Pre-requisites		
(i)	No subproject scope will include features that appear on schedule D of the EIA regulations (2007, updated 2012) (List of Development Proposals Requiring an Environmental Impact Assessment Study)	Development proposals on Schedule D of the EIA regulations related to solid waste management are landfills, incinerators and large scale waste storage and separation facilities.
(ii)	A IEE and EMP must be prepared for each subproject, which must comply with EHS Guidelines on Waste Management Facilities	PMU to seek clearance from ADB on project siting if the criterion cannot be met due to space constraints.
(iii)	Sites must not have any land acquisition or significant involuntary resettlement and social safeguard issues.	Verify land ownership records. Prepare Due Diligence Report following the Resettlement Framework prepared for the
(iv)	Any new facility must not be sited in an environmentally sensitive area, including all areas within 30m of the shoreline, or within 30m of areas such as thickly vegetated areas that are known to be habitats for bird species of conservation value	The 30m distance should be exceeded where possible. The restriction may be reviewed depending on site availability and stakeholder consultation, and provision of design measures to prevent release of leachate into the sea or onto the vegetated area in the event of the capacity of the leachate collection tank being exceeded. On the island of Huraa, where space is restricted and there is a wetland which is a protected area, special attention must be paid to the size of the IWMC leachate collection tank and provisions to contain leachate overflow during storm events.
(v)	No new facility to be sited within 500m of areas of cultural significance, such as ancient religious artifacts	Verification, through consulting island councils and the Ministry of Education[29], that no physical cultural heritage sites are situated within 500m of the IWMC site. The restriction may be reviewed on the basis of site availability and consultation with stakeholders. PMU to seek clearance from ADB on project siting if the criterion cannot be met due to space constraints. Provide for use of “chance find” procedures in the EMP, such that any artifacts are preserved for future generations
(vi)	Sites must have sufficient capacity to contain or handle volumes of waste projected to be generated over at least a 20 year planning horizon	To be assessed based on projections on growth in waste generation for each island
(vii)	Sites must be at least 100m from residences, schools, clinics or mosques	The distance restriction may be reviewed depending on site availability and stakeholder consultation. PMU to seek clearance from ADB on project siting if the criterion cannot be met due to space constraints.
(viii)	Sites must be least 100m from groundwater wells	The 100m limit is precautionary, however attention must be given in detailed design to

[29] Management of the arts and culture sector is currently under the Ministry of Education

		ensure that the leachate collection tank is protected to exclude flood waters, including during storm situations, to ensure that leachate does not enter the groundwater lens. PMU to seek clearance from ADB on project siting if the criterion cannot be met due to space constraints.
(ix)	Sites must not intersect with power lines, water supply pipelines or sewer lines	Where these lie across proposed sites, they must be re-aligned to avoid the site
(x)	For initiatives that require the use of machinery such as shredders and presses, there must be established access to technical expertise for servicing and spare parts must be regularly available in-country	
(xi)	Consensus from island communities on proposed improvements.	Records of public consultations, issues raised, and measures taken to address them to be summarized in IEEs. These consultations shall ensure consultees include women as well as men.
(xii)	No other work, including road, pipeline, or power line improvements are planned at or near the proposed site	Island council to confirm. If such sites are planned, details must be taken account of in design to ensure adequate separation of the infrastructure
(xiii)	World Bank Group's Environmental, Health and Safety (EHS) Guidelines requires IWMCs to consider standard design of 110% volume and bunded for impermeable storage to avoid contaminated runoff entering the surface or groundwater.	Final detailed design to confirm capacity is 110% and bunded
Preferable		
(i)	Where IWMCs exist, any improvements should be to the existing infrastructure, rather than replacement on new sites.	New sites may be necessary if existing site has become unsuitable due to new developments around it or there is objection from communities to rehabilitate the existing IWMCs.
(ii)	Removal of trees to be avoided where possible.	When mature trees (of diameter at breast height of 40cm or greater) must be removed, new trees must be planted of a number and species agreed with the island community
(iii)	Where composting facilities are to be introduced or expanded, a high level of commitment from the community should be evident to ensure both cooperation in ensuring that waste to be composed is not contaminated and that compost will be purchased or used.	Evidence of commitment from the island community should be obtained, for example signed minutes from a public meeting, or signatures from household heads.

Rapid Environmental Assessment Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	MLD: Greater Malé Environmental Improvement and Waste Management Project : Thulusdhoo Island Waste Management Center Subproject
Sector Division:	SAUW

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area…			
▪ Densely populated?		✓	Thulusdhoo island population is 1,400. Thulusdhoo Island is located just 28 km north of Male. It is the capital of Kaafu Atoll.
▪ Heavy with development activities?		✓	Thulusdhoo has an extensive area of newly reclaimed land. The size of Thulusdhoo is 700 x 400 meters. Thulusdhoo industrial sector is quite varied, it includes factories for tuna drying and sea cucumber drying and boat building workshops. A Coca-Cola factory, which was built in the 80s, is considered to be the heart of the island. Because of this factory the island is sometimes called Coke's Island. There are 8 guest houses on the island.
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		✓	
• Protected Area		✓	
• Wetland		✓	
• Mangrove		✓	
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	The island is included in Kaafu Atoll.
B. Potential Environmental Impacts Will the Project cause…			

▪ impacts associated with transport of wastes to the disposal site or treatment facility	✓		IWMC will consist of concrete platforms, small covered sheds, segregated waste processing and storage areas, small office, and fencing. Output 2 of the Project will ensure island council will have the capacity to manage SWM.
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not anticipated. There are no historical and cultural monuments at the subproject site.
▪ degradation of aesthetic and property value loss?		✓	The subproject will improve land aesthetics because of improved waste management infrastructure.
▪ nuisance to neighboring areas due to foul odor and influx of insects, rodents, etc.?	✓		Likely. However, the EMP ensures good housekeeping and site management measures are included to mitigate the impacts at subproject site.
▪ dislocation or involuntary resettlement of people?		✓	Not anticipated. All lands to be used for all subprojects are owned by the government and there are no APs in the land.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	The project will benefit all sectors in the subproject areas.
▪ risks and vulnerabilities related occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		OHS risks are inherent to construction activities. However, these risks can be reduced through implementation of good construction practices and adoption of internationally recognized OHS measures such as the WB EHS guidelines on OHS on construction activities and SWM operations. These are included in the EMP.
▪ public health hazards from odor, smoke from fire, and diseases transmitted by flies, insects, birds and rats?	✓		Likely, though these will be reduced through improved management associated with the IWMC which is expected to replace haphazarding dumping and open burning of waste. Further, the EMP ensures good housekeeping and site management measures are included to mitigate the impacts at all subproject sites.
▪ deterioration of water quality as a result of contamination of receiving waters by leachate from land disposal system?		✓	Not applicable. The subproject will not include any land disposal system.
▪ contamination of ground and/or surface water by leach ate from land disposal system?		✓	Not applicable. The subproject will not include any land disposal system.
▪ land use conflicts?		✓	Not anticipated. All lands to be used for all subprojects are owned by the government.
▪ pollution of surface and ground water from leachate coming form sanitary landfill sites or methane gas produced from decomposition of solid wastes in the absence of air, which could enter the aquifer or escape through soil fissures at places far from the landfill site?		✓	Not applicable. The subproject will not include any landfill facility.
▪ inadequate buffer zone around landfill site to alleviate nuisances?		✓	Not applicable. The subproject will not include any landfill facility. However the IWMC design includes buffer zone.
▪ road blocking and/or increased traffic during construction of facilities?		✓	Not anticipated. Volume of traffic in the island is very low.

▪ noise and dust from construction activities?	✓		Few receptors in vicinity, high ambient noise levels and winds. Impact of noise can be avoided by undertaking activities during day time when background noise is high. Night time works is not expected. Noise-suppression gadgets may also be used. Dust emission can be avoided with the implementation of dust control measures such as sprinkling of water on sites. No significant volumes of spoil will be generated.
▪ temporary silt runoff due to construction?	✓		Run-off during construction will be more. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts. Construction contractors will be prohibited from stockpiling loose materials along drain channels and will be required to immediately dispose any waste materials. Silt fences and traps to be used.
▪ hazards to public health due to inadequate management of landfill site caused by inadequate institutional and financial capabilities for the management of the landfill operation?		✓	Not applicable. The subproject will not include any landfill facilities.
▪ emission of potentially toxic volatile organics from land disposal site?		✓	Not applicable. The subproject will not include any landfill facilities. However, the IWMC design includes leachate collection and management.
▪ surface and ground water pollution from leachate and methane gas migration?		✓	Not applicable. The subproject will not include any landfill facilities. However, the IWMC design includes leachate collection and management.
▪ loss of deep-rooted vegetation (e.g. tress) from landfill gas?		✓	Not applicable. No trees will be cut.
▪ explosion of toxic response from accumulated landfill gas in buildings?.		✓	Not applicable. Landfill gas is not expected to be generated based on the quantity and type of waste. IWMC will not include landfill facility. Wastes will be disposed in Thilafushi facilities.
▪ contamination of air quality from incineration?		✓	Not applicable. The subproject will not cover incineration.
▪ public health hazards from odor, smoke from fire, and diseases transmitted by flies, rodents, insects and birds, etc.?	✓		Limited public access; reduced exposure of pests to waste The operation of the IWMC will ensure community health hazards are avoided with the adoption of WB EHS guidelines on SWM as indicated in the EMP.
▪ health and safety hazards to workers from toxic gases and hazardous materials in the site?	✓		The EMP ensures occupational health and safety measures are included following relevant WB EHS guidelines. Chemicals other than vehicle fuels will not be used during construction and operation activities. Fuels will be stored and handled properly as per EMP.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No significant increase in population of workers from overseas or off-island. Population influx due to project construction and operation is minimal. Labor requirements will be sourced locally. Priority in employment will be given to local residents. Construction contractors will be required to provide workers camp with water supply and sanitation.
▪ social conflicts if workers from other regions or countries are hired?		✓	Labor requirements will sourced locally.

▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		The EMP ensures community health and safety measures are included following relevant WB EHS guidelines on waste management. Chemicals other than vehicle fuels will not be used during construction and operation activities. Fuels will be stored and handled properly following WB EHS guidelines as included in the EMP.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components (e.g., landfill or incinerator) of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		During construction and operation of IWMC, community health and safety risks will be managed by adopting the WB EHS guidelines as indicated in the EMP.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: Greater Malé Environmental Improvement and Waste Management Project

Sector : Waste Management

Subsector: Water and urban infrastructure and services

Division/Department: South Asia Department / Urban Development and Water Division

Screening Questions		Score	Remarks[30]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	The site is expected to be close to the shoreline
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	Sea level rise and peak tide levels need to be considered in design
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	

[30] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Medium Risk

Other Comments:_____
__
_____
_____

Prepared by: Ninette Pajarillaga

Grievance Redress Mechanism Complaint Form

(To be available in local language, if any)
The Greater Malé Environmental Improvement and Waste Management Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.
Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	**Place of registration**

Contact Information/Personal Details					
Name		**Gender**	**Male Female**	**Age**	
Home Address					
Village / Town					
District					
Phone no.					
E-mail					

Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:
If included as attachment/note/letter, please tick here:

How do you want us to reach you for feedback or update on your comment/grievance?

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)

If – then mode:

- ■ **Note/Letter**
- ■ **E-mail**
- ■ **Verbal/Telephonic**

Reviewed by: (Names/Positions of Official(s) reviewing grievance)

Action Taken:

Whether Action Taken Disclosed:	■ **Yes** ■ **No**

Means of Disclosure:

GRIVENCES RECORD AND ACTION TAKEN

Sr. No.	Date	Name and Contact No. of Complainer	Type of Complain	Place	Status of Redress	Remarks

Template for Semi-Annual Environmental Monitoring Report

Introduction

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number	Roles
1. PMU				
2. PIUs				
3. Consultants				

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[31]	If On-going Construction	
				%Physical Progress	Expected Completion Date

[31] If on-going construction, include %physical progress and expected date of completion

Compliance status with National/State/Local statutory environmental requirements[32]

Package No.	Subproject Name	Statutory Environmental Requirements[33]	Status of Compliance[34]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[35]

Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

Compliance status with the environmental management plan (refer to EMP Tables in APPROVED IEE/S)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise IEE Documentation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
	Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

[32] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.

[33] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)

[34] Specify if obtained, submitted and awaiting approval, application not yet submitted

[35] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	Contractor	Nodal Person	Email Address	Contact Number

- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

Summary of Environmental Monitoring Activities (for the Reporting Period)[36]

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

[36] Attach Laboratory Results and Sampling Map/Locations

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

Approach and methodology for environmental monitoring of the project

- Briefly describe the approach and methodology used for environmental monitoring of each sub-project.

Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS (ambient air, water quality and noise levels)

- Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:
    - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
    - Identify if muddy water is escaping site boundaries or if muddy tracks are seen on adjacent roads.
    - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these are intact following heavy rain;
    - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area in the Appendix.
    - Confirm spill kits on site and site procedure for handling emergencies.
    - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
    - Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
    - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
    - Provide information on barricades, signages, and on-site boards. Provide photographs in the Appendix.
    - Indicate if there are any activities being under taken out of working hours and how that is being managed.

- Briefly discuss the basis for environmental parameters monitoring.
- Indicate type of environmental parameters to be monitored and identify the location.
- Indicate the method of monitoring and equipment used.

- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements.

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)

			Day Time	Night Time

Grievance Redress Mechanism

- Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).

Complaints Received during the Reporting Period

- Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

APPENDIXES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors
- Others

SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER CONDITION:

_____

INITIAL SITE CONDITION:

_____

CONCLUDING SITE CONDITION:

Satisfactory ____ Unsatisfactory _____ Incident _____Resolved ____ Unresolved _____

INCIDENT:
Nature of incident:

_____

Intervention Steps:

_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes [ ] No [ ]

Signature

_____

Sign off

_____ _____