بسم الله الرحمن الرحيم

Ministry of Environment and Energy
މިނިސްޓްރީ އޮފް އެންވަޔަރަންމަންޓް އެންޑް އެނަރޖީ

Environmental Protection Agency
އެންވަޔަރަންމަންޓަލް ޕްރޮޓެކްޝަން އެޖެންސީ

އީ.އައި.އޭ ޕްރޮސެސްގެ ދަށުން ހުށަހަޅަންޖެހޭ ރިޕޯޓްތައް ހުށަހަޅާ ފޯމު

އާންމު މައުލޫމާތު

ރިޕޯޓުގެ ނަން: 2nd EIA Addendum to the Water Supply and Sewerage System, Hulhumale Phase 2

ރިޕޯޓު ތައްޔާރުކުރި ކޮންސަލްޓެންޓްގެ ނަން: Ahmed Jameel — މޯބައިލް ނަންބަރު: 7785379

ކޮންސަލްޓަންޓް ރަޖިސްޓްރޭޝަން ނަންބަރު: EIA P07/07 — ހުށަހަޅާ ތާރީޚް: 25-05-2022

އިދާރާ: Male' Water & Sewerage Company Pvt. Ltd — މޯބައިލް ނަންބަރު:

ޑޮކިއުމަންޓް ޗެކްކުރަން އެދޭ ދަރަޖަ: ދަރަޖަ 1 (5000ރ) [x] — ދަރަޖަ 2 (10000ރ) [ ] — ދަރަޖަ 3 (20000ރ) [ ]

ރިޕޯޓުގައި ހިމަނާ މައުލޫމާތު

#		ކޮންސަލްޓަންޓް ފާހަގަ ކުރުމަށް	އިދާރީ ބޭނުމަށް
1	ހުށަހެޅި ކޮންޓްރޯލްކޮޕީގެ އަދަދު	0	
2	އިލެކްޓްރޯނިކް ކޮޕީގެ ފޯމެޓް	pdf	
3	ޓާރމްސް އޮފް ރެފަރެންސް މުއްދަތު ހަމަވާ ތާރީޚް	21-08-2021	
4	ސަމަރީ ޝީޓް ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	11	
5	ޓާރމްސް އޮފް ރެފަރެންސް ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	51	
6	އިދާރާގެ އިޤްރާރު ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	21	
7	މަޝްވަރާދޭ ފަރާތުގެ އިޤްރާރު ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	21	
8	ތަން އެނގޭ ކުރެހުން ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	21	
9	ތަނުގެ ކުރެހުން (އިންފްރާސްޓްރަކްޗަރ)ގެ ސަފުހާ ނަންބަރު	52	
10	ޤާނޫނީ އަދި އިންސްޓިޓިއުޝަނަލް ހިމަނާފައިވާ ސަފުހާ ނަންބަރު:	27	
11	ރިޕޯޓުގައި ބޭނުންކުރި މެތަޑޮލޮޖީގެ ސަފުހާ ނަންބަރު	54	
12	ރިޕޯޓުގައި ކަމާބެހޭ ފަރާތްތަކާއި ކުރި މަޝްވަރާ ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	56	
13	ތިމާވެއްޓަށް އަސަރު ފޯރާނެ މިންވަރު ބަޔާންކޮށްފައިވާ ސަފުހާ ނަންބަރު	37	
14	ބަދަލުގައި ކުރެވިދާނެ ކަންތައްތައް ބަޔާންކޮށް އެކަންތައް އަޅާކިޔުމާއި މަޢުލޫމާތު ހިމަނާފައިވާ ސަފުހާ ނަންބަރު:	45	
15	ތިމާވެއްޓަށް ކުރާ ގެއްލުމުގެ އަސަރުތައް ކުޑަކުރުމަށް އަޅާނެ ފިޔަވަޅުތައް ބަޔާންކޮށްފައިވާ ސަފުހާ ނަންބަރު:	41	
16	ފޯރަން އަންނަނިވި ބަދަލުތައް ދެނެގަތުމަށް މޮނިޓަރިންގ ޕްލޭނާއި އެކަމަށް ހިނގާނެ ޚަރަދު ކަނޑައަޅާފައިވާ ސަފުހާ ނަންބަރު:	46	
17	މި ރިޕޯޓު ތައްޔާރުކުރި ކޮންސަލްޓަންޓުންގެ އިތުރުން ރިޕޯޓު ހެދުމުގައި ބައިވެރިވި މީހުންގެ ލިސްޓު ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	50	
18	އަލަށް ކޮންސަލްޓަން ރިޕޯޓު ހުށަހެޅި ކަމުގެ ހެކި ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	55	
19	އިދާރާގެ ކޮމިޓްމަންޓް ސިޓީ ހިމަނާފައިވާ ސަފުހާ ނަންބަރު:	9	
20	ކޮންސަލްޓަންޓް ޑިކްލަރޭޝަންގައި ސޮއި ކޮށްފައިވާ ސަފުހާ ނަންބަރު:	7	
21	އިދާރާގެ ޑިކްލަރޭޝަންގައި ސޮއި ކޮށްފައިވާ ސަފުހާ ނަންބަރު:	9	
22	މަޝްވަރާ ކުރިއަށް ގެންދިޔުމަށް ސަރުކާރުގެ ކަމާބެހޭ އިދާރާއިން ދޫކޮށްފައިވާ ލިޔުން ހިމަނާފައިވާ ސަފުހާ ނަންބަރު	52	

މި ފޯމާއެކު ފޮނުވާފައިވާ އީ.އައި.އޭ ރިޕޯޓް އެޕްރޫވްކޮށްދެއްވުން އެދެމެވެ.

އިދާރާގެ ނަން: [illegible] — ތާރީޚް: 25-3-2021 — ސޮއި: [signature]

އިދާރީ ބޭނުމަށް

ރިޕޯޓް ރިސީވްކުރި ނަންބަރު: ______ ތާރީޚް: ______

ރިޕޯޓު ފުރިހަމަ ނޫން ކަމުގައި ވާތީ ބަލައިގަނެވޭނެ [ ]

ނަން: ______ ސޮއި: ______

ރިޕޯޓު ފުރިހަމަ ކަމުގައި ވާތީ ޗެކުކުރުމަށް ބަލައިގަތުމަށް ފާހަގަ ކުރުމަށް ... އިދާރާއަށް ރިޕޯޓު [ ]

ނަން: ______ ސޮއި: ______

ހުއްދަދެވޭ ފަރާތް

ނަން: ______ ސޮއި: ______

بسم الله الرحمن الرحيم

MWSC

MALE' WATER & SEWERAGE COMPANY PVT. LTD.

24th March 2021 Ref: MWSC-C/2/2021/2033

Mr. Ibrahim Naeem,
Director General
Environmental Protection Agency
Malé
Maldives,

Dear Mr. Naeem,

Re: 2nd EIA Addendum to the Water Supply and Sewerage System, Hulhumale Phase 2

We are pleased to submit 3 hard copy and a soft copy of the 2nd EIA Addendum to the Water Supply and Sewerage System, Hulhumale Phase 2.

Thanking you for your kind cooperation.

Sincerely yours,

Male' Water and Sewerage Company Pvt. Ltd.

Mohamed Adam
Deputy General Manager, Survey & Drafting

Bushra Hameed
General Manager, Engineering

25 years

Fen Building,5/F, Ameenee Magu, Machchangolhi, Male' 20375, Republic of Maldives
+960 332 3209 +960 332 4306 mail@mwsc.com.mv www.mwsc.com.mv
Company Registration Number: C-67/95

2nd EIA Addendum to the

Water Supply and Sewerage System, Hulhumale Phase 2

Hulhumale. Photo: Google Earth

Proposed by: Male' Water and Sewerage Company Pvt Ltd

Prepared by: Ibrahim Faiz (EIA P05/2017),

For Water Solutions Pvt. Ltd., Maldives

March 2021

BLANK PAGE

1 Table of contents

2 List of Figures and Tables

3 Declaration of the consultants

This EIA Addendum Report has been prepared according to the EIA Regulations 2012, issued by the Ministry of Housing and Environment and all the amendments brought to the regulation.

The EIA was carried out by a multidisciplinary consulting team representing Water Solutions Private Ltd. In preparing this report, no data has been manipulated. All data has been collected by field visits.

I as the lead consultant certify that the statements in this Environmental Impact Assessment study are true, complete, and correct.

Name: Ibrahim Faiz (EIA P05/2017)

Signature: 

BLANK PAGE

4 Proponents' commitment and declaration

بسم الله الرحمن الرحيم

MWSC

MALE' WATER & SEWERAGE COMPANY PVT. LTD.

ދާއިރާ ވޯޓަރ ހާސްވެއްޖެ ކުންފުނި ޕްރައިވެޓް ލިމިޓެޑް

24th March 2021

Ref: MWSC-C/2/2021/2034

Mr. Ibrahim Naeem,
Director General
Environmental Protection Agency
Malé
Maldives,

Dear Mr. Naeem,

Re: Declaration and Commitment to Undertake 2nd EIA Addendum to the Water Supply and Sewerage System, Hulhumale Phase 2.

As the proponent we confirm that we have read the report and to the best our knowledge, all non-technical information provided in the report are complete and accurate.

We would like to confirm our commitment to implement all mitigation and monitoring during construction stage as well as post construction mitigation and monitoring program as specified in the report.

Thanking you for your kind cooperation.

Sincerely yours,

Male' Water and Sewerage Company Pvt. Ltd.

Mohamed Adam
Deputy General Manager, Survey & Drafting

Bushra Hameed
General Manager, Engineering

BLANK PAGE

ސާރާ ހުލާސާ

މި ރިޕޯޓަކީ ހުޅުމާލެ ފޭސް 2 ގައި އެޅުމަށް ހަމަޖެހިފައިވާ ފެނާއި ނަރުދަމާ ނިޒާމު އެޅުމަށް ތައްޔާރުކުރެވިފައިވާ އީ.އައި.އޭ ރިޕޯޓުގެ 2 ވަނަ އެޑެންޑަމެވެ. މި އެޑެންޑަމް ތައްޔާރު ކުރެވިފައިވަނީ މި ޕްރޮޖެކްޓުގެ ސަބަބުން އަލަށް ނިންމާފައިވާ ނަޖިސްބޭރުކުރާ ހޮޅީގެ ބައެއް ފުރުއްޓާގައި ވަޅުލުމަށް މި ޕްރޮޖެކްޓުގެ އޮނަރު ނިންމާފައިވާތީއެވެ. މި ޕްރޮޖެކްޓުގެ އޮނަރަކީ މާލެ ވޯޓަރ އެންޑް ސުވަރޭޖް ކޮމްޕެނީ ޕްރައިވެޓް ލިމިޓެޑެވެ. މި ރިޕޯޓް ތައްޔާރުކުރެވިފައިވަނީ ދިވެހިރާއްޖޭގެ ތިމާވެށި ރައްކާތެރިކުރުމާއި ހިފެހެއްޓުމުގެ ޤާނޫނު (ޤާނޫނު ނަންބަރު 93/4) ދަށުން މިނިސްޓްރީ އޮފް ހައުސިންގ އެންޑް އެންވަޔަރަންމަންޓުން އެކުލަވާލާފައިވާ ތިމާވެއްޓަށް އަސަރުކުރާ މިންވަރު ބެހެއްޓުމާ ބެހޭ ގަވާއިދު 2012 ގައި ބަޔާންކުރެވިފައިވާ އުސޫލުތަކާ އެއްގޮތަށް އެންވަޔަރަންމަންޓް ޕްރޮޓެކްޝަން އެޖެންސީން މިމަސައްކަތަށް ދޫކުރެވިފައިވާ ޓާރމްސް އޮފް ރިފަރެންސާއި އެއްގޮތަށެވެ.

މި ރިޕޯޓުގެ ބޭނުމަކީ، މި ޕްރޮޖެކްޓުގެ ސަބަބުން ޕްރޮޖެކްޓް ހިންގާ ސަރަހައްދުގެ ތިމާވެއްޓަށް އަންނަ ބަދަލުތައް ދެނެގަތުމާއި، ތިމާވެށީގެ ގޮތުން މުހިއްމު އެސަރަހައްދުގެ އެކޮލޮޖީ ބެލުމާއި، ޕްރޮޖެކްޓުގެ ސަބަބުން ތިމާވެއްޓަށް ލިބިދާނެ ގެއްލުންތައް ލަފާކޮށް، އެގެއްލުންތައް ކުޑަކުރުމަށް އެޅިދާނެ ފިޔަވަޅުތައް ހުށަހެޅުމާއި، ޕްރޮޖެކްޓް ކުރިއަށްދާއިރު އާއި ޕްރޮޖެކްޓުގެ ނިމުމުގެ ފަހުން ސަރަހައްދަށް އަންނަ ބަދަލުތައް ދެނެގަތުމެވެ.

މި ޕްރޮޖެކްޓް ކުރިއަށްގެންދާ ސަރަހައްދަކީ ހުޅުމާލޭގެ ދެވަނަ ފިޔަވަހި ފޫނި ހިއްކުމުގެ އިރުމަތީ ފަރާތް ފަރުމާކުރާއެވެ.
މި ޕްރޮޖެކްޓުގެ ދަށުން ފަރުމާކުރާއިރު އެޅުމަށް ހަމަޖެހިފައިވާ ނަޖިސްދޫކުރާ ހޮޅީގެ ބައި މުޅިން ބިންގަނޑުގެ 100މީ އަޑީގައި ވަޅުލެވިގެންދާނެއެވެ. ކުރިން ރާވާފައި އޮތީ މި ހޮޅި އާންމުކޮށް ކަނޑުގެ އުސްމިނުން ވަޅުލާފައި ކަނޑުދިޔަ ބޮޑު ބޯނަކަށް ބެހޭ ގޮތުން ރެއާއިތީއެވެ. ހޮޅި ގެންގޮސް ހުރިގޮތް، ހަރުހިސާބު، ސަރަހައްދުގެ ކަނޑުގެ ފުންމިން ބަލާފައި ވަޅުލާނެ ގޮތް ނިންމާފައެވެ. އޭރު މި ސަރަހައްދަކީ ދިޔަ އަޑިއަޑީގައި މުދަލަށް އެތެރެވާ ބޮޑު ސަރަހައްދެކެވެ. ވަޅުލުމަށް ނިންމީ ދުވަސް ކުރުކޮށް ދިރުމަށް އޮތް ސަރަހައްދުގެ ކުރިން ގެންދާ ސަރަހައްދަށް ބަލާފައެވެ. ވަޅުލާގޮތް ބަދަލުވާ ހޮޅީގެ ބައި އަޑީގައި ވަޅުލާނެއެވެ.

މި ޕްރޮޖެކްޓުގައި ކުރިއަށް ގެންދިޔުމަށް ރާވާފައިވާ ކަންތައްތަކަށް ތިމާވެއްޓަށް ބޮޑު ކަންތައްތަކެއް ނުދާނެ ދިރާސާތަކުން މި މަޝްރޫއުގެ ސަބަބުން ތިމާވެއްޓަށް ކުރާނެ އަސަރުތަކާ ދެނެގަނެވިފައެވެ. މި ގޮތުން އެންމެ ބޮޑު އަސަރުކުރާނެ ބަޔަކީ ކުރިމަތިލާނެ މާހައުލަށް ކުރާ ކުރިމަގުގެ ސަބަބުން މާހައުލުގެ ދިރުމަށް ލިބޭ ބަދަލުތަކެވެ. ހަމައެއާއެކު ކުރިއަށް ގެންދާ ޕްރޮޖެކްޓުގެ މައްސަލައަކީ ވަގުތީ އަސަރުތަކެކެވެ. އެގޮތުން މާހައުލުގައި ވާ ދިރުމަށް ލިބޭ ސަރަހައްދުގެ ނަރުދަމާ އަސަރުކުރާނެއެވެ. ތިމާވެށީގެ އަސަރު ފުރިހަމަ ކުރުމަށް ތަރުތީބުކޮށް ކުރިއަށް ދިއުމަށް ބޮޑުވަރަކަށް މާހައުލު ފެށޭނެ ކުރުކުރާނެއެވެ. ހަމަހިފައިވާ ޕްރޮޖެކްޓުގެ ކާރވާއި ގުޅޭ އަސަރުތައް ކުރުމުގެ ގޮތުން ފިޔަވަޅުތަކެއް ލުއިކޮށް ތިމާވެށްޓަށް ފެންމަތިކުރަން ބޭނުންކުރާނެ ބެލެހެއްޓުމުގެ ފިޔަވަޅުތަކާއި އެކުލެވޭ ގޮތަކަށް ފާސްކުރެވިފައިވާނެއެވެ.

މިކުރުވުން ދިރާސާގެ މައްސަލަ ބެލުމަށްފަހު މަސައްކަތް ކުރުމުންދާއިރު ގެއްލުން ކުޑަކުރާނެ ތަޖުރިބާގެ ބެލެހެއްޓުމާއި ރިޕޯޓުގައި ހިމަނާފައެވެ. މިގޮތުން މަސައްކަތް ކުރުމުގައި ގެންގުޅެން ޖެހޭ މިންގަނޑުތައް ހިމަނާފައިވާނެއެވެ. އަދި މިންވަރު

ގެއްލުން ކުޑަކުރެވޭނެގޮތަށް މަސައްކަތްކުރުމަށް ތަފާތުވިފައިވާނެއެވެ. ކޮންމެ މިފަދަ މަޝްރޫއަކީވެސް މިމާވެށްޓަށް އޭގެ ނޭދެވޭ އަސަރު ކޮށްދެވެސް ވަރަކަށް ކުރާނެ ކަމެކެވެ.

5 Non-Technical Summary

This report discusses the findings of an environmental impact study undertaken by Water Solutions Pvt Ltd for the proposed changes of the construction methodology of the sea outfall under the Hulhumale Phase 2 Water Supply and Sewerage Project. The project is proposed by Male' Water and Sewerage Company Pvt Ltd. MWSC is the utility service provider of water and sewerage service in Greater Male' Region.

The scope of this report is to assess the impacts of the proposed changes; identify the existing environmental conditions of site with regard to these proposed changes, identify potential environmental impacts, propose environmental management and mitigation measures to minimize impacts as well as propose an environmental monitoring plan with appropriate environmental parameters to monitor changes on a regular basis.

The proposed site for the construction of outfall is the east side lagoon of Hulhumale Phase 2 near Phase 1. This area has a wide shallow lagoon area, a reef flat and a reef slope. The lagoon has few live corals, reef flat act as wave breaker and mostly consists of rocks. Reef slope area has live corals and rocks.

The proposed changes in the project includes change in construction methodology of 2 sea outfalls in the project site. Under the addendum, outfalls are proposed to be laid under seabed at depth of -100mm to the top of the block (100mm to from the seabed to the top of the block). The part of the outfall that falls into the lagoon area will be laid under the seabed after excavation. Rest of the outfall on the reef flat and on reef slope will be laid on the seabed using anchor blocks.

As part of the EIA, during construction stage, the main impacts will be raised from the project will be through excavation, general construction, operation of heavy machineries, and waste management. Moreover, during the operation stage, impacts will mainly from the sewage discharge. Operational impacts are discussed in detail in the initial EIA. Details and mitigation measures are explained in Environmental Impact section of this report. These mitigation measure need to be followed in order to minimize environmental damage.

The EIA also allowed to explore the best possible alternatives for the proposed development and identified key mitigation strategies. In the case of this project, there no preferred alternative options and it is recommended to proceed with the proposed project.

An environmental management plan with environmental monitoring has been developed, including important elements that require regular checks. The monitoring component will be adhered to and will allow the assessment of changes due to concept.

Although the project involves negative environmental impacts, it is justifiable in light of the socio-economic conditions and anticipated benefits resulting from this project, which seems to outweigh the negative environmental impacts.

5. Introduction

The EIA Report has been prepared in accordance with the EIA regulations to undertake the following works in Hulhumale Phase 2 east side lagoon.

- Laying down outfall pipeline and blockwork under the lagoon seabed.

5.1 Extent of the EIA Addendum

This EIA Addendum is limited to the proposed works as outlined in the terms of reference. Therefore, the content of the report will address all the concerns to this project that have been considered based on the TOR.

5.2 Aims and Objectives of the EIA

The objective of the report is to:

- Assist in mitigating impacts caused due to the project without undertaking an EIA.
- Promote informed and environmentally sound decision making.
- To demonstrate the commitment by the proponent on the importance of environmental protection and preservation.
- To fulfill the obligations of the proponent to undertake an EIA under Clause 5 of the Environmental Protection and Preservation Act of the Maldives.
- Undertake the project work with minimum damage to the environment.

5.3 EIA Implementation

This EIA Addendum has been prepared by a local environmental consulting firm, Water Solutions. Water Solutions have been chosen by the proponent as the environmental consultants for this project. The leading team members were:

- Ibrahim Faiz, Msc, BSc Environmental Management, Environmental Consultant (EIA-P05/2017)
- Mohamed Umar, BSc Environmental Management, Environmental Consultant (EIA-P02/2019)
- Aleef Naseem, Bsc Marine Biology, Marine Biologist

5.4 Project Implementation

The project will be funded by Male' Water and Sewerage Company Pvt. Ltd. The proponent has awarded the contract to prepare the EIA addendum report and obtain the necessary approvals from the government to a private company Water Solutions.

5.5 Terms of Reference

Terms of Reference for this assessment has been included in the Appendix of this report.

6 Policy, Legal and Administrative Framework

This section outlines the relevant environmental legislation pertaining to this project. The following table outlines the major environmental laws, guidelines, codes and standards, both local and international indicating the relevance to this project. Details of these regulations, what they cover and under what circumstances they apply are attached as an annex.

6.1 Environmental Protection and Preservation Act (Law No. 4/93)

The Environmental Protection and Preservation Act of the Maldives, EPPA (Law No. 4/93) provides the basic framework for environmental management including Environmental Impact Assessment (EIA) process in the Maldives, which is currently being implemented by Environmental Protection Agency (EPA) on behalf of Ministry of Environment and Energy (MEE).

Clause 2 of the EPPA mandates the Ministry of Environment and Energy to formulate policies, rules and regulations regarding the environment.

Clause 5 of this Act specifically provides for environmental impact assessment (EIA), a tool implemented to attempt to integrate environmental issues into development decisions.

According to the Clause, environmental impact assessments are a mandatory requirement for all economic development projects.

Clause 6 of the EPPA gives the Ministry of Environment and Energy the authority to terminate any project that has an undesirable impact on the environment.

Clause 7 of the EPPA refers to the disposal of oil, wastes and poisonous substances in to the Maldivian territory. According to this clause, any type of waste, oil, toxic gas or any substance that may have harmful effects on the environment should not be disposed within the Maldivian territory. If, however, the disposals of such substances become absolutely necessary, the clause states that they should be disposed only within the areas designated for that purpose and if incinerated, appropriate precautions should be taken to avoid harm to the health of the population.

The Environmental Act or Law 4/93 is the single most important legal instrument with regards to environmental management and it gives very high prominence towards safeguarding the environment with regard to all the development activities. Under this Act, the Ministry of Environment and Energy have developed regulations and guidelines concerning the environmental protection in the country.

Applicability

The provisions set forth in Clause 7 of EPPA regarding solid and hazardous waste disposal can be applied to the proposed project. Moreover, regulations developed under the EPA can still be applied to the proposed project, which are outlined herein.

6.2 Environmental Impact Assessment Regulation 2012

The Ministry of Environment has issued EIA regulation on May 2012, which guides the process of undertaking the Environmental Impact Assessment in the Maldives – This guideline also provides a comprehensive outline of the EIA process, including the roles and responsibilities of the consultants and the proponents. This regulation outlines every step of the IEE/EIA process beginning from application to undertake an EIA, details on the contents, minimum requirements for consultants undertaking the EIA, format of the EIA/IEE report and many more.

The guidance provided in this Regulation was followed in the preparation of this EIA report. And the EIA has also been prepared by registered consultants.

6.3 First Addendum to Environmental Impact Assessment Regulation 2012

This amendment was gazetted on 9th April 2013. As per this amendment the responsible authority has to check the submitted EIA report for everything mentioned in the Regulation's article (Kaafu) was in order and inform the proponent whether the EIA Report has been accepted or rejected within 2 working days. The penalty for repetitive offenses has been also amended in this amendment of the Regulation.

6.4 Second Addendum to Environmental Impact Assessment Regulation 2012

This amendment was gazetted on 30th August 2015. With this Addendum to the Environmental Impact Assessment Regulation 2012, the following important points were noted.

- Article 8 (a) of the amendment of the decision for screening form is as follows:
    - Environmental Management Plan
    - Initial Environmental Examination
    - Environmental Impact Assessment
    - Approval to go forward with the screened project
    - Approval to go forward with the project with as per the mitigation measures proposed by EPA.
- The amendment's article 9(b) says the decision for IEE will be as follows:
    - Environmental Impact Assessment Report if the project anticipated to have major environmental impacts
    - Environmental Management Plan.
    - Approval to go forward with the project if the project is not anticipated to occur major environmental impacts
- Article 10 of this amendment says that two (2) reviewers are required to review the environmental management plan and the selection of the reviewers are to be carried out as per the article 13(b).

6.5 Third Addendum to Environmental Impact Assessment Regulation 2012

Amendment 3 (issued on 11th August 2016) covers the point systems for consultants, categories of the consultants and amendment of the penalties to consultants and proponents who fail to follow the regulation. This EIA report was prepared by a Category B registered EIA consultant.

6.6 Fourth Addendum to Environmental Impact Assessment Regulation 2012

There was a 4th amendment done on the EIA regulation 2012 and gazetted on 19th January 2017. This amendment explains about the projects that can be preceded without an Environmental Impact Assessment when the proponent requests to the Ministry of Environment and Energy in writing along with commitments or guarantee that the Proponent will carry out the mitigation measures that may impact on the Environment due to such projects. A list of such projects given in the amendment is as follows.

1- Deepening of Existing harbors and channels as same as the foot print.
2- Uprooting trees that fall into the existing plots given to citizens for residential purpose.
3- Uprooting trees that fall into the roads/path ways to the above plots. (Only councils or who takes such responsibilities can apply).
4- Drilling boreholes to take water.
5- Reclamation carried out as land extension means to the natural existing land. Such lands that are less than 3 years after the reclamation is completed with exception of the projects mentioned article 1 (c) of this amendment.

6- Reclamation carried out in a lagoon with an island shape or characteristics. Such lands that are less than 5 years after the reclamation is completed with exception of the projects mentioned article 1 (c) of this amendment.

Environmental Impact Assessment shall be carried out and permission shall be obtained in Lands that are mentioned in 5 and 6 as above, when such lands become inhabited.

Environmental Impact Assessment shall be carried out in the following projects even in the lands that are reclaimed as per the number 5 and 6 explained above.

1- Projects that involve Dangerous Chemicals
2- Projects that involve in any Oil Storage
3- Projects that involve Incinerators
4- Projects that involves release of any poisonous elements to the atmosphere
5- Projects that involve fiber glass work.

The amendment also says that this amendment will come into force from the date it is gazetted.

6.7 Fifth Addendum to Environmental Impact Assessment Regulation 2012

This amendment was gazetted on 27th December 2018. With this Addendum to the Environmental Impact Assessment Regulation 2012, the following important points were noted:

- It states the termination of article 4(b) of the Environmental Impact Assessment Regulation.
- Changes to the Article 13 (G):
  - Clause (F): decision after reviewing EIA report means, environmental decision statement or requesting for additional information,
- Addition of the following points to Annex (d)
  - 36. Development of tourist resorts
  - 37. Development of tourist hotels

6.8 Regulation on Coral, Sand and Aggregate Mining

This regulation addresses sand mining from uninhabited islands that have been leased; sand mining from the coastal zone of other uninhabited islands; and aggregate mining from uninhabited islands that have been leased and from the coastal zone of other uninhabited islands. Coral mining from the house reef and the atoll rim has been banned through a directive from the President's Office dated 26th September 1990. Under Article 7 (c) of the Regulation on Sand and Coral Mining issued by the Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) on the 13th of March 2000, it is an offence to mine sand or coral from the beach, lagoon or reef of any inhabited island and islands leased for the purpose of building a tourist resort or agricultural development.

Development of a resort cannot use any mined coral and sand. Cement blocks will be used for the construction of building structures. Aggregate and sand for construction need to be imported or bought from the local market.

Proposed project and its components of this project will consider the following criteria:

- No coral mining will be undertaken within the reef or elsewhere for any construction work.
- No sand will be mined from the island environment for construction (includes the reef, island and lagoon).

6.9 The National Biodiversity Strategy and Action Plan

This is an environmental protection and preservation strategy. This strategy establishes several guiding principles and a wide-ranging policies and targets for the conservation of the biodiversity.

The goals of the National Biodiversity Strategy and Action Plan are:

- Conserve biological diversity and sustainably utilize biological resources.
- Build capacity for biodiversity conservation through a strong governance framework, and improved knowledge and understanding.
- Foster community participation, ownership and support for biodiversity conservation.

In implementing the proposed project activities, due care has been given to ensure that the national biodiversity strategies are adhered to. The proponent has committed fully on conservation and protection of the environment while undertaking this proposed project. More specifically, the coral reef and the marine environment have been assessed in order to assess baseline values. Quantitative and qualitative surveys were undertaken to assess the biological diversity of the coral reef. Practical mitigation measures and solutions have been identified to conserve and protect the biodiversity during and after construction.

6.10 Protected Areas and Sensitive Areas

Under Article 4 of the Environment Protection and Preservation Act, the Ministry of Environment is vested with the responsibility of identifying and registering protected areas and natural reserves and drawing up of rules and regulations for their protection and preservation. At present there are no rules and regulations made available to the public on designation and protection of habitats and heritage areas. No protected areas exist within the island environment.

6.11 Waste management policy

The Ministry of Environment has developed the framework for a national waste management policy. The key elements of the policy include:

- Ensure safe disposal of solid waste and encourage recycling and reduction in waste generated.
- Develop guidelines on waste management and disposal and advocate enforcing these guidelines through inter-sectoral collaboration.
- Ensure safe disposal of chemical, industrial and hazardous waste.

The key objective of the waste management policy would be the formulation and implementation of guidelines and means for solid waste management to maintain a healthy environment.

Waste management for the proposed project will be in line with this policy.

6.12 Waste Management Regulation, 2013

Waste Management Regulation (WMR) was published on August 2013 and is effective from February 2014. It has been implemented by Environmental Protection Agency (EPA). The aim of WMR is to implement the national waste policy which contains specific provisions to: (a) Implement measures to minimize impacts on human health, (b) Formulate and implement waste management standards, (c) Implement an integrated framework for sustainable waste management, (d) Encourage waste minimisation, reuse and recycling (e) Implement Polluter-Pays Principle (f) Introduce extended Producer Responsibility.

WMR contains four main sections: (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 sites, (iii) Waste transfer: Standards and permits required for waste transport on land and sea, including transboundary movements, (iv) Reporting requirements: Defines reporting and monitoring requirements and procedures, (v) Enforcement: Defines procedures to implement WMR and penalties for non-compliance.

If any hazardous waste including electronic waste is to be disposed in the Maldives, it should be handled by waste sites specifically approved to manage hazardous and Special Category waste. Transportation and handling shall also conform to the standards specified in WMR. If the waste is to be exported for reuse or disposal in another country, an application needs to be submitted to WMR clauses and international conventions. Thus, all the subprojects will need to comply with the WMR in disposing construction and decommissioning related wastes as applicable.

Waste produced during the construction and operation phase of the project must be disposed in accordance with this regulation. Domestic waste could be disposed through the existing waste management system in Hulhumale.

6.13 Water and Sewerage Act

The Water and Sewerage Act (8/2020) has been implemented to ensure clean and safe water are provided, and adequate sewerage systems are developed all throughout the Maldives by establishing regulations and standards for providing these services. The Act ensures that natural water resources are utilized and maintained in a sustainable manner and that these services are provided with limited environmental impacts. This requires newly developed water and sewerage systems to be operational following an Environmental Impact Assessment report and its approval from the Environmental Protection Agency. The Act also emphasizes on using new technology to reduce environmental impacts and use of renewable energy to provide these services.

6.14 National Wastewater Quality Guidelines 2007

The National Wastewater Quality Guidelines (NWQG) is administered by the EPA. Covering both domestic and industrial wastewater, the main purpose of the guideline is to provide clear technical guidance to individuals, organizations, license holders, government and regulators in order to manage waste water effluents in addition to following international best practice in terms of cleaner operations and production. The guidelines deal with domestic wastewater quality for discharge into deep sea and provide the maximum concentration of listed components that always must be complied with including coliform, pH and suspended solid levels. The NWQGs also provides maximum concentration levels for domestic and industrial wastewater combined but does not specifically provide guidance on dealing with industrial effluents or leachates of any kind. The country does not have set standards for ground water quality. The NWQGs also stipulate that the guidelines are generic and conservative, the standards state that in the event the capacity of the receiving environment to deal with additional wastewater, has been exceeded or when the activity generating the wastewater is envisioned to produce wastewater at extreme lower or higher levels than the standards set in the NWQGs, an Environmental Impact Assessment (EIA) is required and need to be completed by accredited Assessors approved by EPA. In addition, the producer must prove to government that best international Clean Production protocols are followed. Based on the recommendations of the EIA report and proof of Clean Production practice, EPA will issue site specific guidelines for the discharge of wastewaters. No exemptions to the Guidelines will be allowed without site specific guidelines to that effect. Monitoring plans are mandatory for all wastewater generators as per the guidelines.

6.15 National Water and Sewerage Policy

The National Water and Sewerage Policy (NWSP 2017) focuses on providing access to safe water and sewerage services for all. The NWSP has 9 goals: ensure access to safe water supply

and adequate sewerage services; adopting cost-effective, environment friendly and appropriate technologies; strengthening legal framework; encourage private sector investments; building institutional capacity; maintain financial and environmental sustainability; strengthen advocacy and awareness; promote research and development; and protect and conserve water resources. Policy objective 9: calls for adopting a holistic approach to water resources protection, conservation, management, and pollution control. Among the strategies for objective 9 are: establish an effective research-based monitoring program and information platform for inhabited islands' water resources; develop and implement evidence-based water resources management plans taking into consideration the sustainability and vulnerability of the island freshwater resources, wastewater reclamation, water reuse and minimize impact from pollution.

6.16 Public Health Construction Act

The purpose of the public health protection act is to establish policies for protection of public health, identify persons responsible for protection of public health, define how public health protection policies will be implemented. The objectives of the Act also include: establishing policies to respond to public health emergencies; classify situations which may be harmful to health and establish methods to act in such a situation; establish roles and responsibilities of island, atoll, and city councils in protection of public health. Chapter 5 of the Public Health Protection Act covers identifying health hazards, eliminating risk, reporting health hazards, and orders on things to be done or not done in relation to a building.

During the implementation of this project, it is recommended to inform the public about the work schedule and keep them updated with the progress. Sign boards should be placed to aware the public about the work environment safety. Since this is a road development project, construction will be undertaken very close proximity to houses and to the public. Safety measures must be taken to ensure the public health.

Under Public Health Act, Chapter 6 Clause 33 (a) Maldives has declared a public health emergency till January 4, 2021 due to COVID 19 crisis. All the guidelines regarding the COVID-19 health crisis provided by the HPA and Ministry of Health must be followed during the project construction and implementation stage.

7 Project Description

7.1 Project proponent

This project is proposed by Male' Water and Sewerage Company Pvt. Ltd (MWSC). The company has been established in the year 1995 with the purpose of solving the growing water needs in Malé. The principal objective of the company was to design, develop, operate, manage, and maintain the public water, wastewater collection and disposal system in Malé. MWSC has attained achievements including International awards for its success in operations and sharing its knowledge and business practice with regional utility companies. MWSC became an ISO 9001 certified Company in July 2006 based on its good management of business.

7.2 Project Location and Study Area

The project takes place in Hulhumale Phase 2 east side lagoon.

The following figure outlines the location of Hulhumale in Kaafu Atoll.

Figure 1: Photo of Hulhumale with Hulhule and Male' on the left and Hulhumale Phase 2 on the right (Photo: Google Earth)

7.3 Project Boundary

The project boundaries for this project includes part of east side lagoon of Hulhumale Phase 2 as shown in the figure below.

The diagram below shows the project boundary.

Figure 2: Project Boundary

7.4 Project Background

MWSC has undertaken and EIA to develop a sewerage and water supply system in Hulhumale. Decision Statement (DS) to this EIA was issued on 7th August 2016 by EPA. After the start of the project works, EIA Addendum was prepared to shift the proposed outfall location to 114m north of initially proposed location. DS for this EIA addendum was issued on 14th October 2020. After the issuance of the DS, HDC raised concerns that propose location of the outfall is a public beach area used for water sports activities and as well as for the aesthetic reasons, the proposed outfall to be laid below the seabed at -100mm in the lagoon area. Therefore, addendum 2 for this project is proposed to lay the outfall pipe under the seabed.

7.5 Proposed Outfall

Initially project proposed to lay 2 x 400mm outfalls on Hulhumale Phase 2 east side lagoon as part of the water and sewerage project of Hulhumale. Out of two outfalls, part of one has already been constructed. Under this addendum, it is proposed to lay these outfalls below the seabed due to concerns raised by the HDC. The proposed lagoon area for the outfall is a public beach area used for water sports activities. Therefore, proponent has decided to excavate the lagoon and lay the pipe and blockwork at -100mm from seabed to the top of the block. (100mm from the seabed to the top of the block). Below is the location of the proposed outfalls.

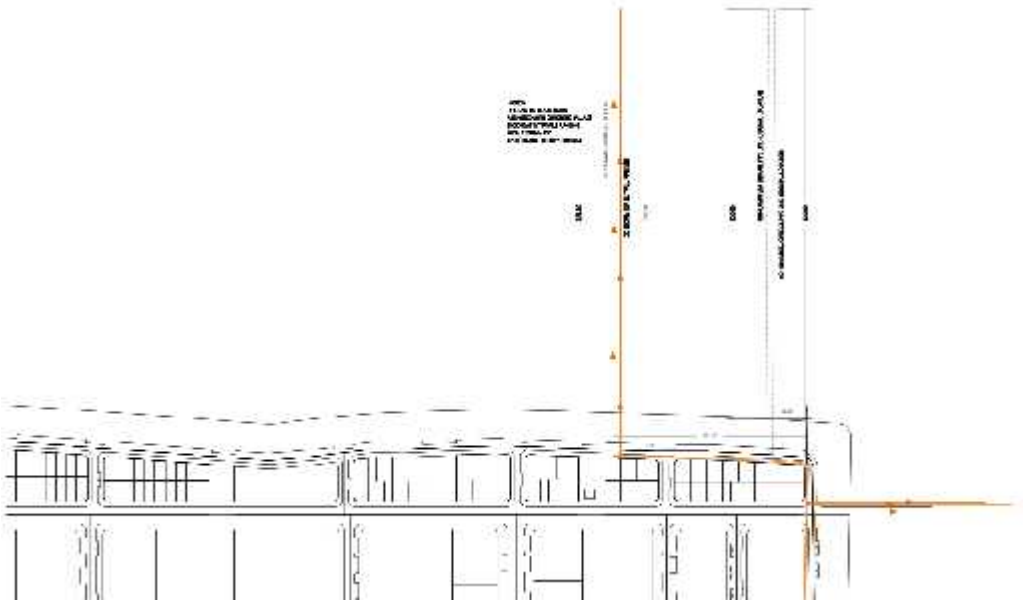


Figure 3: Proposed outfall location (orange line). Initially proposed location (gray line) which was shifted under EIA Addendum 1

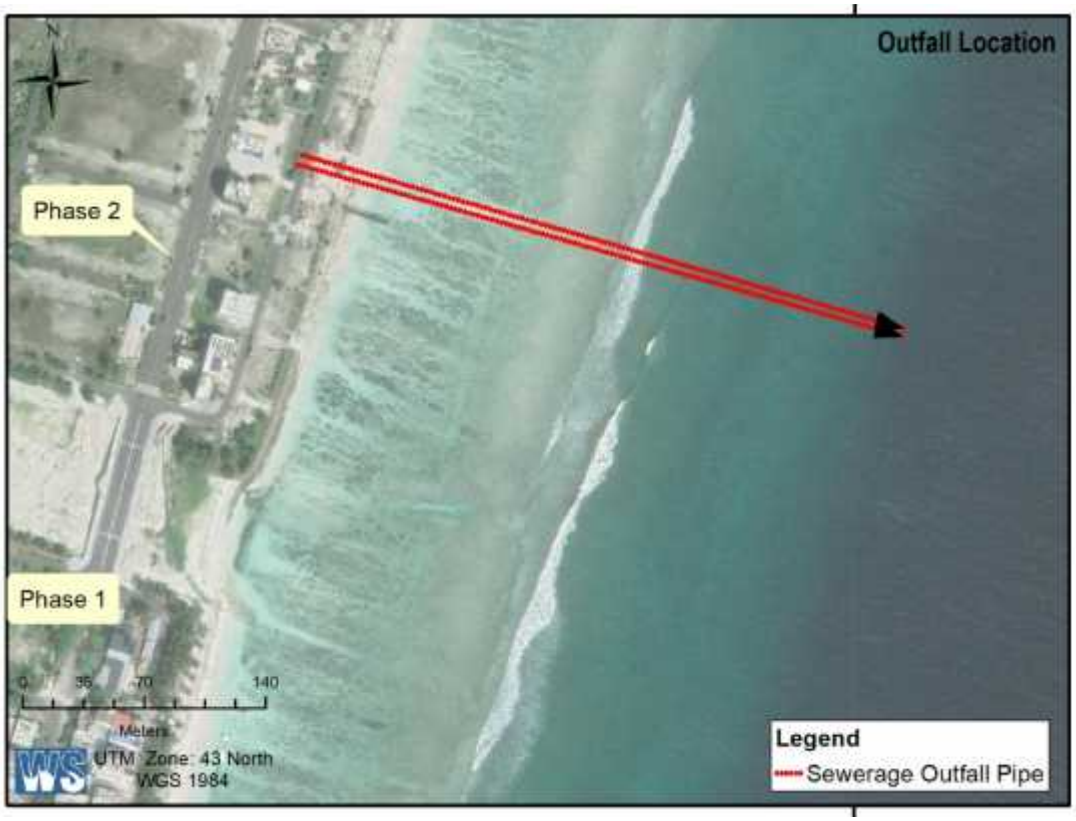


Figure 4: Proposed outfall pipes overlaid on a google image

7.6 Need and Justification

This report has been prepared to address the changes brought to the outfall construction. This change was brough due to the concerns raised by HDC. The initial proposal was to lay the outfalls on the seabed of the lagoon. According to HDC, this area is used by the public as a recreational area for swimming and water sports. Therefore, the outfall and the blockworks could be a hazard to the public using the area. Therefore, MWSC has proposed to lay these 2 outfalls below the seabed at -100mm. The part of the outfall on the seabed of the lagoon will

be laid under the seabed while the part beyond the reef flat will be constructed on the seabed normally.

7.6.1 Project Schedule

The total duration of the project is scheduled to be 25 days from the approval of the Addendum Report.

Task Name	Duration
Hulhumale' Phase II Development Plan	**431 days**
Construction of Sewer Outfall at Location 2	**431 days**
Construction of Sewer Outfall OD 400 x 1	**431 days**
Laying of Sea Outfall (Before first addendum)	299 days
1st EIA addendum and Aporoval	24 days
Laying of Sea Outfall (Before 2nd Addendum)	73 days
2nd EIA Addendum and Approval	70 days
Laying of Sea Outfall pipe	20 days
Commissioning and testing	5 days

Figure 5: Project schedule

7.6.2 Waste Management

The contractor is also required to work towards better management of waste so the volume of waste to be disposed would be reduced. All domestic wastes from the construction activities shall be transferred to Thilafushi.

Spillages of diesel, grease, oil can be as issue if adequate measures are not taken. Hence, oil, grease and other fuel storage will be held on land at the existing storage facilities with adequate impervious flooring. Refuelling of excavators will be required to be undertaken on the island on a hard floor area.

7.6.3 Safety

Full recognition and regard will be taken in the management and execution of project safety plan. Contractors are obliged to provide safety policies, plans and method statements and will be informed prior to order placement on all aspects of safety, health, and welfare.

7.6.4 Environmental protection measures

During the construction stage, the most critical factor is the protection of marine resources. When excavating the seabed, excavators will be used in the project boundary, most importantly in the shallow areas near the reef. During their unloading and placement, damage to the reef and lagoon will occur both directly and indirectly. Direct destruction will occur through the loss of seabed of outfall footprint whereas indirect impacts will be felt through some amount of sedimentation. As a result, this is considered as the most critical path / point of the project as far as the protection of environmental values are concerned.

The diagrams below show primary and secondary impact areas due to proposed project.

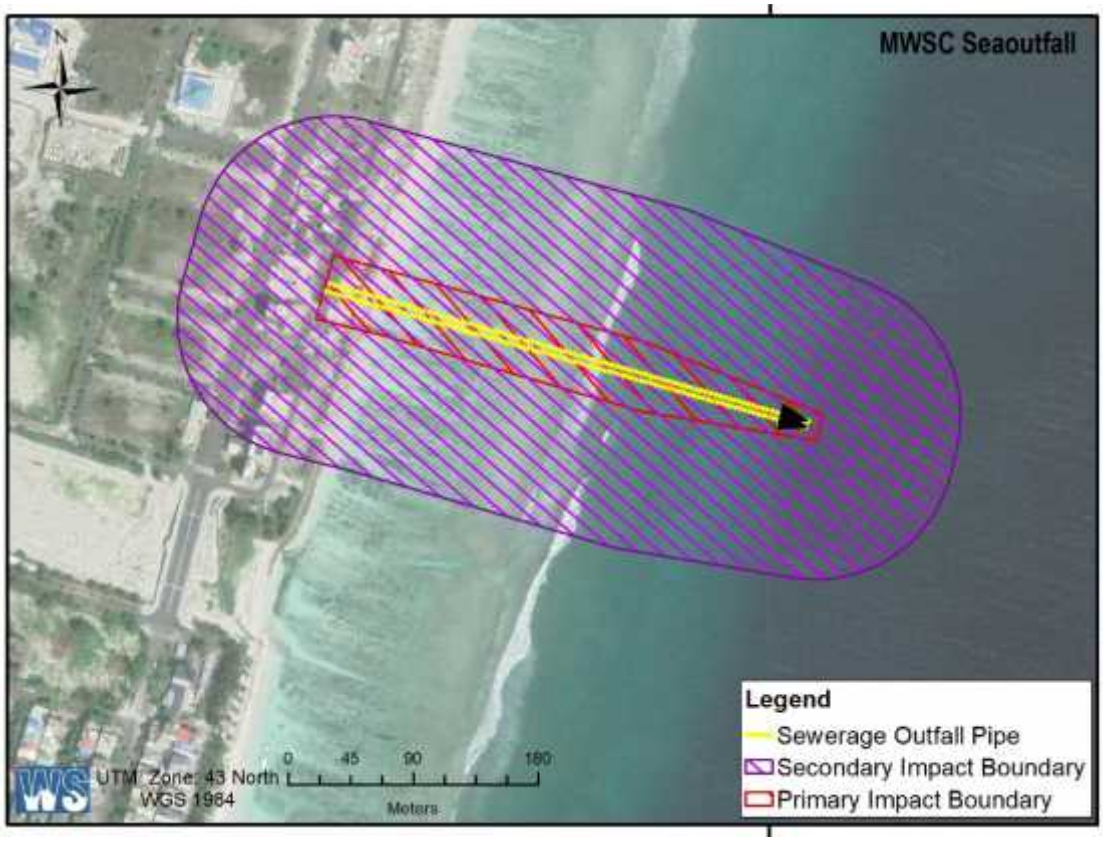


Figure 6: Primary Impact Areas

7.6.5 Risk associated with the project

There are few risk factors associated with this project that could possibly have both financial and environmental implications. There is very little risk associated with direct destruction of the habitats as the coral cover is very low in the areas proposed for excavation to lay outfall.

Some indirect effects during construction period such as use of heavy machinery in the shallow areas of the reef are moderate in nature and easily avoidable if measures are taken to mitigate them. Proper care needs to be taken to control and mitigate the damage caused during the construction period. The area must also be fenced off to make sure the public are not allowed to use the area during the construction.

7.6.6 Emergency plan in case of spill

The project site will have contact numbers for the project manager in case of any emergency and everyone working on this project will have access to the project managers through mobile phones, to avoid any serious spillage, all fueling activities will be undertaken on land. Vehicles refueling will takes place on the land on a non-permeable flooring. This would totally avoid any oil spillages to the marine environment. In case of a serious oil spill from a machinery due to a damage, all work will be immediately stopped, and everyone will be directed to focus their attention and effort to get the leaking stop, either through mechanically or by any temporary means. The focus will then be to move the machinery to land if it happens on the sea.

7.6.7 Machineries used for the project.

Below are the list of machineries and materials that will be used for the project.

Materials	Machineries
Pipe system OD 400 mm, total length of 586m	Measuring tapes
Cement	Excavator
Aggregate	Concrete mixer
Sand	Poke vibrator
Rebar	Diving equipment
Wood for frameworks	Crane truck of 3 ton
	Diving boat
	Drilling machine
	Ef & butt-welding machine

8 Description of the Environment of the Project Site

The baseline information of the proposed project and surrounding area were collected through primary data collected during the study period, and available secondary data. The environmental baseline data includes general geography, meteorology, (precipitation, temperature, humidity, wind conditions), geology, ecologically protected areas, terrestrial and marine environment, bathymetry, tidal conditions, etc.

8.1 Existing General Condition of the Site

The general environmental conditions of the site are well documented in the following EIA reports and reference is made on the following EIA reports.

- EIA for the Proposed Water Supply and Sewerage System, Hulhumale Kaafu Atoll
- Addendum to the EIA Report to the Proposed Water Supply and Sewerage System, Hulhumale Phase 2 (LaMer, 2020)

8.2 Assessment of the Marine Environment

The marine environmental survey at Hulhumale' phase II was focused on four sites as indicated in the following diagram.

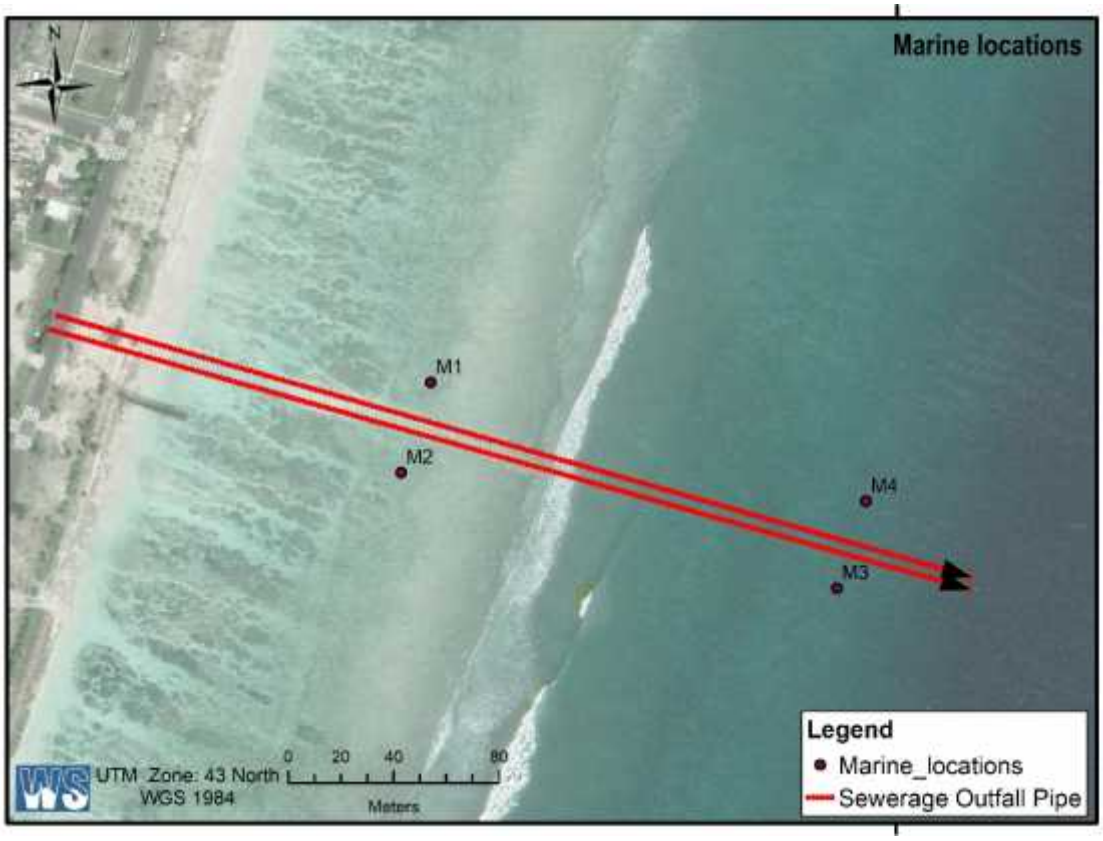


Figure 7: Marine survey locations

Site selection for the marine survey was based on the location where the outfall area is proposed.

8.2.1 Methodology of marine surveys

Several methods are available to estimate the percent benthic cover on coral reefs. Some of the common methods are, rapid visual assessment, line-point intercept, and photo-quadrat surveys. For this particular survey, a photo quadrate method was used. Photo quadrate surveys involve taking photos at a fixed distance from the substrate generally at a random or regular interval along a transect line.

The photo quadrate surveys are undertaken as follows. A transect line of 20 metres at each site, surveyor then places a half a metre quadrate made from PVC along the transect line and takes a photo directly vertically. The second photo is then taken along in the same manner after

approximately 1 m away from the first photo. In this manner, photos are taken along the transect line and in total, 10 photos on each transect line is taken.

8.2.2 Data Processing methodology

Analysis of the photos were done using a computer program called, CPCe (Coral Point Count with Excel extensions). This is an internationally recognized software used all over the word to assess the benthic composition of the reefs. In this programme, photographs are analyzed using a pre-defined benthic categories. Depending on the type of survey, these categories can be user defined at any given level. Users can have very complex levels ranging from individual coral families or have broader assessments categories. As the objective of this survey was to assess the impact of dredging and reclamation, it made sense to use a broader categories. Hence, benthic categories adopted by the Reef Check protocol was utilized. A text file containing these categories were created and imported to CPCe. The Reef Check protocol allows categorizing life forms followed under the Reef Check protocol, which emphasizes on benthic composition categorizing such as hard corals, sand, rock and others. The emphasis is not on recording corals to their species levels, but rather the general coral and other life forms such as hard and soft corals. This method is more accurate as the percentage of healthy coral cover and other life forms can be more accurately recorded even by a non-experienced surveyor.

The following are definition of benthic categories used in this survey.

- **HC:** All living coral including bleached coral; includes fire, blue and organ pipe corals
- **SC**: Soft corals and include zoanthids but not anemones (OT)
- **DC**: Coral that has died within the past year; appears fresh and white or with corallite structures still recognizable
- **ALG**: All macro-algae except coralline, calcareous and turf (record the substrate beneath for these); Halimeda is recorded as OT; turf is shorter than 3cm.
- **SP**: All erect and encrusting sponges (but no tunicates).
- **RC**: Any hard substrate; includes dead coral more than 1 yr old and may be covered by turf or encrusting coralline algae, barnacles, etc.
- **RB**: Reef rocks between 0.5 and 15cm in diameter
- **SD**: Sediment less than 0.5cm in diameter; in water, falls quickly to the bottom when dropped.
- **SI**: Sediment that remains in suspension if disturbed; recorded if color of the underlying surface is obscured by silt.
- **OT**: Any other sessile organism including sea anemones, tunicates, gorgonians or non-living substrate.
- **SG**: All types of sea grass observed categorized in the field SG.

Each of the 10 photos from transect are imported, cropped and prepared for analysis. The CPCe program then generates a matrix of random points overlaid on the image for each point to be visually identified. Users can then input the defined categories for each photo and once all the photos are analysed, the results are displayed on a table.

8.2.3 Benthic composition at site 1 (M1)

Site M1 was selected from the lagoon to the north of the proposed outfall location. The transect was dominated by sand. No live corals were recorded at this site. The following figures shows benthic composition and photographs taken from site M1.

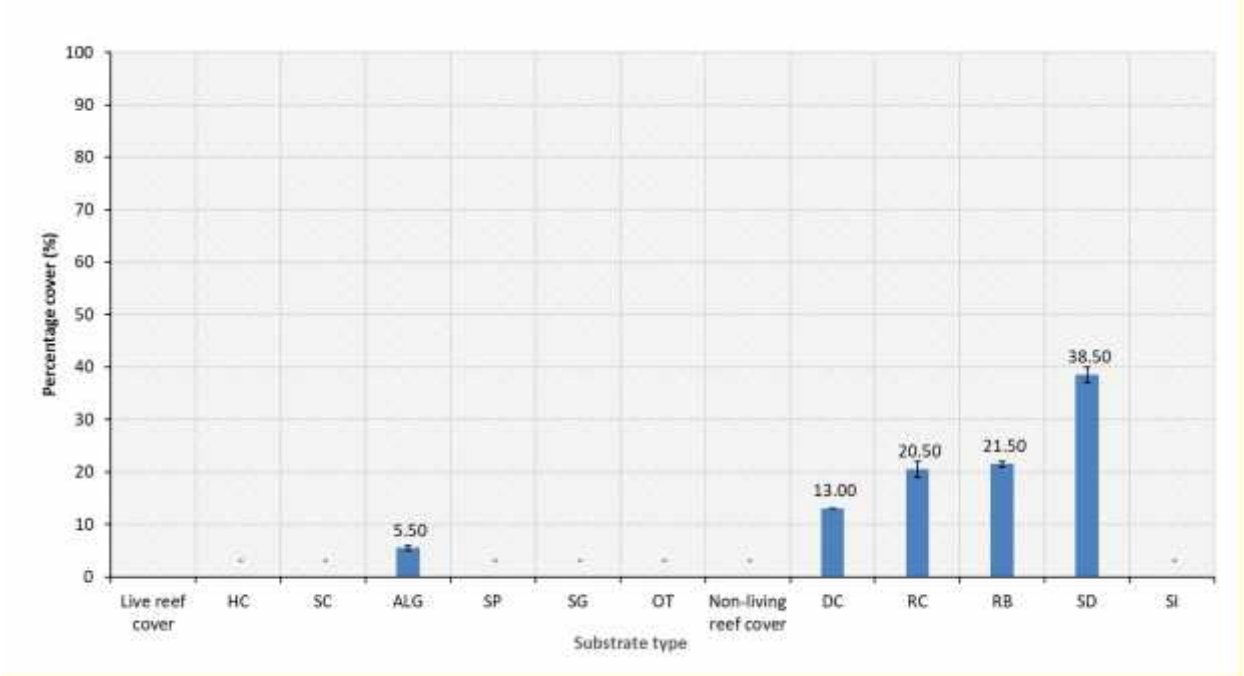


Figure 8: Percentage benthic composition at site 1 (M1) on 28th February 2021

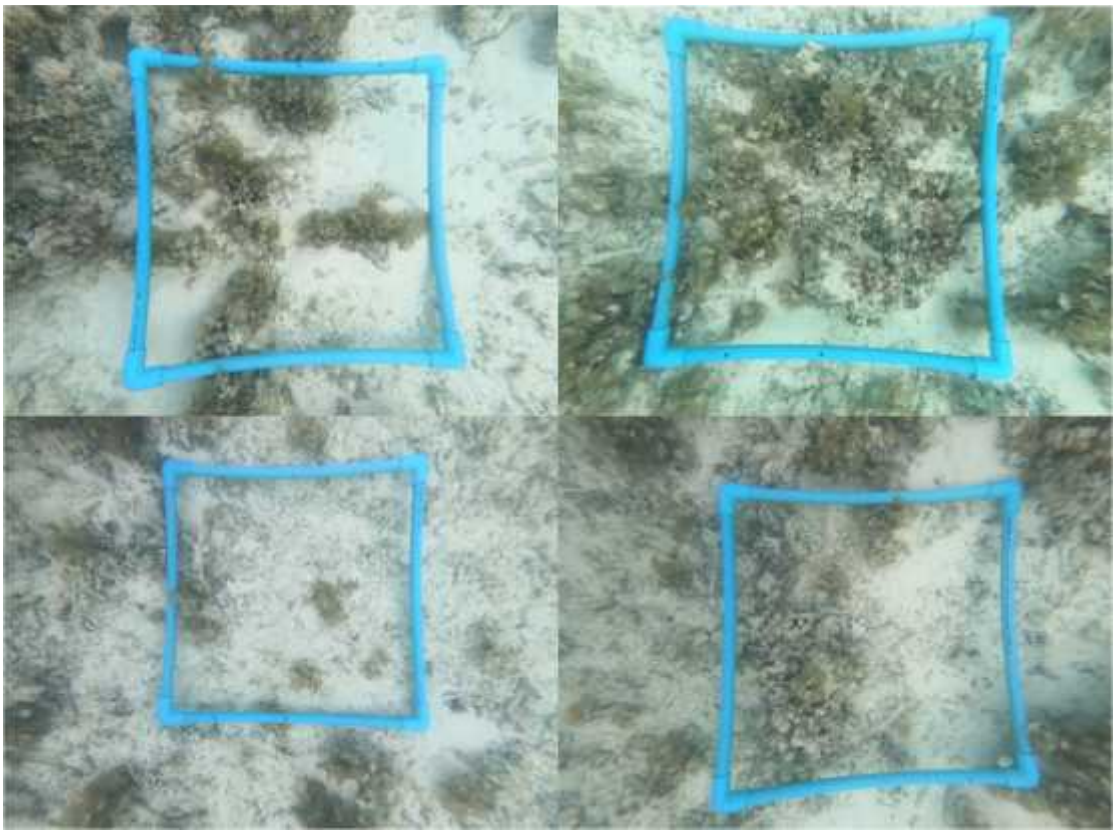


Figure 9: Photos taken from M1 on 28th February 2021

8.2.4 Benthic composition at site 2 (M2)

Site M1 was selected from the lagoon to the south of the proposed outfall location. The transect was dominated by rock. The following figures shows benthic composition and photographs taken from site M1.

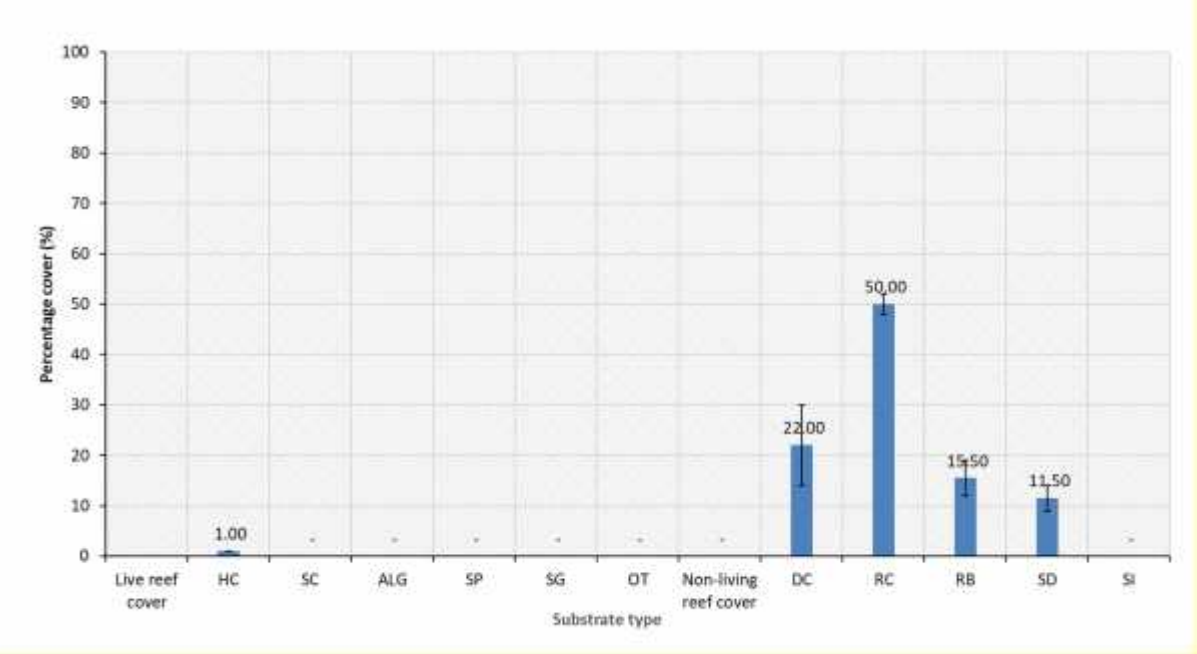


Figure 10: Percentage benthic composition at site 2 (M2) on 28th February 2021

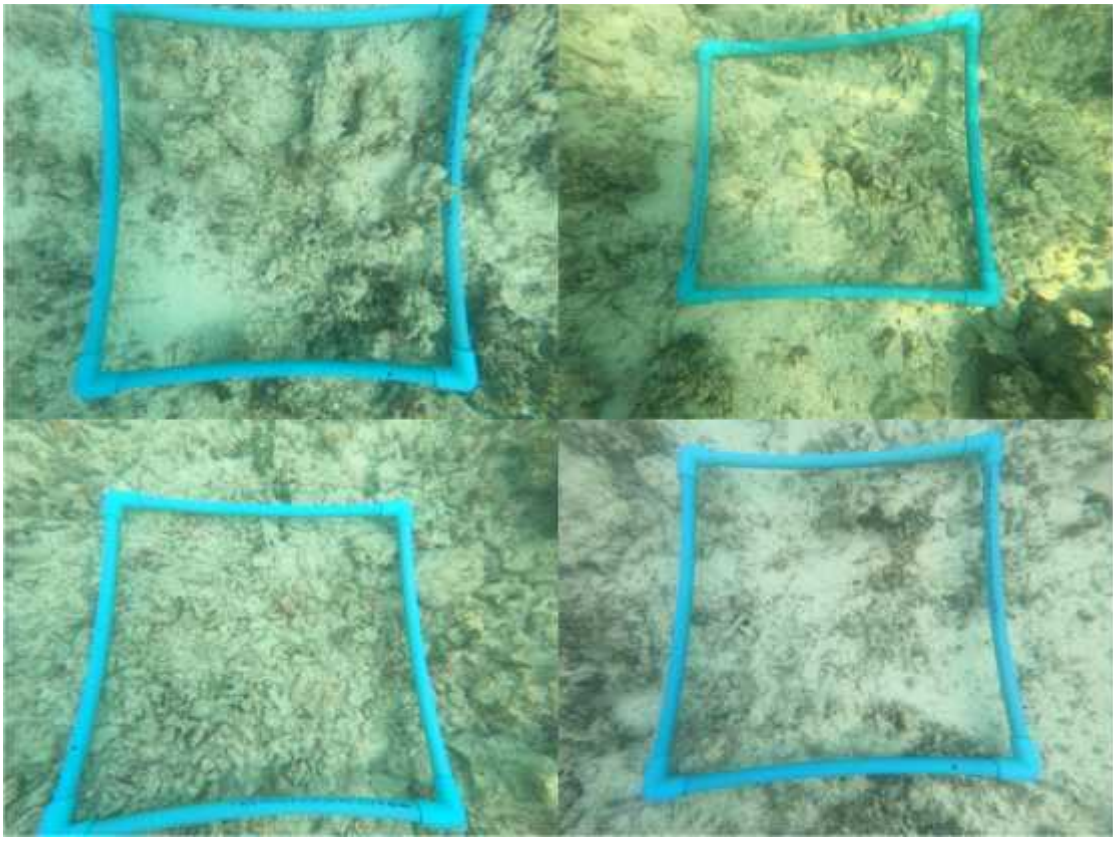


Figure 11: photos taken from site 1 (M1) on 28th February 2021

8.2.5 Benthic composition at site 3 (M3)

Site M1 was selected from the reef slope close to where the proposed outfall ends. The transect was dominated by rock. The following figures shows benthic composition and photographs taken from site M1.

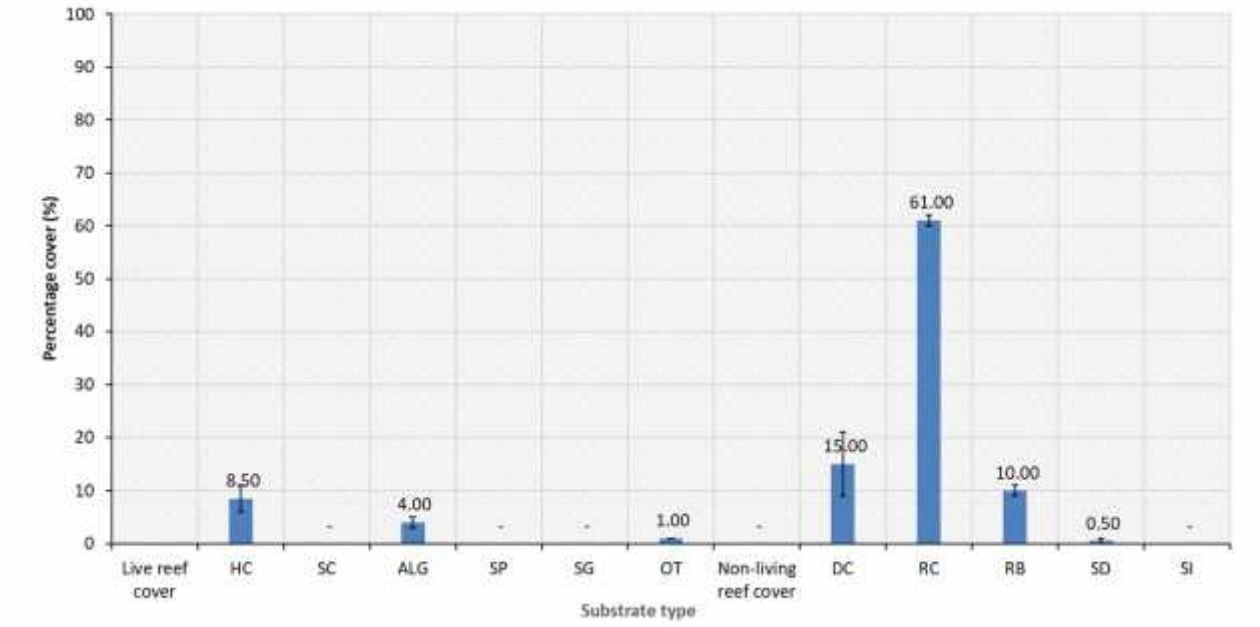


Figure 12: Percentage benthic composition at site 3 (M3) on 28th February 2021

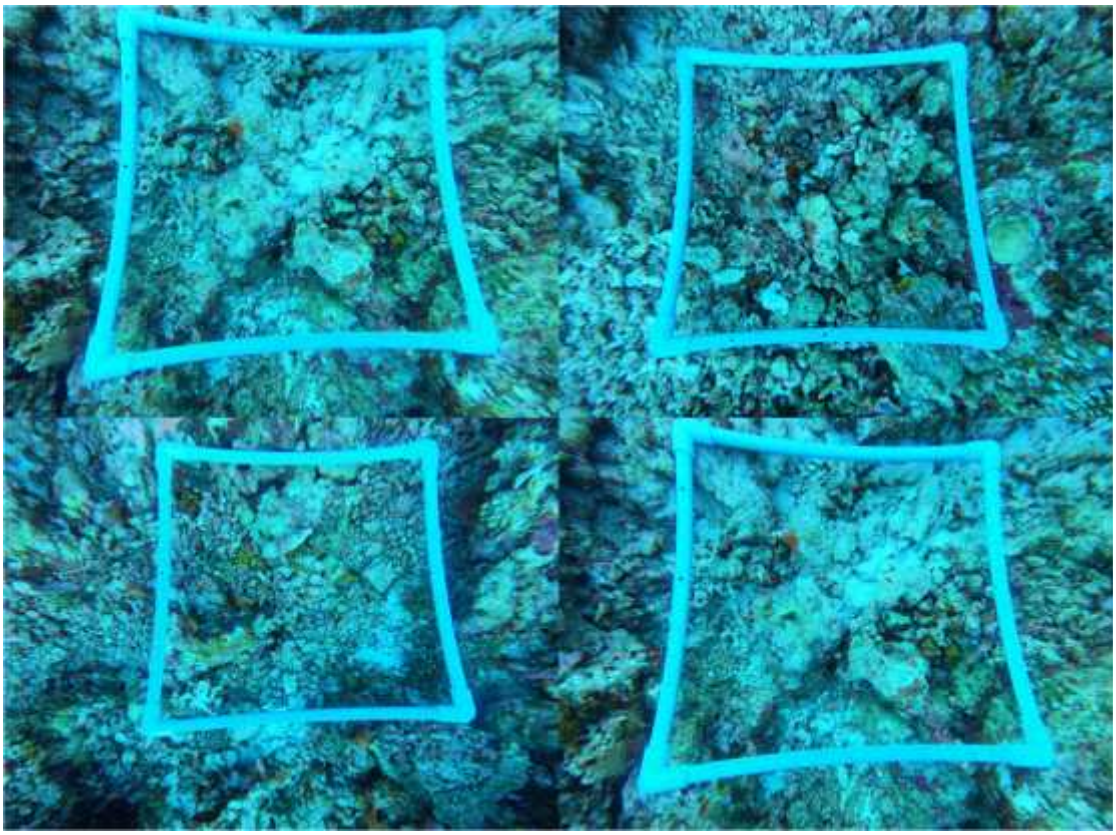


Figure 13: photos taken from site 3 (M3) on 28th February 2021

8.2.6 Benthic composition at site 4 (M4)

Site M1 was selected from the reef slope close to where the proposed outfall ends. The transect was dominated by rock and dead corals. The following figures shows benthic composition and photographs taken from site M1.

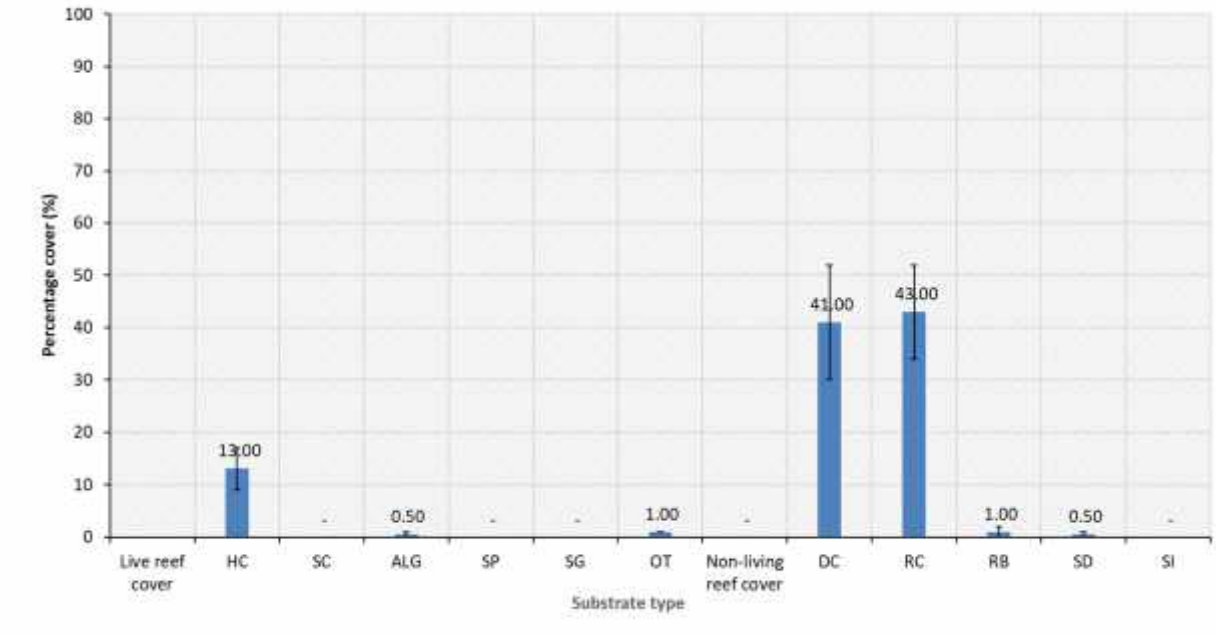


Figure 14: Percentage benthic composition at site 4 (M4) on 28th February 2021

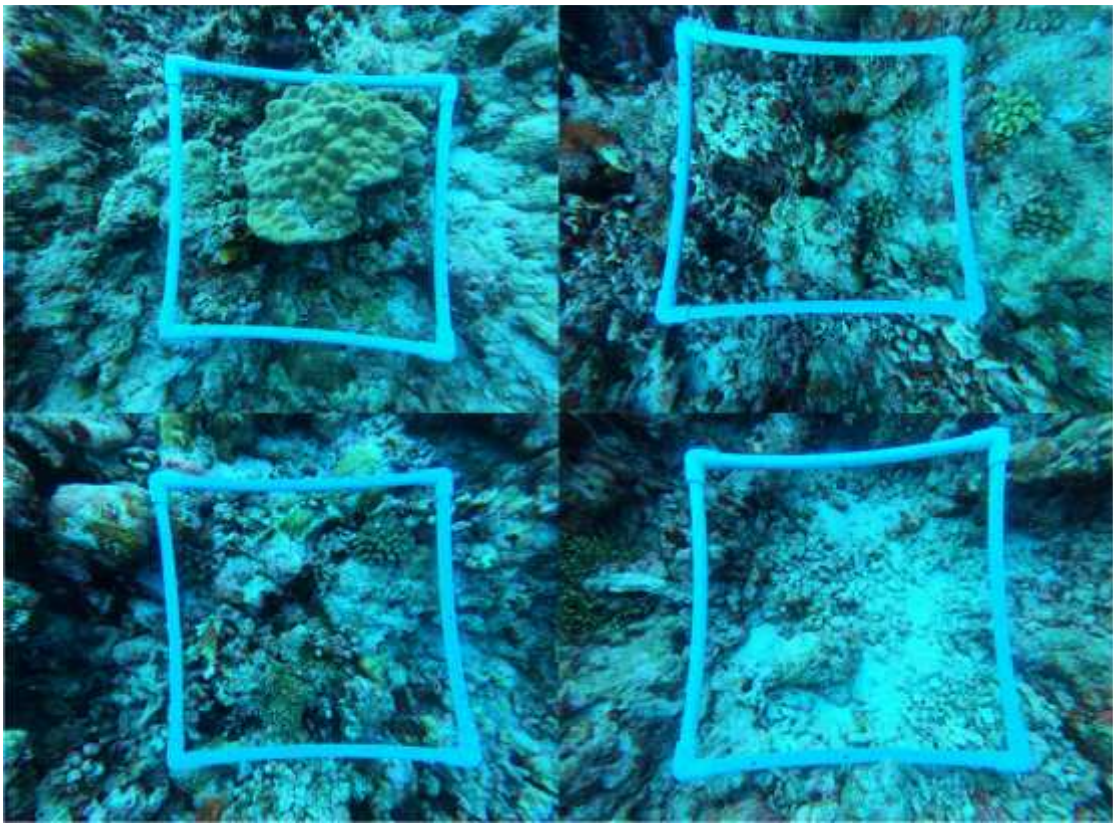


Figure 15: Photos taken from site 4 (M4) on 28th February 2021

8.3 Hydrography/Hydrodynamics

8.3.1 Tidal ranges and tidal currents

The tidal regime in the Maldives is semi-diurnal with diurnal inequalities. This means that there are two high tides and two low tides of different heights a day. The time between successive high tides is approximately 12 hours and 25 minutes. The heights of tides also vary with a monthly cycle. At new moon and full moon, the Moon is aligned with the Sun and the tidal range (the vertical difference between high tide and low tide) is large. The maximum tidal range is called a spring tide. The minimum tidal range is called a neap tide. Neap tides occur when the moon is at right angles to the sun. The tidal range is related to the current speed with larger tidal ranges resulting in faster tidal currents. Tidal variations in Maldives is provided in the table below.

The ocean currents come from the same direction as the currently prevailing monsoon winds. However, influence of tides affects the water current. During full and new moon, a large tidal difference exists which means stronger currents. In between full and new moon the currents are less intense. The result of these ocean currents and tidal currents determines the prevailing currents.

Water level from MSL (m)	Hanimaahoo (2010-2011)	Malé (2007-2011)	Gan (1992-1998)
Highest High Water (HHW)	0.62	0.62	0.79
Mean Highest High Water (MHHW)	0.36	0.34	0.39
Mean High Water (MHW)	0.35	0.33	0.38
Mean Low Water (MLW)	-0.41	-0.36	-0.40
Mean Lowest Low water (MLLW)	-0.42	-0.37	-0.41
Lowest Low water (LLW)	-0.80	-0.72	-0.78

Figure 16: Tide variations at the tide stations of Maldives. Source: Second National Communication of Maldives 2016

8.3.2 Wave climate and Wave Induced Currents

Wave climate and wave induced currents is discussed in detail in the First Addendum for the Proposed Water Supply and Sewerage System, Hulhumale Phase 2 Report by Lamer 2020. Page 17 to 20 discusses the wave induced currents of the proposed site. The figure below shows the wind wave direction around the site. Figure was derived from First Addendum for the Proposed Water Supply and Sewerage System, Hulhumale Phase 2 Report by Lamer 2020.

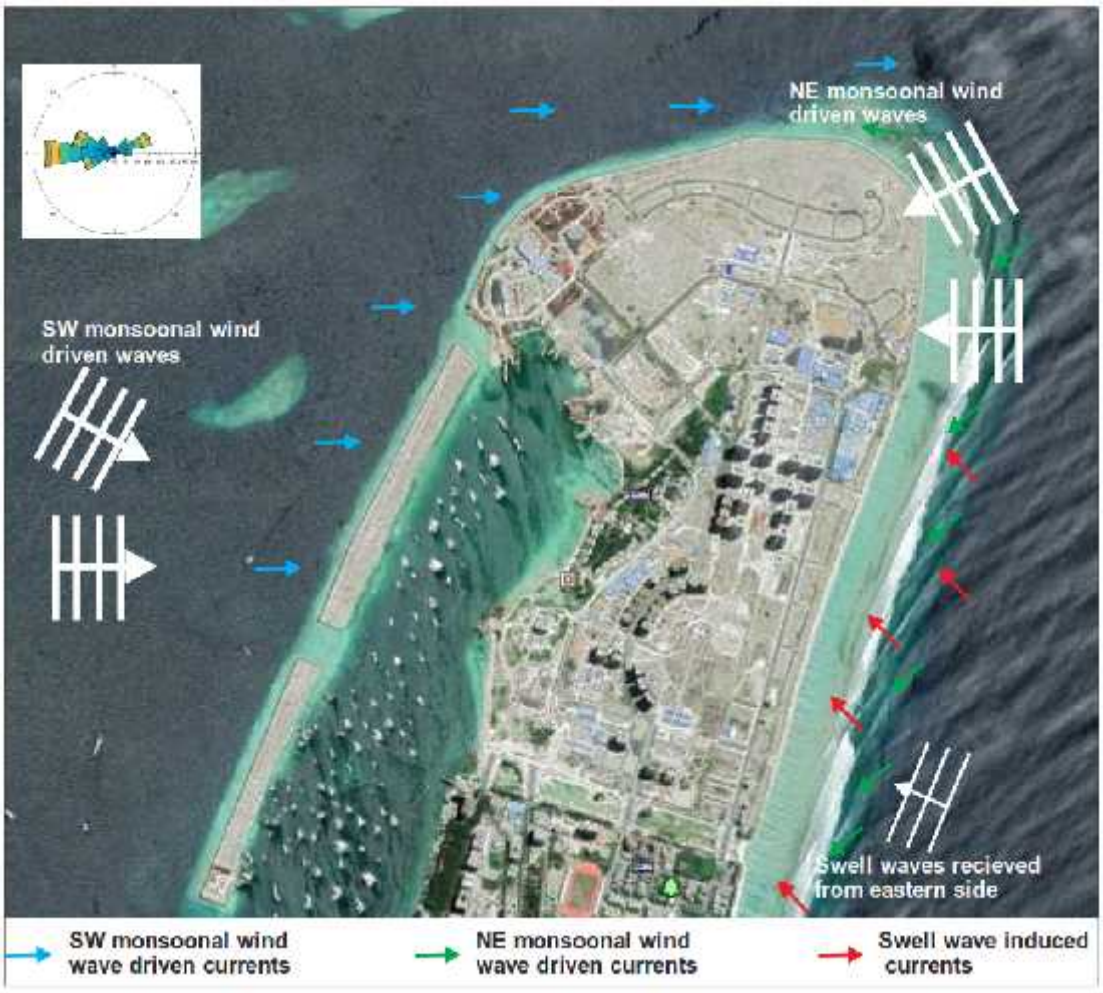


Figure 17: Schematic showing assumed windwave induced currents at the reef system (LaMer, 2020)

8.3.3 Wind induced (seasonal) currents.

In the Maldives there are two seasons (monsoons) South-west monsoon and North-east monsoon. The first one is the South west (Hulhangu moosum) from May until the end of October and the second monsoon is the North-east monsoon (Iruvai moosum) from November to the end of April. In the Hulhangu the wind blows from the south-west and the wind driven current comes from the west. As the wind arrives over the Indian Ocean it is relatively moist, which means more chance of rain. In the other season, the Iruvai the wind blows from the North-East, and the current comes from the east. Coming from India it brings relative dry wind which means mostly dry and more stable weather. The ocean currents come from the same direction as the currently prevailing monsoon winds, from the Southwest in the period from May until the end of October and from the Northeast from November to the end of April to mid-May.

8.3.4 Marine water quality

The marine water samples were collected from the discharge location as away from a control site. The samples were sent to MWSC to test for the parameters outlined in the EIA ToR. The diagrams below show the locations where marine water samples were taken and the table outlines the results of the tests. Marine water sample result sheets from MWSC are attached as an **Appendix**.

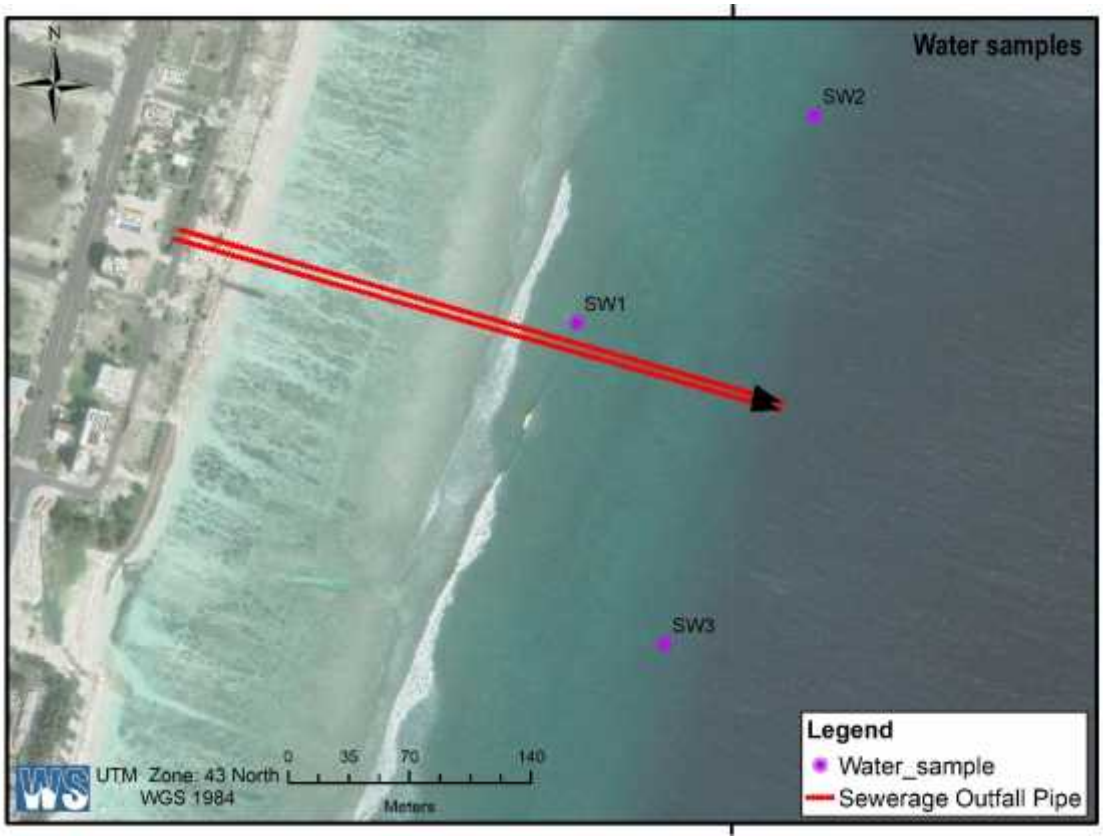


Figure 18: Marine water sample locations (28-08-2021)

Table 1: Outline of the water quality results

Location / parameters	**Temp (℃)**	**pH**	**Salinity (%)**	**EC (µs/cm)**	**TDS (mg/L)**	**Turbidity (NTU)**
Seawater sample 1 (SW1)	22.8	8.21	33.01	50400	25200	0.143
Seawater sample 2 (SW2)	22.8	8.25	32.79	50100	25100	0.184
Seawater sample 2 (SW2)	22.8	8.27	32.80	50100	25100	0.238

9 Stakeholder Consultations

For the purpose of this project, stakeholder consultations were limited to the organizations who were identified by EPA and outlined in the TOR. Effort to consult with these organizations were unsuccessful as none of the authorities replied to the letter sent on 8th February for consultation. On 18th March the letter was followed up with a call to these offices. However, no responses were given after informing that they will get back to us.

9.1 Hulhumale' Development Corporation (HDC)

To conduct stakeholder meeting with HDC letter was sent on 8th March 2021, requesting to inform the EIA consultant of the various concerns related to this project. However, there was no response from HDC regarding the project. Letter sent to HDC is attached as an annex.

9.2 Ministry of Environment

To conduct stakeholder meeting with Ministry of Environment letter was sent on 8th March 2021, requesting to inform the EIA consultant of the various concerns related to this project. However, there was no response from Ministry of Environment regarding the project. Letter sent to Ministry of Environment is attached as an annex.

9.3 Utilities Regulatory Authority (URA)

To conduct stakeholder meeting with URA letter was sent on 8th March 2021, requesting to inform the EIA consultant of the various concerns related to this project. However, there was no response from URA regarding the project. Letter sent to URA is attached as an annex.

10 Environmental Impacts

Environmental Impact identification was undertaken for the proposed activities necessary for the construction phase and the activities that will continue during the operational phase. The impact analyses for construction phase and operational phase were made separately to better understand the impacts as the duration, magnitude and probability of impacts greatly differ.

10.1 Impact Identification and Analysis

Environmental Impact identification was made by a combination of matrices along with expert opinions and experiences from similar projects in the past. The environmental impacts were examined using an adaptation of the Leopold matrix method. The Leopold matrix (Leopold et al, 1971) implements a two-dimensional checklist, where the columns of the matrix contain the project's activities while the rows list the environmental receptors under the three main categories – Physical components, Biological components, and Socio-economic components. This interaction matrix helps to identify impacts on individual factors of the three main categories of the impact. Furthermore, the sum of the magnitude from each impact activity and/or a certain environmental factor could be identified.

This method analyses three aspects of each action which may have an impact on the environment – *Magnitude, Duration, and Probability.*

- Probability – Likelihood of an impact to be produced from a said activity.
- Duration – Defines the duration of which the environmental impacts would persist.
- Magnitude – Defines the severity of the impact, for both positive and negative. A score is given from a scale of +10 to -10. +10 being major positive and -10 being major negative.

Table 2: Evaluation criteria and scoring system for impact analysis.

Evaluation criteria	Magnitude Score	Category
Probability (I)	O	Impact is possible (Probability < 50%
	M	Impact is likely (Probability >50%
	X	Impact is certain (Probability = 100%)
Duration (II)	T	The effects of the activity would not be identifiable within a few months of its completion.
	S	The effects of the activity would not be identifiable within months to a year of its completion.
	L	The effects of the activity would not be identifiable within multiple of its completion.
	P	The effects of the activity will persists endlessly causing irreversible impacts.
Magnitude (III)	9 & 10	Major Positive
	7 & 8	Moderate Positive
	5 & 6	Minor Positive
	-4 to 4	Negligible
	-5 & -6	Minor Negative
	-7 & -8	Moderate Negative
	-9 & -10	Major negative

10.2 Uncertainty and limitations in Impact Prediction

Environmental impact prediction involves a certain degree of uncertainty as the natural and anthropogenic impacts can vary from place to place due to even slight differences in ecological, geomorphological, or social conditions in a particular place. There is also a lack of long-term data, for instance, shoreline, local currents, economic activities and such, which are crucial to analyse impact predictions.

There is also uncertainty with the continuation of this project. Minor or even major changes to the project's concept plan could alter the series of impacts. Major changes would require and EIA addendum to be made. However, the level of uncertainty, in the case of this project is expected to be low.

Table 3: Impact analysis matrix for Construction Phase

		Project Activities						
	Envisaged Impact factors / Magnitude (M) & Importance (I)	Impact of Excavation and outfall laying			Impacts of wastewater / brine discharging			Comments
		I	II	III	I	II	III	
Physical components	Ground water	NA	NA	NA	NA	NA	NA	
	Vegetation	NA	NA	NA	NA	NA	NA	
	Land/ Soil	NA	NA	NA	NA	NA	NA	
	Coastal zone	X	L	-7	O	T	-2	
	Air	O	T	-2	NA	NA	NA	
	Noise	O	T	0	NA	NA	NA	
	Seabed	X	L	-8	M	S	-5	
Biological Components	Ground Water	NA	NA	NA	NA	NA	NA	
	Diversity of terrestrial environment	NA	NA	NA	NA	NA	NA	
	Diversity of marine Environment	M	S	-7	M	S	-5	
Socio-economic and cultural component	Coral reef and ecosystem	M	S	-4	P	S	-6	
	Health and well being	O	S	-1	X	L	9	Proper water supply and sewerage system will improve the health and well being of the residents.
	Accidents	O	S	-1	O	S	6	Number of accidents during recreational activities will be lower due to laying of the outfall pipe under seabed.
Total Impact Magnitude				-29			-1	

BLANK PAGE

Table 4: Matrix of Impacts and Mitigation Measures

Activity	Potential Impacts	Mitigation measures	Cost of Mitigation
Construction stage impacts			
Impact of excavation	**Habitat loss** Excavation will lead to direct loss of habitat for corals and marine organisms in the project footprint. The habitat will be modified permanently. Habitats such as live corals in the target area will be destroyed. Direct habitat loss to corals is very small as the percentage of live corals in the lagoon area is very less. The target area in the lagoon is a rocky sea floor. The wave break zone also does not have live corals but the reef flat area towards the slope has live corals which will be lost during outfall installation. Excavation will only be undertaken on the lagoon and on the reef flat and reef slope, outfall will be placed on the benthos. Hence direct impact of excavation will not be be felt on the reef.	In order to minimize the damage, the following measures are proposed. 1. Only the required area is to be excavated in order to limit the direct impact footprint on the lagoon. 2. Designate one side of the outfalls to operate machinery rather than using a large area in order to avoid the damage to the lagoon/reef footprint.	No cost. Mitigation measures are procedural in nature.
Increase in turbidity	Marine organisms such as corals and seagrasses need UV light for photosynthetic processes. If turbidity is high, then these ecosystems will become stressed. In the case of this project, project boundary has live corals which will be impacted if the turbidity is high. Studies suggest that long term turbidity levels which are >3 NTU lead to sublethal stress. However, long term turbidity levels higher than 5 NTU cause severe stress on coral at shallow depth (Cooper et al., 2008).	In order to minimize the damage, the following measures are proposed. 1. Avoid works during rough weather conditions. 2. Complete the works during the shortest duration possible. 3. Halt the excavation process if the turbidity is higher than 5 NTU.	No cost. Mitigation measures are procedural in nature.

Activity	Potential Impacts	Mitigation measures	Cost of Mitigation
Sedimentation during excavation and outfall installation	Excavation will permanently alter the seabed and disperse sediment plumes to nearby areas in the target area. Some of the activities incorporate the use of heavy machinery to alter the seabed. Corals can tolerate sedimentation to a certain extent. However, coral growth and recruitment will be affected in the moderate term. Prolonged exposure will eventually lead to death of the corals in the surrounding areas and indirect sedimentation impacts to the overall reef as well as the nearby reefs. The impacts of excessive sedimentation on corals include; • Direct physical impacts such as smothering of corals and other benthic organisms, • Reduced light penetration reducing the productivity and growth, calcification and reproduction rates of corals. • Formation of false bottoms characterized by shifting of sediments. • Eutrophication due to increased fine sediments leading to algal blooms. • Formation of anoxic (black) bottoms under the fine sediments.	This activity will be undertaken during calm weather at low tides. Avoid work during bad weather. Outfall location will be set out and marked by qualified surveyors to ensure that the footprint is as per the design. These works to be undertaken by qualified contractors with experience in working in similar environments.	No cost. Mitigation measures are procedural in nature.
Waste management	This can be detrimental to the marine and the terrestrial environment if they are not managed properly. Solid waste generated during the construction stage will include organic, inorganic and few hazardous materials and all of which require adequate disposal.	Domestic waste can be transported to Hulhumale waste transfer facility and eventually to Thilafushi. Educate the workers and create awareness about good waste management and responsible behavior with regard to environmental care.	$20 per trip 0.5T trucks
Operational impacts			

Activity	Potential Impacts	Mitigation measures	Cost of Mitigation
Changes in water quality at discharge location	Disposal of sewage into the marine environment will potentially increase nutrient input in the area. Long term disposal of such materials is a cause of concern, in terms of the effect increased nutrients would have on the seawater quality and reef health and ecosystem.	Install diffuser system at the end of the outfall to dilute the discharge. Treat the sewage before being discharged to sea.	Already included in the project.
Positive social impacts	Laying sea outfall under the seabed will potentially reduce the number of accidents that otherwise will be for the public who use the area recreationally. Proper water and sewerage system in Hulhumale will improve the living condition of the residents.		

BLANK PAGE

11 Alternatives

EIA Regulation requires two alternatives to be suggested for such developments and therefore two alternatives have been suggested in addition to the no project alternative. These alternatives are discussed below:

11.1 No Project Option

The no project options involve laying the outfalls as initially planned. Outfall will be anchored on the seabed using concrete blocks and these structures will be visible on the lagoon.

The main advantages and disadvantages of these are given in the table below.

Table 5: Advantages and disadvantages of the no project option

Strategy	Advantages	Disadvantages
Construct outfall on the seabed	Environmental problems related to seabed excavation can be avoided. Less cost to the proponent. No additional impact footprint.	HDC will continue to raise concerns regarding the safety of the lagoon users in the area. This area is regularly used a water sports area and an outfall on this location will act as a hazard for the public using this area. It will also not be very aesthetically pleasing to lay the outfall on the seabed and parts of which maybe seen overwater during low tide.

11.2 Alternative outfall location

Alternatively, the outfalls can be shifted to another area away from the recreational lagoon area of Hulhumale. However, this alternative was not considered as the water and sewerage network is already laid considering the proposed location as outfalls. In addition, there some works already undertaken in the proposed area to lay outfall. Part of one outfall is already laid. Therefore, it is environmentally more sounding to lay the outfall in this location rather than installing on a new footprint since some damages has already be done. The preferred option in the case of this project is to proceed with the proposed option. Mitigation measures outlined in the report must be adhered during the construction and operation process.

12 Environmental Management and Monitoring Plan

This section deals with the Environmental Management and Monitoring plan for the proposed project with respect to the modifications proposed in this EIA. The proposed monitoring plan is for the construction and operational phase of the project components.

The data collected for this assessment will be used as baseline data while undertaking the monitoring plan. Undertaking environmental monitoring is essential for several reasons. They are:

- To ensure that potential impacts are minimized and to mitigate unanticipated impacts.
- To aid in impact management,
- To improve impact prediction and mitigation methods.
- To gather long term data to minimize uncertainty.
- To ensure sustainable development

The proposed monitoring programme will yield beneficial results if it is undertaken for a long period.

12.1 Cost of Monitoring

The proponent has committed fully for the monitoring programme outlined in this report. The total cost of undertaking the regular monitoring is estimated in this section. Cost of monitoring includes all data collection and reporting to the client and to the relevant government agencies.

12.2 Duration of Monitoring

Monitoring will include marine and coastal aspects only. The proposed schedule for monitoring has been prepared for a total of 3 (three) years. That is twice during construction given the short duration of the project and every 6 months in the first year and annually for the next 2 years. In addition, monitoring requirement of the initial EIA and EIA Addendum 1 must also be followed. Monitoring will be undertaken by subcontracting the work to an independent consultant or a consulting firm. Monitoring reports shall be submitted to the EPA to evaluate the damages of the development.

Table 6: Summary of Monitoring durations and report numbers

	Duration in Months	Frequency of monitoring report	No of monitoring reports
During Construction	1	At the start and immediately after construction	2
For the first year after completion of the project.	12	Every 6 months	2
For two years after completion of the project	24	Annually	2

12.3 Methods of Monitoring

Environmental monitoring will be undertaken using standard methods described in the Methodology section (refer to annex for details). Monitoring is recommended for marine, and coastal environment only.

12.4 Monitoring Responsibility

Monitoring responsibility will be with the client and financial provisions will be made in the project to undertake the monitoring.

12.5 Monitoring Report

A detailed monitoring report should be compiled after the completion of the project. During the operational stage (after the completion of the project), regular monitoring reports should be provided as per the schedule. This report will be submitted to the relevant government agencies for compliance. The report will include details of the site, data collection and analysis, quality control measures, sampling frequency and monitoring analysis and details of methodologies and protocols followed.

The following table outlines the monitoring schedule proposed for the project.

Table 7: Schedule for environmental monitoring

Monitoring Attribute	**Indicator**	**Methodology**	**Monitoring Frequency**		**Cost during (construction phase)**	**Cost during (operational phase)**
			Construction stage	Operational stage		
Marine and coastal environment						
Visual water quality	Visibility of water	Through visual inspections and logs to be kept on site (to ensure that water stagnation does not trap any loose sediments in the water column).	Every day during work.	-	No cost. Contractor to keep the logs on site.	
Monitoring turbidity	Visibility of water and water quality testing	Measure turbidity with portable instruments or send water samples for testing	During excavation works	-	$ 150 per day	-
Sedimentation damage to the reef	Visual assessment of sedimentation damage to other areas of the reef	Qualitative Reef health and fish community census	End of construction phase	Every six months in the first year and annually in the next 2 years		$ 1,000.00 per trip
Water quality at discharge location	Water quality testing	Sending samples to laboratory	-	Every 6 months		$ 700.00 per trip

13 Conclusion

This EIA addendum report was undertaken to obtain the approval to proceed with the modification for the initial proposal to lay the outfalls in Hulhumale Phase 2. Additional change includes laying the lagoon part of outfalls under the seabed at -100mm.

This EIA report has identified the major impacts of the proposed changes in the concept. Few environmental impacts appear to be major as it does involve excavating seabed. Most of the environmental impacts will be felt during the construction stage, whereas the beneficial effects will be evident after the project is complete. These beneficial impacts will be mainly socioeconomic in nature and has been outlined in the report.

During construction stage, the main impacts will be from the excavation of seabed. Excavation process will destroy the outfall footprint and will increase the turbidity in the area from the sedimentation. General Construction, Operation of Heavy Machineries, and Waste Management will also generate some impacts. Moreover, in Operation stage impacts will be raised from discharging the sewage through outfall. Details and mitigation measures are explained in Environmental Impact section of this report. These mitigation measure need to be followed in order to minimize environmental damage.

An environmental management plan with environmental monitoring has been developed, including important elements that require regular checks. The monitoring component will be adhered to and will allow the assessment of changes due the proposed project.

Although the project involves negative environmental impacts, which are not severe as to not undertake the project. The project is justifiable in light of the socio-economic conditions and anticipated benefits resulting from this project, which seems to outweigh the negative environmental impacts.

14 Acknowledgements

Various people have assisted the consulting team in preparing this report, name and their designations are listed below. Water Solutions would like to thank their support and assistance provided in completion of this report.

1- Ibrahim Faiz, MSc, BSc Environmental Management (EIA P05/2017)

2- Mohamed Umar, BSc Environmental Management

3- Aleef Naseem, BSc Marine Biology

4- Ahmed Jameel, B. Eng (Environmental), MSc – Environmental (EIA P07/2007)

5- Hamdhulla Shakeeb, - Surveyor.

6- Water Solutions staff

15 Annex: Terms of reference

No: 203-ECA/MWSC/2021/4

Terms of Reference for the Second Addendum to the Environmental Impact Assessment for the proposed Water and Sewerage Project at Phase 2, Hulhumale, Kaafu Atoll

The following is the Terms of Reference (ToR) for the proposed revisions to the Water and Sewerage Project at Phase 2, Hulhumale', Kaafu Atoll. The proponent of the project is **Male' Water and Sewerage Company Private Limited**. The EIA consultant for this project is **Mr. Ibrahim Faiz (License No. EIAP05/2017).**

While every attempt has been made to ensure that this ToR addresses all of the major issues associated with development proposal, they are not necessarily exhaustive. They should not be interpreted as excluding from consideration matters deemed to be significant but not incorporated in them, or matters currently unforeseen, that emerge as important or significant from environmental studies, or otherwise, during the course of preparation of the EIA report.

1. **Introduction and rationale** – Describe the purpose of the proposed project and, if applicable, the background of the project and the tasks already completed. Clearly identify the rationale and objectives of this addendum.

2. **Study area** – Submit a minimum A3 size scaled plan with indications of all the proposed infrastructures. Specify the agreed boundaries of the study area for the environmental impact assessment highlighting the proposed development location and size.

3. **Scope of work** – Identify and number tasks of the project including site preparation, construction, and decommissioning phases. The following tasks shall be completed:

Task 1. Description of the proposed project – Provide a full description and justification of the relevant parts of the proposed works, using maps at appropriate scales where necessary.

A brief description of major component of the project

- A brief description of the project should be provided in reference to the initial EIA and first addendum.
- Description of the components of the project subjected to this addendum and justifications.
- Describe equipment needed and construction methods associated with laying outfall under seabed.

Task 2. Description of the environment – Assemble, evaluate, and present the environmental baseline study/data regarding the study area and timing of the project. Identify baseline data gaps and identify studies and the level of detail to be carried out by consultant. Consideration of likely monitoring requirements should be borne in mind during survey planning, so that data collected is suitable for use as a baseline. As such all-baseline data must be presented in such a way that they will be usefully applied to future monitoring. The report should outline detailed methodology of data collection utilized.

Environmental Protection Agency
Green Building, 3rd Floor, Handhuvaree Hingun
Male', Rep. of Maldives, 20392
+960 333 5949 +960 798 0379 secretariat@epa.gov.mv www.epa.gov.mv

The baseline data will be collected before construction and from at least two benchmarks. All survey locations shall be referenced with Geographic Positioning System (GPS) including water sampling points and reef transects for posterior data comparison. Information should be divided into the categories shown below:

Marine Environment

- Assessment of the marine environment
- Description of the characteristics of seabed subjected to outfall area

Hydrography/hydrodynamics (localized maps)

- Tidal ranges and tidal currents
- Wave climate and wave induced currents.
- Wind induced (seasonal) currents.
- Marine water quality at the discharge location and alternative (control) location measuring these parameters: Temperature, pH, Salinity, E. Conductivity, TDS, Turbidity

Task 3. Legislative and regulatory considerations – Identify the pertinent legislation, regulations and standards, and environmental policies that are relevant and applicable to the proposed project and identify the appropriate authority jurisdictions that will specifically apply to the project. Include permits and approvals in the EIA document.

Task 4. Potential impacts (environmental and socio-cultural) of proposed project – The addendum report should identify all the impacts, direct and indirect, during and after construction, and evaluate the magnitude and significance of each. Particular attention shall be given to impacts associated with the project component on the following:

- Impacts of excavation on marine habitat alteration.
- Increased turbidity and changes in sediment transport due to outfall relocation.
- Impacts on marine ecosystem from changes in the water quality at sea outfall site.

The methods used to identify the significance of the impacts shall be outlined. One or more of the following methods must be utilized in determining impacts; checklists, matrices, overlays, networks, expert systems and professional judgment. Justification must be provided to the selected methodologies. The report should outline the uncertainties in impact prediction and also outline all positive and negative/short and long-term impacts. Identify impacts that are cumulative and unavoidable.

Task 5. Alternatives to proposed project – Describe alternatives including the *"no action option"* should be presented. Determine the best practical environmental options. Alternatives examined for the proposed project that would achieve the same objective including the "no action alternative". All alternatives must be compared according to commonly accepted standards as much as possible. The comparison should yield the preferred alternative for implementation. Mitigation options should be specified for each component of the proposed project. The comparison should yield the preferred alternative for implementation.

Task 6. Mitigation and management of negative impacts – Identify possible measures to prevent or reduce significant negative impacts to acceptable levels. Mitigation measures must also be identified for both construction and operation phase. Cost of the mitigation measures, equipment and resources required to implement those measures should be specified. The confirmation of commitment of the proponent/developer to implement the proposed mitigation measures shall also be included. In cases where impacts are unavoidable arrangements to compensate for the environmental effect shall be given.

Task 7. Development of monitoring plan – Identify the critical issues requiring monitoring to ensure compliance to mitigation measures and present impact management and monitoring plan for:

- Physical parameters such as marine water quality assessments such as turbidity,
- Biological parameters such as coral reef and benthic monitoring, fish community census at sea outfall pipe location to assess the damages and recovery rates.

Environmental monitoring reports shall be submitted to the EPA. Detail of the monitoring program including the physical and biological parameters for monitoring, cost commitment from responsible person to conduct monitoring in the form of a commitment letter, detailed reporting scheduling, costs, and methods of undertaking the monitoring program must be provided.

Task 8. Stakeholder consultation, Inter-Agency coordination and public/NGO participation) – Identify appropriate mechanisms for providing information on the development proposal and its progress to stakeholders. The EIA Addendum report should include a list of people/groups consulted, their contact details and summary of the major outcomes. The following stakeholders need to be consulted:

- Hulhumale' Development Corporation (HDC)
- Ministry of Environment
- Utilities Regulatory Authority

If the surveys are undertaken at a time where public health emergency is declared due to COVID 19, consultation with stakeholders can be undertaken via e-conference calls or telephone. The EIA report needs to be submitted to Male' City Council and evidence of submission needs to be included in the report. Meeting minutes shall be annexed, and the report shall include a list of those who are consulted and their contacts.

Presentation - The environmental impact assessment report, to be presented in digital format, should be concise and focus on significant environmental issues. It should contain the findings, conclusions and recommended actions supported by summaries of the data collected and citations f or any references used in interpreting those data. The environmental assessment report shall be organized according to, but not necessarily limited by, the outline given in the EIA Regulations, 2012 and the subsequent amendments.

Timeframe for submitting the EIA report – The developer must submit the completed EIA report within 6 months from the date of this Term of Reference

----

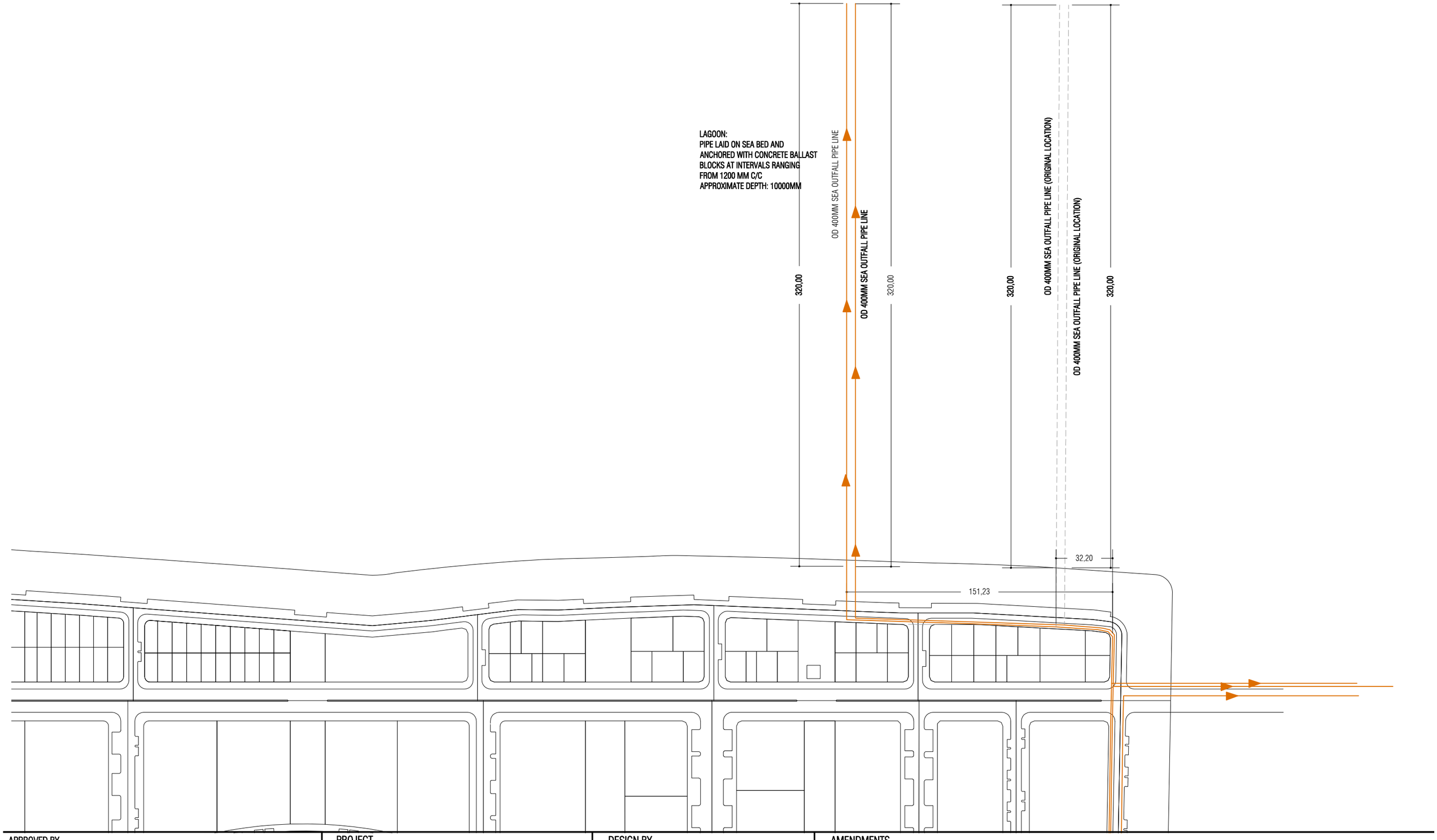
25th February 2021

Environmental Protection Agency
Green Building, 3rd Floor, Handhuvaree Hingun
Male', Rep. of Maldives, 20392

އެންވަޔަރަންމަންޓަލް ޕްރޮޓެކްޝަން އެޖެންސީ
ގްރީން ބިލްޑިންގ، 3ވަނަ ފަންގިފިލާ، ހަނދުވަރީ ހިނގުން
މާލެ، ދިވެހިރާއްޖެ، 20392

+960 333 5949 +960 798 0379 secretariat@epa.gov.mv www.epa.gov.mv

16 Annex: Approved Project Concept



APPROVED BY

PROJECT
K. HULHUMALE' (PHASE II)
INSTALLATION OF SEA OUTFALL FOR THE YEAR 2019

TITLE
SEA OUTFALL LAYOUT (ZONE 1)

CLIENT DEPARTMENT
BUSINESS DEVELOPMENT

DESIGN CONTRACTOR
INTERNAL PLANNING AND DESIGN DEPARTMENT

PAPER SIZE A3 **PAGE NO.** 01

DESIGN BY
PAUL KURIAKOSE

STRUCTURE BY
-

DRAWN BY
AISHATH NADHA GASIM

SCALE NTS

DWG NO. 19-I36-HML-SO-S1-01

DATE (R) 22.09.2020 [02]

AMENDMENTS

MWSC
MALE' WATER & SEWERAGE COMPANY PVT. LTD.
AMEENEE MAGU, MACHCHANGOLHI MALE' 20-01 REPUBLIC OF MALDIVES
TEL: (+960) 3323209, FAX: (+960) 3332306, E-mail: mwsc@dhiraagu.net.mv

17 Annex: Water Quality Reports

Male' Water & Sewerage Company Pvt Ltd
Water Quality Assurance Laboratory
Quality Assurance Building, 1st Floor, Male' Hingun, Vilimale', Male' City, Maldives
Tel: +9603323209, Fax: +9603324306, Email: wqa@mwsc.com.mv

LB-TEST-090

WATER QUALITY TEST REPORT

Report No: 500186374

Customer Information:
Water Solutions Pvt Ltd
M.Niyadhurumaage
Alimas Magu
Male' 20063

Report date: **04/03/2021**
Test Requisition Form No: **900191370**
Sample(s) Recieved Date: **02/03/2021**
Date of Analysis: **02/03/2021 - 02/03/2021**

Sample Description ~	Hulhumale' SW 1	Hulhumale' SW 2	Hulhumale' SW 3	**TEST METHOD**	**UNIT**
Sample Type ~	Sea Water	Sea Water	Sea Water		
Sample No	83217137	83217138	83217139		
Sampled Date ~	01/03/2021 02:30	01/03/2021 02:30	01/03/2021 02:30		
PARAMETER	**ANALYSIS RESULT**				
Physical Appearance	Clear with particles	Clear with particles	Clear with particles		
Conductivity *	50400	50100	50100	Method 2510 B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	µS/cm
pH *	8.21	8.25	8.27	Method 4500-H+ B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	-
Salinity	33.01	32.79	32.80	Method 2520 B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	‰
Temperature	22.8	22.8	22.7	Electrometry	°C
Total Dissolved Solids	25200	25100	25100	Electrometry	mg/L
Turbidity *	0.143	0.184	0.238	HACH Nephelometric Method (adapted from HACH 2100N Turbidimeter User Manual)	NTU

Keys: µS/cm : Micro Seimen per Centimeter, **‰** : Parts Per Thousand, **°C** : Degree Celcius, **mg/L** : Milligram Per Liter, **NTU** : Nephelometric Turbidity Unit

Checked by

Aminath Sofa
Laboratory Executive

Approved by

Nihaz A. Zahir
Senior Quality Officer

Notes:
Sampling Authority: Sampling was not done by MWSC Laboratory.
This report shall not be reproduced except in full, without written approval of MWSC.
This test report is ONLY FOR THE SAMPLES TESTED.
~ Information provided by the customer. This information may affect the validity of the test results.
*Parameters accredited by EIAC under ISO/IEC 17025:2017

********** END OF REPORT **********

18 Annex: Methodology

1.1 Introduction

The annex describes detail methodologies used to collect data on the existing environment for EIA studies in the Maldives. For EIA studies in the Maldives, various methodologies are used and the type and methods vary for different projects. Almost all projects will utilize some general data collection methodologies in combination of various other methods. The following section outlines the data collection methodologies that are used in Maldives and their description.

1.2 General Methodologies of Data Collection

In this method, the condition of the existing environment is analyzed using appropriate scientific methods. The environmental components of the study area are focused for terrestrial, marine and coastal environment depending on the specific projects. In general, for any project that requires the study of the marine environment, the marine environment of the island is studied including the coral reef and the lagoon. Focus is given on specific areas of the island's reef which is expected to have the greatest impact as a result of the proposed project. Coastal environmental data collection involves mapping the shoreline, taking beach profiles from selected locations, identifying and mapping costal defense structures and assessing the coastal environment for erosion or accretion. Terrestrial data collection usually includes creating a terrestrial map of the island or a specific area.

1.3 Mapping and Location Identification

The island, lagoon, reef or specific areas of islands or a project site is mapped, including shore line, vegetation line, reef lines, existing mature trees, coastal defense structures or other significant topographic features. Mapping is undertaken using hand held differential GPS and available aerial photos. The location of data collection sites are marked using handheld GPS. These data collection points includes marine water sampling locations, marine survey locations, existing groynes and sea walls, mature trees, breakwaters, protected or archaeological sites, erosion prone areas, sand spits, beach rocks etc.

1.4 Marine Environment Surveys

Marine environmental surveys were conducted to collect data on key environmental components (i.e. the coral reef system and the lagoon), that will be impacted due to the project. Four methods are primarily used to collect data, namely:

- Line Intercept transects (LIT's)
- Detail photo quadrate analysis,
- Fish census and
- Visual observations.

Purpose of the survey is to define and establish marine environmental baseline conditions for impact evaluation during and after a project. Surveys are based on standard marine environmental surveys so that they can be repeatedly carried out to monitor and record changes and assess possible impacts on the marine environment from the proposed work activities. Surveys include quantitative and qualitative methods. In addition, photos are taken along the reef survey sites and the length of the lagoon.

1.5 Line Intercept Transects (LIT)

Line Intercept Transect (LIT) surveys are carried out to assess the benthic types and species at the survey sites. This method uses life form categories to assess the benthic sessile community of reefs and it is possible to incorporate taxonomic data as well. LIT surveys can be used to evaluate the community structure of corals in terms of species composition and

diversity patterns in different zones on a reef. LIT method also provides a rapid estimate of percent cover of corals, algal cover, and cases of other prominent organisms as well as bare substratum.

Quantitative percent cover of the reef community can be obtained using this method and it can be repeated over time to obtain changes over a period of time. Disadvantages of this method include difficulty in standardizing the life form categories and the limitation of the data collected, to information on percent cover and relative abundance (English et al. 1997). LIT surveys produce valuable data even though they are time consuming and require considerable effort and skills to record notes underwater (Segal & Castro 2001). A line transect of 20m length is normally used, but transect lengths can vary depending on the surveyor.

1.6 Photo quadrate analysis

Photo transect coral reef survey method is used to quantify the data of coral reef benthic communities i.e. live corals and their types, other benthos, dead corals and other reef substrate. This method is used to support the LIT surveys or as an alternative to line transect. A series of photographs are taken along the transect line (usually 20 m each) using an underwater camera. These photographs are combined to form a photo-composite. Photo-composite of the mapped area of the reef are then analyzed using computer software. It provided a detail record of individual corals, sandy or rubble area and other benthos to a mapped area. The photographs not only allowed speedy collection of data in the field, but also provided a permanent record of the transect line, which is useful for long-term monitoring of growth, mortality and recruitment.

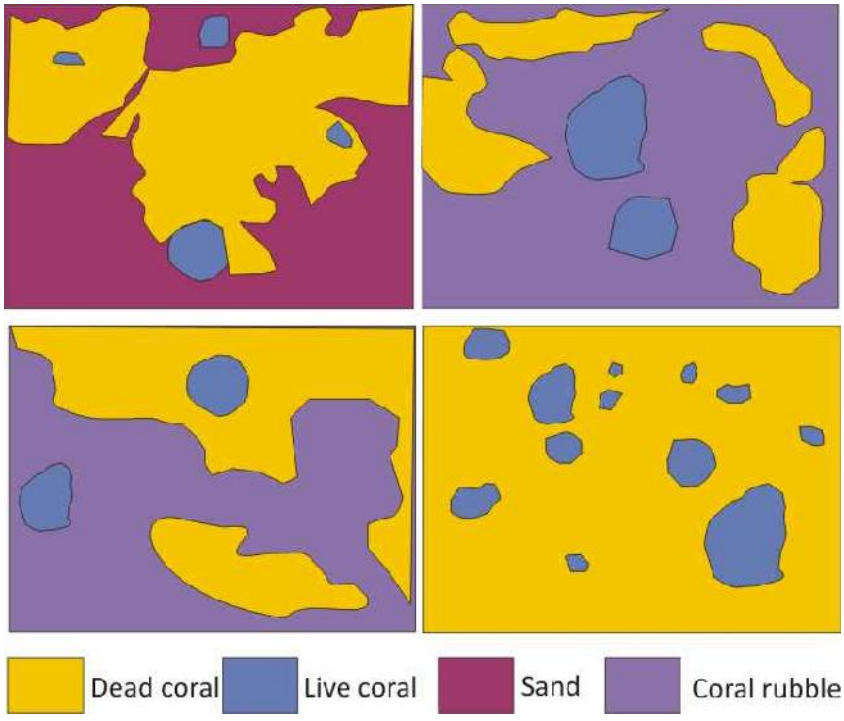


Figure 1: Typical photo quadrate analysis

1.7 Qualitative assessment

Qualitative assessment of the reef or lagoon is based on visual observation by snorkeling and then comparing the result with underwater photos and aerial photographs.

1.8 Permanent Photo Quadrats

This method involves taking still photographs of a fixed quadrat that are analyzed in the lab. It is useful to determine temporal change in shallow macrobenthos communities. Permanent photo-quadrats can also complement LITs and are suitable for small-scale questions and to follow the fate of individual colonies. Detailed temporal change can be determined for individual corals for biological condition, growth, mortality and recruitment. Data can be used to estimate percent cover, species diversity, relative abundance, density and size. Percentage cover of target organisms can be determined in the lab by either point sample methods by placing a grid cover the quadrat or by digitizing the image (digitizing is more expensive, time-consuming, requires special software and expertise). The precision depends on the apparatus used and the ability to take photo from exactly the same spot as well as observer differences for analysis.

On each designated Impact Sites squares of 50x50cm side length are placed randomly along the coral patches in about 1,5m depth. Still photos are taken and analyzed using the software CPCe 3.4 (Kohler and Gill 2006) with an equally spaced grid overlaid in 10 columns and 10 rows (100 points) per 50x50cm quadrat. Substrate categories are recorded and described. Statistical analysis is then undertaken using PAST software (PAlaeontological Statistics ver. 1.90, Øyvind Hammer).

All quadrats at the survey sites are permanently marked with square plastic markers for further monitoring studies. In addition, when possible, sub-surface buoys are installed at each Site close to the quadrats.

1.9 Reef fish Visual Census

Under water counts of reef fishes or underwater visual census (UVC) method is used to assess the fish population at an Impact Site and a Control Site. Visual counts appear to give reasonably reliable results provided that they are applied to fish that are non-cryptic and either diurnally active or at least evident by day. In this method, the surveyor swims along the transect paths above the reef, counting fish that were observed within 1,5m either side of the transect and above up to the water column. The same transects line as for the Visual Quadrat survey is normally utilized to carry out the fish census. Fish are counted along the 20 m transect path (that is in a belt of 1.5 m on either side and up to the water surface). To count the fish, the surveyor swims slowly along, counting fishes that are seen within the defined band transect, 20m long by 3m wide (i.e. one with a total area of 60m²). All fish encountered are recorded at least up to family level, some up to genus and species level, noted on the underwater slate immediately after they are seen. Counting any fish more than once is avoided by training and experience. Speed at which the path swum is controlled so as to standardize the efficiency of search. If the surveyor swims too fast it is easy to miss fish, especially of smaller species, that may be temporarily obscured by corals or rock or be taking shelter. Experience shows that the slower the surveyor swims, more fish that is recorded up to a point. However, the highest number recorded by moving along very slowly may actually be an over estimate of fish density. Hence it is necessary to standardize swimming speed to a slow but not too slow pace. The standard speed of swimming practiced is at a mean rate of 8m a minute. For results, only the most abundant fish families are taken into account, each representing one of the following functional groups: herbivores (Acanthuridae, Scaridae), omnivores (selected Labridae), corallivores (Chaetodontodae) as well as habitat specialists (Pomacentridae).

1.10 Marine Water Quality

One of the main environmental components that is affected by implementing a number of projects in Maldives is the marine water quality. Water quality is assessed during the field trip by collecting samples and testing them at National Health Laboratory. Water quality is

assessed from multiple locations depending on the project. The locations, frequency and parameters to be monitored are given in the EIA report.

1.11 Coastal environment

1.12 Shoreline and vegetation line mapping

The island's shore line and vegetation lines are mapped during low, high and mid tides using a handheld GPS assisted by aerial photos. The data is then entered in to a GIS database and maps are generated.

1.12.1 Coastal structures mapping

Similar to the island's shore line and vegetation lines, all the coastal infrastructures such as groynes, sea walls, revetments, offshore and near shore breakwaters are mapped using a handheld GPS assisted by aerial photos. The data is then entered in to a GIS database and maps are generated.

1.12.2 Erosion and Accretion areas mapping

Areas where severe erosion and accretion occurring are mapped using a handheld GPS. The data is then entered in to a GIS database and maps are generated and compared with previous available maps and satellite photos.

1.12.3 Beach Profiles

Dumpy levels were also used to survey around selected locations around the island and beach profiles were generated from these data. The location along the which the beach profiles were taken was marked using a GPS for future monitoring. When selecting locations, a permanent structure or object such as a building corner, larger mature tree or any other similar benchmark were identified for future reference. The final beach profiles are corrected to MSL and graphs developed.

1.12.4 Drogues and currents

Nearshore currents in the lagoon or reef were measured by deploying a handheld GPS in a watertight casing with a fin attached at the bottom. The GPS is deployed for a period of minimum 15 minutes during which time its displacement from the original position are recorded as a line. After 15 minutes, it is removed and deployed at another location. Once the data is collected, currents in a particular area is calculated by measuring the distance it has travelled by 15 minutes.

1.13 Terrestrial environment

1.13.1 Terrestrial floral survey

The baseline terrestrial environment of the project location is studied in detail by counting trees existing in the area, and gathering information available from island office or from other available sources. The survey concentrates on identifying vegetation types, their abundance and occurrence in a given area. The methods used to assess the tree types and abundance are using line transects. A measuring tape is used to set up the transect line which is selected randomly from within the project boundary. The surveyor measures and records the type of trees and their average heights. Average heights are estimated and so there is a greater degree of error in estimating the tree heights. The results are then tabulated to calculate the

percentage of different trees. In addition, records from island office / resort or other sources are also used to cross check the figures.

1.13.2 Terrestrial faunal survey

In depth faunal survey is not assessed but the types of fauna encountered during the floral transect is identified and recorded. Focus in given on specific fauna such as turtles, fruit bats, sea birds and other sensitive birds. Birds and their habitation patterns are also observed and recorded during the survey.

1.13.3 Ground Water Assessment

Groundwater quality is assessed by collecting samples from given locations selected randomly or from available points within the island using YSI 6820 multi parameter handheld water quality meter. In addition, water quality is also tested at the National Health Laboratory.

1.14 Coastal Environment

Data collected on coastal environment includes beach profiles, existing coastal structures (sea walls, breakwaters, groyns etc.), beach composition, beach width, shore line and vegetation line. All beach profile locations are marked on GPS maps and their geographical coordinates are marked on a map. Beach profiles are taken as baseline data to make comparisons during monitoring programme so that any changes resulting from the coastal or any other component of a project can be assessed accurately. Beach profiles are measured using auto levels, GPS and a staff.

1.15 Bathymetry

Bathymetric survey are undertaken in the lagoon or reef using Echosounder attached to a boat. The levels are then corrected for mean sea level and represented in a map. Bathymetric maps provide accurate estimates of depths in a particular lagoon or a reef.

1.16 Aerial photos

Aerials photos provide useful information such as assisting the analysis of marine environment, identifying wave patterns and changes to shoreline and also vulnerable areas of the island for all kinds of projects. Aerial photos are purchased from DigitalGlobe.

1.17 Available long term weather data

Long term available weather data is obtained from the nearest weather station to a project in Maldives, which is based in Male' International Airport (Male' atoll), Hanimaadhoo (Haa Dhaal Atoll), Kaadehdhoo (Gaaf Dhaal atoll and Gan island in Seenu atoll. These data sets are used to develop a regional model in ArcGIS to assess the vulnerable areas of the island or any other project during both monsoons, thus helping the EIA team to assess the vulnerable areas of the island for erosion and various other weather related issues.

19 Annex: EIA Submission to Male' City Council

Aleef Naseem <aleef@water-solutions.biz>

EIA submission

1 message

Aleef Naseem <aleef@water-solutions.biz> Thu, Mar 25, 2021 at 10:13 AM
To: admin@malecity.gov.mv, secretariat@malecity.gov.mv

Dear Sir/Madam,

Please find attached the 2nd EIA addendum for the Water Supply and Sewerage System, Hulhumale Phase 2.

A letter is attached with this email for receival confirmation. Please sign this letter and email it back to me.

Thank you and kind regards,

--
Aleef Naseem
Jr. Marine Biologist

Water Solutions Pvt. Ltd.
4th Floor, M. Niyadhurumaage, Alimas magu, Male,' Maldives
Tel: (960)3341643
Fax : (960)3331643
E-mail: aleef@water-solutions.biz
Website: www.water-solutions.biz

2 attachments

2021-03-25 - EIA Addendum 2 to the Water Supply and Sewerage System, Hulhumale Phase 2.pdf
3318K

5-2021-03-25 WS-LTR-081 Male' city council EIA submission letter.pdf
50K

20 Annex: Letters sent for stakeholder consultation

بسم الله الرحمن الرحيم

Water Solutions Pvt. Ltd. Reg No: C-344/2005

M. Niyadhurumaage 4th Floor, Alimas Magu, Male', Maldives

ނަމްބަރު: WS/LTR/2021/066

ޔޫޓިލިޓީ ރެގިއުލޭޓަރީ އޮތޯރިޓީގެ ޗީފް އެގްޒެކެޓިވް އޮފިސަރ ޙަމީދު އަބްދުލްމަޖީދު އަށް ،

ވެދުން ސަލާމަށްފަހު ދަންނަވަމެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫ

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއުގެ ތިމާވެއްޓަށް އަސަރުކުރާ މިންވަރު ބަލާނެ ކަރު (އީ.އައި.އޭ) ރިޕޯޓް ހުށަހެޅުމުގެ މަސައްކަތަށް މާލޭ ވޯޓަރ އެންޑް ސުވަރޭޖް ކޮމްޕެނީގެ ފަރާތުން ވަނީ ވޯޓަރ ސޮލިއުޝަންސް އާއި ހަވާލުކުރައްވާފައެވެ. މި ރިޕޯޓަކީ ދިވެހިރާއްޖޭގެ ތިމާވެށި ރައްކާތެރިކުރުމާއި ހިމާޔަތްކުރުމުގެ ޤާނޫނު (ޤާނޫނު ނަންބަރު 93/4) ގެ ދަށުން ރާއްޖޭގެ ތިމާވެއްޓަށް ފާހަގަކުރެވޭފަދަ ބަދަލެއް އަތުވެދާނެ ޕްރޮޖެކްޓްތަކެއް ހިންގުމުގެ ކުރިން ތައްޔާރުކުރަންޖެހޭ ރިޕޯޓެކެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާ މުނާސަބަތުން ކުރިއަށް ގެންދިއުމުން އާއްމުގެ ފާހަގަކުރެވޭ ބަދަލުތަކާއި ގެންގުޅުއްވާ މަސައްކަތްތަކުގެ މަޢުލޫމާތު ހިމެނޭ ގޮތަށް މި އީ.އައި.އޭ ހުށަހަޅާ ކުރިން އެކި ފަރާތްތަކުގެ ހިޔާލު ހޯދުމަށް ފޮނުވިއެވެ. އީ.އައި.އޭގެ ޓާމްސް އޮފް ރެފަރެންސްގައި ބުނެފައިވާ ގޮތުން ކޮންސަލްޓޭޝަން ޕްރޮސެސްގެ ތެރޭގައި ކަމާބެހޭ ފަރާތްތަކާ ބައްދަލުކުރުމަށް ޓަކައި މިފަރާތުން ވަނީ އީ.އައި.އޭ ތައްޔާރުކުރުމުގައި ވަޒީފާ އަދާކުރާ ފަރާތްތަކުގެ ތެރެއިން ޝާމިލުވެފައެވެ.

މި ސިޓީއާއެކު މި ޕްރޮޖެކްޓާއި ބެހޭ ޚުލާޞާއެއް ފޮނުވަމެވެ. ވީމާ، ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާ ގުޅޭގޮތުން ތިޔަ އޮފީހުގެ އަރިހުން ހުށަހަޅާ ޚިޔާލުތައް ކަމާގުޅޭ ތަފްސީލު ލިޔުމަކުން ފޮނުވައިދެއްވުން ވަރަށް ގިނަ އަގުވަޒަންކުރާނެ ކަމަށް ހުށަހަޅާ ކާމިޔާބު އެދެމެވެ.

މިކަމާ ގުޅޭ މަސައްކަތަކާއި ބެހޭގޮތުން އިތުރު މަޢުލޫމާތު ބޭނުންފުޅުވާނަމަ، އީ.އައި.އޭ ޓީމުގެ ލީޑަރ އަލީފް ނަސީމް (aleef@water-solutions.biz/3341643/7551544) އާއި ގުޅުއްވުން އެދެމެވެ.

އިޙްތިރާމް ފޯރުކޮށް ކުރުއްވުން އެދެމެވެ.

8 މާރިޗު 2021 މ.

ޚާދިމްކުމް

އަލީފް ނަސީމް

ޗީފް އެންވަޔަރަންމަންޓަލް ކޮންސަލްޓަންޓް

WATER SOLUTIONS PVT LTD
Reg No: C-344/2005
Rep of Maldives

ޔޫޓިލިޓީ ރެގިއުލޭޓަރީ އޮތޯރިޓީ

ކ. މާލެ،

ދިވެހިރާއްޖެ

Water Solutions Pvt. Ltd. Reg No: C-344/2005
M. Niyadhurumaage 4th Floor, Alimas magu, Male', Maldives

ނަމްބަރު: WS/LTR/2021/067

ހައުސިންގ ޑިވެލޮޕްމަންޓް ކޯޕަރޭޝަންގެ މެނޭޖިންގ ޑިރެކްޓަރ ސުހައިލް އަހުމަދަށް
ވެރިން ސަލާމަށްފަހު ދަންނަވަމެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫ

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއުގެ ތިމާވެށްޓަށް އަސަރުކުރާ މިންވަރު ބަޔާންކުރާ (އީ.އައި.އޭ) ރިޕޯޓް ހެދުމުގެ މަސައްކަތް މާލެ ވޯޓަރ އެންޑް ސުވަރޭޖް ކޮމްޕެނީގެ ފަރާތުން ވަނީ ވޯޓަރ ސޮލިއުޝަންސް އާއި ހަވާލުކޮށްފައެވެ. މި ރިޕޯޓަކީ ދިވެހިރާއްޖޭގެ ތިމާވެށި ރައްކާތެރިކުރުމާއި ހިމާޔަތްކުރުމުގެ ޤާނޫނު (ޤާނޫނު ނަންބަރު 93/4) ގެ ދަށުން ރާއްޖޭގެ ތިމާވެއްޓަށް ފުރަގަސްދޭފަދަ ބަދަލުތައް އަންދާޒާކުރުން ޕްރޮޖެކްޓްތަކުގެ ހިންގުމުގެ ކުރިން ތައްޔާރުކުރަންޖެހޭ ރިޕޯޓެކެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާ މިމަސައްކަތާ ކުރިއަށް ގެންދިއުމުން އެކަށޭ ވައްތަރު ބަދަލުތަކާއި ގެންގުޅޭނެ މަސައްކަތްތަކާއި މި އީ.އައި.އޭ ހެދުމަށް އެންވަޔަރަންމަންޓް ޕްރޮޓެކްޝަން އެޖެންސީ އިން ދޫކުރައްވާ އީ.އައި.އޭގެ ޓާރމްސް އޮފް ރިފަރެންސްގައި މިކަމާ ގުޅޭ ފަރާތްތަކުން ބޭނުންވާ ކޮންސަލްޓޭޝަން ކުރުމަށް ފަރާތަ ކުރައްވާފައެވެ. އަދި ތިމާވެށްޓަށް ބޭރު ގޮތުން ފޯރާނެ ނުރައްކާ އީ.އައި.އޭ ރިޕޯޓުގައި ފާހަގަކުރެވިފައިވާ ފަދަ ދަންނަވާލަމެވެ.

މި ސިޓީއާއިއެކު މި ޕްރޮޖެކްޓާއި ބެހޭ މަޢުލޫމާތު ފޮނުވަމެވެ. މިގޮތުން، ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާ ގުޅޭގޮތުން ތިޔަ އޮފީހުގެ އެއްވެސް ކޮމެންޓެއް ނުވަތަ ފާހަގަކުރައްވާ ބޭނުންތެރިވާނެ މައުލޫމާތެއް ވާނަމަ ފޮނުއްވުން އެދެމެވެ.

ތިޔަ އޮފީހުގެ ވަކި ސަރަހައްދަކާއި ބެހޭ މައުލޫމާތު ވަނީ ބޭނުންވާނަމަ، އީ.އައި.އޭ ޓީމުގެ ލީޑަރ
އަލީފް ނަސީމް (aleef@water-solutions.biz/3341643/7551544) އާއި ގުޅުއްވުން އެދެމެވެ.

އިޙްތިރާމް ފޭށްވުމާ ކުރިއްޔާ އެދެމެވެ.

8 މާރިޗު 2021 މ.

ޚާދިމްކުމް

އަލީފް ނަސީމް

ޓީމް ލީޑަރ އެންވަޔަރަންމަންޓަލް ކޮންސަލްޓަންޓް

ހައުސިންގ ޑިވެލޮޕްމަންޓް ކޯޕަރޭޝަން
ދިވެހިރާއްޖެ

Water Solutions Pvt. Ltd. Reg No: C-344/2005
M. Niyadhurumaage 4th Floor, Alimas Magu, Male', Maldives

ނަމްބަރު: WS/LTR/2021/068

އެންވަޔަރަންމަންޓް މިނިސްޓަރ ޑރ. ހުސައިން ރަޝީދު ހަސަން އަށް،

ވެދުން ސަލާމަށްފަހު ދަންނަވަމެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝް

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއުގެ ތިމާވެއްޓަށް އަސަރުކުރާ މިންވަރު ބަޔާންކުރާ (އީ.އައި.އޭ) ރިޕޯޓް ހެދުމުގެ މަސައްކަތް މާލެ ވޯޓަރ އެންޑް ސުވަރޭޖް ކޮމްޕެނީ ވަނީ ވޯޓަރ ސޮލިއުޝަންސް އާއި ހަވާލުކޮށްފައެވެ. މި ރިޕޯޓަކީ ދިވެހިރާއްޖޭގެ ތިމާވެށި ރައްކާތެރިކޮށް ހިމާޔަތްކުރުމުގެ ޤާނޫނު (ޤާނޫނު ނަންބަރު 93/4) ގެ ދަށުން ރާއްޖޭގެ ތިމާވެއްޓަށް ފޯރާނެ ބަދަލުތައް އަޅުވާލުމަށް ޕްރޮޖެކްޓްގެ ހިންގުމުގެ ކުރިން ތައްޔާރުކުރަންޖެހޭ ރިޕޯޓެކެވެ.

ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާއި މިމަސައްކަތާ ކުރިއަށް ގެންދިއުމުން އެތަރުގެ ވެއްޓަށް ބަދަލުތަކެއް ގެނެވިދާނެ މަސައްކަތްތަކެއްކަމުން މި އީ.އައި.އޭ ހެދުމަށް އެންވަޔަރަންމަންޓް ޕްރޮޓެކްޝަން އެޖެންސީ އިން ދޫކުރެއްވި އީ.އައި.އޭގެ ޓާމްސް އޮފް ރެފަރެންސްގައި ... ކުރައްވާފައެވެ. އަދި މިފަހަރުގެ މިރިޕޯޓްތަކުގައި ... އީ.އައި.އޭ ރިޕޯޓުގައި ... ދަންނަވަމެވެ.

މި ސަބްމިޝަނަކީ މި ޕްރޮޖެކްޓްގެ ބޭސް ލައިން ސާރވޭ ރިޕޯޓެވެ. ވީމާ، ހުޅުމާލެ ފޭސް 2 ގައި އައުޓްފޯލް އެޅުމަށް ހިންގާ މަޝްރޫއާ ގުޅޭގޮތުން ... ޓެކްނިކަލް ... އަވަސް ... އެދެމެވެ.

ތިޔަ އޮފީހުގެ މިމަސައްކަތާގުޅޭ ބޭފުޅުން އިތުރު މަޢުލޫމާތެއް ބޭނުންފުޅުވާނަމަ، އީ.އައި.އޭ ޓީމުގެ ލީޑަރ ޢަލީފް ނަސީމް (aleef@water-solutions·biz/3341643/7551544) އާއި ގުޅުއްވުން އެދެމެވެ.

އިޙްތިރާމް ގަބޫލު ކުރެއްވުން އެދެމެވެ.

8 މާރިޗު 2021 މ.

ޚާދިމުކުމް

[signature]

އަލީފް ނަސީމް

ޓީމް ލީޑަރ އެންވަޔަރަންމަންޓަލް ކޮންސަލްޓެންޓް

WATER SOLUTIONS PVT LTD Reg No: C-344/2005 Rep of Maldives

މިނިސްޓްރީ އޮފް އެންވަޔަރަންމަންޓް

ކ. މާލެ،

ދިވެހިރާއްޖެ