

Reference No:

**Terms of Reference (TOR) for Final Construction Phase ESIA Monitoring Report of Vandhoo  
Regional Waste Management Facility**

**SECTION A: Background and Context of the ESIA Monitoring Report**

**Establishment of the Vandhoo RWMF.**

Government of Maldives took a decision to invest heavily in the waste sector with support from various donors and international agencies to build necessary infrastructure to develop an integrated and sustainable solid waste management system throughout the country on a zonal approach. This process was initiated in 2008 with the support of the World Bank to develop an integrated SWM system for Zone II, namely the Maldives Environment Management Project (MEMP). This project was completed in 2015, by developing SWM systems on inhabited islands as well as a Regional Waste Management Facility (RWMF) in the uninhabited island of Raa Vandhoo. The facility was designed via a Best Practicable Environmental Options (BPEO) study conducted for the North Province Regional Waste Management Project (SENES and CDE, 2010).

Following completion of MEMP project, the Government of Maldives applied for a grant from World Bank IDA for another regional waste management project, the Maldives Clean Environment Project (MCEP), which was approved by the World Bank Board and effective from September 2017. Sub-component 2a of MCEP supports investment activities in Zone II for operationalization of the facilities created under MEMP at the Vandhoo RWMF. This includes both human capacity building interventions as well as infrastructure development at the site. In addition, as the funding available via the MCEP is limited, the GoM has utilized various other credits/grants to develop ancillary infrastructure on the site as approved by the World Bank and also subject to the World Bank's safeguards procedures as associated facilities.

**The Chronology of the Environmental and Social Assessment Process Followed**

As part of the World Bank Safeguards Policy requirements and the National Environmental Impact Assessment Regulations of the Maldives and requirements mandated by the Environmental Protection Agency the interventions warranted a full Environmental and Social Impact Assessment (ESIA) process. As infrastructure development at the site has been phase, the original ESIA for the Vandhoo RWMF has undergone a first Addendum in 2019 and a second Addendum in 2022.

[Note: Although, the 2019 report is referred to as a first addendum to the 2012 ESIA as per World Bank's safeguards standards, it is considered as a standalone ESIA under the national Environmental Impact Assessment Regulation of the Maldives, since the validity terms of the 2012 ESIA had expired at the time of the preparation of the 2019 report (more than 5 years). And the second addendum report is considered as a first addendum to the 2019 ESIA as per the national regulatory requirements].

The World Bank has agreed with the Government of Maldives to align the project safeguards requirements with the national requirements which allows for addendums to be done. The ESIA process to date is summarized as follows.

- **The original ESIA conducted in 2012 prepared and financed as part of the Bank-Financed MEMP project**, implemented between 2008 to June 2016. The original ESIA was for the

establishment of the Vandhoo-RWMF based on the BPEO and Feasibility Study for the Vandhoo RWMF. The ESIA was cleared by the EPA and the World Bank in 2013. The EPA of Maldives issued a decision note on 31st January 2013 and the World Bank approved the report in August 2013.

- **The First Addendum to the Original ESIA was prepared for the additional interventions introduced by and financed under MCEP in 2019**, which were mostly for storage and accommodation facilities. This standalone First Addendum Report was cleared by the Bank in 2019. The First Addendum was cleared by the World Bank on 10 June 2019. The report was also earlier approved by the Environmental Protection Agency (EPA) on 14 February 2019.
- **The Second Addendum to the ESIA was prepared to consider minor updates brought to the Original Master Plan for the RWMF**, which includes the following revisions:
  - Change to the proposed location of the fuel storage tanks (to relocate close to the powerhouse and incinerator).
  - Arranging for Temporary fuel storage setup during construction
  - Minor extensions or connections to the road network as described in the original ESIA and the First Addendum;
  - Preparation of a Traffic Management Plan; and
  - Change of the sewerage system plan from a central system to the use of septic tanks.

The second addendum was cleared by the Bank in 20 January 2022 and by the EPA on 12 January 2022. Majority of the civil works covered under the First Addendum financed by MCEP has been completed with the remaining two projects expected to be completed within Q4 of 2024, prior to closure of MCEP.

In addition to the aforementioned instruments, **Annex 1** provides summaries of construction phase monitoring reports completed as part of the ESIA process. The current status of civil works covered under the first addendum (2019 ESIA) and second addendum are provided in **Annex 2**.

## **SECTION B: Scope of Work**

The final construction phase ESIA monitoring report of Vandhoo RWMF, will exclusively focus on implementation progress of sub-projects, implementation of mitigation measures and monitoring of MCEP financed activities covered under the First and Second Addendums. The report should be prepared to read in conjunction with the Construction Phase Monitoring Report 1 of the ESIA for upgrading of infrastructure at Vandhoo RWMF (Zuhair & Shan, 2021).

**The ESIA Monitoring Report will be structured as follows:**

- **Introduction** – The purpose and objectives of the report and details of the author should be presented here along with the chronology of environmental and social impact assessment process followed throughout the implementation phase of First and Second Addendum to the ESIA of Vandhoo RWMF. Reference to the previous monitoring report done under the First Addendum shall be provided.
- **Key Tasks and Scope** –The following tasks shall be completed and presented as sections of the report as follows. The tasks will cover all phases of the project interventions and provide details in line with the phases of preparation, construction and decommissioning.

### **Task 1. Status of Sub-Projects Implementation**

Describe the current implementation status of the sub-projects covered in First Addendum and Second Addendum. Reference shall be made to the funding agency, contractor, status (completed, ongoing, on hold etc.) commencement date, competition date or expected competition date, followed by a brief description. Anticipated timelines shall be provided for those projects not covered under MCEP in consultation with relevant staff of Waste Management and Pollution Control Department of MCCEE.

*Note: If any of the aforementioned details are covered under Construction Phase Monitoring Report 1 of the ESIA for upgrading of infrastructure at Vandhoo RWMF (Zuhair & Shan, 2021) reference can be made to the relevant sections of report.*

### **Task 2. Implementation of Mitigation Measures**

Describe the level of implementation of mitigation measures, in reference to the mitigation matrices of First Addendum (Appendix 1 of Additional Information) and Second Addendum (Chapter 9, page 9-95 to 9-111). Supporting photographic evidence shall be provided where applicable.

*Note: If any of the aforementioned details are covered under Construction Phase Monitoring Report 1 of the ESIA for upgrading of infrastructure at Vandhoo RWMF (Zuhair & Shan, 2021) reference can be made to the relevant sections of report.*

### **Task 3. Vegetation Clearance Details**

The total number of vegetation clearance for each sub-project shall be provided in reference to the baseline vegetation surveys done. This shall include the following:

- Type of Vegetation
- Quantity
- Estimated Size
- Removal Date
- Location (geographic coordinates)
- Method of removal
- Management of wood/green waste

Supporting photographic evidence shall be provided where applicable.

*Note: If any of the aforementioned details are covered under Construction Phase Monitoring Report 1 of the ESIA for upgrading of infrastructure at Vandhoo RWMF (Zuhair & Shan, 2021) reference can be made to the relevant sections of report.*

### **Task 4. Grievance Redress Mechanism**

Describe the level implementation of the GRM at sub-project level (QR code, GRM board, Code of Conducts etc.). Provide details of the grievances received during the implementation of the subproject (if any). This should cover the following:

- Detail of Grievance
- Type of Grievance (Unofficial / Official)
- Date

- Status (Resolved, Unresolved, In-progress).

*Note: If any of the aforementioned details are covered under Construction Phase Monitoring Report 1 of the ESIA for upgrading of infrastructure at Vandhoo RWMF (Zuhair & Shan, 2021) reference can be made to the relevant sections of report.*

### Task 5. ESIA Monitoring

Conduct the assessments reflected in the monitoring programme of First Addendum (Appendix 5 of Additional Information) and Second Addendum (Chapter 11) and the present the data. This shall include but not limited to the following:

Component	Parameters	Monitoring Location	Instrument Referred
Air Quality	Particulate Matter (PM10), Carbon Monoxide (CO), NOx, SO2	Direct emissions measurement at the powerhouse chimney	First Addendum
Effluents (Lechate)	BOD5, pH, TSS, Ammonia, Zinc, Benzoic Acid, Phenols	At the landfill cell / leachate pond	First Addendum
Ground-water Quality	Temperature, pH, Electrical Conductivity, TDS, TSS, DO, Ammonia, Phosphate, Sulphate, Zinc, Benzoic Acid, Phenols, Hydrocarbons	Borewell east Borewell west Well	First Addendum
Ground-water Quality	Temperature, Salinity, pH, Conductivity, Total Dissolved Solids (TDS), Total Petroleum Hydrocarbon	Location of fuel storage tank and control site	Second Addendum
Vegetation Clearance Impact Mitigation	Monitoring number of trees/palms removed. Record number replanted in Vandhoo and those planted elsewhere.	Project site and Dhuvaafaru	First Addendum Second Addendum
Seawater Quality	Temperature, pH, Salinity, Electrical Conductivity, TDS, TSS, Turbidity, Ammonia, Phosphate, Sulfate, Total Coliform, Fecal Coliform	Outfall location and baseline locations SW1, SW2, SW3 and SW4	Second Addendum First Addendum
Reef	Coral Cover (diversity), Algal Cover, Fish Community (abundance and tropical groups)	SW1, SW2, SW3 and SW4	First Addendum
Shoreline	High tideline, Low tideline, Vegetation line	Shoreline of the island	First Addendum
Workforce health and safety	General health and wellbeing of the workforce	Project Site	First Addendum Second Addendum
Grievance Redress Mechanism	Grievances received by contractor's workers and/or general public.	Project Site and Accommodation Site and Islands	First Addendum Second Addendum

	Note: operational staff related grievances are not required to be covered as operation safeguards monitoring is undertaken separately through O-ESMP reporting.		
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The results of the monitoring conducted should be compared with the baseline data of ESIA's and Construction Phase Monitoring Report 1. During this comparison, any deviations or changes observed should be analyzed and interpreted to assess their significance in relation to environmental and social impacts. This interpretation process will help identify whether the project is meeting its environmental and social performance objectives as outlined in the baseline assessments and monitoring reports.

### **Task 6. Conclusion**

This section shall comment on the environmental acceptability of the project based on conducted assessments and compares it with baseline data gathered during the ESIA process. It also identifies additional conditions or external requirements necessary to maintain the effectiveness of implemented measures post-closure of MCEP.

- **Validation and Disclosure-** The report shall be disclosed in MCCEE website post clearance from the World Bank.
  
- **References**  
 Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the ESIA monitoring report with full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.

## ANNEX 1: SUMMARY OF CONSTRUCTION PHASE MONITORING REPORTS

### Construction Phase ESIA Monitoring – Original ESIA of Vandhoo RWMF

A total of 6 interim construction phase monitoring reports were prepared in compliance with the monitoring schedule given in the 2012 ESIA. A 7th consolidated report (final report) summarising the finding of the individual reports was prepared in September 2016 and submitted to the World Bank and EPA. Following are the main components investigated as part of the monitoring, along with a summary of monitoring results:

- **Compliance to the mitigation measures proposed:** analysed through a series of field visits through qualitative (visual) and quantitative observations. The overall compliance to the mitigation measures proposed were found to be satisfactory. The wetland area has been surveyed and demarcated, while a buffer of vegetation belt has been established at the 15ha area allocated for the RWMF. Additionally, it was found that less than the proposed area for vegetation clearance was actually cleared (7.1ha was cleared, while 7.6ha was proposed in the ESIA) thereby minimising the negative impacts to terrestrial biodiversity even further. Replantation of coconut palms were also carried out.
- **Shoreline survey/beach profiles:** Vegetation line, low tide line (beach toe), high tideline (beach berm) was resurveyed and compared with the baseline data. Beach profiles were taken from 4 locations and compared with the baseline profiles taken in 2012. The results show that there is a net decrease in beach sedimentation over the surveyed period, suggesting that there is erosion at these sites.
- **Reef Assessment:** Underwater photography was used to conduct quantitative reef surveys in order to assess the overall condition of the reef. Monitoring surveys were performed four times on March 2014, March 2015, October 2015 and July 2016 and the overall results indicate that the reef is in good and healthy condition. It was found that the coral cover has increased from the ESIA baseline (2012 data) from 43% and 25% to 61% and 59% at site 1 and site 2 respectively at 3 meters depth in March 2014. Subsequent survey in October 2015 showed a slight reduction in coral cover as compared to March 2014. Coral cover increased in March 2015 with a significant reduction in cover in July 2016. The change in cover can be attributed to natural variability or construction related impacts.
- **Water quality Assessment:** Water quality samples were taken for marine waters and groundwater and compared with the baseline water quality conditions. The groundwater samples taken for monitoring from the 3 sampling wells show that it was relatively saline and low in Dissolved Oxygen (DO) content. The period of sampling was identified as the mostly like reason for high salinity rather than excessive saltwater intrusion. However, based on the monitoring results it was deduced that the groundwater is not suitable for portable use and can only be used for non-portable use. Seawater quality monitoring results show no significant difference from the ESIA baseline.
- **Turtle Management Plan:** Repeated surveys of the beach, especially the 15-hectare portion of the island was carried out to document any nesting activity and also to compare findings of the baseline survey. A sea turtle management plan for rehabilitating nesting turtle population and protection of eggs was prepared and annexed to the report. Implementation details are covered in section 3.1.

## Construction Phase ESIA Monitoring – First Addendum to ESIA of Vandhoo RWMF (2019 ESIA)

A detailed construction phase ESIA monitoring report under the First Addendum to the ESIA of Vandhoo RWMF (2019 ESIA) were prepared in 2021. This report covers the status of implementation at the time of report writing of activities proposed under the subject ESIA addendum, the level of implementation of mitigation measures, grievance redressal mechanism imposed, and vegetation removal and replantation details.

The following technical marine assessments were undertaken:

Component	Parameter	Monitoring location	Methodology
<b>Reef</b>	Coral cover (diversity)  Fish community (abundance and trophic groups)	RS1 RS2	Snorkelling around the reef and taking photo quadrants using an underwater camera at depth of 2-3m, in a belt measuring 200m by 5m, at each site.  Fish community abundance was analysed at the family level, with the focus on estimating the presence of major fish groups and predominant species.
<b>Seawater</b>	Temperature; pH; Salinity Electrical conductivity; TDS; TSS; Turbidity Ammonia; Phosphate; Sulfate	SW1 SW2	Seawater quality tests were done at SW1 and SW2.
<b>Shoreline</b>	High tideline; Low tideline Vegetation line	Shoreline of the island	Shoreline of the island was re-surveyed using a DJI RTK drone and processed using the application software.  High tideline, low tideline and vegetation line were retaken and compared with baseline.

During the field investigations, the reef and seawater quality north of the island were monitored at RS1/SW1 and RS2/SW2 locations. An additional seawater sample was also taken from the harbour basin considering the change in the proposed brine outfall location from SW4 to harbour basin. The marine environment at RS3/SW3 and SW4 were not monitored at this stage due to that fact that none of the proposed developments have commenced at south side of the island. Seawater at SW4 will be monitored as per the monitoring schedule when the sewer outfall has been constructed.

## ANNEX 2: CURRENT STATUS OF CIVIL WORKS

The table below provides the current implementation status of the sub-projects proposed under the First and Second Addendums.

SN	Sub-project	Implementing Agency	Progress Percentage	Comments
1	Guard House	MCEP	100%	Completed
2	RO Plant Building	MCEP	100%	Completed
3	Waste Storage Bunker	MCEP	100%	Completed
4	Store Room	MCEP	100%	Completed
5	Extension of Bunker 1	MCEP	100%	Completed
6	Utility Building Extension	MCEP	100%	Completed
7	Landfill Rehabilitation	WAMCO	100%	Completed
8	RO Plant	MCEP	85%	In progress
9	Waster Tanks and Water Network	MCEP	75%	In progress
10	Fuel Storage Tanks	MCEP	38%	In progress
11	Accommodation Block	ADFT / IRENA	5%	In progress. Not expected to be completed during MCEP project period.
12	Sewer Network	WMCPD	0%	Will not be initiated during MCEP project period.
13	Recycling Facility	WMPCD	0%	Will not be initiated during MCEP project period.
14	Roads	WMPCD / WAMCO	0%	Will not be initiated during MCEP project period.
15	Temporary fuel storage setup	MCEP / WAMCO	100%	
16	Traffic Management Plan	MCEP / WAMCO	50%	Plan prepared, but installation of traffic signages pending road construction.



### **ANNEX 3: LIST OF ACRONYMS AND ABBREVIATIONS**

ADFD: Abu Dhabi Fund for Development

BPEO: Best Practical Environmental Option

ESIA: Environmental and Social Impact Assessment

ESHS: Environmental and Social Health and Safety

GoM: Government of Maldives

GRM: Grievance Redress Mechanism

IRENA: International Renewable Energy Agency

MCEP: Maldives Clean Environment Project

MECCT: Ministry of Environment, Climate Change and Technology

MEMP: Maldives Environmental Management Project

MoF: Ministry of Finance

O-ESMP: Operational Environmental and Social Management Plan

OHS: Operational Health and Safety

PMU: Project Management Unit

RWMF: Regional Waste Management Facility

SOE: State Owned Enterprise

WAMCO: Waste Management Corporation Ltd.

WtE: Waste to Energy