

# **Environmental and Social Management Plan (ESMP) for the Construction Phase of Maniyafushi Research Development Facility (TO BE INCLUDED IN CONTRACTS)**



**2018**

**SUSTAINABLE FISHERIES RESOURCES DEVELOPMENT PROJECT  
MINISTRY OF FISHERIES AND AGRICULTURE/WORLD BANK  
REPUBLIC OF MALDIVES**

2.1 EARTHWORK AND SOIL CONSERVATION												
2.1.1 SITE CLEARANCE AND LAND DEVELOPMENT												
Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementation	Supervision	
Removal of palm trees	Throughout construction process	Flora and fauna impacts, land disturbance	Impact on terrestrial vegetation and species	Low	✓			Uprooting trees regulation 2005 5a	Avoid cutting of trees unless absolutely necessary. Trees that are of rare endemic should not be removed. During removing, attention maintain minimum disturbances to soil cover and care should be taken not to damage adjoining trees. Compensation for the trees removed should be conducted at a 1:2 ratio at least Water spraying should be done to avoid dust generation due to site clearance.	Contractor	MRC	
2.1.2 CONSERVATION AND REUSE OF TOP SOIL												
Masonry and Construction	Within the project sites where topsoil from productive land to be removed	Soil and debris	Soil quality	Low					Top soil of the agricultural areas and any other productive areas where it has to be removed for this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing	Contractor	MRC	Engineering Cost
	Site(s) identified for replantation program					✓			Removed top soil could be used as a productive soil when replanting/establishing vegetation			
	Locations where topsoil is stockpiled for reuse								Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum.			
2.1.3 PROTECTION OF GROUND COVER AND VEGETATION												
Vehicle and machinery operation	Within the project areas/ new servicing yards developed by contractor for the project	Ground cover and vegetation	Soil quality, impact on terrestrial fauna	Low		✓			Vehicles, machinery and equipment shall be used and stationed only in the areas of work and designated sites approved by the engineer. Entry and exit of construction vehicles and machinery should be restricted to particular points as directed by the engineer. Sites used for maintenance and plant service should be restored back to its final status, and site restoration is considered as incidental to work.	Contractor	MRC	
									Do not destroy ground vegetation cover unnecessarily			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementati on	Supervision	

2.1.4 DISPOSAL OF DEBRIS AND SOIL													
Masonry and Construction	Disposal sites to be identified by the contractor and approved by Engineer.	Land disturbance	Soil quality	Low			✓	Experienced Contractor	Precautions in excavation and construction	Contractor	MRC	Engineering Cost	
			Soil quality						All debris and residual spoil material including any left earth shall be disposed only at locations approved by the engineer for such purpose and subjected to the clause <b>2.1.1</b>				
			Ground and surface water						The contractor shall obtain the approval from EPA for disposal and spoil at the specified location, as directed by the Engineer				
	All burrow sites (licensed sites) identified by contractor and approved by engineer.	Soil and debris											The debris and spoil shall be disposed in such a manner that; (i) waterways and drainage paths are not blocked (ii) the disposed material should not be washed away by runoff and (iii) should not be a nuisance to the public
			Soil quality										The debris and residual spoil material including any left earth shall be used, to refill the burrow areas as directed by the engineer, subjected to laying of topsoil as per EMP clause <b>2.1.3</b> .
													Excavated earth materials and all debris materials shall be disposed immediately without allowing to stockpile at identified locations for debris disposal, recommended by the engineer. During transportation, dispose materials should be covered with tarpaulin.
									Ground and surface water				If approved by the engineer, contractor can dispose the debris and spoil as a filling material provided that the contractor can ensure that such material is used for legally acceptable purposes with disposed in an environmentally acceptable manner.
Applicable throughout the project sites													
In identified filling sites subjected to the approval of engineer													

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned				Implementation	
2.1.5 CONTAMINATION OF SOIL BY FUEL AND LUBRICANTS												
Vehicle and machinery operation	Servicing yards to be used for vehicle servicing	Spills and leaks	Surface water and ground water contamination	Medium	✓			Experienced contractor to handle machinery and vehicle operation	Approval from Transport Authority or relevant authority in the form of a Licence should be secured by the contractor if he intends to prepare his own vehicle servicing yard	Contractor	MRC	Engineering Cost
	Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer											
	Waste oil, other petroleum products and untreated wastewater shall not be discharged on ground Adequate measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers. All waste petroleum products shall be disposed of in accordance with the guidelines issued by the EPA or the engineer.											
	Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work											
2.1.6 DISPOSAL OF HARMFUL CONSTRUCTION WASTES												
Disposal of construction wastes	Locations identified to store chemicals and waste disposal	Waste disposal chemicals and debris	Surface and ground water impact to marine life and human health	Medium	✓			Waste Management Regulation 2013 clause 1.4 Solid waste and hazardous materials will be transported to Thilafushi	Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the Engineer. Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful materials have been dumped as waste at the end of the project.	Contractor	MRC	Engineering Cost
	All disposal sites should be approved by the engineer and approved by EPA and relevant local authority.											
	All affected water bodies close to material storage and waste disposal sites								The contractor shall clean up water-bodies contaminated as directed by the engineer at his own cost.			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned				Implementation	
2.2 STORAGE AND HANDLING OF CONSTRUCTION MATERIAL												
2.2.1 EMISSION OF DUST												
Storage and handling of construction material	At all material storage locations (stock piles of sand, gravel and metal)	Emissions to air	Air quality and impact to human health	Medium		✓			Storage locations of sand, metal, soil should be located away from settlements and other sensitive receptors and covered (with artificial barriers or natural vegetation). Measures given under clauses 2.5.1 should be considered within material storage site to minimize dust during handling of material. All access roads within the storage site should be sprinkled with water for dust suspension.	Contractor	MRC	Engineering Cost
2.2.2 STORAGE OF FUEL, OIL, AND CHEMICALS (AVOID FUMES AND OFFENSIVE ODOUR)												
Chemicals and oil	At all material storage locations (cement, bitumen, fuel, oil and other chemicals used for construction activities)	Spills and leaks	Surface and ground water impact to marine life	Medium		✓			All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface (concrete slab) above ground level. Storage facility of cement, bitumen (barrels), oil and other chemicals should be an enclosed structure ensuring that no storm water flows in to the structure. A ridge should be placed around the storage facility to avoid runoff getting in to the structure.	Contractor	MRC	Engineering Cost
		Risks to labour	Impact to human health						Adequate ventilation should be kept to avoid accumulation of fumes and offensive odour that could be harmful to material handlers.Measures given under clause 2.9 should be considered to avoid any accidents and risks to worker population and public.	Contractor	MRC	
2.2.3 TRANSPORTATION OF MATERIAL												
Transportation of vehicles	Within the project locations and the vicinity	Air pollution, traffic congestion, public nuisance	Air quality, community impact	Low		✓			Avoid over- loaded trucks to transport material. During transportation, materials should be covered with tarpaulin. Minimize public nuisance due to dust, traffic, congestion, air pollution, etc., due to such haulage. Select routes based on the truck load; divide the load to prevent damages to local roads. If there are damages to local roads Contractor shall repair all damaged infrastructure/ roads.	Contractor	MRC	

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned					
2.3 PROTECTION OF WATER SOURCES AND QUALITY												
2.3.1 LOSS OF MINOR WATER SOURCES AND DISRUPTION TO WATER SOURCES												
Use of water	Project sites and worker camps	Water waste	Water conservation	Medium		✓		Dewatering Regulation	Contractor should make employees aware on water conservation and waste minimization in the construction process.	Contractor	MRC	Engineering Cost
		Conflict with community water	Impact on community water sources	Low		✓			Arrange adequate supply of water for the project throughout the construction period. Not obtain water for project purposes, including for labour camps, from public or community water supply schemes without a prior approval from the relevant authority. Not extract water from ground water or surface water bodies without the permission from engineer & EPA licence for dewatering.			
	Wells and other public water sources locations within the project sites	Conflict with community water	Impact on community water sources	Low	✓				Contractor shall protect sources of water (potable or otherwise) such as water sources used by the community so that continued use these water sources will not be disrupted by the work. In case the closer of such sources is required on temporary basis contractor shall provide alternative arrangement for supply. Alternative sources such as wells thus provided should be within acceptable distance to the original sources and accessible to the affected community.			
	Project sites	Effluents to water	Ground and surface water contamination	Low	✓				In case the contractors activities may adversely affect the quantity or quality of water, the contractor shall serve notice to the relevant authorities such as EPA and downstream users of water sufficiently in advance.			
	Construction sites, material and soil storage areas, and equipment and machinery service areas			Medium	✓				Apply best management practices to control contamination of run-off water during maintenance & operation of equipment.			
					✓				Maintain adequate distance between stockpiles & water bodies to control effects to natural drainage paths.			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned					
2.3.2 SILTATION INTO WATER BODIES												
Storage of construction materials			Surface water and impact to coral reefs	Medium					Construction materials containing small / fine particles shall be stored in places not subjected to flooding and in such a manner that these materials will not be washed away by runoff.	Contractor	MRC	Engineering Cost
Waste disposal		Soil and debris							Temporary soil dumps should be placed at least 200m away from all water bodies			
									If temporary soil piles are left at the site for a long time those piles should be covered with thick polythene sheets			
									All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch.			
2.3.4 CONTAMINATION OF WATER FROM CONSTRUCTION WASTE												
	At all water courses located adjacent construction sites	Surface water and ground water contamination	Impact on water quality	Medium					The work shall be carried out in such a manner that pollution of lagoons, sea and other coastal water bodies paths located within construction areas or downstream is minimized. <b>Measures as given in 2.1.6., 2.3.2 and 2.3.6</b> clauses shall be taken to prevent the wastewater produced in construction from entering directly into water bodies or the irrigation systems.	Contractor	MRC	Engineering Cost



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					Yes	No	Planned			Implementation	Supervision	
2.3.5 CONTAMINATION FROM FUEL AND LUBRICANTS												
Wastewater disposal, Vehicles, machinery and plant servicing and maintenance	Vehicle and plant maintenance and servicing centres		Ground and surface water, Impact to marine life	Medium			✓		All vehicle and plant maintenance and servicing stations shall be located and operated as per the conditions and /or guidelines stipulated under the relevant local authority. In general these should be located at least 200m away from water bodies and wastewater shall not be disposed without meeting the disposal standards of the EPA.Wastewater from vehicle and plant maintenance and servicing stations shall be cleared of oil and grease and other contaminants to meet the relevant standards before discharging to the environment	Contractor	MRC	
	Yards, servicing centres							Vehicle, machinery and equipment maintenance and re-filling shall be done as required in EMP clause 2.1.6. to prevent water pollution as well				
2.3.6 WASTAGE OF WATER AND WASTE MINIMISATION												
Use of water	Within project sites and labour camps	Water waste	Water conservation	Medium			✓		The contractor shall educate and made employees aware on water conservation, waste minimization and safe disposal of waste following guidelines.	Contractor	MRC	
2.3.7 EXTRACTION OF WATER												
Extraction of Water	Within project sites and labour camps	Conflict with community water	Impact on community water sources	Low	✓			Dewatering regulation	The contractor is responsible for arranging adequate supply of water for the project purpose throughout the construction period. Contractor shall not obtain water for his purposes including for labour camps from public or community water supplies without approval from the relevant authority. Such extraction (if approved) should be under direct supervision of the engineer	Contractor	MRC	Engineering Cost
	At all natural water sources used for construction works	Ground water contamination, discharge to waterways	Ground and surface water		✓				Extraction of water by the contractor for the project purposes shall comply with the guidelines and instructions issued by EPA The Contractor shall not extract water from groundwater or from surface water-bodies without permission from the Engineer.			
						✓			. The Contractor may use the natural sources of water subject to the provision that any claim arising out of conflicts with other users of the said natural sources			



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					Yes	No	Planned				Implementation	
2.3.8 LOCATING, SANITATION AND WASTE DISPOSAL IN CONSTRUCTION CAMPS												
Sewage disposal	At all labour camps	Ground water contamination, discharge to waterways	Ground and surface water, Impact to marine life, impact to human health	High			✓		Locations selected for labour camps should be approved by engineer a Construction of labourer camps shall not be located within 200m from waterways or near to a site or premises of religious, cultural or archaeological importance and school.	Contractor	MRC	Engineering Cost
				High		✓		Direct disposal to sea	Labour camps shall be provided with adequate and appropriate facilities for disposal of sewerage. The sewage systems shall be properly designed, built and operated so that no pollution to ground or adjacent water bodies takes place. Compliance with the relevant regulations and guidelines issued by the EPA shall be strictly adhered to. There must also be sewage treatment, and frequent seawater quality monitoring			
Wastewater disposal				Medium	✓			Sand, cartridge, and UV filtered for final disposal to sea	Contractor shall adhere to the EPA recommendations on disposal of wastewater. Wastewater shall not be discharged to ground or waterways in a manner that will cause unacceptable surface or ground water pollution			
Solid waste disposal				High			✓	Waste Management Regulation, Solid waste and hazardous materials will be transported to Thilafushi	Labour camps shall be provided with adequate and appropriate facilities for disposal of solid waste. Garbage bins shall be provided the camps and regularly emptied. Waste segregation is highly encouraged. Garbage should be disposed of in a hygienic manner, to the satisfaction of the relevant norms.			
Labour camps		Outbreak of disease	Impact to human health	High	✓				All camps are kept clean and hygienic to prevent breeding of vectors			
				Medium			✓		Report any outbreak of infectious disease in a labour camp to the engineer , MRC, and Health Protection Agency immediately.. All relevant t regulations aimed at safety and health of workers shall be adhered to.			
					✓				Remove all labour camps fully after its need is over, empty septic tanks, remove all garbage, debris and clean and restore the area back to its former condition. A consent letter from the relevant local authority should be obtained that certifies the decommissioning has taken place to the level acceptable to the land owner			Engineering Cost

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					Yes	No	Planned			Implementation	Supervision	
2.4 FLOOD PREVENTION												
2.4.1 BLOCKAGE OF DRAINAGE PATHS AND DRAINS												
Masonry and Construction	All construction work sites	Land disturbance	Impact to terrain and property	Low	✓			Experienced Contractor	Contractor's activities shall not lead to flooding conditions as a result of blocked drainage paths and drains. The contractor shall take all measures necessary or as directed by the Engineer to keep all drainage paths and drains clear of blockage at all times..	Contractor	MRC	Engineering Cost
									If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to (a) prevent loss of access to any land or property and (b) prevent damage to land and property			
									Contractor shall compensate for any loss of income or damage as a result.			
2.5 AIR POLLUTION												
2.5.1 ODOUR AND OFFENSIVE SMELLS												
Chemicals	Within construction and work sites including all sites used for store all chemicals and places where chemical reactions take place.)	Spills and leaks	Surface and ground water impact to marine life	Medium			✓	Experienced Contractor	Contractor shall take precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odour and offensive smell emanating from chemicals and processes applied in construction works or from labour camps. In a situation when/where odour or offensive smell does occur contractor shall take immediate action to rectify the situation. Contractor is responsible for any compensation involved with any health issue arisen out of bad odour and offensive smells	Contractor	MRC	Engineering Cost
		Risks to workers	Impact to human health						Adequate ventilation should be kept to avoid accumulation of fumes and offensive odour that could be harmful to material handlers.			
Sewage	At all labour camps								The waste disposal and sewerage treatment system for the labour camps shall be properly designed, built and operated so that no odour is generated. Compliance with any existing regulations or guidelines.			
2.5.2 EMISSION FROM CONSTRUCTION VEHICLES, MACHINERY AND EQUIPMENT												
Vehicles, equipment and machinery operation	All plants, machinery and vehicles used for construction		Air quality from fuel combustion from vehicles and plant machinery	Medium	✓			EPA Vehicle Emissions standards Experienced Contractor	Comply with EPA Vehicle Emission Standards	Contractor	MRC	Engineering Cost
									All vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards.			
									Fuel efficient vehicles and machinery			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementation	Supervision	
2.5.3 GENERATION OF DUST												
Topsoil removal, transporting sand, rubble, cement, bitumen	Within the construction area where earth work will take place, storage locations of sand, rubble, bitumen, cement and all sub roads used for material transportation, paying special attention to sensitive locations.	Air emissions	Air quality and impact to human health	Medium			✓	Experienced Contractor	The contractor shall manage the dust generating activities such as topsoil removal, handling and transporting sand, rubble, bitumen, and cement during periods of high winds or during more stable conditions with winds directed towards adjacent residences and other facilities.	Contractor	MRC	Engineering Cost
									All stockpiles shall be located sufficiently away from sensitive receptors.			
									All vehicles delivering materials shall be covered to avoid spillage and dust emission.			
									The Contractor should avoid, and take suitable action to prevent dirt and mud being carried to the roadway (particularly following wet weather).			
									The contractor should enforce vehicle speed limits to minimize dust generation.			
									The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited)			
									All cleared areas shall be rehabilitated progressively			
									All earthwork shall be protected in a manner acceptable to the minimize generation of dust.			
									All existing roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tires.			
									Clearance shall be affected immediately by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment. Additionally, if so directed by the Engineer, the road surface will be hosed or sprinkled water using appropriate equipment.			
Plants, machinery and equipment shall be handled (including dismantling) so as to minimize generation of dust.												
The contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the Engineer in accordance with the relevant emission norms, and use a sprinkler system for dust suppression.												

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementation	Supervision	
2.6 NOISE PROTECTION AND VIBRATION												
2.6.1 NOISE FROM VEHICLES, PLANTS, AND EQUIPMENT												
Machinery, equipment and vehicle	Project sites and worker camps	Noise pollution	Impact to workers,	Low	✓			Matu is not a locally inhabited island	All machinery and equipment should be well maintained and fitted with noise reduction devices.	Contractor	MRC	Engineering Cost
operation									In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 8 pm to 6 am. No construction shall take place within 100m around hospitals between 20.00 hours to 06.00 hours. Near noise sensitive sites, such as schools noisy equipment shall not be used during noise sensitive times of the day.			
									All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.			
									Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators, and saws shall not exceed 75 dB(A).			
									Maintenance of vehicles, equipment and machinery shall be regular and proper to keep noise from these at a minimum.			
									Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with Personal Protective Gear.			
Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting. Only chemical blasting where rocks have to be removed for landslide mitigation measures												

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementation	Supervision	

## 2.7 IMPACTS TO FLORA

### 2.7.1 LOSS OR DAMAGE TO TREES OR VEGETATION

Removal of trees	All project sites	Flora and fauna, land disturbance	Impact to flora and habitat, and heritage				✓	Uprooting plants and trees Regulation 2006/ National Biodiversity Strategy Action Plan (NBSAP)	All works shall be carried out in a manner that the destruction to the flora and their habitats is minimised. Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. In all such cases contractor shall take prior approval from the Engineer.			
	Indicative number of trees plants and indicative number of planting structures necessary are to be identified by the contractor. Planting should take place as soon as the plant removal takes			Low			✓		Contractor shall adhere to the guidelines and recommendations made by the Environmental Protection Agency, if any with regard to felling of trees and removal of vegetation.	Contractor	MRC	Engineering
						✓	The contractor shall plant over 5 year old root-balled native trees suitable for the location as identified by the Engineer. The planting should take place in public land suitable for the purpose The contractor shall build hardy structures around the trees for protection. The contractor shall be responsible for ensuring the well-being of the trees/plants until the end of the contract					
					✓		Vegetation buffers and habitat corridors					
					✓		Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Engineer.					

### 2.7.2 CHANCE FINDS OF IMPORTANT FLORA

Land clearance, construction		Flora and fauna, land disturbance	Impact to flora and habitat	Low			✓	Uprooting Plants and Trees regulation 2006	During construction, if a rare/endangered flora species is found, it shall be immediately informed to the relevant agency by the contractor through the engineer. All activities that could destroy such flora and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's or EPA's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such flora and/or its habitat.	Contractor	MRC	
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Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned					
2.8 DISRUPTION TO PEOPLE												
2.8.1 LOSS OF ACCESS												
Masonry and Construction	All project sites	Public nuisance	Impact to community	Low	✓			Matu is not a locally inhabited island	At all times, the Contractor shall provide safe and convenient passage for vehicles and pedestrians. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer.	Contractor	MRC	Engineering Cost
									The works shall not interfere unnecessarily or improperly and ensure convenience of public at all times			
									On completion of the works, all temporary obstructions to access shall be cleared away, all rubbish and piles of debris that obstruct access be cleared to the satisfaction of the Engineer			Engineering Cost
									Providing advance information to the public about the planned construction works and activities causing disruption to access and the temporary arrangements made to give relief to public in order to avoid any inconveniences due to the construction activities			
2.8.2 TRAFFIC CONTROL AND SAFETY												
Vehicle operation	Road-side construction sites	Accidents, congestion	Impact to human safety	Low	✓			Matus not a locally inhabited island	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the street under improvement. The provision of traffic safety measures shall be considered incidental to work and follow	Contractor		
	Construction areas								Vehicles travelling in and out of the Project area should maintain low speeds when transporting material to avoid d the risk of accidents.		MRC	Engineering Cost

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2.9 ACCIDENTS AND RISKS												
2.9.1 PUBLIC WORKER SAFETY												
Labour	Construction areas, material storage and worker camps	Accidents	Impact to worker health	Medium			✓	Matu is not a locally inhabited island	All reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as fire, explosions, blasts, falling rocks, falling to excavated pits, chemical sprays, unsafe power supply lines etc.	Contractor	MRC	Engineering Cost
								Experienced Contractor	The Contractor shall comply with requirements for the safety of the workmen as per the international labour organization (ILO) convention No. 62 and Occupational Health and Safety of the Maldives Association of Construction Industry (MACI) to the extent that those are applicable to this contract. The contractor shall supply all necessary safety appliances and personal protective equipment (PPE) for eye and face, head, hearing, foot, hand, body and leg, and respiratory protection such as safety goggles, helmets, masks, boots, etc., to the workers and staff. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, excavations, trenches and safe means of entry and egress.			
									Construction activities on existing facilities where operation is underway should be conducted post times of operation, post operational hours of the centre if on the same site.			
									The Contractor shall comply with requirements for the safety of the workmen as per the international labour organization (ILO) convention No. 62 , guidelines of the Health Protection Agency , MACI, and Labour Authority of the Maldives to the extent that those are applicable to this contract. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, excavations, trenches and safe means of entry and egress.			



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					Yes	No	Planned				Implementation	
2.9.2 PREVENTION OF RISKS AND ELECTROCUTION												
Labour	Construction areas, material storage and worker camps	OHS	Impact to worker safety	Medium			✓		All electrical wiring and supply related work should confirm to <b>British Standards (BS) or relevant Maldivian Standards</b> . Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger lights, fencing and lights will be provided to protect the public and workers. All electric power driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly inspected and as per BS provisions and to the satisfaction of the Engineer.	Contractor	MRC	Engineering Cost
2.9.3 RISK AT HAZARDOUS ACTIVITY												
Labour	Construction areas, material storage and worker camps	OHS	Impact to Worker health	High			✓		All workers employed in hazardous activities shall be provided with necessary protective gear. These activities include mixing asphalt material, cement, lime mortars, concrete etc., welding work, work at crushing plants, blasting work, operators of machinery and equipment such as power saws, etc.	Contractor	MRC	Engineering Cost
									Substitute harmful chemicals for less harmful chemicals. The use of any toxic chemical shall be strictly in accordance with the manufacturer’s instructions. The Engineer shall be notified of toxic chemicals that are planned to be used in all contract related activities. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product			
							✓		Materials Safety Data Sheets MSDS) and International Chemical Safety Cards (ICSC) should be visible for workers to see in their language			
2.9.4 LEAD POLLUTION												
Labour	Workshops, yards where spray painting is done	OHS	Impact to Worker health	Medium		✓			The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain <b>MNDF</b> approval for importing and handling explosives	Contractor	MRC	Engineering Cost

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned				Implementation	
2.10 HEALTH AND SAFETY												
2.10.1 PREVENTION OF VECTOR BASED DISEASES												
Disease	At worker camps, stores, yards	OHS	Impact to Worker health	Medium		✓			Contractor shall take necessary actions to prevent breeding of mosquitoes at places of work, labour camps, plus office and store buildings. Stagnation of water in all areas including gutters, used and empty cans, containers, tires, etc. shall be prevented. Approved chemicals to destroy mosquitoes and larvae should be regularly applied. All burrow sites should be rehabilitated at the end of their use by the contractor in accordance with the requirements issued by the relevant local authorities	Contractor	MRC	Engineering Cost
									Contractor shall keep all places of work, labour camps, plus office and store buildings clean devoid of garbage to prevent breeding of rats and other vectors such as flies.			
2.10.2 WORKERS HEALTH AND SAFETY												
Labour	Within construction sites, vehicles, workshops and worker camps	OHS	Impact to Worker health and safety	Medium			✓		All employed construction workers must be given a medical examination before employment. This must be repeated annually. The results of these medical examinations must be kept by the contracting company.	Contractor	MRC	
									All employees must be given printed information on the social and health implications of their work, and how to avoid problems. This should incorporate advice in the field of gender based violence, sexual exploitation and abuse, sexually transmitted diseases, including HIV/AIDS, and illicit behavior and crime.			
									All compressed gas bottles must be stored, chained in the upright position, in a locked ventilation enclosure. All legal toxic or hazardous waste (e.g. water chlorination agents) must be stored in a locked, waterproof ventilated enclosure			
2.10.3 FIRST AID AND EMERGENCY RESPONSE												
Labour	Within construction sites, quarry, crusher, concrete batching plants, workshops and worker camps	OHS	Impact to Worker health and safety	Medium			✓		At every workplace, first aid kit and fire extinguishers shall be provided as per the regulations. At every workplace an ambulance room containing the prescribed equipment and nursing staff shall be provided.	Contractor	MRC	Engineering Cost
2.10.4 POTABLE WATER												
Drinking water	Within construction sites, quarry, crusher, concrete batching plants, workshops and worker camps	OHS	Impact to Worker health and safety	Low	✓				In every workplace and labour camps portable water shall be available throughout the day in sufficient quantities.	Contractor	MRC	Engineering Cost

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned				Implementation	
2.10.5 HYGEINE												
Labour	Worker camps and temporary sheds at work sites	OHS	Impact to Worker health and safety Impact to Worker health and safety	Low					The contractor shall provide and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scale approved by the engineer.	Contractor	MRC	Engineering Cost
						✓			At every workplace and labour camps sufficient number of bathing facilities, latrines and urinals shall be provided in accordance with the Health and Safety regulations and/or as directed by the Engineer. These bathroom and toilet facilities shall be suitably located within the workplace/buildings. Latrines shall be cleaned at least three times daily in the morning, midday and evening and kept in a strict sanitary condition. If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular shall be provided. There shall be adequate supply of water, within and close to latrines and urinals			
				Medium		✓		Open disposal to sea	The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.			
				Medium			✓	Waste Regulation 2013	Garbage bins must be provided in the camp, work sites and regularly emptied and the garbage disposed of in a hygienic manner. Construction camps shall have a clean hygienic environment and adequate health care shall be provided for the work force.			
				Medium	✓			Waste Regulation 2013	Unless otherwise arranged for by the relevant local authority such as local level or atoll councils, the contractor shall arrange proper disposal of sludge from septic tanks. The contractor shall obtain approval for such disposal from the EPA.			
2.11 PROTECTION OF ARCHAEOLOGICAL, CULTURAL, AND RELIGIOUS PLACES AND PROPERTIES												
2.11.1 PREVENTION OF DAMAGE TO CULTURAL AND RELIGIOUS PLACES AND PROPERTIES												
Masonry and Construction, topsoil removal, site clearance	Near physical cultural resources	Loss of heritage	Impact to community	Low					During construction activities the contractor should take all necessary and adequate care to minimize impacts on cultural properties which includes cultural sites and remains, places of worship.	Contractor	MRC	
					✓				Features that are to be protected during construction (cemeteries, mature trees, wells, etc) should be marked with brightly coloured tape. Workers should not be allowed to trespass in to such areas			
									Neighbouring communities should be consulted before construction to identify issues of local concern.			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned					
2.11.2 CHANCE FINDS OF ARCHAEOLOGICAL PROPERTY												
Masonry and Construction, topsoil removal, site clearance	In all project sites	Loss of heritage	Impact to community	Low		✓			All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest etc. discovered on the site and/or during construction work shall be the property of the government of Maldives.	Contractor	MRC	
									The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing and shall, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the Engineer’s instructions for dealing with the same, awaiting which all work shall be stopped within 100m in all directions from the site of discovery.			
									If directed by the Engineers the Contractor shall obtain advice and assistance from the relevant local authorities such as Department of Heritage and Ministry of Tourism on conservation measures to be taken with regard to the artefacts prior to recommencement of work in the area.			
2.12 ENVIRONMENTAL ENHANCEMENT												
2.12.1 LANDSCAPING												
Revegetation, landscaping, replanting	All project sites and associated sites			Medium				National Biodiversity Strategy Action Plan (NBSAP)	Landscape plantation, re-vegetation etc, shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents.	Contractor	MRC	Engineering Cost
					✓		✓		The contractor also shall remove all debris, piles of unwanted earth, spoil material, away from the roadsides and from other work places and disposed at locations designated or acceptable to the Engineer or as per Clause 2.1.1.			
					✓				On completion of the works, the temporary structures shall be cleared away in full, all rubbish burnt, waste dumps and septic tank shall be filled and closed and roadsides, workplaces and labour camps, cleared and cleaned.			
					✓			Waste Management Regulation 2013	In case of an inadvertent damage cause to a utility, the contractor shall immediately inform the service provider and help to restore the service without delay.			

Activity	Location/Project Phase	Aspect	Impact	Risk Rating	Control in Place			Method	Proposed Protective and Preventative Measures	Institutional Responsibility		Mitigation Cost
					Yes	No	Planned			Implementation	Supervision	
2.12.3 HANDLING ENVIRONMENTAL ISSUES DURING CONSTRUCTION												
Management of environmental and social issues	Relevant construction sites during the construction period	Environmental and social issues	Implementati on of the EMP	Medium		✓			For large contracts, the Contractor will appoint a 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, and will be responsible for ensuring the implementation of EMP	Contractor	MRC	Engineering Cost
			Implementati on of the ESMP			✓			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			
		Grievance and redress	Transparency and established feedback mechanism between project and stakeholders			✓			Contractor shall develop suitable method to receive complaints. The complaint register shall be placed at a convenient place, easily accessible by the public.			
		Environmental and social issues	Implementati on of EMP			✓			Contractor shall prepare detailed Environmental Method Statement (EMS) clearly stating the approach, actions and manner in which the EMP is implemented. It is required from the contractor to prepare the EMS for each work site, if work will be carried out at more than one site at once and time plan for implementation. The EMS shall be updated regularly and submit for Engineers review.			