

Preliminary Construction Phase ESMP for the proposed construction of IWMC with Mechanical Composting Technology at Th. Buruni

1. Site Details

The proposed Island Waste Management Centre (IWMC) is located in the north eastern end of the island at 2°33'34.62"N, 73° 6'42.71"E. The site requires vegetation clearance. Currently this site can be accessed through an unofficial path that goes through a burial ground in the island. Heavy vehicles may not be able to use this path without damaging the ancient burial ground. The island council shared plans of clearing an official access road to the IWMC from the south eastern end of the island. Plot vegetation includes *Cocos nucifera* (Dhivehi ruh), *Hibiscus tiliaceus* (Dhigga) and some undergrowth. It is estimated that 21 mature coconut palms, 1 juvenile coconut palm and 1 other tree will require removal from the site.

Type of Vegetation	Estimated Quantity
Juvenile small coconut palms	1
Mature Coconut Palms	21
Other Trees	1

The juvenile coconut palms found at the site and trees of 15ft or less in height shall be translocated elsewhere at the island.

2. Mitigation Measures for Construction Phase

The following table provides a list of general mitigation measures that the selected contractor has to follow during the implementation of the project. These measures are provided to assist the potential bidders to estimate cost for environmental and social component during the preparation of the bid documents, while updating of the ESMP is being undertaken in parallel. Potential bidders should note that additional measures are likely to be proposed in the updated ESMP, which they have to fully implement and therefore, it is advised to account for a contingency when proposing costs.

Disclaimer: An ESMP was originally developed for the project in 2018, which was subsequently approved by the EPA and the World Bank. The permit obtained for ESMP has expired and it is currently in the process of updating to reflect changes brought to the scope of the project, especially the organic waste treatment technology, which has been changed from windrow-based composting to mechanical in-vessel composting. It is to be noted that the updated ESMP will need to be cleared from the EPA and the World Bank prior to signing of the civil works contracts.

Environmental Management Plan			
Impact	Mitigation Measure	Responsible Party	Cost of Mitigation
<i>Management of Impacts during Construction Phase</i>			
1. Physical / Chemical			
Note: All construction activities should be undertaken in the presence of an experienced supervisor.			
Contamination of groundwater and soil due to chemical spillage and seepage	<p>Hazardous waste such as waste oil and diesel should be stored in sealed containers and placed on an impermeable surface and transferred to the nearest regional waste management facility for final disposal.</p> <p>Stored containers should be regularly inspected to identify any leakages. Conspicuous warning signs (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities.</p>	<p>P: Contractor S: IC Supervisor</p>	Cost associated with purchasing of containers and transport to RWMF
Noise pollution due to construction activities and use of machinery	<p>Ensure construction activities occur between 8 am and 6 pm.</p> <p>Construction workers should wear ear muffs when using machinery that produce significant noise and while undertaking welding and drilling activities.</p>	P: Contractor	Cost associated with purchasing ear muffs
Negative impact on air quality during transfer of construction materials and progression of works	<p>During transport of construction materials from the harbor to the site, all sand and aggregate should be transported in covered vehicles or wheelbarrows and vehicle movement should be via routes that are well away from community roads where possible. Transportation should be at low vehicular speeds and loading and unloading should be conducted within the site.</p> <p>All vehicles used in the project should have an up to date road worthiness certificate.</p> <p>All vehicles and machinery should be well tuned. Machines should be switched off when not in use.</p> <p>Ensure that construction site is regularly wetted to minimize impact of dust as a result of the project.</p>	P: Contractor	No cost involved.

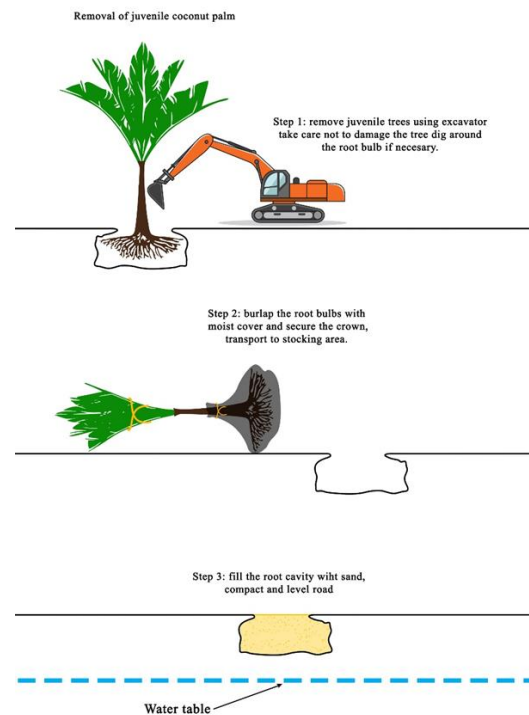
	<p>Materials that are stockpiled at the location for long period of time should be covered to minimize impact of dust generation due to windy conditions.</p> <p>The contractor should not burn any waste.</p>		
Coastal erosion and loss of beach aesthetics due to sand mining	<p>Ensure that all construction materials including sand are sourced in compliance with the national laws and regulation.</p> <p>Sand should not be sourced from the beach or lagoon of an inhabited island, tourist resort, or any protected island. This includes the area of the island designated by EPA for sand mining of local public use.</p>	P: Contractor	Cost associated with purchasing sand from a reputable source (hardware shops) and transporting to the island.
Waste Management	<p>Construction waste produced should be reused for the construction of the IWMC as much as possible. The remaining reusable materials such as (metal bars and roofing sheets) should be given to the island community or the island council free of cost.</p> <p>Leaves of felled vegetation is to be sundried and left at the forest area for natural degradation.</p> <p>Any remaining C&D waste shall be disposed at the area designated by the council for C&D waste disposal.</p> <p>The figure below illustrates proposed temporary storage areas for hazardous waste and remains of removed vegetation.</p>	<p>P: Contractor</p> <p>S: Island Council</p>	Cost associated with transport to RWMF

			
Littering and general waste generated by construction workers	<p>Place a bin at the site to dispose general waste generated by the workers.</p> <p>Establish procedures for general waste disposal which should include actions to be taken if the procedures are breached.</p>	P: Contractor	Cost associated with purchasing a bin
2. Biological			
Impacts from site clearing and earthworks (terrestrial pollution, vegetation removal)	<p><u>Mitigation Measures to Reduce Number of Trees Targeted for Removal</u></p> <p>Site Setting Out During the initial set out survey, mark the limits of the plot as accurately as possible to avoid damaging or removing trees not intersecting with the plot.</p> <p>In site clearance works the priority shall be given to minimize the trees removed or felled by minor adjustments that could be brought in marking the final boundaries of the plot as well as the road.</p> <p>Translocation of Juvenile and Small Trees</p>	P: Contractor	Cost associated with hiring of pickups for transporting to translocation area.

In the case of those trees that require absolute removal priority shall be given for relocation. Juvenile coconut palms and other trees in the site that can be manually translocated (15ft or less, without the use of an excavator) must be transferred and replanted elsewhere in the islands. Records of replanted vegetation (name, date and respective locations with GPS coordinates) should be maintained. The Island Council shall be consulted on potential location for translocation

Method: A root ball of shovel-width radius from the trunk should be made and carefully extracted. Prior to digging, the soil around the root system will be thoroughly wetted to help keep the root ball together.

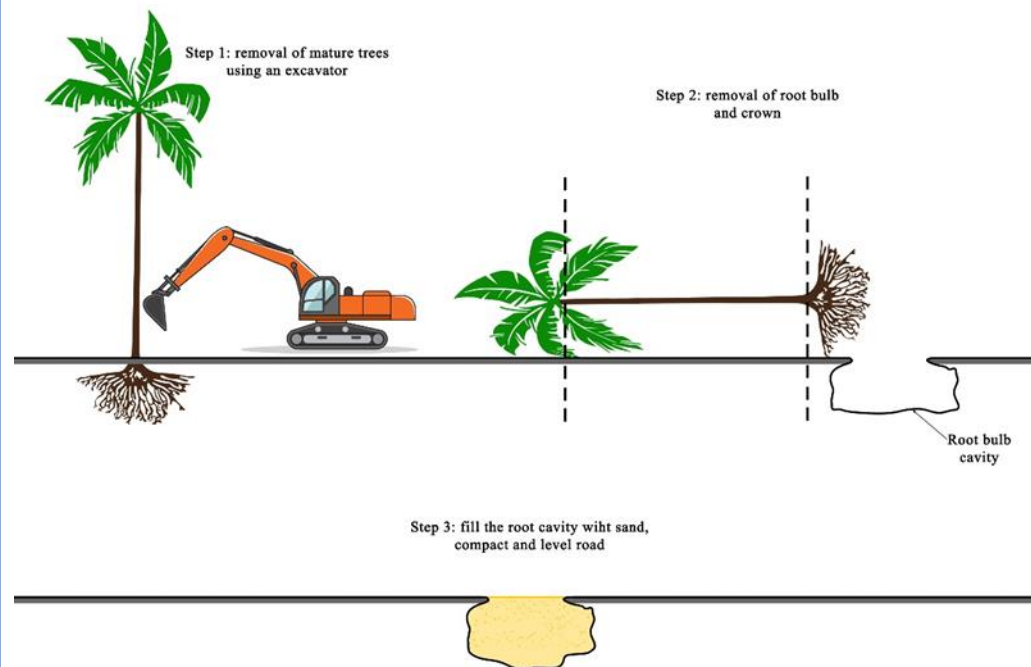
Half or more of the older leaves will be removed at the time of digging. The remaining leaves will be tied together in a bundle around the bud with a twine.



Felling of Trees


Only those trees that cannot be relocated for various reasons should be felled and the trunks stockpiled near the site for reusing in the construction or transferred to a stockpiling area designated by the island council to be given to the island community free of cost. Fronds and root bulb and base of the trunk shall be cut using a chainsaw and only trunks will be transferred to the stockpiling area. Parts of the root bulb will be used for backfilling of the depression created (See Figure for illustration of removal method). All fronds and nuts will be removed from the terminal bulb and piled up separately. Nuts will be given to the community free of cost and fronds will be left to sundry.

The contractor must ensure from the Island Council if compensation was issued for the trees belonging to individuals prior to felling of any such trees.



For each tree that is felled, two new trees shall be planted (not ornamental plants) elsewhere at the island. Buruni island council proposed two area for compensatory planting of trees.

- Open spaces near the vegetation line close to the site as reinforcement to the vegetation line in the area
- Area on the south western side of the harbor.
- On the sides of the new proposed access road

	<p>These areas shall be utilized for compensatory planting of trees for the trees removed for both the access road and site plot.</p>  <p>Legend</p> <ul style="list-style-type: none"> --- Road network Tree relocation zone IWMC plot Proposed access road Residential footprint Vegetated areas Harbour Reef <p>Disposal at Forest Area</p> <p>Considering a tree as waste shall be considered when all the above options have been exhausted. In such cases, leaves and branches must be removed and left for sundry in the forest area and trunks chopped into small piece and left in the forest area for natural degradation.</p>		
Negative impacts to vegetation due to improper handling and driving during material transportation.	<p>Workers will be informed to avoid damaging trees and disturbances to animals and to generally avoid engaging in destructive activities to the environment intentional or unintentional.</p> <p>Avoid roads with significant vegetation during transportation within the island.</p> <p>Avoid bringing heavy vehicles to the island where possible.</p>	P: Contractor	No cost involved
Negative impact on	<p>Workers will be informed to avoid damaging trees and disturbances to animals and to generally avoid engaging in destructive activities to the environment intentional or unintentional.</p>	P: Contractor	Cost associated

fauna during material transport	<p>Materials shall be obtained from the closest source.</p> <p>The materials shall be brought in bulk and transported to the island within a single trip where possible.</p> <p>The materials shall be stored at the project site or in a close proximity to avoid unnecessary movement of vehicles within the island through the construction phase.</p> <p>Ensure that all construction materials imported to the island are free of any alien species or pests.</p> <p>Ensure that oils and paints are properly sealed prior to transportation.</p> <p>Ensure that materials are not kept beyond the height of the sides of the vessels and are properly covered, when transporting via sea.</p>		with purchasing of containers designed for storing hazardous substances.
3. Health and Safety			
Occupational Health and Safety	<p>All workers should be provided with safety gear and should ensure that safety gear is utilized at all times. This includes: safety hats, boots, glasses, masks and gloves.</p> <p>Ear muffs shall be provided where equipment or machinery that emit significant amount of noise is used (welding, drilling etc.).</p> <p>Chemical-Liquid protective gloves should be used when handling any chemicals, waste oil or other liquid waste.</p> <p>First aid kit must be purchased and kept on site at all times</p> <p>No open electrical wiring or cables should be kept on site.</p> <p>Health and Safety briefing should be given to all construction workers.</p> <p>A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored monthly and recorded in the monitoring.</p>	P: Contractor	Cost associated with purchasing safety materials.
Working Conditions and Labor	<p>The maximum working hours of all construction workers should be 48 hours per week as per the Employment Act of Maldives.</p> <p>Meals should be provided to construction workers 3 times a day.</p>	P: Contractor	

	<p>Safe drinking water should be supplied to construction workers and must be made available at the work site and the labor camp.</p> <p>Appropriate sleeping arrangements shall be made for the construction workers.</p> <p>Temporary resting arrangements for the workers shall be facilitated at the work site.</p>		
Management of COVID19	<p>Travel permit must be taken from HPA for the workers if traveling from Male' or an island placed under COVID19 monitoring. The standard quarantine procedure must be followed as instructed by the authorities.</p> <p>Workers must be briefed about the safety protocols and social distancing measures that has to be enforced.</p> <p>The workers must perform frequent hand hygiene.</p> <p>All workers must wear face masks.</p> <p>The movement of workers must be restricted between the labor camp and work site as much as possible.</p> <p>Daily body temperature of all the workers should be taken and log records maintained. If a worker is having a temperature of 37.8C or above or symptoms of flu that person must not report to work and should be self-isolated and respective authorities notified.</p> <p>Handwashing or hand sanitizing facilities must be established at the work site and the labor camp.</p> <p>Labor camp should facilitate social distancing. The beds should be kept at least 3 – 6 fts apart.</p> <p>COVID19 awareness materials should be displayed in the worksite and the labor camp.</p> <p>Construction tools should be cleaned using disinfecting solution (1:9 bleach solution) at the end of each day or when changing shifts (if shift-based work methodology is adopted).</p>	P: Contractor	Cost associated with purchasing soap, hand sanitizers etc. and printing of awareness materials.
Health and safety of public	<p>Demarcate the site boundary through taping or hoarding.</p> <p>Place sign boards to indicate that only authorized personnel are allowed entry.</p> <p>Make sure that the general public do not have access to the site and its vicinity. Regularly monitor for entrance of residents.</p> <p>Make sure that public chairs are not found at the vicinity of the site.</p>	P: Contractor S: Island Council	Cost associated with designing and printing sign boards.

Fire hazard	<p>Ensure that electrical wires are installed properly by a certified person.</p> <p>Ensure that portable extinguishers are readily available in case of an emergency fire.</p> <p>Flammable hazardous waste such as used oil and diesel must be labeled with hazardous waste and fire hazard signage and regularly inspected to identify any leakages. Conspicuous warning signs (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities.</p> <p>National Fire Code (NFC) shall be strictly followed while handling, transporting and storing fuel. Inflammable goods such as fuel drums, portable fuel containers and cleaning solvents and chemicals will be closed off from public access.</p>	P: Contractor	Cost associated with hiring an expert electrician and purchasing of fire extinguishers
4. Sociological and Cultural			
Legal Issues	All expatriate workers must hold valid work permits	P: Contractor	Work Permit fees
Handling Environmental and Social Issues during Construction	<p>The contractor will appoint a suitably qualified Environmental Officer following the award of the contract. The Environmental Officer will be the primary point of contact for assistance with all environmental issues during the pre-construction and construction phases. He/ She shall be responsible for ensuring the implementation of ESMP.</p> <p>The contractor shall appoint a person responsible for community liaison and to handle public complaints regarding environmental/social related matters. All public complaints will be entered into the Complaints Register. The Environmental Officer will promptly investigate and review environmental complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints. A register of all complaints is to be passed to the Engineer within 24 hrs. They are received, with the action taken by the Environmental Officer on complains thereof; and</p> <p>The site supervisor may assume the on-site responsibility of the environment officer and community liaison officer, subject to being adequately trained and having thorough knowledge of the ESMP.</p> <p>Contractor shall prepare detailed Environmental Method Statement (EMS) clearly stating the approach, actions and manner in which the ESMP is implemented.</p>	P: Contractor	Cost associated with hiring of staff.
Sociocultural conflict due to arrival of expatriate workers	<p>Ensure that local workers are used as much as possible. If expatriate workers are used ensure that they respect the local culture.</p> <p>The contractor in collaboration with the Island Council shall undertake a training to sensitize the labor to the local context and customs. This training should also cover topics related to Gender-based violence.</p>	P: Contractor S: Island Council	Cost associated with hiring staff

Benefit to local economy	Ensure that construction materials are purchased from the island as much as possible. Preference shall be given to hire local construction workers from the island and the atoll or region.	P: Contractor	Cost associated with material purchase
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3. Cost Estimate for Implementation of Mitigation Measures

Following table provide an estimated cost of some of the items required for the implementation of the ESMP during construction phase.

#	Item	Responsibility	Cost Estimate (MVR)
1	PPEs required for construction such as hard hats, gloves, safety shoes and safety harness.	Contractor	10,000.00
2	PPEs to mitigate COVID19 such as face masks, antibacterial soap, hand sanitizers, disinfectant cleaning liquid (bleach) and printing of awareness materials etc.	Contractor	5,000.00
3	Hiring of pickups (from the island) to translocate vegetation (MVR 200 per trip is assumed)	Contractor	2,000.00
4	Portable fire extinguisher for site	Contractor	2,000.00
5	Firefighting Equipment for the IWMC (item included in BOQ): <ul style="list-style-type: none"> 50KG DCP Trolley (nos 2) 50LTR Foam Trolley (nos 1) Wet Chemical 6Ltr with Cabinet for hazardous waste area (nos 1) Water 9Ltr with Cabinet for Office Area – Outside (nos 1) CO2 2KG with Cabinet for Office Area – Outside (nos 1) 	Contractor	35,000.00
6	Project board and Construction Safety sign board	Contractor	3,000.00
7	IWMC name board, cell labels and fire safety sign boards	Contractor	5,000.00
8	Bin for placing general waste	Contractor	1000.00
9	Site demarcation through hoarding	Contractor	1000.00
	Subtotal		64,000.00
	Contingency	10% of Sub-Total	6,400.00
	Total		70,400.00

ANNEX 1: Dhivehi Translation of ESMP Matrix