ENVIRONMENTAL IMPACT ASSESSMENT FOR ADDITIONAL WATER VILLA, EXPANDING EXISTING WATER VILLAS AND ASSOCIATED WORKS IN LHAVIYANI KANUHURAA

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LETTER OF COMMITMENT & DECLARATION OF PROPONENT

DECLARATION OF CONSULTANTS

We certify that the statements made in this Environmental Impact Assessment report are true, complete and correct to the best of our knowledge and available information

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EXECUTIVE SUMMARY

1. The purpose of this EIA is to critically analyze and assess the potential environmental impacts associated with the proposed additional water villa, expanding existing water villas and associate works and propose the solutions and preferred alternatives as well as mitigation measures to minimize any negative impacts whilst trying to derive the maximum positive impacts from the project.
2. Kanuhura Maldives is looking to improve their services by upgrading its existing facilities with some modifications to the current buildings. Essentially the upgrade is required in order to diversify the current facilities looking forward to meet the growing demand for exotic tourism ventures. The additional of pools and new water villa will definitely improve the aesthetics of the resorts Villas. Thereby improving the standard of services being provided to the tourists by the resort.
3. The primary objective of the proposed project is to carry out the following works in the Kanuhura resort:
    - New water villa
    - Addition of pools, refurbishment and expansion of existing water villas
    - Refurbishment of jetty and addition of buggy facilities
    - Upgrade of water production capacity
4. The major impacts of the proposed project during the construction phase are the impacts to the marine environment, majorly resulting from the construction works in the over water villas resulting from turbidity and sedimentation. Other impacts include impacts arising from mobilization, waste generation during constructional and decommissioning, impacts from oil and chemical spill and risk of accidents on the workers with other similar impacts. The major impact during operational phase is on the marine environment, which is mainly the increase of brine and sewerage waste generation from increased water demand by the new pools. High positive impacts on the landscape integrity and economic benefits are also visaged from the proposed project.
5. Major mitigation measures include, undertaking proper sedimentation controls and restricting the movement of barges and excavators to a narrow area. Care should also be also be given to ensure that the workforce will abide by the health and other regulatory measures to minimize the risk of the Covid-19 episode within the workforce. It is also proposed to extension of the brine line beyond the reefs edge as currently the brine line is established in the center of the lagoon to mitigate the environmental impacts to the marine environment during the operational phase.

6. Main alternatives that were studied were the no-project option, alternative locations to the new water villa and the changes to the proposed design of the pools. However, on further observation, it was noted that it would be more beneficial to proceed with the project as proposed.
7. In terms of environmental monitoring, it is recommended to monitor the water quality, benthic substrate, fish census and waste generation during the construction phase of the project. Furthermore, continuation of monitoring the marine environment is recommended in the operational phase with monitoring the hydrodynamics, coastline and water quality monitoring of the proposed pools.
8. The socioeconomic benefits during the operations far outweigh the negative impacts of the construction phase of the proposed project. Hence, with the mitigation measures outlined in the report, it is recommended to proceed with the project as planned.

ސާރު ހުލާސާ

1. މި ރިޕޯޓަކީ ޅ.ކަނުހުރާގައި ކުރިއަށް ގެންދިއުމަށް ހުށަހަޅައިފާ ރިސޯޓުގެ އަޕްގްރޭޑް ކުރުމުގެ މަސައްކަތްތަކާއި ގުޅިގެން ތިމާވެއްޓަށް އަސަރު ފޯރާނެ މިންވަރު ބަޔާންކުރާ ރިޕޯޓެވެ. މި ރިޕޯޓް ހެދިފައިވަނީ ދިވެހިރާއްޖޭގެ ތިމާވެށި ރައްކާތެރިކުރުމާއި ދެމެހެއްޓުމާ ބެހޭ ޤާނޫނު ނަންބަރު 4/93 ގެ 5 ވަނަ މާއްދާގެ ދަށުން އަދި ތިމާވެއްޓަށް އަސަރު ފޯރާނެ މިންވަރު ބަޔާން ކުރާ ރިޕޯޓް ހެދުމާ ބެހޭ ޤަވާއިދު 2012 ގެ ދަށުންނެވެ. ރިޕޯޓުގައި މި މަޝްރޫޢު އާއި ގުޅިގެން ކުރަން ނިންމާ އަސަރުތަކާއި، މިއަސަރުތަކުގެ މިންވަރު ކުޑަކުރެވޭނެ ގޮތްތަކާއި، މަޝްރޫޢުގެ ބައިތައް ހިންގާނެ ތަރުތީބު ގޮތްތަކާއި އަދި މަޝްރޫޢުއިން ކުރާނެ ފައިދާތަކާއި އަސަރުތަކުގެ މައްޗަށް ބަލާލާފައި ވާނެއެވެ.
2. މި މަޝްރޫޢުގެ މައިގަނޑު ބައިތަކުގެ ތެރޭގައި ހިމެނެނީ
   - އަލަށް ވޯޓަރ ވިލާ އެއް ޤާއިމުކުރުން
   - މިހާރު ޤާއިމުކުރެވިފައިވާ ވޯޓަރ ވިލާތަކުގައި ޑެކް ހަރުކޮށް، މަރާމާތުކުރުން
   - ވޯޓަރ ވިލާ ޖެޓީ މަރާމާތުކުރުމާއި ޖެޓީގައި ބަދިގެ ފެސިލިޓީ އިތުރުކުރުން
   - މަޝްރޫޢުގެ ދަށުން ޤާއިމުކުރާ ޕްރޮޖެކްޓަށް ބޭނުންވާ އިތުރު ފެން ފޯރުކޮށްދިނުމަށްޓަކައި، ރިސޯޓުގައި ޤާއިމުކޮށްފައިވާ މިރުފެން އުފައްދާ ޕްލާންޓުގެ ކެޕޭސިޓީ އިތުރުކުރުން
3. މި މަޝްރޫޢުގެ ސަބަބުން ތިމާވެއްޓަށް ކުރާނެ މައިގަނޑު އަސަރަކީ ކަނޑުގައި ބޮޑުވުން، ވޯޓަރ ވިލާ ސަރަހައްދުގައި މަޝްރޫޢުގެ މަސައްކަތް ކުރިއަށް ގެންދިޔުމުގެ ސަބަބުން އެ ސަރަހައްދު ކިލަނބުވެ ކަނޑުގެ ދިރުންތަކަށް ކުރާނެ ނުރައްކާ އަސަރެވެ. މީގެ އިތުރުން މަޝްރޫޢުގެ މަސައްކަތް ކުރިއަށްދާއިރު އުފެދޭ ކުނީގެ ސަބަބުންނާއި، ތެޔޮ އަދި ކެމިކަލް ލީކުވުމުގެ ސަބަބުންނާއި، މަޝްރޫޢަށް ބޭނުންވާ ވަސީލަތްތަކާއި މަޝްރޫޢު ހިންގާ ސަރަހައްދަށް ގެންދިޔުމުގައިވެސް ތިމާވެއްޓަށް ނުރައްކާ ގެއްލުން ކުރާނެ ކަމަށް ލަފާކުރެވެއެވެ. މި ނުރައްކާ އަސަރުތައް ކުޑަކުރުމަށް ބަލައި ރިޕޯޓުގައި ވަނީ ގެއްލުން ކުޑަކުރުމަށް އެޅޭނެ ފިޔަވަޅުތައް ހާމަކޮށްފައެވެ. މީގެ ތެރޭގައި، މަޝްރޫޢުގެ ސަބަބުން އުފެދޭ ކިލަނބުވުން / ހިކަނދު ކޮންޓްރޯލް ކުރުމަށް އެޅޭ ފިޔަވަޅުތަކާއި، ބާރޖް އަދި އެކްސްކަވޭޓަރ އޮޕަރޭޓް ކުރާ ސަރަހައްދު ވަކިކޮށް ހަނިކުރުން ހިމެނެއެވެ. އަދި، މީގެ އިތުރުން، މިހާރު ރާއްޖޭގައިވެސް ފެތުރިފައިވާ ކޯވިޑް 19 ގެ ބަލިމަޑުކަމުން ރައްކާތެރިވުމުގެ ފިޔަވަޅުތައް އެޅުމަކީ މުހިއްމުކަމެއް ކަމުގައިވެސް ފާހަގަ ކޮށްފައެވެ.
4. މަޝްރޫޢުގެ އޮޕަރޭޝަނަލް ފޭސްގައި ވެއްޓަށް އެއްވެސް ނުރައްކާ އަސަރެއް ކުރާނެ ކަމަށް ނުބެލެވޭ، ރިސޯޓުގެ ޕްލޭނަށް އިތުރު ކުރުމުގެ ސަބަބުން މިބުރުން އުފެއްދާ ކުނިއާއި ބޭނުންކުރާ ފެނުގެ މިންވަރު އިތުރުވުމާއި، ނަރުދަމާގެ ނިޒާމަށް އަސަރު މިންވަރު އިތުރުވުމެވެ. މިކަމުގެ ސަބަބުން ކަނޑުގެ ދިރުންތަކަށް ގެއްލުން އަސަރު ކުރެ ކުރުމަށްޓަކައި، މިބުރުން އުފެއްދާ ކުނިތަކުގެ ހާލު ފެނުން ބޭނުން ކުރުމަށް ވަނީ ހަދައިފައެވެ.
5. މަޝްރޫޢުގެ އަން ގެންދިއުން ބަދަލުތަކުގެ ތެރޭގައި ބެލުމުން، މަޝްރޫޢު ކުރިއަށް ނުގެންގޮސް ދޫކޮށްލުން ފަދަ ގޮތް އާއި ގެއްލުމަކާއި، އަލަށް ވޯޓަރ ވިލާ އަޅާ ސަރަހައްދު ބަދަލު ކުރުމުން ލިބިދާނެ ގެއްލުމާއި ނުވަތަ ފައިދާ އަދާއި، މިހާރު ހުށަހަޅާފައިވާ ޑިޒައިނާ ގުޅޭ ބަދަލު ގެނައުމުން ލިބޭނެ ފައިދާ ނުވަތަ ގެއްލުމަކީ. ނަމަވެސް އެންމެ ރަނގަޅު ގޮތަކީ ހުށަހަޅާފައިވާ މިގޮތުން މަޝްރޫޢު ހުށަހަޅާފައިވާ ގޮތަށް ކުރިއަށް ގެންދިއުމެވެ.
6. ހުރިހާ ކަމެއްގެ ރަނގަޅަށް މޮނިޓަރ ކުރުން ވަރަށް މުހިއްމެވެ. އެއީ ވެއްޓަށް ލިބޭނެ ގެއްލުން ކުޑަކުރުމަށްޓަކައި ބޭނުންކުރެވޭ ފިޔަވަޅުތަކުގެ އެފެކްޓިވްނަސް ދެނެގަތުމަށް އެކަށީގެންވާކަމަށް. އަދި ރަގަޅުކުރަންޖެހޭ ކަންކަންވެސް އެނގޭ މޮނިޓަރ ކުރުމުންނެވެ. އެގޮތުން ޕްލޭނެއް ހުށަހަޅާފައިވާ މޮނިޓަރ ކުރުމާއި ފަދަގޮތުގެ ދިނުމާއި މަޝްރޫޢުގެ މަސައްކަތް ކުރިއަށް ގެންދާ ސަރަހައްދު މަސްވެރިކަމަށް އަސަރު ބަދަލުތަކާއި އަދި މީގެ އިތުރުން ރިޕޯޓުގައި ބަޔާންކޮށްފައިވާ ޕްރޮޕޯޒް ކޮށްފައި މޮނިޓަރިން ޝެޑިއުލް އާ އެއްގޮތަށް މޮނިޓަރ ކުރުމަށް ވަރަށް މުހިއްމު ކަމަށްގައި ފާހަގަ ކުރެވެއެވެ.

7. ލ ތިމާގެއަށް ބަދަލުގެ ގޮތުގައި ކުރިއަށް ގެންދާ ކަންތައްތަކުގެ ތަފްޞީލު ދެއްކުން، ތަކެތި ގެނައުމާ ގުޅޭ ކަންތައްތަކުގެ ތަފްޞީލު ދެއްކުން، ކަނޑުގެ ބަދަލުގައި ބިންގަނޑު ދަމާ ގޮތުގެ ތަފްޞީލު ދެއްކުން، ކަނޑުގެ ބަދަލުގައި ބިންގަނޑު ދަމާ ގޮތުގެ ތަފްޞީލު ދެއްކުން، ކަނޑުގެ ބަދަލުގައި ބިންގަނޑު ދަމާ ގޮތުގެ ތަފްޞީލު ދެއްކުން.

1. INTRODUCTION

1.1. Structure of the EIA

This Environmental Impact Assessment (EIA) addresses the potential impacts of the proposed development on the physical, biological, environmental and socio-economic aspects of the development area in addition to providing safeguards to reduce any environmental effects.

In addition to forming a basis for the assessment and approval of the proposed changes, this EIA provides the community and government authorities with information on all aspects of the proposal. The EIA has been divided into following sections:-

- **Section 1**: INTRODUCTION- Provides an outline of the structure and purpose of the EIA as well as objectives of the proposed development;
- **Section 2**: STATUTORY REQUIREMENTS- Outlines the relevant legislative requirements pertaining to the proposed project;
- **Section 3**: PROJECT DESCRIPTION- Described the proposed development in detail;
- **Section 4**: METHODOLOGY- Describes the detailed methods used for data collection on the existing environment and baseline conditions;
- **Section 5**: EXISITING ENVIRONMENT- Describes the present conditions of the physical components of the study area and sets baseline conditions;
- **Section 6**: STAKEHOLDER CONSULTATION- Provides details on the consultation process and parties consulted for this study;
- **Section 7:** OPTIONS ASSESSMENT- Discusses all the available alternatives for the project and justifies the preferred option;
- **Section 8**: POTENTIAL IMPACT ANALYSIS- Describes the prevailing environmental characteristics and constraints of the site and locality being investigated and an assessment of the potential environmental impacts associated with the proposed changes. Mitigation measures that would be implemented to reduce any potentially adverse impacts are also identified;
- **Section 9**: ENVIRONMENTAL MANAGEMENT- Outlines the environmental management plans which would be used to mitigate/monitor the changes;
- **Section 10**: JUSTIFICATION AND CONCLUSION- The conclusions drawn from the proposed project and impact analysis with the justification of the preferred options;
- **Section 11**: ACKNOWLEDGEMENTS; and
- **Section 12**: REFERENCES

Supporting documents are provided as appendices to this EIA.

1.2. Need for the project

Kanuhura Maldives is looking to improve their services by upgrading its existing facilities with some modifications to the current buildings. Essentially the upgrade is required in order to diversify the current facilities looking forward to meet the growing demand for exotic tourism ventures. The additional of pools and new water villa will definitely improve the aesthetics of the resorts Villas. Thereby improving the standard of services being provided to the tourists by the resort.

1.3. Project objectives

The primary objective of the proposed project is to carry out the following works in the Lh.Kanuhura resort:

- New water villa
- Addition of pools, refurbishment and expansion of existing water villas
- Refurbishment of jetty and addition of buggy facilities
- Upgrade of water production capacity

1.4. The EIA process

The EIA process in the Maldives is coordinated by the Environmental Protection Agency (EPA) of the Maldives in order to ensure that environmental considerations are included in decisions regarding projects which may have an adverse impact on the environment.

The first step in the process involves screening of the project to determine whether a particular project warrants preparation of an EIA. Based on this decision, the EPA then decides the scope of the EIA which is conferred to the project proponents, the consultants as well as any relevant stakeholders to the project at a scoping meeting. A document ideally encompassing the issues and impacts that have been identified during the scoping meeting will then be issued known as the Terms of Reference (ToR). The consultant then prepares the EIA in accordance with the ToR and/or the range of issues identified during the scoping process. Once the findings of the EIA has been reported to the EPA, it gets reviewed following which an EIA Decision Note (DN) is issued to the proponent who is responsible for implementing the project according to the DN and undertake appropriate environmental monitoring if required and report to the EPA. However, in light of the current Covid-19 situation stakeholder consultations are allowed to be undertaken through telephone or through e-conference.

1.5. Purpose of this EIA

As per article 5 (a) of the Environmental Protection and Preservation Act of the Maldives (Law No. 4/93) and the EIA Regulation 2012 of the Maldives, any development projects/activities that may have a significant impact on the environment are required to have an EIA submitted to the EPA prior to implementation.

The EIA application was provided to the EPA by the consultant and this EIA has been completed as per the requirements outlined within the approved ToR (Refer to Appendix B).

The purpose of this EIA is to critically analyze the environmental and socio-economic impacts which may arise due to the construction and operation of the proposed project. After analyzing the impacts it would be then possible to suggest proper mitigation measures to prevent/reduce any negative impacts and to enhance any positive impacts. The study involves evaluation of baseline conditions, prediction of the likely impacts, stakeholder consultation and design mitigation measures.

1.6. Terms of reference (ToR)

A scoping meeting was held for the project. Upon submission of draft ToR, EPA reviewed the draft ToR and issued the approved ToR on 27th June 2021 (the approved ToR is attached in Appendix B of this report).

1.7. EIA implementation

This EIA has been prepared by registered consultants as per EIA Regulation 2012 of the Maldives. The team members were:-

- Mahfooz Abdul Wahhab (P22/2016)
- Ibrahim Rashihu Adam (P06/2017)
- Mohamed Ibrahim Jaleel (EIA T01/2015)

1.8. The proponent

Kanuhura Resort is operated and managed by Sun Resort Limited Kanuhura. Sun Resorts, founded in 1983, is one of the principal Mauritian hotel groups. They own and manage six hotel complexes, including Kanuhura.

2. STATUTORY REQUIREMENTS

This section describes the statutory requirements relevant to the proposed proposal. Section 2.1 describes all the relevant laws, policies and strategic action plans that must be complied to for this proposal. Section 2.2 describes all the pertinent regulations, section 2.3 all the guidelines and section 2.4 describe all the international conventions that the Maldives are a party to.

2.1. Laws, Policies and Strategic Action Plans

2.1.1. Environmental Protection and Preservation Act (4/93)

The Environmental protection and Preservation Act of the Maldives was enacted to protect the environment and its resources for the current and future generations. Relevant articles under this law pertaining to the proposed project are:-

- Article 2 states that the instructions for environmental protection will be given from the competent authority and everyone must respectfully follow these instructions;
- Article 3 states that all matters relating to environmental protection and preservation must be handled by the Ministry of Planning, Human Resource and Environment (MPHRE);
- Article 4 states that MPHRE must declare protected sites and species and formulate the regulations to manage them. If any other party wants to declare a protected site or species they must be registered in the MPHRE and managed according to regulations made by the Ministry;
- Article 5 states that any projects which pose significant impacts to the environment, an EIA report has to be made and submitted to the MPHRE. The projects which require an EIA and the regulation must be made by MPHRE;
- Article 6 states that if any project is found to cause significant adverse impacts, MPHRE have the right to stop the project;
- Article 7 states that any waste, oil or hazardous gas must not be dumped into any part of the Maldives, however, if strictly needs to be disposed it should be disposed of in an area designated by the Government. If such hazardous gas, waste or oil is to be disposed by combustion, it should be done in a way it does not impact human health and environment;
- Article 8 states that any hazardous waste must not be disposed into any part of the Maldives. Before trans-boundary transfer of such waste, approval must be

taken from the Ministry of Transport and Communication by writing to the Ministry at least 3 months beforehand.

- Article 9 states that any party who violates this law or any regulation under this law is punishable to no more than MVR 100 million according to the offence. The fine will be applied by the MPHRE.
- Article 10 states that any offence to this law or any regulation under this law or any action resulting in environment damage, the compensation for such damages can be taken through judicial processes.

1st addendum to Environmental Protection and Preservation Act (4/93) law no 12/2014

Article 3 and 11 of the Environmental Protection and Preservation Act (4/93) of Maldives is amended as follows:-

Under article 3, all matters relating to environmental protection and preservation must be handled by the Ministry charged with implementation of environmental policy.

2.1.2. Water and sewerage Act (8/2020)

The water and sewerage Act was published on 05th August 2020 with the aims to provide safe water and sanitation services to the general public by implementing guidelines for providing water and sanitation service, operation and maintenance of water and sewer facilities, and other related guidelines. Relevant articles under this law pertaining to the proposed project are:-

- Article 5 states that, to provide the water and sanitation services entitled for every citizen of Maldives, it is the duty of the government to implement the following;
    - establishing facilities required to provide water and sanitation services sustainably
    - ensuring that safe water and adequate sanitation services are provided
    - overcoming any hindrance to provide water and sanitation service
    - establishing standards for water and sanitation service
    - ensuring that the water and sanitation service providers follow the set standards
    - researching and developing the water and sanitation sector
- Article 6 states that the water and sanitation policies shall be declared by the Minister as advised by the President. These policies shall be made available to the general public. All parties involved in the water and sanitation sector must fully comply with these policies.

- Article 7 states that Utility Regulatory Authority shall be responsible to implement this law.
- Article 8 states the duties of the Ministry in detail. These include drafting the polices, laws and regulations required to implement this law, establishing water and sanitation facilities in all inhabited Islands of the Maldives within 05 years of implementation of this law, ensuring that proper sewerage facilities are established on tourist and other industrial islands, and all the works to develop the water and sanitation sector.
- Article 9 states that the Council has the authority to declare the fees that could be taken from the water and sanitation service in accordance with the Utility Regulatory Authority and Governments policies and regulations. Additional responsibilities of the Council include; monitoring the third party water and sanitation service provider, monitoring environmental impacts due to water and sewer systems, providing information about water and sanitation service on the Island to the Competent Authorities, ensuring that enough water is available to the living population of the Island, and providing water and sanitation service via a licensed third party.
- Article 10 states the points that must be included in the third party agreement mentioned in article 9.
- Article 11 states the duties of Utility Regulatory Authority, which is to give licenses to all water and sewerage facilities in the Maldives and monitoring them.
- Article 15 states that the licensed all water and sanitation service providers must submit a plan to provider water and sanitation service annually with an implementation report which specifies; (1) water quality, (2) lost water, (3) service interruption, (4) costs, (5) revenue generated, and (6) CSR activities.
- Article 18 states that the groundwater presents in Tourism, Industrial and Reclaimed Islands are protected.
- Article 19 states that the groundwater presents in Tourism, Industrial and Reclaimed Islands cannot be used for commercial purposes. For existing agricultural Island a period of 2 years must be given for them to install RO plants and for inhabited islands, RO plants must be installed for agricultural field larger than 10,000 m^2.
- Article 20 states that any activity that contaminates the ground water is prohibited. Exclusive of this clause is using fertilizer for agricultural purpose and installing septic tanks in households. The article further states that fuel and other chemicals

must be handled properly such that spills do not occur and if a spill occurs, the proponent must be responsible for clean-up. Finally, it is prohibited to dispose water which contains fuel and chemicals from Engine maintenance to the sea.

- Article 21 states that dewatering must be done in accordance with the regulations made under this law.
- Article 22 states that it is prohibited to dispose brine into ground or wetlands. Further, mixing of permeate water and rain water must be done according to set guidelines of the Utility Regulatory Authority.
- Article 24 states that there must be 05 days of water stored in case of emergency by all the service providers. Emergency water storage must be allocated in reference to the living population on the island, available water, and land availability for water storage.
- Article 25 states that operating license for water and sanitation service must be issued after the EIA process.
- Article 27 states that power required for the operation of RO plants must be from renewable energy sources. However, a period of 05 years shall be given to existing RO plants for transition. Nonetheless during an emergency situation due to a disaster on in case of renewable energy system failure, power from Diesel generators could be used.
- Article 28 states that rain water must be included as much as possible in the provision of Desalinated water.
- Article 29 states that it is the duty of the water and sanitation service provider to do all works required to provide the service in the assigned region for them. Additional responsibilities include; providing reports to Utility Regulatory Authority, upgrading water and sewerage facilities according to new technology, providing the first house connection free of charge, and water testing to ensure quality of water.
- Article 30 states that the water and sanitation service provider reserved the right to prohibit certain substances being disposed into the sewer system, installing meters, and entering households and commercial places.
- Article 31 states that the water facilities on inhabited islands of the Maldives must be established in accordance with MFDA's regulations. Additional points under this article include; the established water systems must have the capacity to test for water quality and disinfect, and it is the responsibility of the building's owner to establish measure to manage pressure in tall buildings, if a license for providing

water has already been issued to an inhabited Island a second RO plant by another party could be installed with the approval of the Utility Regulatory Authority.

- Article 32 states that the Ministry shall declare publicly the Islands which require an STP and duration for establishing STP's on these Islands. On the islands where the Ministry has declared that an STP is required, on these islands sewerage services must only be provided with an STP. However, during an emergency situation due to flooding, disposal of this storm water is allowed without the involvement of an STP. Additional points include; Disposing of water from dewatering to the sewerage network is prohibited and technical specification for sewerage facilities must be made by the Utility Regulatory Authority.
- Article 34 states that an agreement must be made prior to giving approval to any water and sanitation service provider and this agreement must be registered in the Utility Regulatory Authority.
- Article 35 states that all water and sewer systems in the Maldives must be operated after registering in the Utility Regulatory Authority.
- Article 36 states that water and sewer services in inhabited Islands of the Maldives must be given after taking the operating license from the Utility Regulatory Authority.
- Article 37 states that an exclusive operating license could only be given after getting the written approval from the president as advised by the Parliament if it is needed for the betterment of the country.
- Article 38 states the requirements of the operating license, these include; operation and maintenance of water and sewer systems in accordance with the regulations set by the Utility Regulatory Authority, implementing the business plan mentioned in article 41(a-2), reporting, and fulfilling other requirements set by the Utility Regulatory Authority.
- Article 41 states that the procedures for obtaining the operating license must be publicly made available. The article further details the information the service provider must submit while applying for the operating license.
- Article 42 states that the fees for water and sewer for inhabited Islands will be declared by the Utility Regulatory Authority.
- Article 43 states that the service provider must submit a performance report to the Utility Regulatory Authority, Council, and Ministry annually
- Article 44 states that customers have the right to report any complaints regarding the service provider to the Utility Regulatory Authority.

- Article 45 states that the Utility Regulatory Authority has the right to investigate the service provider of any misconduct or even if the Utility Regulatory Authority deems necessary.
- Article 60 states that if there are any overlaps with other laws regarding water and sanitation, this law shall take precedence.
- Article 61 states that with the implementation of this law, the articles pertaining to water and sanitation services under the law on general public services (4/96) is void.

2.1.3. Utility Regulatory Authority Law (26/2020)

This Utility Regulatory Authority Law was drafted to establish an Authority that will oversee the general public services given in the Maldives. The specific objectives of this law include;

- Ensure that the general public services given in the Maldives are provided sustainably
- Ensure that general public services are given efficiently and with minimal damage to the environment
- Ensure that general public services are given at adequate standards
- Create a competitive environment to develop general public services in the Maldives
- Draft and implement regulations on general public services
- Regulate the general public service providers
- Create awareness on the rights of the customers and the service providers

This law has 16 chapters. Chapter 1 states the objectives of the law, Chapter 2 states the responsibilities of the Utility Regulatory Authority, Chapter 3 states how the board of directors are to be established and their responsibilities, Chapter 4 states the organizational structure of the Utility Regulatory Authority, Chapter 5 states the responsibilities of the Minister, Chapter 6 states details about operating licenses, Chapter 7 states how tariffs are to be implemented, chapter 8, 9 and 12, 13, 14 sates the rights of the Utility Regulatory Authority in relation to monitoring service providers, Chapter 10 states the discipline that the Utility Regulatory Authority must have, Chapter 11 states guides on conflict resolution, Chapter 15 states the budget and reporting by the Utility Regulatory Authority, Chapter 16 states the changes in existing institutional framework such as the transfer of Maldives Energy Authority and EPA Water, Sanitation and Waste section to the Utility Regulatory Authority. Relevant articles under this law pertaining to the proposed project are:-

- Article 4 states all the responsibilities of the Utility Regulatory Authority. The most important responsibilities include; giving operating license to service providers, implementing all laws and regulations pertaining to general public services and ensuring that the service providers abide by them, implementing tariff, drafting and implementing regulation and guidelines for providing general public services.
- Article 23 states that a license must be obtained in order to provide any general public service in the Maldives.
- Article 24 states that the license for general public services will be given by the Utility Regulatory Authority.
- Article 25 states that an exclusive operating license will only be given after getting the written approval from the president as advised by the Parliament if it is needed for the betterment of the country.
- Article 29 states that the fees taken for general public services must be as per the approved tariffs from the Utility Regulatory Authority.
- The Service providers must strictly follow the directions of the Utility Regulatory Authority as mentioned in chapters 8, 9, 12, 13, and 14.

2.1.4. National Water and Sewerage policy 2017

The National Water and Sewerage Policy (NSWP) 2017 sets out the government's plans for water and sewerage services in the future and the steps that will be taken to ensure provision of appropriate and sustainable water and sewerage services to all. The NSWP has a 10-year time frame with a mid-term year review in the 5th year. The progress of implementation is to be monitored and reviewed by the water and sanitation department of the Ministry of Environment, Climate change and Technology along with an independent review process. The NSWP has 09 goals, these are;

- Ensure access to safe water supply and adequate sewerage services
- Adopting coast-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
- Protect and conserve water resources

2.1.5. The National Water and Sewerage Strategic Plan (The NWSSP 2020-2025)

The NWSSP 2020-2025 is an action plan made under the article 14(a) of Water and Sewerage Act (8/2020). The strategies and targets included in the action plan is derived from the National Strategic Action Plan 2019-2023 endorsed by the Government in 2019. The vision of this action plan is to ensure equitable access to safe water and improved sewerage serviced for all. The mission is to provide efficient, effective and reliable water supply and sewerage services, promote conservation and management of the water resources, and to develop sector capacity for sustainable management of resources and services. The action plan has 6 policy goals with its associated target in order to reach the vision. These are;

- Policy 1: Ensure access to safe water supply and adequate sewerage services
    - Target 1.1: By 2020, Water and Sewerage Act is ratified
    - Target 1.2: By 2020, Utility Regulatoryy Authority (URA) for integrated utility services is functional
    - Target 1.3: By 2021, Water and Sanitation coordination committee is functional
    - Target 1.4: By 2023, all water and sewerage utility providers have an operating license
- Policy 2: Adopt cost-effective and environment-friendly water and sewerage infrastructure
    - Target 2.1: By 2020, a standard mechanism to foster private sector investment in the water and sanitation sector will be in effect
    - Target 2.2: By 2023, all inhabited islands, will have access to safe water supply and sewerage facilities
    - Target 2.3: By 2023, 30% of energy consumption for water and sewerage facilities across the Maldives will be met with renewable energy
- Policy 3: Build sector capacity in water resources, water supply and sewerage services
    - Target 3.1: By 2023, at least 60% of technical staff in utility service providers are licensed (/ By 2023, all technical staff operating and maintaining the water and sewerage facilities will have at least certificate level 3 qualification and will be licensed)
    - Target 3.2: By 2023, at least 40 engineers will be trained in water and sanitation related field

  - Target 3.3: By 2023, at least 30% of all employees working in water and sewerage facilities in each island shall be women
  - Target 3.4: By 2022, collaborative partnership arrangements will be made with at least 3 local/international educational institutes for capacity building of water and sewerage sector programmes and services
  - Target 3.5: By 2024, two (2) staff at each island or city council will be trained for overall utility operational services, governance and best practices
- Policy 4: Strengthen advocacy and awareness programs on water resources, water supply and sewerage
  - Target 4.1: By 2022, public perceptions on safe water and sanitation practices improved by 33% compared to 2018 levels
  - Target 4.2: By 2023, at least 40% of households phased out single-use bottled water use
  - Target 4.3: By 2023, WASH awareness programs targeting to island functionaries, front line workers, CBOs and NGOs that are active in all island communities are carried out
- Policy 5: Protect and conserve natural water resources
  - Target 5.1: By 2023, water resource conservation and management plans are implemented in all inhabited islands.
- Policy 6: Build flood resilient island communities
  - Target 6.1: By 2021, identify and map flood prone islands
  - Target 6.2: By 2022, develop and enforce design criteria's and guidelines for flood mitigation

2.1.6. Waste management policy

With the implementation of waste management policy 2015, the 2011 and 2007 policy is void. The waste management policy which came into effect on 2015 is to ensure that the Maldivians are well aware of the waste management techniques and maintains cleanliness as well as the natural aesthetics and clean air quality of the country is well maintained. Under this policy, all the inhabited islands need to implement a waste management plan and manage all the wastes generated from that island in accordance with that policy.

2.1.7. Public Health Protection Act (7/2012)

The purpose of this 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 and establish policies to limit basic rights ensured under the

Maldives Constitution to Maldivians and people living in Maldives to necessary extents to protect public health. Chapter 5 of the act outlines health hazards, eliminating risk, reporting health hazards, and order of things that can be done and not done in relation to a building. Chapter 6 of the act outlines the procedures for declaring state of emergency.

2.1.8. Immigration Act (1/2007)

This act lays down the rules for the departure and entry of Maldivian Nationals and foreign Nationals. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 3; all persons shall enter the Maldives from an authorised port, unless a person is compelled to do otherwise, due to sudden natural causes, or an emergency which is beyond the control of the person. Persons departing from the Maldives shall also depart from an authorised port unless in cases of emergency as stated above.
- Article 7; (a) A foreign national may enter the Maldives if he/she can produce a valid passport and a valid permit of entry. (b) A foreign national may leave the Maldives provided that he/she has a valid passport. (c) Pursuant to subsection (a), a foreign national may enter the Maldives, unless as stated otherwise in the Regulations made under this Act, by filling a disembarkation form as specified in the Regulations and by submitting it with the passport to an immigration officer, and upon the leave to grant a permit of entry for the Maldives. (d) A foreign national may depart from the Maldives, unless as stated otherwise in the Regulations made under this Act, by filling an embarkation form as specified in the Regulations, and submitting it with the passport to an immigration officer and upon the leave to grant departure.
- Article 8; (a) For the purposes of this Act, permits to remain in the Maldives shall be divided into the following eight types;
  (1) Tourist Visa
  (2) Diplomatic Visa
  (3) Student Visa
  (4) Business Visa
  (5) Dependant Visa
  (6) Work Visa
  (7) Resident Visa
  (8) Special Visa
  (b) The permits specified in subsection (a) are subject to the Regulations made under this Act.

2.1.9. Maldives Tourism Act (2/99)

This act encompasses the issues related to the development of tourism in the Maldives. It came into effect on the November, 1999, repealing the Law on Tourism in the Maldives (Act

No. 15/79) and the Law on Leasing of Uninhabited Islands for the Development of Tourist Resorts (Act No. 3/94). Act No. 15/79 was the primary legislation that was passed by the Citizen's Majlis in November 1979 and the main aim was to provide for the collection of a bed tax from the visiting tourists and to control their movement in the Maldives. While this Act only dealt with tourist resorts, hotels and guest houses, the amended act (Act No. 2/99) incorporates the determination of zones where tourism development can occur, as well as the development and management of marinas and the operation of tourist vessels, diving centers and travel agencies. This is evidence that the tourism industry has expanded since the enactment of the initial laws, both in magnitude and in the diversity of facilities that are provided for the visiting tourists.

The environmental legislation that directly applies to the development is outlined under article 15 (a) and (b). Article 15 (a) provides for the felling of Ruh's and trees, dredging of lagoons, reclamation of land or any other activity that may cause permanent change to the natural environment of an island leased as a tourist resort. It states that the activities mentioned above can only be carried out after obtaining written permission from the Ministry of Tourism and in accordance with the relevant regulations.

Under Article 15 (b), a justification has to be provided for such an activity, as well as an environmental impact assessment, which has to be submitted to and approved by the Ministry of Housing and Environment.

There are several regulations under the Maldives Tourism Act (Law No. 2/99) and those pertaining to the environment are presented below.

2.1.10. Maldives Third Tourism Master Plan

The Maldives Third Tourism Master Plan (TTMP) was launched in August 2007. The planning horizon is from 2006 to 2010. The strategies recommended will integrate with the policies and strategies for tourism, air and sea transport proposed in the 7th National Development Plan which is also being developed.

The TTMP will focus on the following areas:

- Identification of potential product expansion and diversification and Maldives tourism product review.
- Increasing the share of Maldivians working in the tourism industry.
- Greater community involvement in the tourism sector.
- Improvements in the retention of economic benefits of tourism within the Maldives economy.
- Improvements to the tourism related infrastructure and support services.

- Protecting, preserving and promoting the natural resource base, heritage and culture in relation to tourism development.
- Strengthening the institutional capacity of Ministry of Tourism
- Developing domestic tourism.
- Improving the legislative framework in relation to the tourism industry.

2.1.11. Anti-Human Trafficking Act (12/2013)

This act was enacted to combat human trafficking in the Maldives in order to protect human rights and human dignity. As per international best practices this act includes three main components of criminalization, prevention and rehabilitation of victims, making human trafficking a criminal offense in the Maldives. The law also strictly prohibits forced labor and fraudulent recruitment. The main objective of this act include;

- Preventing human trafficking in the Maldives
- Establish crimes of human trafficking and prescribe the punishments
- Provide for prosecution of perpetrators under this act
- Providing protection and assistance to victims of human trafficking
- Promote and protect the human rights of trafficked victims
- Engage in cooperation with local and international NGOs working against human trafficking to combat human trafficking

2.2. Regulations

2.2.1. Regulation on the Protection and Conservation of Environment in the Tourism Industry

This regulation is made pursuant to Law No. 2/99 (Maldives Tourism Act). The purpose of this regulation is to protect the environment in the tourism industry and to encourage and facilitate sustainable development of tourism. Relevant clauses are described below

2.2.1.1. Protection of environment during construction

Any of the following activity in an island or place leased for the purpose of tourism shall be carried out after obtaining permission from the Ministry of Tourism and Civil Aviation.

- Dredging of the lagoon and reclamation of land
- Construction on the beach and lagoon
- Beach enhancement by pumping sand
- Construction of breakwater
- Construction of sea wall, revetment or groyne
- Dredging of lagoon or reef for safe access

- Dredging of reef

- Felling of trees
- Importing and exporting living species
- Conducting research of land, sea and lagoon
- Demolition of a building or facility
- Anything which may adversely affect the vegetation or fresh water lens of the island

In addition to the provisions of clause 2.1 above, any activity that may cause damage or adversely affect the environment shall be carried out after obtaining permission from the Ministry of Tourism and Civil Aviation.

In making an application to obtain the permission to carry out any activity stipulated in clause 2.1, the applicant must submit the details of the activity together with a site plan of the island or designated area prepared to a reasonable scale. The site plan must include the following:

- Beach toe
- Vegetation line
- High tide line
- Low tide line
- Reef crest line
- Deep lagoon line

An environmental impact assessment report prepared in accordance with the Protection and Conservation of Environment Act of Maldives (Law No. 4/93) shall be submitted to the Ministry of Tourism and Civil Aviation prior to the commencement of any construction project or any activity stipulated in clause 2.1

Trees shall not be felled in order to construct buildings or for other purpose in an island, resort, or other place leased for the purpose of tourism, except with prior written permission from the Ministry of Tourism and Civil Aviation.

In the event any tree or coconut palm is felled for construction or any other reason in any resort, picnic island, or marina or such other place leased for the purpose of tourism, two trees or coconut palms shall be replanted in the same island.

In the event trees has to be felled for infrastructure development in an island or land leased for the development of tourism, and if the said island or land does not have space to replant two trees for each tree felled, then evidence to sustain the same shall be submitted to the

Ministry of Tourism and Civil Aviation and a special permission to be exempted from the requirement in clause 2.6 shall be obtained.

Huge, aged or rare trees shall not be felled in any resort, picnic island, marina or such place leased for the development of tourism. While allocating land for the purpose of construction, an unused area of five meters radius around such trees shall be spared.

Ground water shall not be extracted for the purpose of construction in an island or land leased for the development of tourism.

Any infrastructure or facility in an island or land leased for the development of tourism shall be built five meters inwards from the vegetation line.

A distance of at least two meters shall be spared in between two guest rooms or guest room blocks in building guest rooms in any resort, picnic island, marina or such place leased for the development of tourism.

In order to preserve and maintain the natural environment of islands or part of it leased for purpose of tourism, at least 80% of the island shall be spared un-built. The area inwards from the vegetation line shall be taken as the area of the island. If the relevant area is a designated part of an island, the area inwards from the vegetation line of that area shall be taken.

It is prohibited to extract coral stones from any part of the lagoon or the reef of an island in the Maldives, for any purpose of an island leased for the development of tourism

In an island or land leased for the development of tourism, all jetties built in all resorts, picnic islands, marinas or other islands shall be built in such a way that allows free movement of water current and sand beneath the jetty.

Coral stone shall not be extracted from any reef in the Maldives for renovation or repair of any jetty or breakwater built (prior to the passing of this regulation) in accordance with clause 2.14 of this regulation.

2.2.1.2. Protected Species

Protected birds or marine living species shall not be caught or kept in cages or other enclosed space in an island or land leased for the development of tourism.

It is prohibited to carry out any activity that would harm the protected living species in an island or place leased for the development of tourism, or harming or shifting their nests or habitat or eggs.

It is prohibited, except as may be permitted by a competent government authority, to carry out any renovation, improvement or alteration to a protected area.

It is prohibited to anchor any vessel in a protected area. If buoys are placed in a protected area, those must be used for anchoring vessels.

Places, items, building or structures of historical, cultural or natural and environmental significance in an island leased for tourism purpose shall be properly maintained and conserved in accordance with the instructions from relevant government authorities.

Any place designated by the government as of historic significance in any island or part of it leased for tourism development shall be properly maintained. An un-built area with a radius of at least 5 meters shall be left surrounding such places.

In taking tourist to diving areas, no harm should be caused to the marine flora and fauna of the Maldives and no item shall be extracted or removed from such places.
If any item or place of historic or cultural significance is found while diving with tourists, it shall be reported to the Ministry of Tourism and Civil Aviation without causing any damage to such item or place.

2.2.1.3. Penalty

If any provision of this regulation is contravened by any tourist resort, picnic island, marina, hotel, guest house, or tourist vessel, shall be guilty of an offence, and shall be liable to a fine, taking into consideration the seriousness of the non-compliance, between MRF 1000.00 and MRF 10,000.00 in the first instance. Parties repeatedly in non-compliance shall be liable to a fine between MRF 50,000.00 and MRF 100,000.00 If non-compliance of a provision occurs more than once, the Ministry reserves the right to revoke the licence.

This regulation shall come into force commencing from the 20th day of July 2006

2.2.2. Environmental Impact Assessment Regulation 2012 (2012/R-27)

The EIA Regulation, which came into force in 2007, has been revised and this revised EIA Regulation is currently in force since May 2012. The Regulation sets out the criteria to determine whether a development proposal is likely to significantly affect the environment and is therefore subject to an EIA. Schedule D of the EIA Regulation defines the type of projects that would be subject to EIA. The main purpose of this Regulation is to provide step-by-step guidance for proponents, consultants, government agencies and general public on how to obtain approval in the form of an Environmental DS. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 6 states that when government agencies propose a project, while finalizing the location for the project, they should reflect on the criteria's mentioned in Schedule B of this regulation. Furthermore, they should reflect on all the laws and regulations pertaining to environmental protection in the Maldives as well as international conventions, plans and programs to which Maldives is a party to.
- Article 7 states that the proponent must apply for an Environmental DS prior to commencement of any developmental project in accordance with article 8 of this regulation.
- Article 8 states that the proponent must apply for a screening if the developmental project is not listed in the inclusive list for EIAs (Schedule D of this regulation). If the proposed developmental project is listed under Schedule D of this regulation, then the proponent must submit an EIA application form.
- Article 11 states that a scoping meeting must be conducted and a ToR must be agreed upon by the proponent and the competent authority.
- Article 12 states that the EIA report must be written as per the approved ToR and the report must be a technical report with scientifically proven alternatives, impacts, and mitigations.
- Article 13 states that the competent authority must assign two independent reviewers to review the submitted EIA report and within 28 working days the competent authority must issue an Environmental DS or for additional information.
- Article 14 states that the Environmental DS must be; (1) Approval with the condition that the proponent follows the proposed mitigation measures (2) EIA report rejection due to poor quality of the report (3) Rejection of the proposal by the competent authority due to potential irreversible negative impacts. The approval has a validity of 1 year. If the proponent could not start the works within one year of the approval due to force major, then the competent authority could give an extension.
- Article 15 states that if the proponent is not contented with the DS, then the proponent may apply to review the DS.

Since the enactment of the EIA regulation in 2012 there have been five amendments to the regulation. These five amendments are discussed below.

1st amendment to the Environmental Impact Assessment Regulation 2012 (2013/R-18)

The first amendment to the EIA regulation 2012 involved the establishment of a guideline for fining environmental offences under article 20. According to the guideline fines are as follows; (1) MVR 20,000 for first offence (2) MVR 60,000 for second offence (3) MVR 120,000 for 3rd offence (4) MVR 200,000 for repeated offences after the 3rd time.

2nd amendment to the Environmental Impact Assessment Regulation 2012 (2015/R-174)

With the 2nd amendment to the environmental impact assessment regulation 2012, there were some procedural changes made to the EIA process. The most important was the shifting of tourism related development projects EIAs to the Ministry of Tourism (article 4). The detailed amendments made to the relevant articles are discussed below;

- Article 7 was amended to have three categories of review period as follows; (1) MVR 5000 for a 15 day review period, (2) MVR 5000 for a 10 day review period, (3) MVR 5000 for a 05 day review period
- Article 8 was amended to have 5 categories of Environmental DS for screening as follows; (1) Environment Management Plan, (2) Initial Environmental Examination, (3) Environmental Impact Assessment, (4) Approval to go forth with the screened project, and (5) Approval to go forth with the project according to the mitigation measures proposed by EPA.
- Article 9 was amended to have 3 categories of Environmental DS for an IEE as follows; (1) Environmental Impact Assessment report if the project is anticipated to have major environmental impacts, (2) Environment Management Plan, (3) Approval to go forth with the project if the project is not anticipated to have major environmental impacts.
- Article 14 was amended to have a guideline for extending the Environmental DS as follows; (1) Extension for Environmental DS must be applied by the proponent with the justification for the delay, (2) If extension was applied before the deadline for Environmental DS, an extension shall be granted without a fine, (3) If extension was applied within one month of the deadline for Environmental DS, a fine of MVR 5000 will be charged, (4) If extension was applied within 2 month of the deadline for Environmental DS, a fine of MVR 10,000 will be charged, (5) an extension shall not be granted if applied after 2 months of the deadline for Environmental DS, (6) extension for environmental DS shall be granted for a maximum of 1 year and only once. Further points were added to article 14 to set out the guideline for applying, review and issuing Environment DS for addendums. In this regard a proponent can apply for an addendum for an approved EIA report if; (1) it has not been 5 years since the Environmental DS was issued, (2) scope change, (3) works within 500 m of the proposed project.
- Schedule D of the regulation was amended to exclude all tourism related projects and some further changes to the list of project were also made.
- Schedule U was added to the regulation. For the projects under this schedule, approval to go ahead with the project will be granted once the proponent submits a commitment to implement the mitigation measures prescribed by EPA. There project are; (1) maintenance dredging without any changes to the initial footprint,

(2) removing vegetation by local plot owners, (3) clearing roads for new housing plots after getting approval from island Council, (4) drilling borehole on land for extracting water.

3rd amendment to the Environmental Impact Regulation 2012 (2016/R-66)

One of the major amendments to the EIA regulation with this amendment is that the EIA consultants are classified into 2 categories (article 16). To be eligible for a category A consultant, the applicant should hold a minimum of level 7 qualification in an environment related field recognized by the Maldives National Qualification Framework. Likewise, to be eligible for a category B consultant, the applicant should hold a minimum of level 7 qualification in specific fields relevant for the nature of the project recognized by the Maldives National Qualification Framework. Additional detailed amendments made to the relevant articles are discussed below;

- Article 5 was amended to mention the implementing agency to be EPA on behalf of the Ministry.
- Article 6 was amended such that except for EMP and Environmental monitoring reports, all other reports under this regulation shall be made by a registered EIA Consultant. Further points were added to the article which mentions to submit data which could be used for environmental monitoring and the proponent must inform the Ministry in writing prior to commencement of the project once the approval has been granted for a project.
- Article 11 was amended such that while applying for EIA, the ToR must be submitted in an editable format along with the application form and project brief. Furthermore, it is now mentioned that that the ToR must be agreed upon during the scoping meeting and that only another registered EIA Consultant could replace the projects EIA Consultant if he cannot attend the scoping meeting, and the proponent could apply for an extension on the validity of the ToR during a 1-year period from the scoping meeting date.
- Article 13 was amended to include more guidelines on how to manage the EIA review process. An additional point was also added which gives the authority to EPA to conduct a review meeting with the Consultant and Proponent if they deem necessary.
- Article 14 was amended to include 2 more points which states that the Environmental DS must have the parameters for the environmental monitoring report and the schedule. The Ministry could ask the proponent to submit environmental monitoring reports up to 5 years or more if the Ministry deems necessary. Additionally, the proponent must share the Environmental DS with the

Contractor ad a copy of this Environmental DS and a copy of the approved EIA report must be made available at the project site.

- Article 20 was amended to include the guideline on how to penalize offences under this regulation.

4th amendment to the Environmental Impact Regulation 2012 (2017/R-7)

Under this amendment the Schedule U which was added under the 2nd amendment to the EIA regulation (2015/R-174) was amended to include two more type of projects; (5) all projects except for the projects mentioned in point N of this schedule for newly reclaimed areas on natural islands until three years from the reclaimed date, (6) all projects except for the projects mentioned in point N of this schedule for newly reclaimed islands until three years from the reclamation date. The projects mentioned in point N of this schedule are any project that involves dangerous chemicals, oil storage, incinerators, release of toxic chemicals to atmosphere, and fiber works. However, if the reclaimed lands were to be populated then any major developmental project shall be subjected to EIA.

5th amendment to the Environmental Impact Regulation 2012 (2018/R-131)

With this 5th amendment, Tourism related developments are again included under this regulation. Additionally, the Schedule D was amended to include tourist resort development and tourist hotel developments in the inclusive list for EIAs.

2.2.3. Waste Management Regulation (2013/R-58)

The waste management regulation dictates the principles needed to follow when handling waste. The aim is to minimize adverse impacts to the environment and human health from waste. Under this regulation, island councils are required to make a waste management plan and submit it to the competent authority. This plan must be reviewed at least every five years. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 8 states that hazardous waste are specified in Schedule J and under no circumstance should it be burned or disposed off in any area of the Maldives. While transporting hazardous waste, it must be in a closed container without any leaks. Further a sign must be on the container, specifying that it is hazardous waste. The import of any hazardous waste mentioned in Schedule J to Maldives is an offense.
- Article 11 states that waste generated at islands must be disposed off in areas specified for the purpose or areas approved by competent authority. Disposal of waste to following areas is prohibited under this regulation and is an offense;
    - Mangroves
    - Island Lagoon
    - Reef

- Lagoon(falhu)
- Finolhu
- Beach
- Vegetation line
- Harbor
- Park
- Road

Approval to dispose waste to areas not approved by competent authority will be given under following circumstances;

1. Waste is disposed as a measure to protect human health
2. Situation created by natural disaster or a state of emergency

Approval to manage waste at household level is not required for the following actions;

1. Waste segregation at household
2. Composting at household

- Article 12 states that anybody responsible for public sites must place and manage a dustbin. The waste in these dustbins must be managed according to this regulation. Disposal of waste to public sites (besides the dustbin) is an offense.
- Article 16 states that approval must be taken from the competent authority for the following waste management works
    1. Waste collection
    2. Transportation of waste by land and sea
    3. Waste treatment
    4. Storage of waste
    5. Management of waste disposal sites
    6. Landfill
    7. Handling of hazardous waste

    The number of waste management approvals for a particular area or areas will be decided by the competent authority based on the following;

    1. Waste generation
    2. Economic gains from waste management actions
    3. Environmental protection requirements for the area
- Article 25 states that waste must be transported from one place to another in accordance with the standards set in schedule A of this regulation. If waste is to be removed from an Island, it should be taken to a regional waste management facility.

<u>1st amendment to waste management regulation (2014/R-10)</u>

This amendment only included the amendment of dates to start implementing articles of this regulation (article 4).

2nd amendment to waste management regulation (2014/R-10)

This amendment also only included the amendment of dates to start implementing articles of this regulation (article 4). The date to implement the articles 13, 14, and 16 were amended to 05th October 2014.

3rd amendment to waste management regulation (2017/R-90)

This amendment included amendments to the schedule A and K of this regulation. Further article 25 was amended to include that action will be taken against parties which does not transport waste according to the standards set under this regulation.

4th amendment to waste management regulation (2018/R-63)

With this amendment the most notable, was the establishment of a system for fining offences under this regulation under Schedule N. Further article 25 was amended such that waste that needs to be removed from an Island must be taken to the nearest waste management center.

2.2.4. Regulation on Environmental Liabilities (2011/R-9)

This regulation was made in order to emphasize on sustainable development according to Article 22 of the Constitution of the Republic of Maldives 2008 and penalize environmental offences to the regulations made under Environmental Protection and Preservation Act (4/93) in the intention to prevent such offences. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 5 states that this regulation will be implemented by the EPA on behalf of the Ministry of Environment, Climate change and Technology.
- Article 7 states that, if there is a potential environmental damage or if there was an environmental damage due to a project, then the proponent must report to the Competent Authority and take measures to prevent such damages. The Competent Authority must assert to the proponent to implement mitigation measures.
- Article 8 states that, instead of the proponent under following circumstances the Competent Authority reserves the right to implement measures to prevent or mitigate environmental damages;
    - In an emergency
    - The proponent did not implement the mitigation measures prescribed by the Competent Authority under article 7
    - The proponent must bear the cost of implementing the mitigation measures mentioned in article 7 and for inspection visits from the Competent Authority
- Article 9 states that, for potential environmental damages imposed for works done by getting written approval from a government institution or advice, the cost of

mitigation measures implemented maybe reclaimed from the government institution that gave the approval.

- Article 10 and 11 states that, if the Competent Authority found that there were environmental damages due to the actions of anybody, the Competent Authority could ask them to submit the mitigation measures that could be implement along with the information mentioned in Schedule 6 of this regulation.
- Article 12 states that the proponent has the right to review the decisions of the Competent Authority to the Minister if;
    - The environmental damages were not due to the actions of the proponent
    - If the decisions of the Competent Authority regarding the environmental damages were questionable by the proponent
    - If the environmental damage was imposed due to the proponent following a regulation
    - If the environmental damage was imposed due to a third party while the proponent was diligently following all the mitigation measures
- Article 13 states that the Competent Authority has the right to visit and inspect the project sites, take copies of the documents photographs, and samples.
- Article 14 states that when inquired by the Competent Authority about information regarding any investigations under this regulation, correct information must be provided by the inquired entity or person.
- Article 15, 16 and 17 states the procedures for fining offences for environmental liabilities.

2.2.5. Regulation on Safety Standards for Construction Work (2019/R-156)

This regulation was made under the Building Act (4/2017) with the aims to improve working conditions for laborers and to protect the general public from potential health hazards due to construction activities. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 5 states that the following are Contractors responsibilities;
    - If the contractor's work exceeds MVR 1,500,000 a health and safety plan has to be prepared and followed for the safety of employees as well as the public.
    -
    - While handling construction materials, must ensure the safety of the workers and the general public
    - Informing the workers of any potential health hazards during construction works
    - Have an emergency response plan

  - Ensure that works are proceeding in accordance with the health and safety plan
  - Providing personal protective equipment for workers and they must be trained to use the equipment
  - Ensure construction site is safe for the workers and general public
  - Ensure that there is no disturbance to the general public from the construction site
  - Ensure waste is managed properly at the worksite
  - Ensure that the construction materials are properly stored
  - Ensure that safety boards and signs are installed around the construction site
- Article 6 states that if the contractor's work exceeds MVR 1,500,000 an emergency response plan must be made and the following must be fulfilled accordingly;
  - Emergency response plan must be made available at the constructions site
  - Inform the workers on the emergency response plan and its protocols
  - Have at least 2 emergency response drills every year
  - Ensure that a first aid personnel is always available at all times at the construction site
  - First aid kit must be readily available at the construction site
  - Ensure that the equipment's in the first aid kit is in proper condition
  - Installing safety boards at the construction site
  - Contacts for Emergencies must be available on a notice board at the construction site
- Article 7 states that the contractor must appoint a safety supervisor with more than five years of experience for the project.
- Article 8 states that the responsibilities of the site safety supervisor is to carrying out daily site inspections to ensure the proper measures are being taken to ensure safety and to report to the contractor/Competent Authority if the measures are not being implemented.
- Article 9 states that if the contractor's work exceeds MVR 5,000,000, the contractor must have an insurance policy taken to compensate for any damages to the workers and the surrounding people.
- Article 10 states that all contractor's must ensure that the general public is protected from the construction site by doing the following;
  - Installing pedestrian detour boards
  - Ensure construction materials and equipment's are stored in a way that does not pose any difficulties to the general public
  - Installing safety boards, fences, tapes, sheets to protect the general public

- Article 11 states that the contractor should ensure that workers are always using personal protective equipment when on site. These include safety helmets, safety boots, safety goggles, noise cancellation headphones, gloves, masks, safety belt, and other safety equipment's necessary as per the type of work.
- Article 12 states that all construction sites must be fenced off. The article also explains in details how the fence must be erected.
- Article 13 states that the contractor must ensure the required safety equipment's are provided to the works if they are handling hazardous substances.
- Article 14 explains in detail the safety procedures that must be followed while working at higher than 3 m.
- Article 15, 16, and 17 explains in detail the safety measures that must be taken while working on an overhead platform, roofs, and ladders.
- Article 18, 19 explains how scaffolding are to be used.
- Article 20, 21, 22, 23 states the safety measures that must be followed for using electrical equipment's,
- Article 24 states that the contractor must implement a chemical handling procedure for handling chemicals. The article also explains in details what is to be included in the chemical handling procedure.
- Article 25, 26, 27, 28 states the safety measures that must be followed while working with asbestos, gas cutters, and compressed gas welding.
- Article 29 states that, if there are flammable materials at the construction site, fire prevention equipment must be made available.
- Article 30, 31, and 32 states the safety measures that must be followed for using equipment's powered by mechanical power and electricity, cranes,
- Article 33 states the safety measures that must be followed for while working in closed spaces.
- Article 34 states the measures that must be followed while decommissioning a building.
- Article 35 states the construction materials must be stored within a close area. Approval must be taken from the Competent Authority to store at the designated area and the approval must be shown on a board.
- Article 36 states the measures that must be followed while loading and unloading materials to a construction site.
- Article 37 and 38 explains the requirements for the safety board and other signs that must be installed at construction sites.

- Article 39 states that, when an accident occurs at a construction site, it must be immediately reported to the police. The record of accidents must be maintained by the contractor.
- Article 49 states that, if there is no entity responsible for implementing the measures mentioned under this regulation, then the proponent shall be responsible for implementing the measures. The proponent must report any offences against this regulation to the Ministry.
- Article 50 states that with the enforcement of this regulation the Male' Planning Regulation Chapter 3 is void.

2.2.6. Regulation on uprooting, cutting and transportation of palms and trees

This regulation was implemented on 1 February 2006 by the Ministry of Environment, Climate change and Technology, Energy and Water. The primary purpose of the regulation is to control and regulate large-scale uprooting, removal, cutting and transportation of palms and trees from one island to another. According to the regulation, certain types of trees and plants that have unique attributes are prohibited to be removed from its natural environment. Also, uprooting and removal of a vast number of trees and palms are subjected to an EIA, which is required to be submitted to the EPA and written approval is required prior to implementation of the project. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 3 states that the following types of vegetation is prohibited to be removed;
    - Vegetation found from 15 m inland of the vegetation line
    - Vegetation found on and around 15 m of wetlands and mangroves
    - Vegetation found on any protected areas of the Maldives
    - Any protected trees
    - Vegetation which has environmentally unique characteristics
- Article 5 (a) states that, to clear large number of trees for any purpose, an EIA must first be done and approval from the competent authority must be obtained. Article 5 (b) states that, if trees are to be transported with soil, the allowable limit is an 8-inch x 10-inch black bag. Article 5 (e) states that, trees larger than what is mentioned in article 8 (a) of this regulation, must be transported with only the soil in their root balls. Article 5 (f) states that, if machinery is to be used for uprooting trees, no damages must be done to any trees besides the trees concerned for uprooting.
- Article 6 states that, if the total number of a particular species of tree is less than 05 on an island, then this species of tree can only be transported with a special permit from the Ministry of Environment, Climate change and Technology. Furthermore, this applies to trees on which birds roost or live in inhabited and uninhabited islands.

- Article 7 states that, the maximum number of trees which could be removed from an island shall be declared by the Ministry of Environment, Climate change and Technology, based on the existing numbers of trees on the Island.
- Article 8 states that, coconut trees taller than 15 feet and other trees taller than 8 feet, their limit for removal is 10 trees, to uproot greater than 10 trees require an approval from Ministry of Environment, Climate change and Technology. Smaller trees could be removed by taking an approval from Island Council and the limit for uprooting is less than 1/3rd of the trees present in the area. For any purpose uprooting and transport of trees must be done under the supervision of the Island Council on inhabited Island; personnel responsible to manage the island in case of uninhabited Island.
- Article 9 states that, after uprooting trees, the holes must be backfilled with soil. It is prohibited to put in any waste into the holes.
- Article 10 states that, any offences against this regulation will be punishable under Act 4/93 accordingly.

1st amendment to regulation on uprooting, cutting and transportation of palms and trees (2014/R-7)

The amendment to this regulation has specified a set of categories and any tree falling under these categories is not allowed to be removed unless it is a project of the government, approved by the parliament. Relevant articles under this law pertaining to the proposed project are:-

- Article 3 was amended such that the prohibited trees for removal could be removed for a project approved by the parliament with the condition that the proponent must plant 6 trees for each tree removed instead of 2. Furthermore, a monitoring plan must be made and the proponent must implement it.
- Article 11 was amended to mention that this regulation will be enforced by the EPA on behalf of the Ministry of Environment, Climate change and Technology.

2.2.7. Regulation on management and conservation of water resources (2021/R-22)

This regulation has been formulated under the Article 17,18,19,20 and 23 of the Water and Sewerage Act (08/2020). The main purpose of the regulation is to ensure sustainable use, conservation, protection, improvement, and beneficial use of the water resources. Relevant articles under this regulation pertaining to the proposed project is:

Article 6:

- None shall do any harm or damage to the water resources.
- Groundwater and other naturally occurring water resources on the islands, shall not be utilised for any economic or business use.

- Dewatering for building construction shall be carried out as per the relevant regulation.

Article 8: Overflow from all roofs shall be connected to the well of the building or a designated recharge structure. No overflow from the roofs shall be connected to the sewer system of the islands.

Article 10: All activities shall be carried out in a manner that would not contaminate the water resources in accordance to the clause 20 of the water and sewerage act (08/2020)

Article 11:

- After the establishment of an improved sewerage system, all household in the spatial coverage of the system shall be connected. After 1 year of official service innuageration of the system, no households within the spatial coverage of the system shall use other means of sewerage management where the effluent is decipated into the ground (such as sceptic tanks).
- Within 1 year of the from establishing the water, all the existing operational sceptic tanks within the spatial coverage of the system, shall be safely desludged, treated and closed off by the service provider of the island. The service provider may charge a fee that is approved by the regulator for the service.
- Managing the operation and maintenance of the sewer system without any contamination of the groundwater resources is the responsibility of the licensed service provider.
- In any island with a sewerage treatment plant (STP), the treated water should only be recharged to the ground if the effluent is at a standard that is equivalent to the requirement set in the appendix 4 of the regulation. Furthermore, in the case of treated water recharge, the service provider is required to submit and implement a groundwater monitoring plan after the approval of the regulator. Recharging any treated effluents that does not meet the requirement is prohibited.

Article 12: Spillage of any oil and chemical to the ground is prohibited. Oil and chemical shall be store in shaded, appropriately bunded areas and in a manner that even if the total volume of the dedicated storage is leaked, the leaked volume is able to be recovered without contamination of the soil or the groundwater. Transfer of oil and chemical on land must be carried out with appropriate safety measures to prevent spillage. Discarding of waste oil and chemicals must be carried out in a manner that does not contaminate any of the water resource, and at a facility that is approved by the regulator.

Article 17: All responsibilities of rectification of a polluted groundwater resource from spillage of oil and chemicals shall be borne by the polluter. Any incidence of groundwater

pollution from oil and chemical spillage should be reported to the regulator within 24 hours. The rectification works shall be carried as per the instruction of the regulator.

2.2.8. Regulation on protection of environmentally sensitive areas (2018/R-78)

This regulation was under article 4 of the Environmental Protection and Preservation Act (4/93) in order to declare standards to declare areas for protection, manage protected areas, establish environmentally sensitive areas, establish a network of protected areas, create public awareness and participation in management of protected areas, protection and preservation of Maldivian biodiversity for future generations. According to this regulation there are 7 types of protected areas; (1) Internationally recognized areas, (2) Strategic Nature Reserve, (3) Wilderness area, (4) National Park, (5) Natural Monument, (6) Habitat / Species Management area, and (7) Protected Area with Sustainable use. Relevant articles under this regulation pertaining to the proposed project are:-

- Article 12 states that a management plan must be made in order to manage the protected areas. This management plan must reflect on the developmental plans for the region.

2.2.9. Regulation on Construction Material Import and Production Control

The purpose of the regulation is to control the quality of imported and produced materials that are used in the construction industry. The regulation specifies the materials which would be controlled under the regulation in its annex 1. Furthermore, the regulation details out the registration requirements, permits, procedures, quality controls and applicable fine of those that breach the regulation.

2.2.10. Regulation on Construction Material and Construction materials testing facilities

Under the regulation all contractors involved in the construction industry are to be registered. The regulation includes the requirements of contractor's registration, grading, implications on participating in international tenders, insurance, project licenses, Joint venture registrations, responsibilities of the registered contractors and applicable fine for breaching the regulation.

2.2.11. Regulation on protection of old trees

This regulation was made under article 4 of the Environmental Protection and Preservation Act (4/93) in order to declare standards to manage protected trees in the Maldives. The regulation states the criteria for trees to be protected; (1) trees older than 50 years, (2) trees that

are threatened to extinction locally, (3) ecologically important species, and (4) due to the request of public. Relevant articles under this regulation pertaining to the proposed project are:

- Article 6 and 7 states that a radius of 2 m from the crown of the protected tree shall be protected and while allocating land of purposes special attention must be given to not disturb such trees. Further any activities that may cause damage to the trees shall not be undertaken.

2.2.12. Carrying Capacity for Islands to be developed as Tourist Resorts

A set of standards has been imposed under this regulation to ensure preservation of the natural beauty and the environment of the islands as well as the consumer's image of the islands. As such, the following guidelines are provided:

- The felling of trees has to be carried out evenly throughout the island with the intention of conserving the natural façade and the beauty of the island.
- Sufficient trees have to be left untouched when clearing trees for construction in order that they block the view of the buildings. All buildings, including two storey buildings are to be constructed below the highest canopy level so that they are not visible above the treetops.
- The maximum number of buildings to be constructed on the island should be dependent on how much space can be cleared of vegetation, with consideration of the above factors.
- The maximum area utilized for the construction of buildings should not exceed 20% of the total land area.
- All buildings should be located at least 5 m landwards from the vegetation line of the island. In the event that over water bungalows are built on the reef flat or lagoon, an equal area has to be left free on the island.
- To provide the visiting guests with sufficient beach area, the guest rooms should face the beach with a minimum of 5 m of beach allocated for each room.

2.2.13. Disposal of Garbage from Tourist Resorts

- Garbage from the resorts should be disposed of appropriately to avoid impacts on the environment. Waste disposed of at sea should be thrown away far out to sea, ensuring that it does not get washed back on the beach of any islands.
- All resorts are required to have incinerators and compactors to be utilized for burning all flammable material and compact the cans respectively. Glass is to be broken into small pieces and plastic and polythene bags burnt.

- A fine between Rf100 and Rf2000 is to be charged if the regulation is breached, and the sum doubled for those who violate it a second time.
- In addition to the Maldives Tourism Act and the relevant Regulations, there are Circulars issued by the Ministry of Tourism, advising the Tourism industry of their new policies or strengthening the existing ones.
- Circular no. 21/90 (21.04.1990) advices all resorts having filled jetties to be modified so that they allow free flow of currents through them or new jetties composed of reinforced concerted stilts to be built in their place by the end of June 1991.
- Circular no. CIR-ES/98/07 issued on the 27th of January 1998 states that all resorts have to obtain permission from the Ministry of Tourism before commencing any coastal modifications. Hard engineering solutions are discouraged while environmentally friendly structures are supported.
- Circular no. 88-ES/CIR/2002/12 (05.05.2002) deals with the proper disposal of garbage from the resorts in response to concerns that floating garbage from resort islands were washing up on beaches of nearby islands.

2.2.14. Regulation on Use, Handling, and Storage of Oil

The purpose of the regulation is to reduce fire hazards caused by the mishandling of oil, to raise awareness on the proper handling methods of oil and to standardize the infrastructure of oil handling and storage facilities.

- Article 2 of the regulation details out all the aspects of vehicles that handle and transport oil on land.
- Article 3 deals with all the aspects of petrol handling in storage areas and service centres.
- Article 4 highlights the aspects of fuel handling in diesel and kerosene service centres.

Article 5 highlights the aspects of fuel pipeline from storage to meters

2.2.15. Regulation on Stone, Sand and Coral Mining

This regulation specifies the articles regarding stone, sand and coral mining from the lagoons, reefs, and other areas and the conservation of these resources.

- Article 2 states that any stone, sand, or coral mining activities must be carried out after obtaining the required approval from the relevant authorities. If these activities are carried out in the inhabited islands and other leased uninhabited islands, these activities must comply with and Law on Stone, Sand and Coral Mining in Inhabited Islands (77/78) and Law on the Uninhabited Islands (20/98).
- Article 3 states that stone mining from any area of the Maldives is prohibited.
- Article 4 states that coral mining is prohibited from the following areas;

  - Islands and its beaches leased for industrial purposes
  - Areas on and beyond the atoll reef edge
  - Coral mining during dredging activities in harbour development projects, and beach / reef cleaning activities in industrial islands, approved by the relevant government authorities are excluded in this article.
- Articles 5 states that the sand mining from the islands leased for industrial purposes are prohibited. Permission to mine sand may be given for all other islands and those islands which lie on independent reef systems from other inhabited islands.

2.3. Guidelines and technical specifications

2.3.1. Guideline for uprooting, cutting and transportation of palms and trees (published on 6th June 2017)

This guideline was made under Article 5(a) of the regulation on uprooting, cutting and transportation of palms and trees, to specify the guideline for giving approval to uprooting, cutting and transportation of trees. Relevant articles under this guideline pertaining to the proposed project are:-

- Article 3 states that while giving approval for uprooting, cutting and transportation of trees for any project, the following must be fulfilled;
  - The project strictly requires land clearance
  - The budget for the project has been approved
  - Approval from the relevant government body for the project
- Article 4 states that, in order to obtain approval for uprooting, cutting and transportation of trees under this guideline, the proponent must apply for approval from EPA through the application form on Schedule 1.
- Article 5 states the procedure for giving approval for uprooting, cutting and transportation of trees. The first step is for the proponent to submit information on the type, size, numbers and location of trees to EPA. If there are no prohibited trees to be removed in the area and if the total number of trees to be removed is less than 200 or the land clearance area is less than 8250 m^2, then approval shall be given under this guideline with a set of mitigation measures to be followed by the proponent.

2.3.2. National wastewater quality guidelines (published on January 2007)

The purpose of the guideline is to assist all stakeholders in the water cycle to manage the discharge of wastewater in such a way that it does not limit water's fitness for use by different water users. The guideline suggests specific values of maximum concentrations that can be tolerated by future users of each parameter potentially present in wastewater. These values may not be exceeded when treated wastewater is released back into surface water, groundwater or

into the ocean. The values are generic and should be used together with the EIA and clean Production Protocols to finalize the license for the discharge of specific waste water.

2.4. International Conventions, plans and programs

2.4.1. United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol

UNFCCC is the first binding international legal instrument that deals directly with the threat of climate change. It was enacted at the 1992 Earth Summit in Rio de Janeiro and came into force on the 21st of March 1994.

Signatory countries have agreed to take action to achieve the goal outlined in Article 2 of the Convention which addresses the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system," Thus all Parties to the Convention are committed under Article 4 to adopt national programs for mitigating climate change, promote sustainable management and conservation of greenhouse gas (GHG) sinks such as coral reefs, to develop adaptation strategies, to address climate change in relevant social, economic and environmental policies, to cooperate in technical, scientific and educational matters and to promote scientific research and exchange of information.

The Kyoto Protocol entered into force on the 16th of February 2005 and is an international and legally binding agreement to reduce GHG emissions globally. It strengthens the Convention by committing Annex I Parties to individual, legally-binding targets to achieve limitations or reductions in their GHG emissions. Maldives has signed and ratified both the Convention and the Protocol.

2.4.2. Paris Agreement

The Paris Agreement is also an agreement within the framework of the UNFCCC dealing with GHG emission mitigation, adaptation and finance proposed to start in the year 2020. Upon opening for signatories on 22 April 2016, 180 UNFCCC members have signed the treaty (including Maldives), however, only 22 of which ratified it so far which is not enough for the treaty to enter into force yet. The aim of the convention as described in Article 2 of the treaty is "enhancing the implementation" of the UNFCCC through:-

i. Holding the increase in global average temperature to well below 2° C above pre-industrial level and to pursue efforts to limit the temperature increase to 1.5° C above pre-industrial levels, recognising that this would significantly reduce the risk and impacts of climate change;
ii. Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and lower GHG emissions development in a manner that does not threaten food production; and

iii. Making finance flows consistent with a pathway towards low GHG emissions and climate resilient development.

2.4.3. The Vienna Convention for the Protection of the Ozone Layer

The Vienna Convention for the Protection of the Ozone Layer is a multilateral environmental agreement which entered into force in 1988. It acts as a framework for the international efforts to protect the ozone layer. In 2009, the Vienna Convention became the first convention of any kind to achieve universal ratification. The objective of the Convention were for the Parties to promote corporation by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer. Maldives has signed and ratified this convention and adheres to it.

2.4.4. The Montreal Protocol on Substances that Deplete the Ozone Layer

The Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to reduce production and consumption of ozone depleting substances in order to phase out the production and abundance of substances that are responsible for depletion of the ozone layer. This protocol entered into force on 1 January 1989. Since its adoption, it has undergone 8 revisions and the Maldives abide by 4 of those addendums mentioned below:-

- The London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (1990);
- The Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (1992);
- The Montreal Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (1997); and
- The Beijing Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (1999).

2.4.5. Agenda 21

Agenda 21 is a non-binding voluntary implemented action plan of the United Nations (UN) with regards to sustainable development. It is a comprehensive plan of actions taken globally, nationally and locally by organizations of the United Nations System, Governments and Major Groups in every area in which humans impact on the environment. It is also an outcome of the Earth Summit (UN Conference of Environment and Development) held in Rio De Jeneiro,

Brazil in 1992. Maldives is among the 178 countries which adopted this action plan. Out of the 4 sections it is grouped into, the proposed development pertains to:-

i. Section I: *Social and Economic Dimensions* which is directed towards combating poverty, especially in developing countries, changing consumption patterns, promoting health, achieving a more sustainable population and sustainable settlement in decision making; and
ii. Section II: *Conservation and Management of Resources for Development* which includes atmospheric protection, combating deforestation, protecting fragile environments, conservation of biodiversity, control of pollution and the management of biotechnology and radioactive wastes.

2.4.6. Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The Sustainable Development Goals are:

- No Poverty
- Zero Hunger
- Good Health and Well-being
- Quality Education
- Gender Equality
- Clean Water and Sanitation
- Affordable and Clean Energy
- Decent Work and Economic Growth
- Industry, Innovation, and Infrastructure
- Reducing Inequality
- Sustainable Cities and Communities
- Responsible Consumption and Production
- Climate Action
- Life Below Water
- Life On Land
- Peace, Justice, and Strong Institutions
- Partnerships for the Goals

2.4.7. Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD), formally known as the Biodiversity Convention, is a multilateral treaty which entered into force on 29 December 1993. The convention has 3 main goals:-

i. Conservation of biodiversity;
ii. Sustainable use of its components; and
iii. Fair and equitable sharing of benefits arising from genetic resources.

The objectives of the convention is to develop national strategies for the conservation and sustainable use of biodiversity.

2.4.8. Washington Declaration on Protection of the Marine Environment from Land-based Activities

Maldives is a signatory to the Washington Declaration on Protection of the Marine Environment from Land-based Activities which intends at setting a common goal sustained and effective action to deal with all land-based impacts upon the marine environment, specifically those resulting from sewage, persistent organic pollutants, radioactive substance, heavy metals, oils (hydrocarbons), nutrients, sediment mobilization, litter and physical alteration and destruction of habitat.

2.4.9. Regional plans and programs

In addition to the international treaties and conventions, Maldives is also a key player in the formulating and adopting of various regional plans and programs to protect the environment by actively participating in activities organised by several regional bodies. As such, Maldives is committed to the following which pertains to the proposed project: -

- South Asian Association for Regional Corporation (SAARC) Environment Action Plan adopted in Male' in 1997;
- SAARC Study on Greenhouse Effect and its Impacts on the Region;
- South Asian Regional Seas Action Plan and Resolutions concerning its implementation (1994); SAARC Study on Causes and Consequences of Natural Disasters;
- South Asian Seas Program; and
- Male' Declaration on Control and Prevention of Air Pollution and its likely Transboundary Effects for South Asia (1998).

2.5. Required permits and Approvals

The following permits and approvals shall be obtained from the relevant authority prior to commencement of construction phase of the project:-

Table 1. Permits and Approvals required for the proposed development

Permits/Approvals	**Approving Agency/Authority**	**Status**
Concept Approval	MoT	Received
EIA Decision Note	EPA	Ongoing through the current EIA

2.6. Compliance of the Proposed Proposal to Statutory Requirements

All statutory requirements pertaining to this project shall be adhered to by the proponent during detail design phase, construction and operational phase. Furthermore, any changes to the legislative framework shall be considered and required changes shall be brought to project components as necessary.

3. PROJECT DESCIRPTION

3.1. Study area, project boundary and surroundings

The project island is 150km away from the capital Male' and located 5°31'57.48"N and 73°30'22.56"E in the northern side of Lhaviyani atoll. The island has 1.4km in length and 0.35km in width. The nearest inhabited island is Lh.Hinnavaru, which is located around 10.9km from Kanuhura. The project sites include the water villa area which is the major civil works area of the proposed project, the excavator mobilization area, the temporary site and the material storage which are highlighted in Figure 1. Detailed drawings of the proposed infrastructure and renovation are given in Appendix C- Detail drawings for upgrade works of the report.

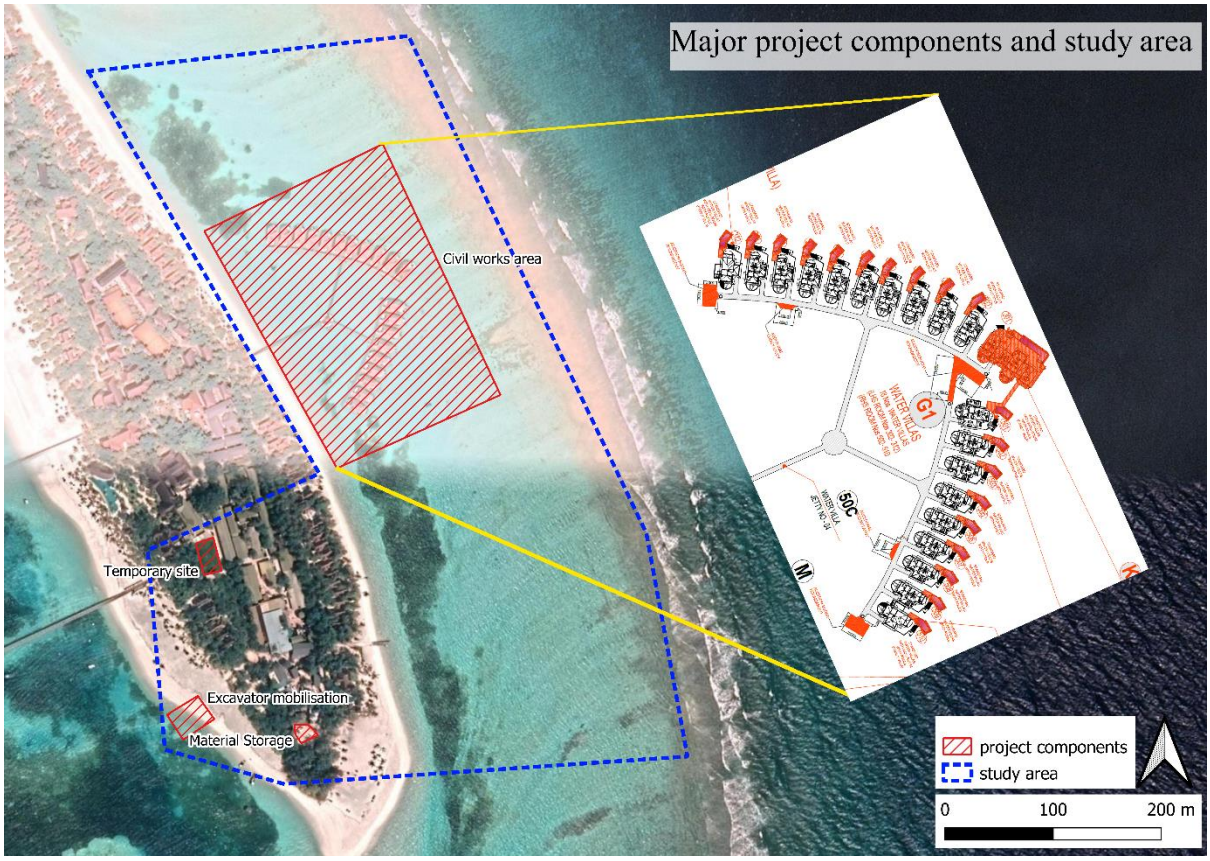


Figure 1: Major project components and study area

There are two protected areas, Kuredhi Kanduolhi and Fushi faru area which are located approximately 2 – 2.5 km from the proposed major civil works region of the proposed project as indicated in Figure 2. The nearest environmentally sensitive area is approximately 2.8km southwest of the project island which is known as Maagiri. This sensitive area is noted to have lots of reef fish, overhangs, sharks and turtles. However, given the considerable distance between the project site and the protected and sensitive areas, no significant disturbance are envisaged to the areas from the works of the proposed project.

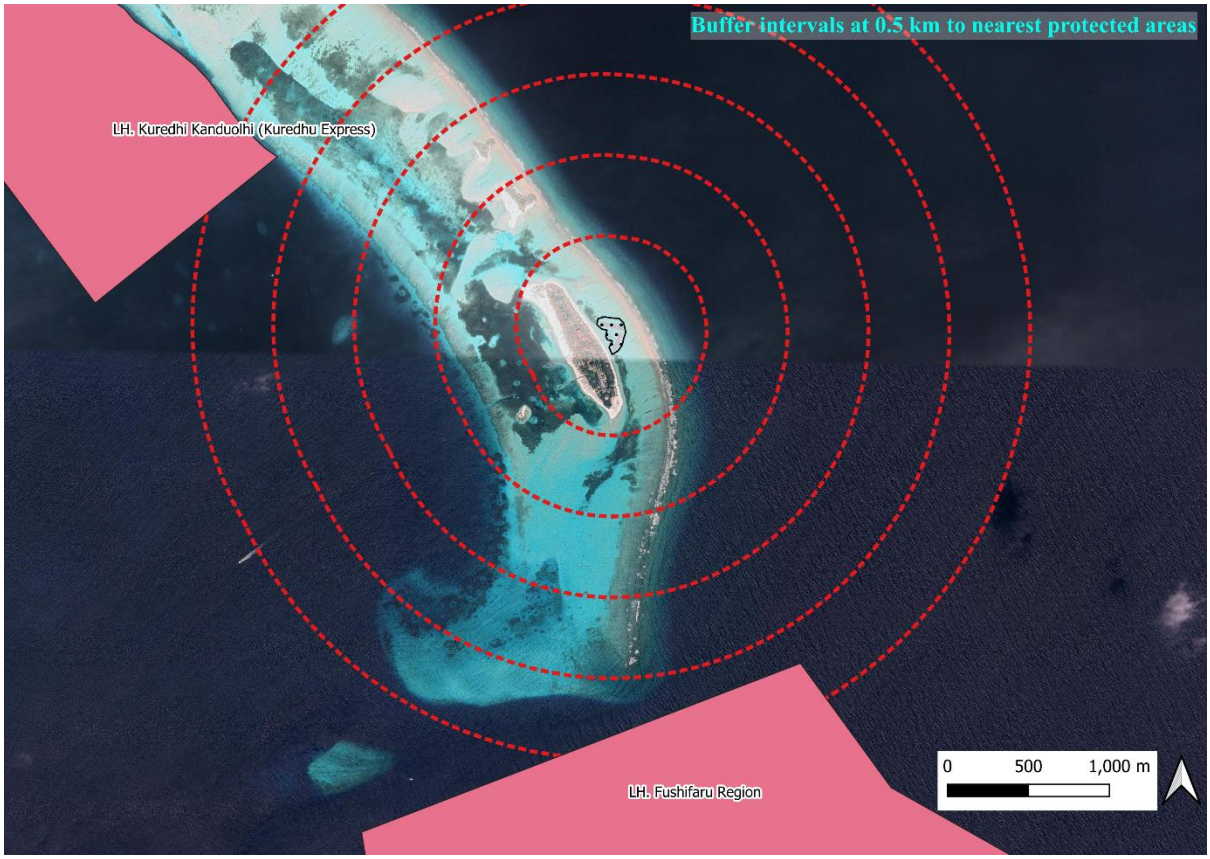


Figure 2: Nearest protected areas

3.2. Description of existing facilities

The resort is a five star accommodation centre and has 11 types of residences with a total of 80 villas. This include 12 beach bungalows, 10 beach villas, 18 water villas, 18 beach pool villas, 02 water pool villas, 06 retreat beach pool villas, 01 grand beach villa, 06 grand beach pool villas, 05 retreat grand beach pool villas, 01 retreat family beach pool villas and 01 sanctuary pool villa.

In terms of dining facilities, the resort also has 6 restaurants with a number of different cuisines to offer. As for leisure facilities, the resort has an infinity pool, wellness centre, beauty salon, 02 tennis courts, mini soccer field, squash court, kids club, game room, gym, yoga, diving center and water sports. Other amenities of the resort include the mosque, lounges and clinic. A detailed layout of the resort is also annexed to the report in the Appendix C- Detail drawings for upgrade works for further information.

3.3. Proposed upgrade works under this EIA

This report will cover construction works associated with renovations and modifications in several existing villas. This includes construction of new pools and decks while demolishing existing ones. The details are as follows;

As such for this particular EIA the proposed works are;

- New water villa
- Addition of pools, refurbishment and expansion of existing water villas
- Refurbishment of jetty and addition of buggy facilities
- Upgrade of water production capacity

The details of each work are given in the following sections;

3.3.1. New Water Villa

This is the new water villa which is proposed to be built on the tip of the current water villa network. The objective is to increase the carrying capacity of the resort and to improve the attractiveness of the resort's offer. The water villa has 02 bedrooms, 03 bathrooms. 1 outdoor bath, deck and pool. A partial print of the villa is given below. However, full detail drawings are annexed in the Appendix C of the report.

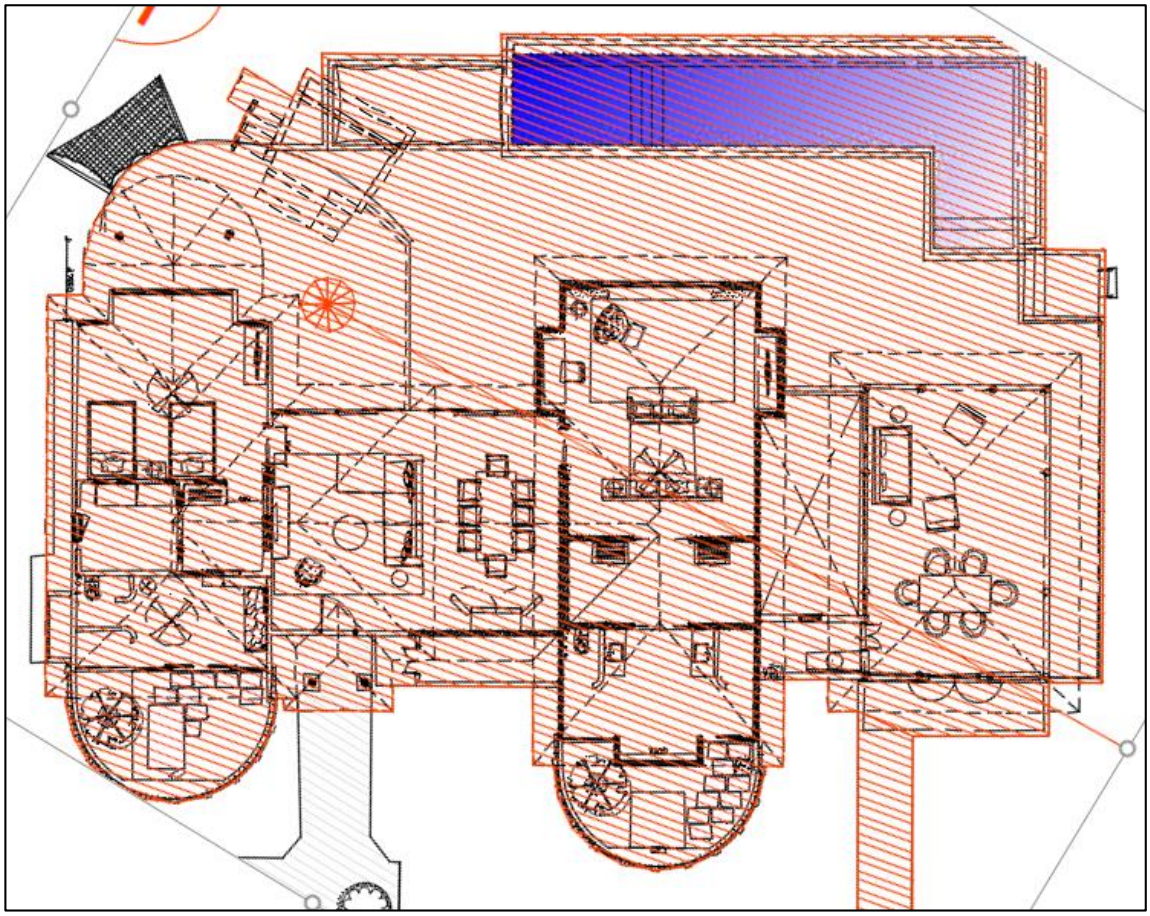


Figure 3: partial print of the floor plan of the new water villa

3.3.2. Addition of pools, refurbishment and expansion of existing water villas.

Under the current renovation, it is also proposed to add pools to existing 19 over water villas, refurbishing the roofs of the water villas, addition of new MEP room with timber deck extension and extension of bedroom slab as they are currently damaged. The objective of the addition of the pool is to improve the guest experience. A partial print is provided in Figure 4, details drawings of the pools and other additions are provided in appendix C of the report.

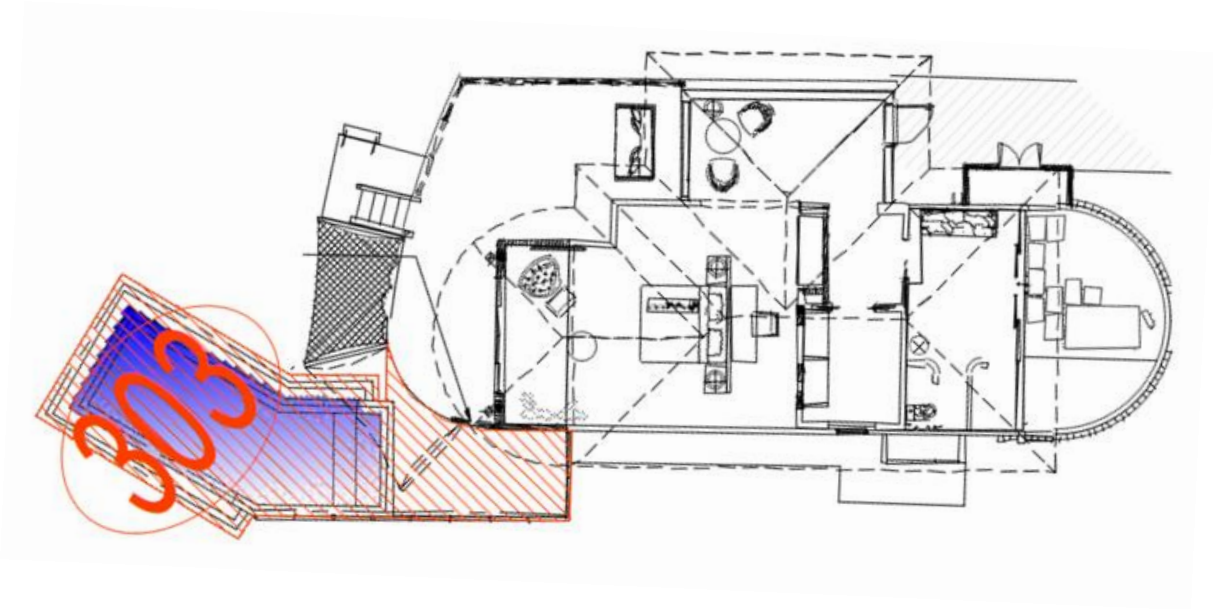


Figure 4: partial print of the floor plan of the addition of new pool to water villas

3.3.3. Refurbishment of jetty and addition of buggy facilities

The walkway jetty to the water villas has old timber decks which required replacing for better aesthetics and safety as well. Furthermore, three buggy roundabouts and two additional buggy layby is also included in the scope of the current project.

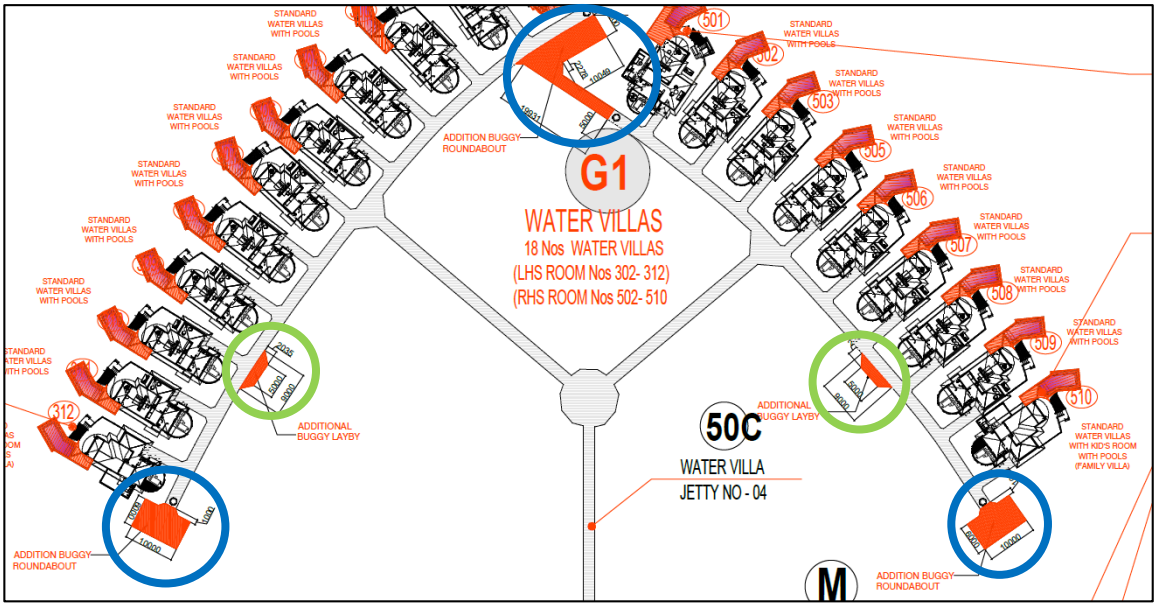


Figure 5: Locations of additional buggy facilities

3.3.4. Upgrade of water production capacity

With the addition of the new pools for all the existing water villas would have an significant increase in the water demand of the resort. As such an additional requirement of 476cbm will be added to the existing demand as this volume of water will be needed to feed the pools across a seven-day interval. To cater for the gap between the existing production capacity and the increase in water demand, it is proposed to add a production capacity of 100 cbm to the existing RO plant facility. No additional works are required except for the addition of the new module to the operational RO plant. Existing distribution, treatment and disinfection infrastructure will be used for the proposed project during the construction and operation phase of this project.

3.4. Project Inputs and Outputs

The following two tables details the project inputs and outputs for the works to be undertaken in the proposed project.

Table 2: Major project inputs

Input resource(s)	Source/ type	Qty/Volume	Source of resource
Construction phase			
Man power	expatriate	Large numbers	Contractor
Construction material	**Temporary site setup**: Galvanized pipes, roofing sheets, toilet units, toilet fittings, cement, sand, timber, spun piles	Small quantities	Local purchase or import
	Concrete works: reinforcement steel bars, river sand, cement, aggregates	Large quantities	Local purchase or import

	Roofing: Timber; Thatch, prefabricated materials.	Large quantities	Local purchase or import
	Electrical: electrical cables and wires, DBs, MMCBs and MCBs, PVC pipes, light weight, telephone cable CAT 5, PVC conduits, 4 core armored cables, PP-R pipe, Multi pump, UPVC (T1000, T600) for sewerage grid	Large quantities	Local purchase or import
	Water and Sewer: HDPE pipes, pumps, control panels, inspection chambers	Large quantities	Local purchase or import
	Finishing: floor and wall tiles, gypsum boards, calcium silicate boards, zinc coated corrugated metal roof, paint, varnish, lacquer, thinner, dry walls, carpet etc.	Large quantities	Local purchase or import
Machinery and equipment	Excavator, Truck, Concrete mixer, General construction tools, Small lorry, forklift, Barge, Dewatering pump, total station, level gage, Crane	Large quantities	Contractor
Water	Desalinated water	Large quantities	On island facilities
Fuel for operation	Petrol	Large quantities	On island facilities
Power	Electricity	Large quantities	On island facilities
Nose and mouth covering (COVID 19)	Face masks	Large quantities	Contractor
Operational phase			
Water	For pools	Large quantities	On island facilities and regional waste management center

Table 3: Major project outputs

Project outputs	**Method of generation/Qty**	**Method of control**
New water villa	Waste and waste water	Disposed though existing infrastructure
New pools	Brine	Flushed through existing brine line
Construction wastes	Waste oils Packaging waste	Waste oil stored in closed labeled containers and transferred to Thilafushi for disposal Packaging waste stored in an area and routinely transferred to Thilafushi for disposal
Noise	Localized to the project site	Unavoidable, but could be minimized by limiting working hours to daytime only and completing the project within the earliest possible duration.

3.5. Project Construction

3.5.1. Mobilisation

The excavator required for the project will be carried to the island via a barge. Other materials and workforce will be transported in a ferry or a hired sea vessel. The barge will drop the excavator on the Southern side of the island behind the service jetty. The excavator will then make it way around the island to the other side where the proposed works are to be carried out. Once in the lagoon it will take the path where there is no corals or seagrass beds to make its way to the water villas.

3.5.2. Decommissioning

Once the project has been completed, contractor leaves the site after performing the required site clearance. Any temporary project facilities will be demolished and the waste will be transported to Thilafushi for disposal. All heavy machinery brought in by the contractor will be demobilized.

3.5.3. Project management

During the construction phase, the following work profile will be utilized.

Table 4. Work profile required for implementation of the proposed project

Designation	responsibility
Project manager	Overall responsibility for the implementation of the project
Project engineer	Ensure that works are in accordance to drawings and specifications
Surveyors	Provide layout and levels
Site manager	In charge of site work implementation and coordination
Implementation Supervisors	Ensures that works are carried out according to project managers instructions
Safety supervisors	Assess risk and ensure that everyone follows the safety rules and regulations.
Laborers	Carries out all the tasks

A contractor has not yet been hired for the proposed project. However, the proponent is committed to hire local small-scale contractors wherever possible and wherever local workforce is unavailable, it will be sourced from abroad.

3.5.4. Construction work regime

All the civil structures will be built using normal construction materials with least possible alterations to the natural environment. The construction waste shall be properly managed and shipped routinely to Thilafushi for disposal. Proper construction sign boards shall be placed for the safety of the workers and general public who use the road.

The water villas side will be fenced off as per MoT regulations for safety of tourists and to minimize disturbances to any existing tourists on the resort with sign boards. Furthermore, the site will be monitored throughout the day to ensure that no trespassing is done to avoid any unfortunate incidences.

3.5.5. Health and safety measures

Mosquitoes, high temperature and drowning prevention measures are taken on site. Drugs are sprayed and mosquito nets are used in the accommodation area; Appropriate drugs are prepared in case of heatstroke. To prevent drowning, a strict management system is to be formulated and performed under supervision. Additionally, fencing the project site, set up entrance and exit, and arrange safety and civilization management personnel for on-site management.

Basic first aid facilities and safety gears shall be made readily available by the contractor during the construction phase of the project as per the regulation on safety standards for construction work. In case of an emergency, the workers shall be taken to the health centers on respective islands and if the need be, taken to Male'. Other specific safety measures during construction phases are detailed in the respective components under the project description.

Special consideration will be given to take all possible preventive measures of the current pandemic of Covid-19 during the construction and operation phase of the project. As such, the recommendations of the Health Protection Agency will strictly be enforced whilst sensitisation sessions will be undertaken to internal controls of health and safety to all the work force

During the operational phase basic first aid facilities and safety gears shall be made readily available to the working staff at the facilities. Occupation health and safety guidelines shall be strictly followed by all personnel. In case of an emergency, the workers shall be taken to the health centers on the respective islands and if the need be, taken to Male'.

3.5.6. Temporary facilities

Major part of the workforce is planned to be housed in the existing back of house (BOH) facilities of the resort. However, if the existing space is lacking, the proponent plans to house the workforce in the temporary site shown in Figure 1 by establishing prefab accommodation houses. Temporary connections of clean water, adequate sewerage and electricity services will be provided from the exiting utility infrastructure of the island. Waste produced during the construction and operational phase will be managed through the existing waste management facilities and as per the set regulations.

3.5.7. Accidents and Spillage reduction

Fuel and chemical management are to be handle with utmost care as spillage and contamination of the groundwater is prohibited under the new Water and Sewerage Act (08/2020). Same caution will be executed while working in the over water villas as well. Spillage control mechanisms will be in place prior to execution of works and labour force will be trained prior to commencement of the work. A dedicated environmental and social safeguards officer will be employed by the proponent to ensure the safety checks are in place to ensure the implementation of the mitigation and monitoring measures specified in the current report

3.5.8. Proposed methodology to be employed for the upgrade works

For the new pools and new villa, over water columns will be required. Pre-cast pad footing and column stump will be positioned to the designated location by using an excavator. A dug 800mm to 1000m depth will need to be dug for the footing to go securely under the sand bed. The excavation will be done using the excavator.

The remaining reinforced concrete works; beams, pools slabs, pool walls, columns, and roof beams are in situ. Plywood formworks will be made and then concrete will be poured. The formwork will be supported by G.I pipe supports under the beams and slabs to hold the weight from concrete pouring until concrete is properly cured. There will be portable platforms made from GI pipe plywood top (approximately 4m x 5m in size) that will be used during concreting

of beams, slabs etc. This platform will be hoisted and moved to next villa by an excavator as a staging for concreting (concrete mixer will be sitting here). This is done to prevent any cement from falling to the lagoon and for ease of work.

3.6. Project Operation

Once the upgrade works are completed the new water villa will be managed according to the existing resort schemes. Certain measures that shall be implemented for the new pools are give below;

3.6.1. Pool operation

The water present in the pool shall be safe to the guests and it shall be clean and crystal clear. To achieve clear water, a filtration system shall be installed consisting of pumps and filters. Also water from the filtration units shall be evenly distributed into the swimming pool. To eliminate the germs in the water, proper disinfection shall be carried out using chlorine. In this case, the pool operators shall dissolve calcium hypochlorite in water and dose into the pool to maintain the free chlorine level between 2-3 ppm. On the other hand, the pH of the water shall be neutralized by dosing diluted hydrochloric acid in the pool water and as such the pH shall be maintained in the range of 7.2 to 7.6. With time the filtration system shall require backwashing and as such the backwash water, having same characteristics of the pool water in terms of pH and free chlorine but containing solid impurities will be discharged into a properly designed soak away. We expect a backwash water volume of approximately 30 m3 when all filters are backwashed in a day. Please note that one filter shall be backwashed at a time and therefore a flow of 6 m3 is expected every hour into the soak away.

The potential impact is risk of drowning for a non-swimmer. As mitigation sign boards will be put up in deep areas of the pool. Filters will be connected to filter out water inside the pool, hence water will be re-circulated back into the pool. Moreover, the drainage system around the pool will recover displaced water and pump the water back into the pool through the filters

3.7. Project duration and schedule of implementation

The construction will commence once the EIA process has been completed. Estimated date is late June 2021. Construction works is expected to be completed by June 2022. Refer to Appendix D for a detailed work plan of the proposed project. The entire project is estimated to be completed within 12 months from project commencement date.

3.8. Tasks already completed

No works has been carried with regard to the proposed scope of works. Currently, the concept approval has been acquired from Ministry of Tourism and is annex in the Appendix G- APPROVED SITE PLAN of the current report.

4. METHODOLOGY

4.1. Water quality

4 marine water sample was collected from project location at Kanuhuraa Maldives (Refer to Figure 7 and Table 5 for sampling locations and respective GPS coordinates). Samples were collected in 500 mL plastic bottles by first rinsing the bottle with the sampling water three times. Samples were then sent to Maldives Water and Sewerage Company's (MWSC) water quality assurance laboratory for testing.

4.2. Current measurement

A drogue constructed from plastic plates joined together by bolts to make four fins (Figure 6) to catch the currents, were used to measure currents. The drogue was deployed for five minutes, the start and end location of the drogue was geo-referenced using a hand-held GPS (Figure 6). The distance travelled was later calculated and the speed of currents determined. Drogue runs were done at 4 different locations (the locations of current measurement are shown on Figure 7 and respective GPS coordinates on Table 5.)

Figure 6. Drogue deployed at sea for current measurement (left) and hand-held GPS used to geo-reference sampling locations

4.3. Benthic Substrate Analysis

CPCe software was used to assess the benthic substrate, which is one of the most widely used tools for marine assessments. 15 pictures were taken at each respective site from which 10 photos are chosen for analysis (Refer to Figure 7 and Table 5 for sampling locations and respective GPS coordinates). CPCe used 25 points on each photograph to point out the substrate found at each point. The software calculates the percentage of each substrate for the 10 photographs. The method is repeated to take 4 transects at different locations.

4.4. Fish Census

The number of fish encountered while swimming for 5 minutes in a straight line on the reef were all counted to get the total abundance. Fish census were carried out at the 5 locations where benthic substrate analysis were undertaken (Refer to Figure 7 and Table 5 for sampling locations and respective GPS coordinates). The relative abundance for each family is then calculated.

4.5. Limitations and uncertainty in data collection

There are several sources of uncertainty and limitations in any data collection method, some of which we aren't even aware of it. Nonetheless, the possible sources of uncertainty and limitations for the methods used to collect data for this EIA is described below.

Firstly, the water quality tests were not done on-site, therefore the results may not reflect the actual physical parameters of water for example temperature.

Current measurements were taken only at one time. While currents may change depending on the time and the season.

During benthic substrate analysis, the category of the substrate is very subjective and hence different analyzers may perceive a substrate category differently. To avoid this human bias, one analyzer has analyzed all the transects for this EIA.

Fish census were taken only at one time, while the abundance of fish may differ with tide, day and night and with season. Furthermore, since the fish census was done via snorkeling only the fish mostly living at 0-5m depth would be recorded.

4.6. Geo-referencing

The geo-coordinates for each sampling location is shown in Figure 7 and Table 5 below.

Table 5: Geo-coordinates for all sampling locations at Kanuhura

Code	Type	Location	GPS Coordinates	
			Easting	Northing
P1	Coral transect, fish census & marine water sample	Project site	334660.075	611917.902
P2	Coral transect, fish census, drogue deployed & marine water sample	Project site	334787.776	611854.833
P3	Coral transect, fish census, drogue deployed & marine water sample	Project site	334736.754	611736.805
C	Coral transect, fish census, drogue	Southeast from the project site	334917.287	611690.029

	deployed & marine water sample			
M1	Coral transect, fish census & drogue deployed	North from the project site	334568.720	612074.048

Figure 7: Sampling locations locations at Kanuhura

5. EXISTING ENVIRONMENT

5.1. The Maldivian setting

Maldives, officially known as the Republic of Maldives and sometimes referred to as the Maldive Islands, is an island nation (Zahid, 2011) consisting of nearly 1192 islands on a double chain of 26 natural atolls (administratively divided into 20 atolls), 80-120 km wide, in the Laccadive Sea in the Indian Ocean (Ministry of Environment, Climate change and Technology & Construction [MEC], 2004). Elevating less than 3 meters above mean sea level, with 80% of land area less than 1 m, Maldives is the flattest country in the world. The total area is about 107,500 km^2 of which roughly 300 km^2 of landmass (Zahid, 2011), with a population of about 338, 434 (as per September 2014 census) (UNFPA, 2016) spread over 194 inhabited islands (Department of National Planning [DNP], 2010). Stretching 860 km from latitude 7°6”35”N, crosses the Equator to 0°42”24”S, and lies between 72°32”19”E and 73°46”13”E longitude (Zahid, 2011). These coral Atolls are located on the 1600 km long Laccadives-Chagos submarine ridge extending into the central Indian Ocean from the SW coast of the Indian sub-continent (MEC, 2004).

The Atolls vary greatly in shape and size as well as the characteristics of the Atolls, reefs and reef islands vary considerably from north to south. The northern atolls are broad banks, discontinuously fringed by reefs with small reef islands and with numerous patch reefs and faros in the Lagoon whereas in the southern atolls, faros and patch reef are rarer in the Lagoon, continuity of the atoll rim is greater and a larger proportion of the perimeter of the Atolls is occupied by islands. The islands also differ depending on location, form and topography. The islands vary in size from 0.5 km^2 to around 5.0 km^2 and in shape from small sandbanks with sparse vegetation to elongated strip islands. Many have storm ridges at the seaward edges and a few are characterized by swampy depressions in the center (MEC, 2004).

Located on the equator, Maldives experiences a warm, humid tropical climate or a monsoonal climate with two distinct seasons known as the northeast monsoon (dry season) from January to March and southwest monsoon (wet season) from May to November (MEC, 2004). The southwest season brings in torrential rain (Zahid, 2011) and rainfall varies from north to south along the atoll chain, with a drier north and wetter south (MEC 2004). Rainfall varied from 1,407 mm to 2,707 mm interannually over the last 30 years. May, August, September and December are the wettest months and January to April the driest (MEC, 2004).

The annual and seasonal temperatures vary very little with a mean annual temperature of 28°C (MEC, 2004); however, the diurnal temperature fluctuates from 31°C during the day to 23°C at night. This is associated with the small size of the islands and the tempering of the hot days by cooling sea breezes surrounding the islands (Zahid, 2011). The highest and lowest temperatures on record are 36.8°C on May 1991 and 17.2°C on April 1978 respectively (MEC, 2004).

Ocean currents are driven by the monsoon winds with the westerly flowing currents dominating the northeast monsoon and easterly currents dominating the southwest monsoon. Changes in current flow patterns occur in April and December corresponding to the transition periods of the southwest and northeast monsoons respectively. Currents near the shoreline slightly differ from oceanic currents depending on the location, orientation and morphology of the reefs and underwater topography (Zahid, 2011).

Sea surface temperature (SST) is reasonably constant throughout the year and ranges between 28 to 29 °C. Mean monthly SST rises from December/January to April/May. However, May 1998 experienced a mean monthly SST of 30.3 °C which is expected to occur every 20 years. Furthermore, temperature drops rapidly to below 20 °C at a depth of 90-100 m (MEC, 2004).

5.2. Climatic conditions

The Bureau of Meteorology of Maldives has compiled a range of climate variables since 1975 from five different meteorological stations located across the Maldives. Climate variables including temperature and rainfall were analyzed for the Hulhule' station as the Bureau of Meteorology of Maldives classify Lhaviyanu Atoll to the central region of the Maldives even though the measured distance from Kanuhura to Hanimaadhoo is shorter 141 Km (Kanuhura to Hulhule' is 148.5 Km).

5.2.1. Temperature

Analysis of temperature data shows that the variation in temperature throughout the year is generally very minimal, however, daily temperature ranges from 34.9°C during the day to 19°C at night. Looking at the monthly variation in temperature, the highest temperature was recorded for the month of April from the meteorological station in Hulhule' reading 31.8°C over the past 45 years. With regards to the minimum temperature, the lowest temperature at Hulhule', 25.4°C was recorded for November and December (Figure 8).

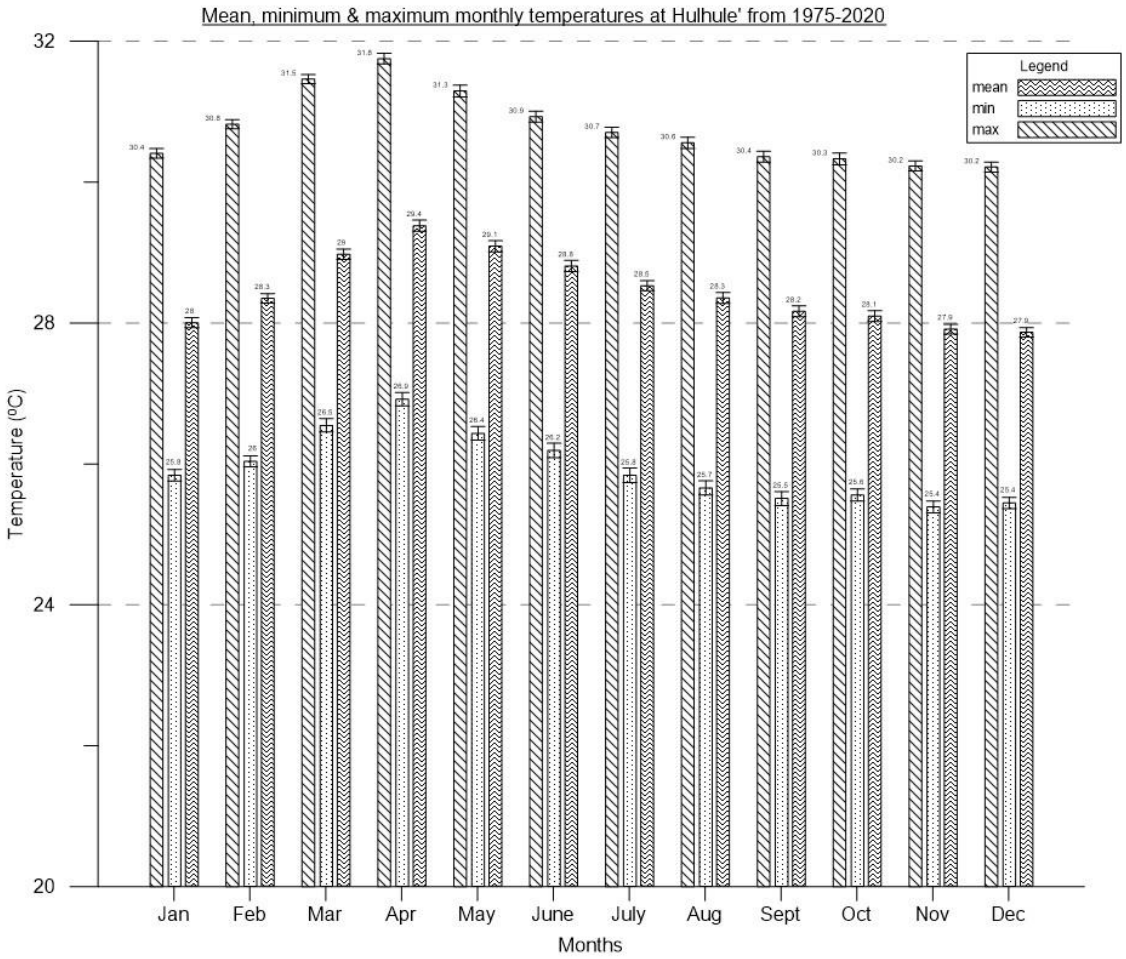


Figure 8. Mean, minimum and maximum monthly temperatures (°C) for Hulhule from 1975 to 2020 (Data obtained from the Bureau of Meteorology, Maldives)

5.2.2. Rainfall

Analysis of rainfall data from 1975 to 2020 at Hulhule' meteorological station shows that the mean monthly rainfall follows the traditionally defined seasons with most rain occurring from May to December and little rain falling outside these months. The highest amount of rain was observed during the month of October with approximately 237 mm of rain on average and the lowest rain was experienced in February, averaging only about 40.4 mm of rain over the past 45 years.

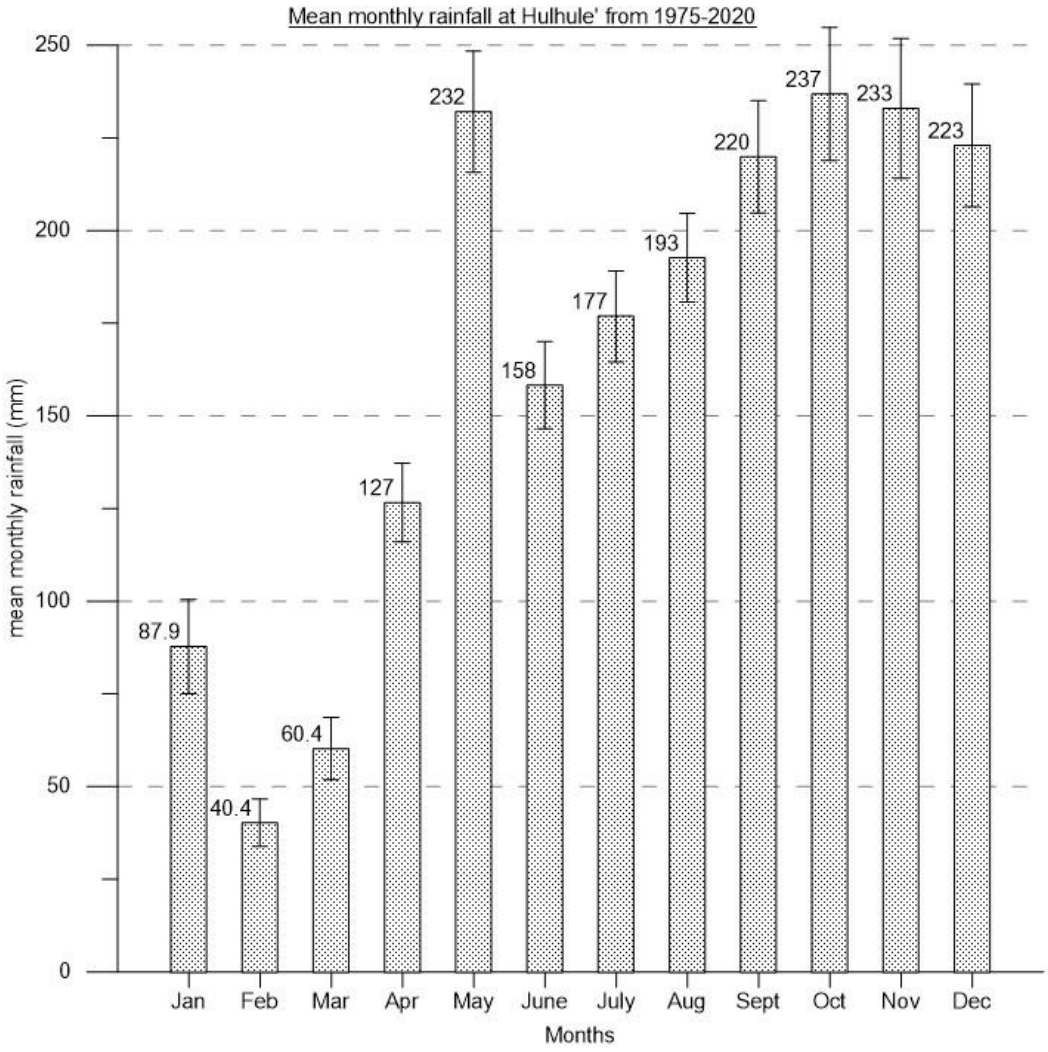


Figure 9. Mean monthly rainfall (mm) for Hulhule from 1975 to 2020 (Data obtained from the Bureau of Meteorology, Maldives)

5.2.3. Wind

Climate in the Maldives is dominated by the Indian monsoon climate South West (SW) monsoon and North East (NE) monsoon. The Indian monsoon system is one of the major climate systems of the world, impacting large portions of both Africa and Asia.

The period of the year during which prevailing winds are from south to westerly direction is known as the SW monsoon (Kench, P.S., Parnell, K.E. & Brander, R.W., 2009). The period during which prevailing winds are from north-easterly directions is known as NE monsoon. Transitions from NE to SW monsoon and vice versa are distinctly different from SW or NE monsoon. During these transition periods the wind becomes more variable.

The SW monsoon lasts between May and September while the NE monsoon lasts between December and February. The period between March and April is the transition period from the NE monsoon to SW monsoon known locally as the *Hulhangu Halha*, while the transition period from SW monsoon to NE monsoon is known as *Iruvai Halha. Iruvai Halha* is from

October to November (Table 6). SW monsoon is generally rough and wetter than the NE monsoon. Storms and gales are infrequent in this part of the globe and cyclones do not reach as far south as the Maldivian archipelago.

Table 6: The four seasons in the Maldives. Source DHI (1999).

Season	Month
NE-Monsoon	December
	January
	February
Transition Period 1	March
	April
SW-Monsoon	May
	June
	July
	August
	September
Transition Period 2	October
	November

By analyzing the available wind data from the meteorological station a windrose was drawn (Figure 10 and Figure 11). The wind speed classes have been categorized according to the beaufort wind scale (Trujillo & Thurman, 2016). According to this scale wind speeds of 4-6 knots are light breeze, 28-47 knots are gales and wind speeds greater than 48 knots are considered as storm. The following table shows the beaufort wind scale.

Table 7: beaufort wind scale

Beaufort number	Descriptive term	Wind Speed (knots)
0	Calm	0-1
1	Light air	1-3
2	Light breeze	4-6
3	Gentle breeze	7-10
4	Moderate breeze	11-16
5	Fresh breeze	17-21
6	Strong breeze	22-27
7	Near gale	28-33
8	Gale	34-40
9	Strone gale	41-47
10	Storm	48-55
11	Voilent storm	56-63
12	Hurricane	64 +

Looking at the mean wind speeds and direction for Hulhule', it was observed that the strongest winds occur from W and WNW directions (in the SW monsoon) and NE, ENE, and E direction (in the NE monsoon). Winds from the South and SE were less prevalent and with

comparatively low speeds. Majority of the times, winds occur at a speed of 7 to 16 kn which is generally known as gentle to moderate breeze. Mean wind speeds above 22 kn occurred from the Western quadrant (W and WNW) to a very low occurrence.

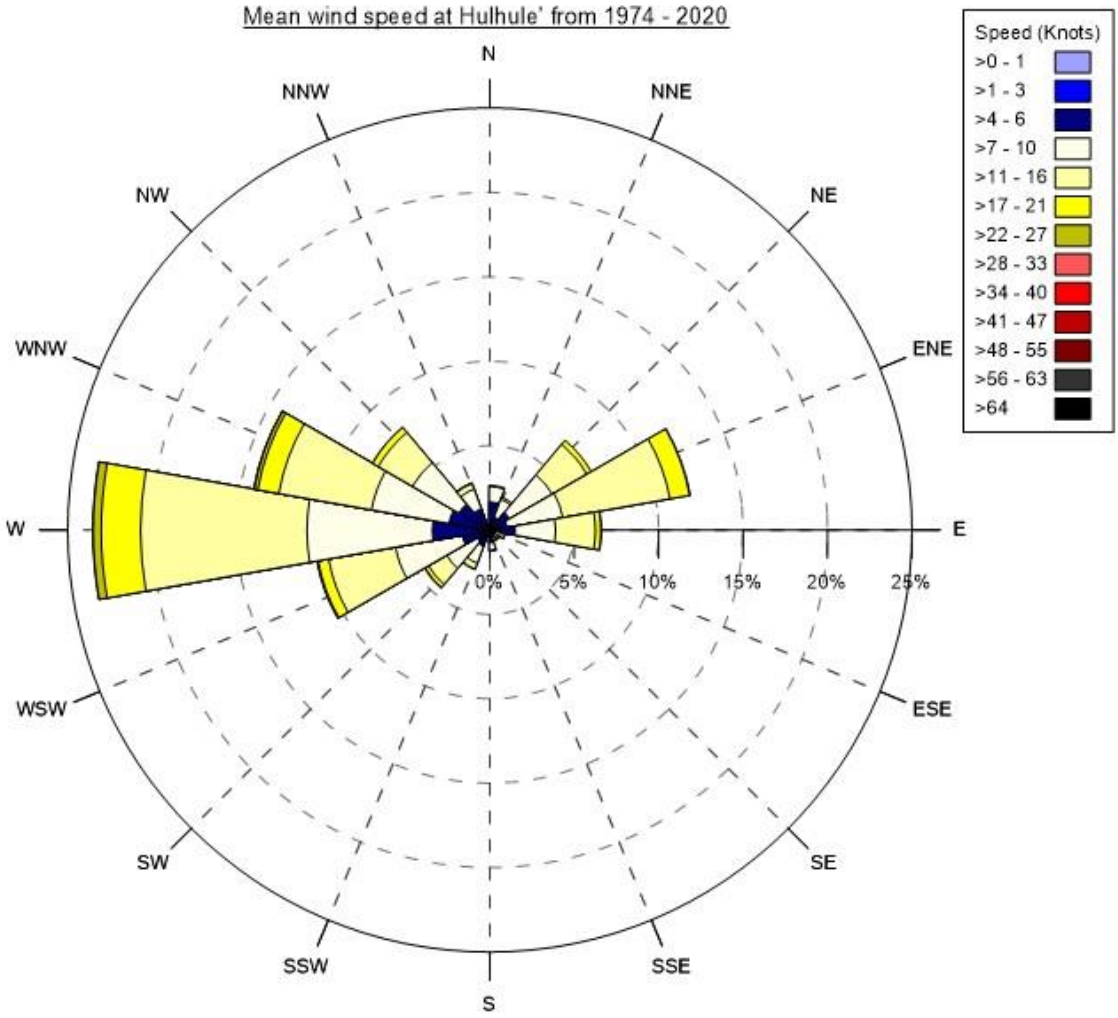


Figure 10. Mean wind speeds for Hulhule from 1975 to 2020 (Data obtained from the Bureau of Meteorology, Maldives)

With respect to maximum wind speeds, visual inspection of the wind rose plot coincides with that of the mean wind speeds. Approximately 2% of the times, wind speeds had gone as high as > 40 kn at this region. The highest recorded maximum wind speed for the region was 90 kn on 21st February 2005 during the data collection period. The most common maximum wind speed is between 7-27 kn.

Wind rose plots for both maximum and mean wind speeds show that winds from the West are dominant (17 % of the times).

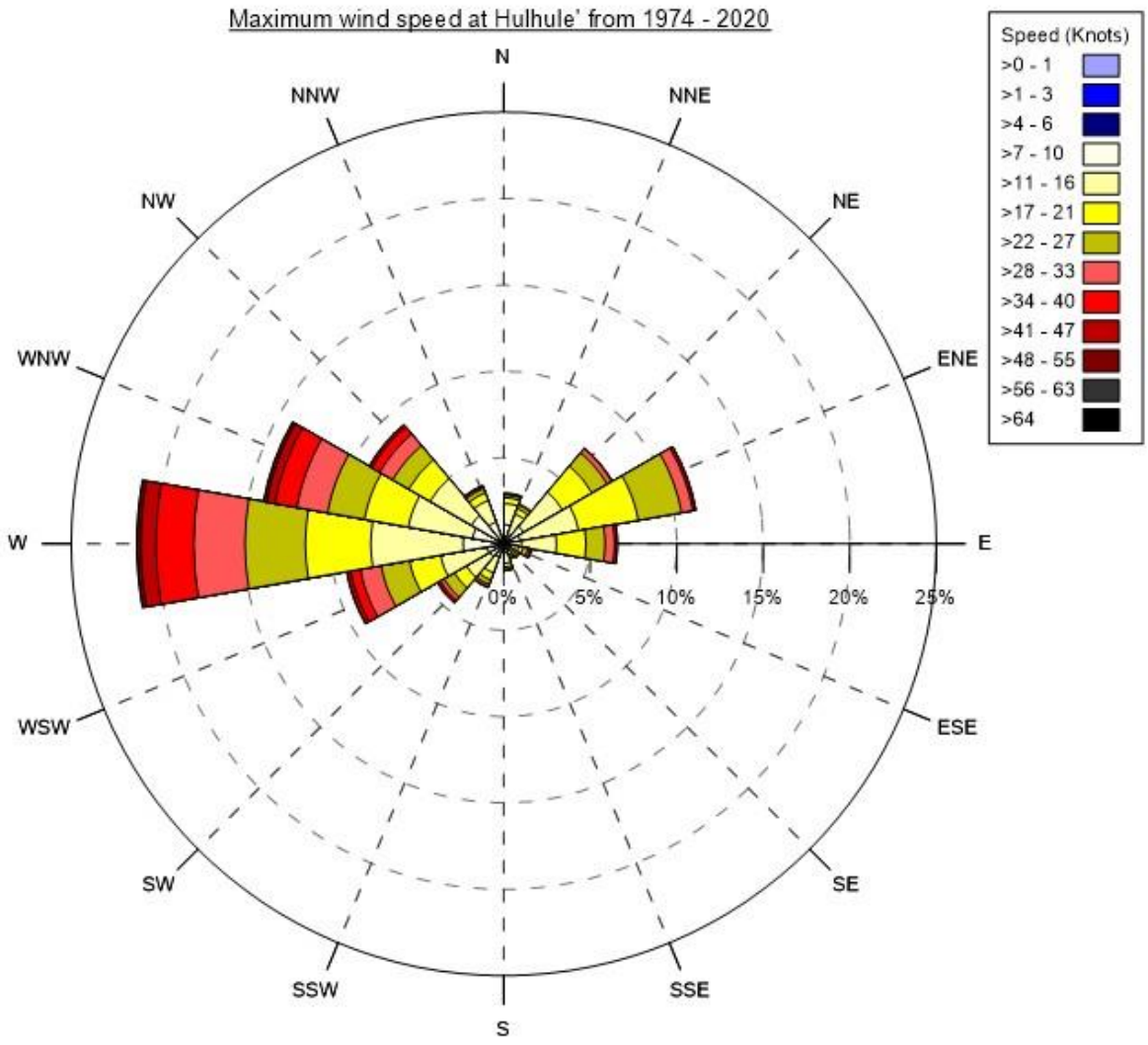


Figure 11: Maximum wind speeds for Hulhule from 1975 to 2020 (Data obtained from the Bureau of Meteorology, Maldives)

5.2.4. Waves

Hydrodynamics features in Maldives have been very poorly studied. Young (1999) shows wave climate data for a ten-year period for each world regional zone. Wave height was measured by satellite (Radar Altimeter), whereas a global wave model was used to precise wave directions. It indicates that the dominant swell approaches from southerly directions (Figure 12). On a seasonal basis, swell is from the south-southwest from April to November (SW monsoon) with a peak significant wave height (Hs) of 1.8m in June, and from the south to southeast directions from November to March (NE monsoon) with minimum Hs of 0.75m in March.

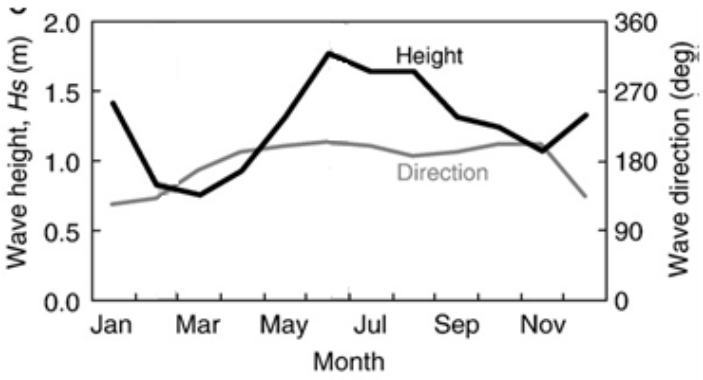


Figure 12: Ten year mean monthly wave height and direction for the central Maldives. Source: Young (1999).

The work of Contestabile, Lauro, Galli, Corselli, & Vicinanza in a report published in 2017 regarding wave energy in the Maldives showed that Young's findings were accurate. They showed that the wave energy in the South (average significant wave height 1.5 m) is higher and diminishing towards the Northern islands (average significant wave height 1.3 m). Furthermore, there is a change in wave energy in the Eastern and Western side of the Maldives which are much more evident for extreme events. The maximum significant wave height in the West is 3.59 m and 3.05 in the East. The main reason for these difference in wave energy is because the majority of the swell waves approach the Maldives from the S-SW direction.

In addition to the swell waves Maldivian islands are impacted by local wind generated waves. Wind waves are generated due to monsoonal winds in the Maldives. Therefore, the strength and direction of wind waves is dictated by the strength and direction of the winds. Since the monsoonal winds are strongest in the SW monsoon between April-July, it is during this period the strongest wind waves would be generated.

5.2.5. Currents

In the Indian Ocean the Maldivian archipelago has relatively stronger currents (Riyaz, 2016). Current speeds in the channels between the atolls can vary between 0.51-0.77 m/s while the currents in the channels within the atolls are stronger and the E-W oriented channels having the strongest currents between 1.5-2.6 m/s (Rober Gordon Univeristy, 2011).

In the Maldives currents are predominantly caused by the complex interaction of oceanic currents, tidal currents and local wind induced currents. The major current that flows through the Maldives is caused by the monsoonal winds. During the SW monsoon the currents flow from W-E and during the NE monsoon from E-W (Rober Gordon Univeristy, 2011). Other factors which influence the currents are waves, local bathymetry and topography. The resultant currents at a specific location in the Maldives is determined by the complex interaction among the aforementioned factors.

Tidal currents are caused by the horizontal movement of water which is caused by the regular rise and fall of the sea level due to tides (Riyaz, 2016). The strength of the tidal currents are determined by the tidal ranges and follow the same periodicities as the tide meaning the tidal currents would be weaker during low tide and vice versa. In general, the tidal currents flow eastward during flood and westward during ebb.

5.2.6. Tides

The tides in the Maldives are semi-diurnal with diurnal inequalities meaning there are two high and two lows everyday with different heights (Rober Gordon Univeristy, 2011). In addition to the daily variation in tides, there are variations in tides due to the lunar cycle which are caused by the varying gravitation pull of the moon due to the position of the moon. When the moon and the sun is aligned in a straight line the gravitational pull is greatest and this causes a spring tide. When the moon and the sun are aligned at 90^0 their combined gravitational pull is at the minimum and this causes a neap tide.

With reference to mean sea level (MSL) the mean higher high water is +0.34 m and mean lower low water is -0.36 m (Riyaz, 2016). However, it has been reported that the highest astronomical tide was at +0.64 and lowest astronomical tide at -0.56.

Table 8: mean tidal variations in the Maldives (Riyaz, 2016).

Tide Level	*Referred to MSL*
highest astronomical tide (HAT)	+0.64
mean higher high water (MHHW)	+0.34
mean lower high water (MLHW)	+0.14
mean sea level (MSL)	0.00
mean higher low water (MHLW)	-0.16
mean lower low water (MHLW)	-0.36
lowest astronomical tide (LAT)	-0.56

5.3. General setting of Kanuhura

Located on the northern half of Maldives, Kanuhuraa is located at the northern periphery of Lhaviyani Atoll at geographic coordinates of 611730.00 m N and 334588.00 m E (Figure 13). The reef system hosting the island is exclusive to the island. The land area of Kanuhuraa is about 14.5 ha. The closest inhabited islands to Kanuhuraa is Hinnavaru at distances of approximately 11.3 km. The island hosting the major international airport of the country, Hulhule' is located 148.5 km to the south of Kanuhuraa (Figure 13).

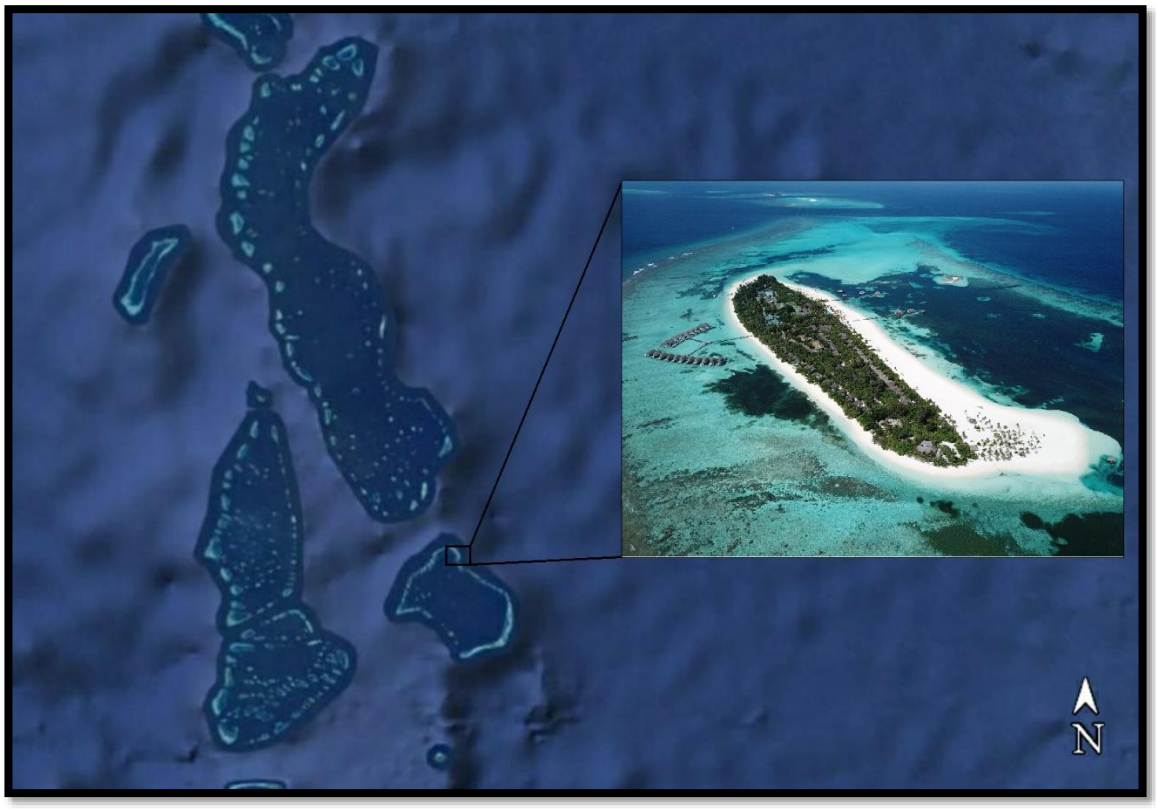


Figure 13. Location of Kanuhuraa (right) in Lhaviyani Atoll

5.4. Marine water quality

Marine water quality was compared with a set of internationally agreed optimal ranges as follows;

Table 9: marine water quality optimal ranges

Location	Optimal Range	Reference
Temperature (^{0}C)	18^0C - 32^0C *Changes should not surpass 1^0C above the average long term maximum	GBRMPA, 2009
pH	8.0-8.3 *Levels below 7.4 pH cause stress	EPA
Salinity (%)	3.2% - 4.2%	GBRMPA, 2009
Turbidity (NTU)	3-5 NTU	Cooper *et al.* 2008

	>5 NTU causes stress	

Marine water test results from MWSC water quality assurance laboratory is attached in **Error! Reference source not found.** of this report.

Among the tested parameters, all were within the optimal ranges.

Table 10: marine water quality test results (parameters exceeding optimal ranges are highlighted in red) for Kanuhura

Location	**P1**	**P2**	**P3**	**C**
Temperature (^{0}C)	23.6	23.9	23.9	24.0
pH	8.18	8.19	8.20	8.26
Salinity (%)	3.449	3.397	3.439	3.343
Turbidity (NTU)	0.127	0.119	0.131	0.123

5.5. Marine environment

During the snorkeling session, it was observed that the Kanuhuraa reef flat had overall low live coral cover (3.4%). At site P1 and P3 the majority of both areas were covered in sand with 94% and 92.8% respectively. It was observed that Site C was dominated by rubble (58.7%) located just southeast of the project site. Furthermore, site M1 was completely covered with seagrass (*Thalassia hemprichhi*) located north of the project site. During the snorkeling period the currents at all the sites were moderate.

5.5.1. Benthic substrate

Major coral categories

The results show that the total live coral cover of the island reef flat was low (3.4%), the dominant substrate is sand (53.0%) followed by rubble (17.6%). Live coral cover was highest at Site C (16.8%). Site P2 and C showed high rubble cover compared to the rest of the surveyed sites, with 25.6% and 58.7% respectively. The detailed percentages of coral covers in transects are shown in Table 11 and Figure 14 below.

Table 11: Major benthic categories

MAJOR CATEGORY (% of transect)	**P1**	**P2**	**P3**	**C**	**M1**	**Mean**	**CI 95%+**	**CI 95%-**

CORAL (HC)	0.0	0.0	0.0	16.8	0.0	3.4	7.1	-0.4
SOFT CORAL (SC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS (OT)	2.8	0.0	6.8	0.0	100.0	1.9	21.5	-17.6
ROCK (RC)	0.0	10.0	0.0	10.9	0.0	4.2	6.9	1.5
RUBBLE (RB)	3.2	25.6	0.4	58.7	0.0	17.6	29.6	5.5
SAND (SD)	94.0	64.4	92.8	13.6	0.0	53.0	69.8	36.1

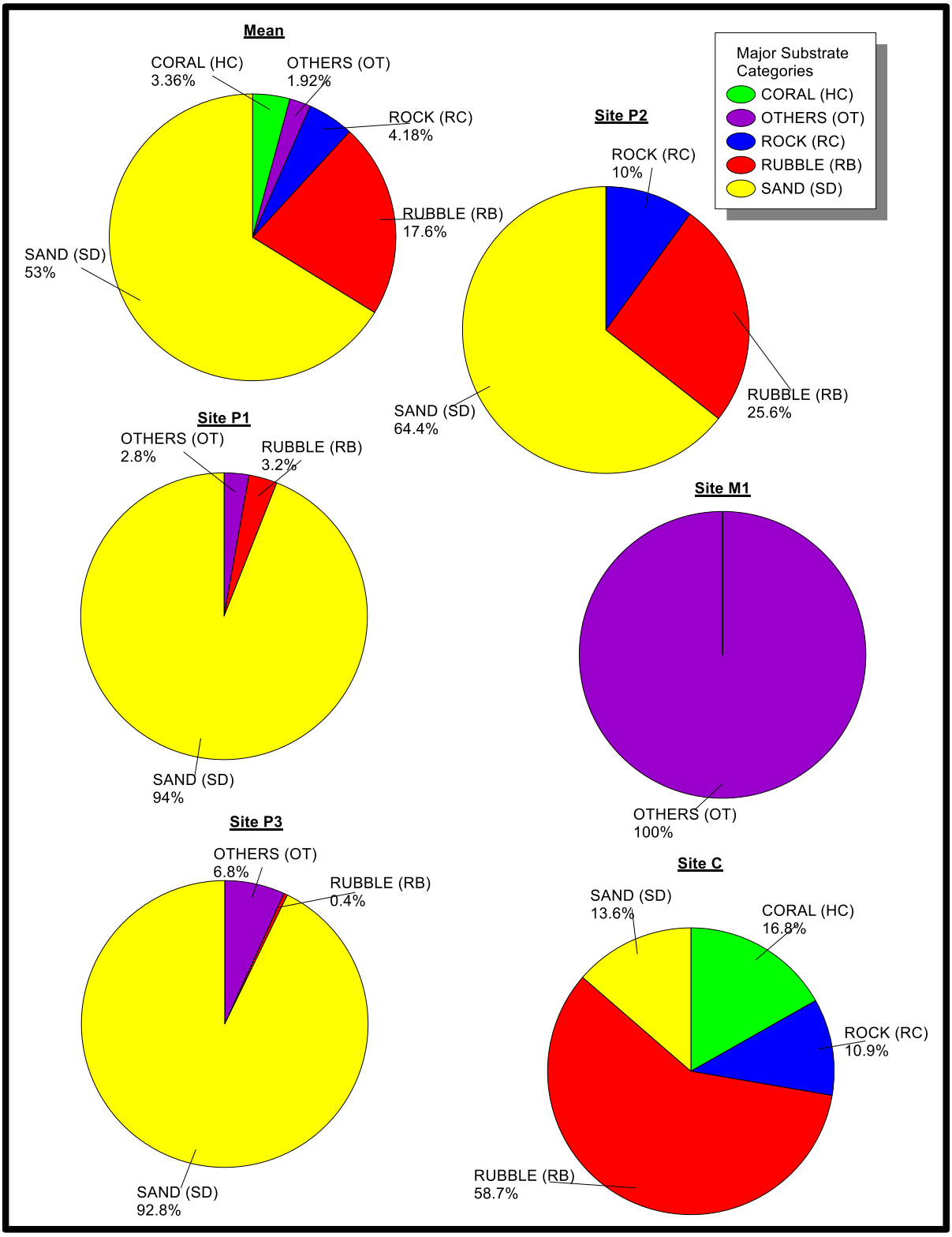


Figure 14: Major substrate categories of all transects and their mean (top left)

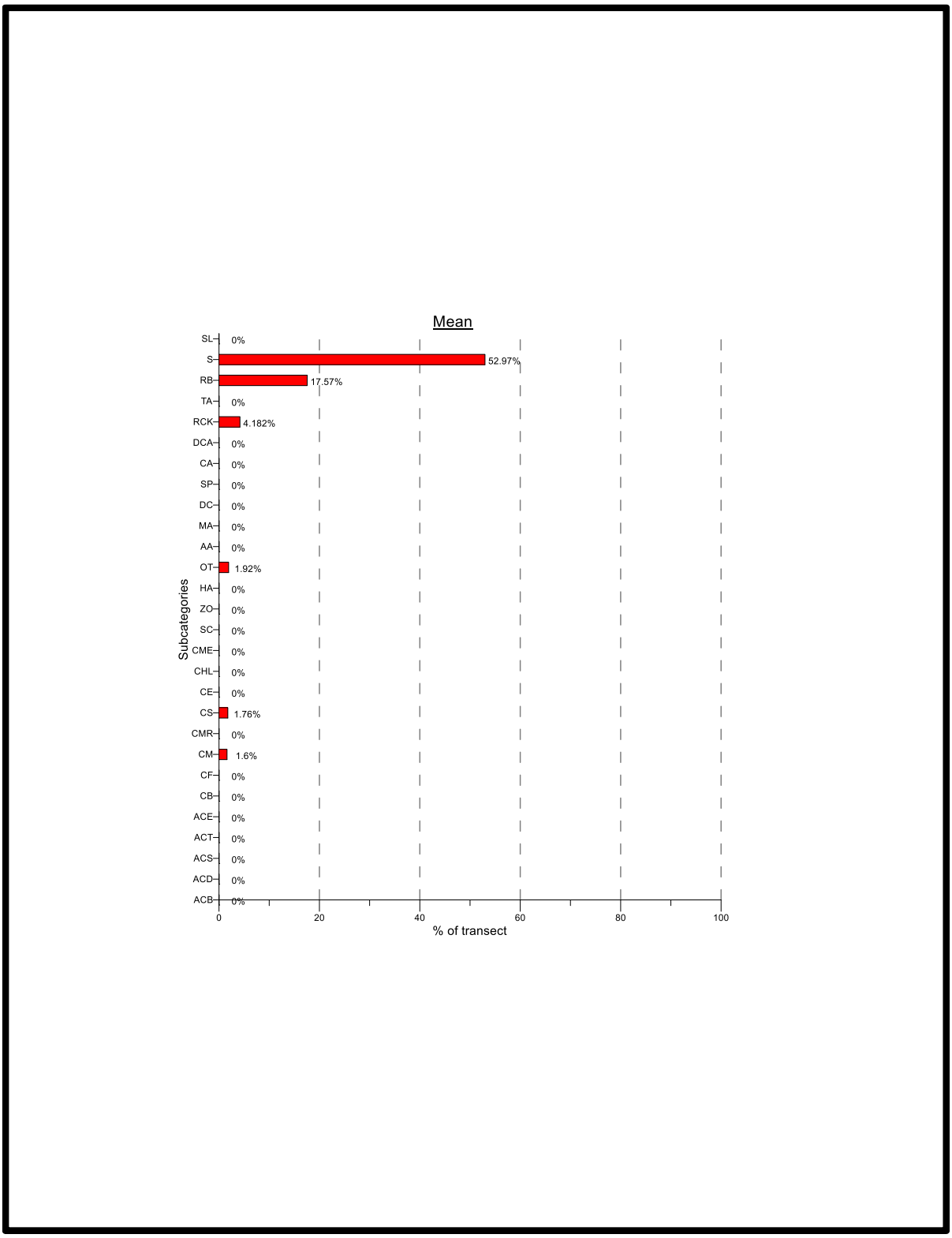
Sub categories

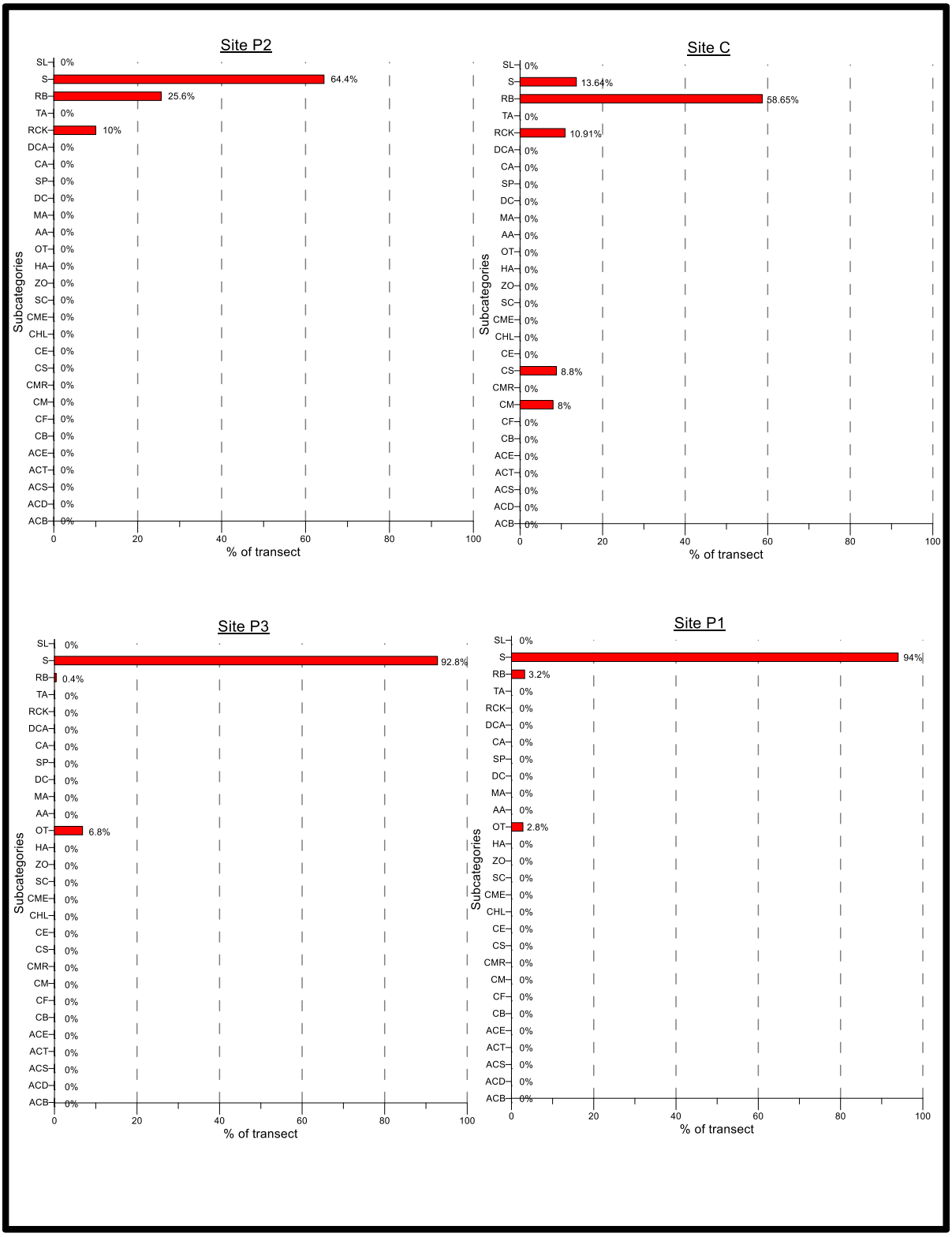
The results show that Kanhuraa reef flat had low coral diversity. The coral categories found at Kanhuraa reef flat were *Coral Massive* (1.6%) and *Acropora Submassive* (0.3%).

Sand dominated the reef flat with 53.0% followed by rubble at 17.6%. Details are shown in Table 12 and Figure 15 below.

Table 12. Percentage of substrate subcategories at Thinadhoo reef

SUBCATEGORIES (% of transect)	C	P1	P2	P3	M1	Mean	CI 95%+	CI 95%-
Acropora Branching (ACB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acropora Digitate (ACD)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acropora Submassive (ACS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acropora Tabular (ACT)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acropora encrusting (ACE)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coral Branching (CB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coral Foliose (CF)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coral Massive (CM)	8.0	0.0	0.0	0.0	0.0	1.6	3.4	-0.2
Coral Mushroom (CMR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coral Submassive (CS)	8.8	0.0	0.0	0.0	0.0	1.8	3.7	-0.2
Coral encrusting (CE)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heliopora (CHL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Millepora (CME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Soft Coral (SC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zoanthid (ZO)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halimeda (HA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other (OT)	0.0	2.8	0.0	6.8	100.0	1.9	21.5	-17.6
Algal Assemblage (AA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Macraoalgae (MA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dead Coral (DC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sponges (SP)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coralline Algae (CA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dead coral with Algae (DCA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rock (RCK)	10.9	0.0	10.0	0.0	0.0	4.2	6.9	1.5
Turf Algae (TA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubble (RB)	58.7	3.2	25.6	0.4	0.0	17.6	29.6	5.5
Sand (S)	13.6	94.0	64.4	92.8	0.0	53.0	69.8	36.1
Silt (SL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0


Mean
SL 0%
S 52.97%
RB 17.57%
TA 0%
RCK 4.182%
DCA 0%
CA 0%
SP 0%
DC 0%
MA 0%
AA 0%
OT 1.92%
HA 0%
ZO 0%
SC 0%
CME 0%
CHL 0%
CE 0%
CS 1.76%
CMR 0%
CM 1.6%
CF 0%
CB 0%
ACE 0%
ACT 0%
ACS 0%
ACD 0%
ACB 0%
Subcategories
0
20
40
60
80
100
% of transect


Site P2
Site C
Site P3
Site P1
Subcategories
% of transect
SL S RB TA RCK DCA CA SP DC MA AA OT HA ZO SC CME CHL CE CS CMR CM CF CB ACE ACT ACS ACD ACB
0 20 40 60 80 100
64.4%
25.6%
10%
13.64%
58.65%
10.91%
8.8%
8%
92.8%
0.4%
6.8%
94%
3.2%
2.8%

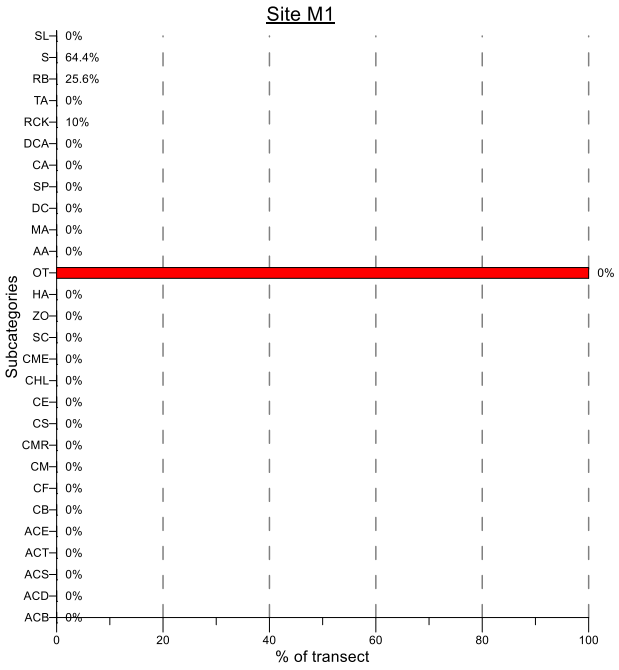


Figure 15: Subcategories of each transect and their mean

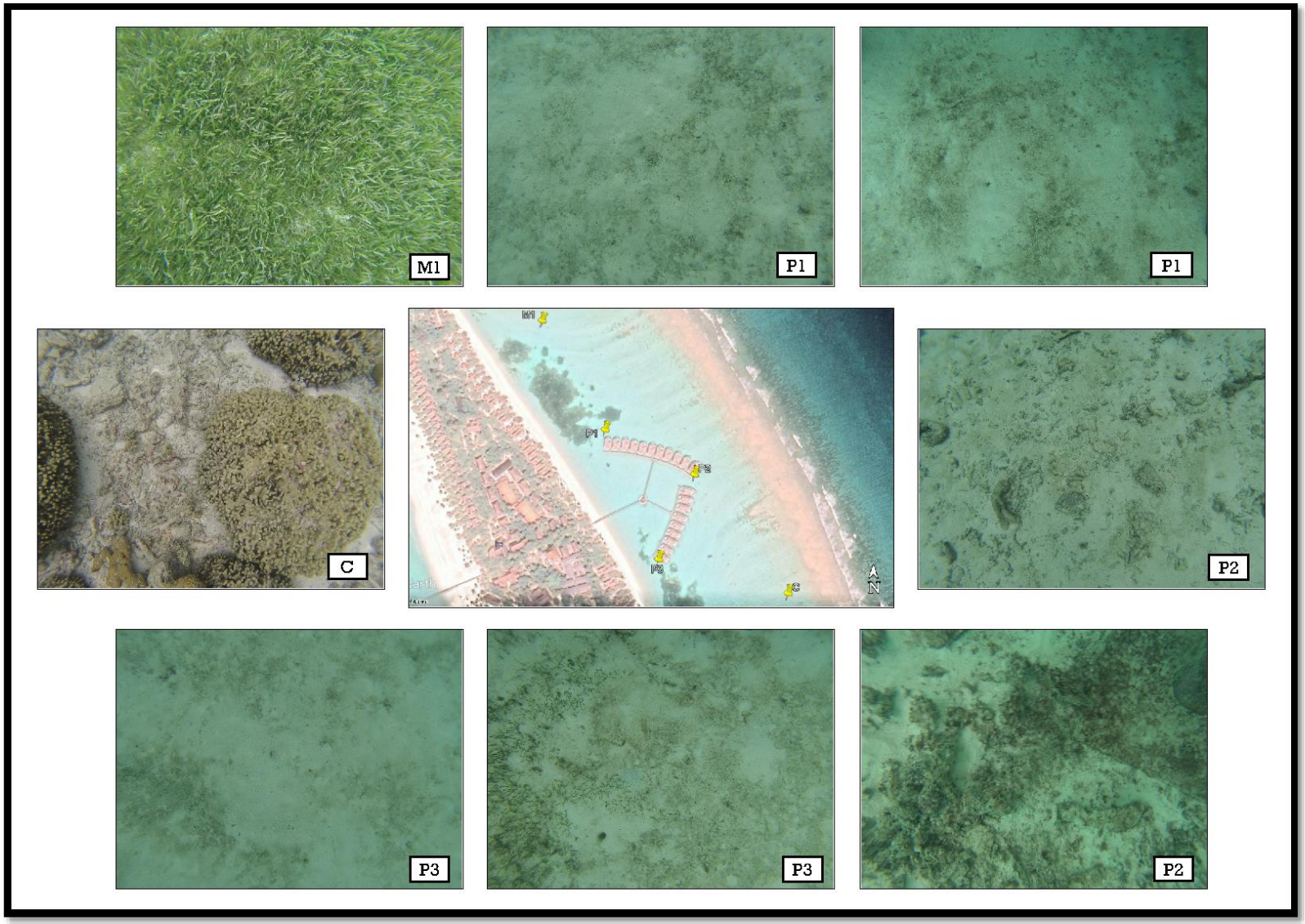


Figure 16: Benthic substrates at Kanuhura survey locations

5.5.2. Fish census

A total of 291 individuals were recorded in Lh. Kanuhura reef from the 5 fish visual census that were conducted, they represent 15 species from 15 genera, and 14 families. The most abundant species were Acantharus bariene (abundance 80), followed by Chromis viridis (abundance 70) and Lethrinus harak (abundance 55).

The most abundant families of fish were Acanthuridae and Pomacentridae (relative abundance 27.5%) followed by Lethrinidae (relative abundance 18.9%).

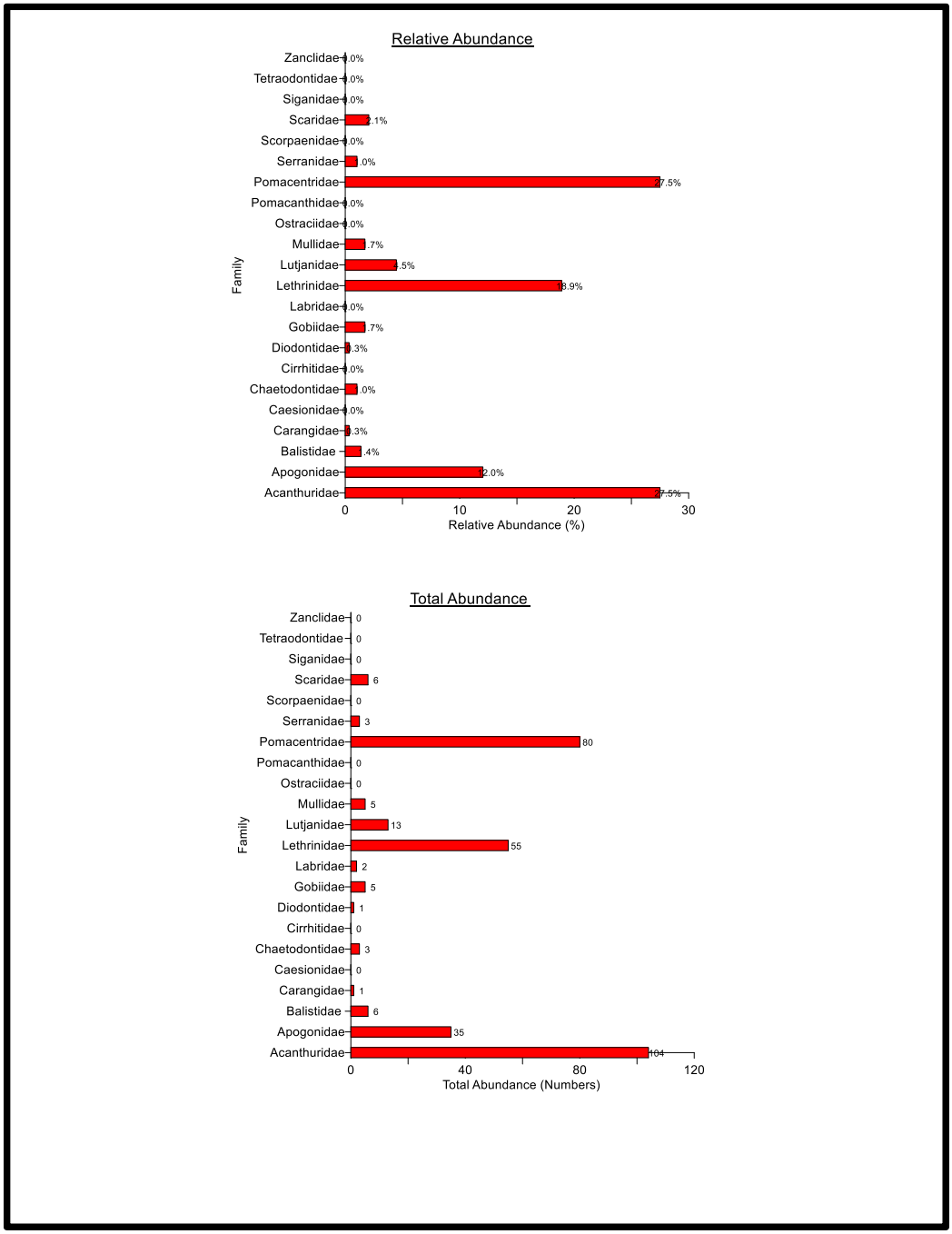
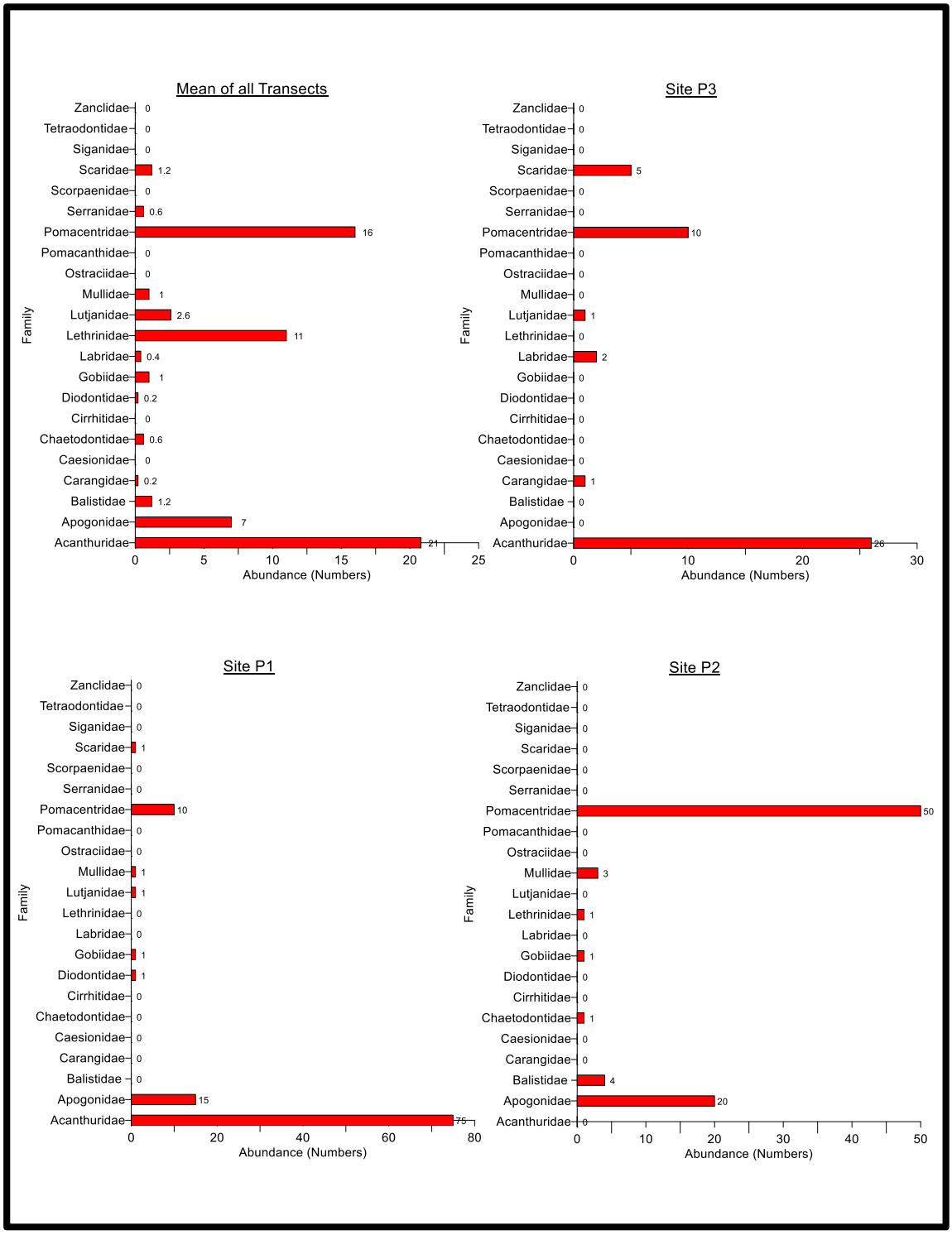


Figure 17: Total abundance (bottom) and relative abundance (top) of fish at Kanuhuraa reef

Looking at the differences in fish abundances at different sites, site P1, P2 and P3 displayed similar number of families except for site M1 where the fish diversity is poor; at this site only 1 family was found. It was observed that site C had the highest fish diversity with 9 families.


Mean of all Transects
Zanclidae 0
Tetraodontidae 0
Siganidae 0
Scaridae 1.2
Scorpaenidae 0
Serranidae 0.6
Pomacentridae 16
Pomacanthidae 0
Ostraciidae 0
Mullidae 1
Lutjanidae 2.6
Lethrinidae 11
Labridae 0.4
Gobiidae 1
Diodontidae 0.2
Cirrhitidae 0
Chaetodontidae 0.6
Caesionidae 0
Carangidae 0.2
Balistidae 1.2
Apogonidae 7
Acanthuridae 21
Family
0 5 10 15 20 25
Abundance (Numbers)
Site P3
Zanclidae 0
Tetraodontidae 0
Siganidae 0
Scaridae 5
Scorpaenidae 0
Serranidae 0
Pomacentridae 10
Pomacanthidae 0
Ostraciidae 0
Mullidae 0
Lutjanidae 1
Lethrinidae 0
Labridae 2
Gobiidae 0
Diodontidae 0
Cirrhitidae 0
Chaetodontidae 0
Caesionidae 0
Carangidae 1
Balistidae 0
Apogonidae 0
Acanthuridae 26
Family
0 10 20 30
Abundance (Numbers)
Site P1
Zanclidae 0
Tetraodontidae 0
Siganidae 0
Scaridae 1
Scorpaenidae 0
Serranidae 0
Pomacentridae 10
Pomacanthidae 0
Ostraciidae 0
Mullidae 1
Lutjanidae 1
Lethrinidae 0
Labridae 0
Gobiidae 1
Diodontidae 1
Cirrhitidae 0
Chaetodontidae 0
Caesionidae 0
Carangidae 0
Balistidae 0
Apogonidae 15
Acanthuridae 75
Family
0 20 40 60 80
Abundance (Numbers)
Site P2
Zanclidae 0
Tetraodontidae 0
Siganidae 0
Scaridae 0
Scorpaenidae 0
Serranidae 0
Pomacentridae 50
Pomacanthidae 0
Ostraciidae 0
Mullidae 3
Lutjanidae 0
Lethrinidae 1
Labridae 0
Gobiidae 1
Diodontidae 0
Cirrhitidae 0
Chaetodontidae 1
Caesionidae 0
Carangidae 0
Balistidae 4
Apogonidae 20
Acanthuridae 0
Family
0 10 20 30 40 50
Abundance (Numbers)

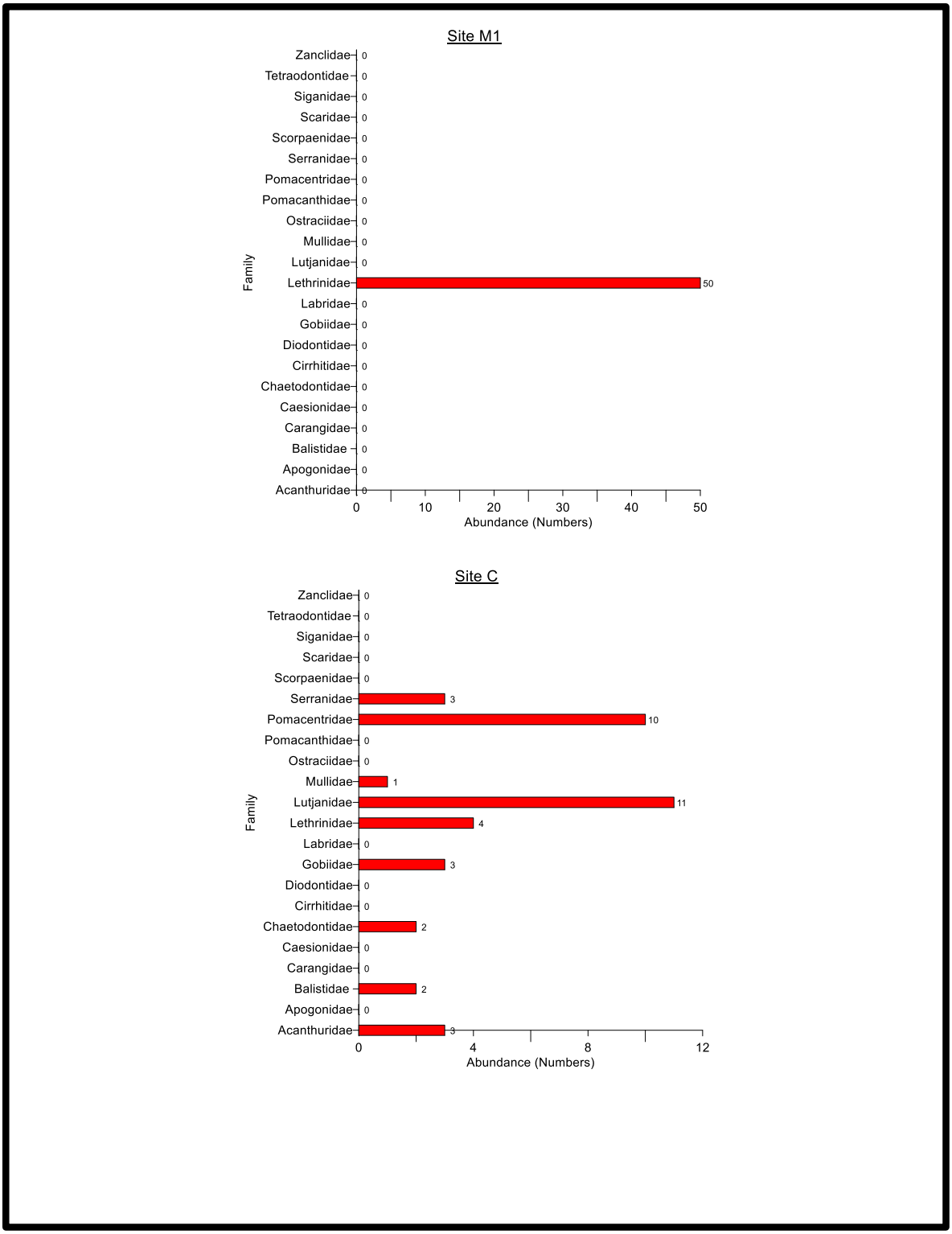


Figure 18: Abundance of fish in 5 survey sites at Kanuhuraa reef flat

5.6. Currents and Coastal dynamics

Kanuhuraa is located on the Northern rim of Lhaviyani atoll. To the SE of the Island lies number of reef systems at the outer rim of the atoll which would obstruct the incoming swells from SE direction. Therefore, the intensity of the Swell waves reaching the Island in the NE monsoon would be low.

During the NE monsoon the winds predominantly blow from ENE. Towards this direction there are no Atolls, Island or Reefs. Therefore, the effective fetch from this direction would be very high and hence the Island would experience strong wind waves from this direction.

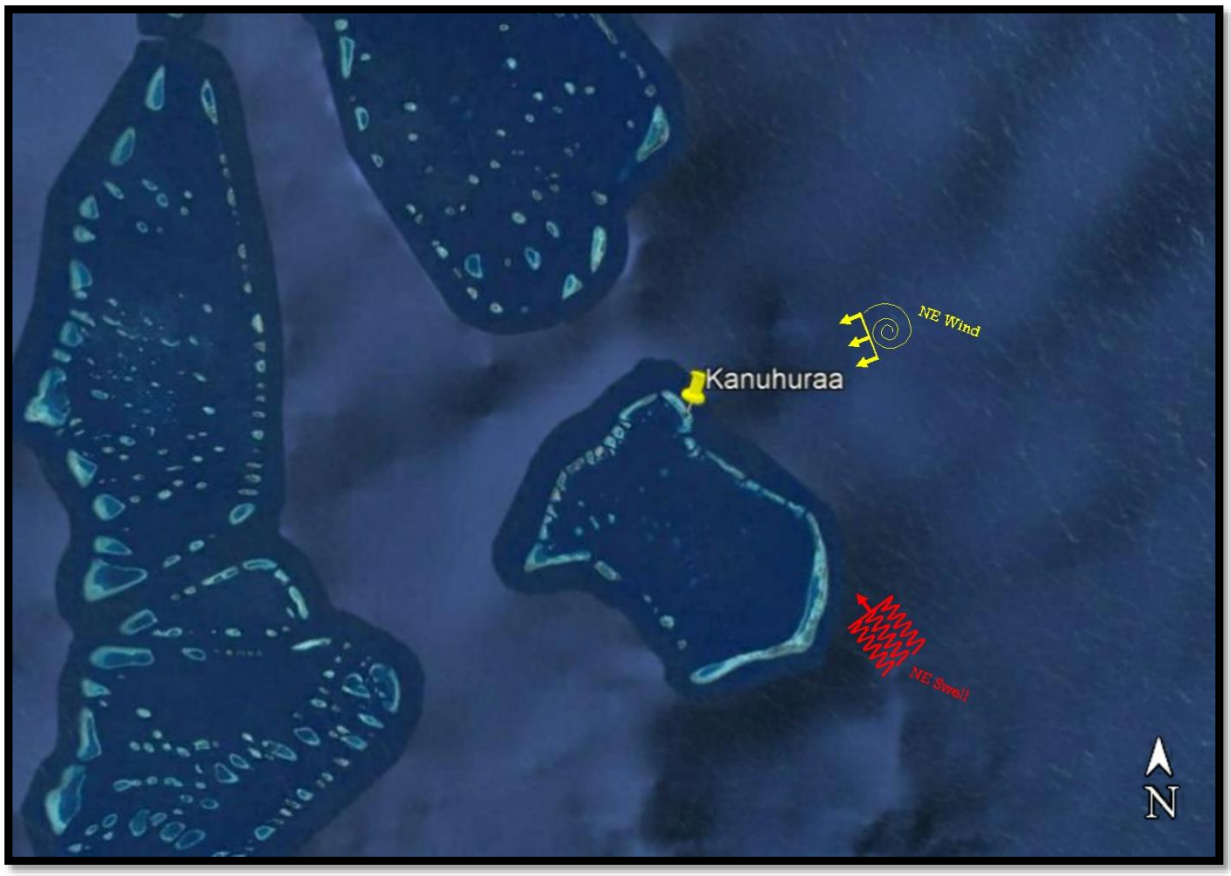


Figure 19. Approach of wind and swell waves to Kanuhura in NE monsoon

During the SW monsoon, swells would approach the island from south to SW directions. To the South lies majority of Lhaviyani Atoll and to the SW lies Baa Atoll with extensive reef systems and Islands, therefore the intensity of swell waves reaching the Island from this direction would be very low.

The strongest winds during SW monsoon comes from the W and WNW direction. In this direction there are a few islands. These islands would reduce effective fetch to some extent, which in turn would reduce the intensity of the wind waves from this direction.

Overall, the strongest waves to Kanuhuraa would most likely come from the W, WNW and ENE direction.

Figure 20: approach of wind and swell waves to Kanuhura in SW monsoon

The current measurements were taken during the SW monsoon when the general pattern of currents through the Maldives is from west to east. Furthermore, in Maldives currents generally flow westwards during low tide. During data collection period there were strong winds approaching from the W and WNW direction which would create high wind driven current towards the east. With the low tide being at its lowest point the strength of the tidal currents would be very low, hence the SSE moving currents. The strongest current measured was from the north of the project site, with a speed of 0.125 m/s flowing in SE direction.

Schematic diagrams showing the measured current patterns on Kanuhuraa reef flat is shown in below.

Figure 21: Current patterns around Kanuhura

5.7. Hazard Vulnerability

The United Nations Development Program (UNDP) has compiled a very thorough study to develop a risk profile for the Maldives in order to determine the probability of hazards across different regions of Maldives based on geological evidence, historical data and projections derived from theoretical analysis (UNDP, 2006). Likelihood of storm hazards for the island under concern are analyzed using this disaster risk management study done by the UNDP and likelihood of flooding is analyzed using rainfall data from the nearest meteorological center to each island. Some island specific data are also obtained from consultation with island councils and personal communication with the islanders.

5.7.1. Storms

In addition to monsoonal heavy rains and strong winds, hazardous weather events which regularly affect the Maldives are tropical storms or tropical cyclones and severe local storms (thunder storms/thunder squalls) (UNDP, 2006).

Every so often, tropical cyclones hitting the Maldives are highly destructive due to associated strong winds that exceed a speed of 150 km/hr, heavy rainfall of above 30-40 cm in 24 hrs and storm tides that often exceed 4-5 m. Strong winds often damage vegetation, houses, communication networks and roads. Heavy rainfall is associated with serious flooding. Cyclonic winds can sometimes cause a sudden rise in sea level along the coast, leading to a storm surge. The combined effect of surge and tide, which is known as ‘storm tide’, can cause catastrophic events in low lying areas, flat coasts and islands such as the Maldives (UNDP, 2006).

Hazards associated with thunder storms include strong winds often exceeding a speed of 100 km/hr, heavy rainfall, lightning and hail. Such thunder storms are very frequent in the equatorial region, which is where the Maldives lie, however, they are less violent at this region. Moreover, land areas are more frequently hit by thunder storms than the open ocean. Strong winds generated by severe local storms generate large wind-driven waves which are hazardous for the Maldives (UNDP, 2006).

5.7.2. Cyclonic winds

Studies of historic data suggests that even though the northern islands of the country were affected by weak cyclones which formed in the southern part of Bay of Bengal and the Arabian Sea, in general the Maldives islands were less prone to tropical cyclones. According to the cyclonic wind hazard zone classification, the north most islands represent the highest risk region and the hazard risk decreases moving down south (UNDP, 2006).

On a scale of 1-5, with 5 being the highest risk zone, *Kanuhura* falls under the high-risk zone (Figure 22) (UNDP, 2006).

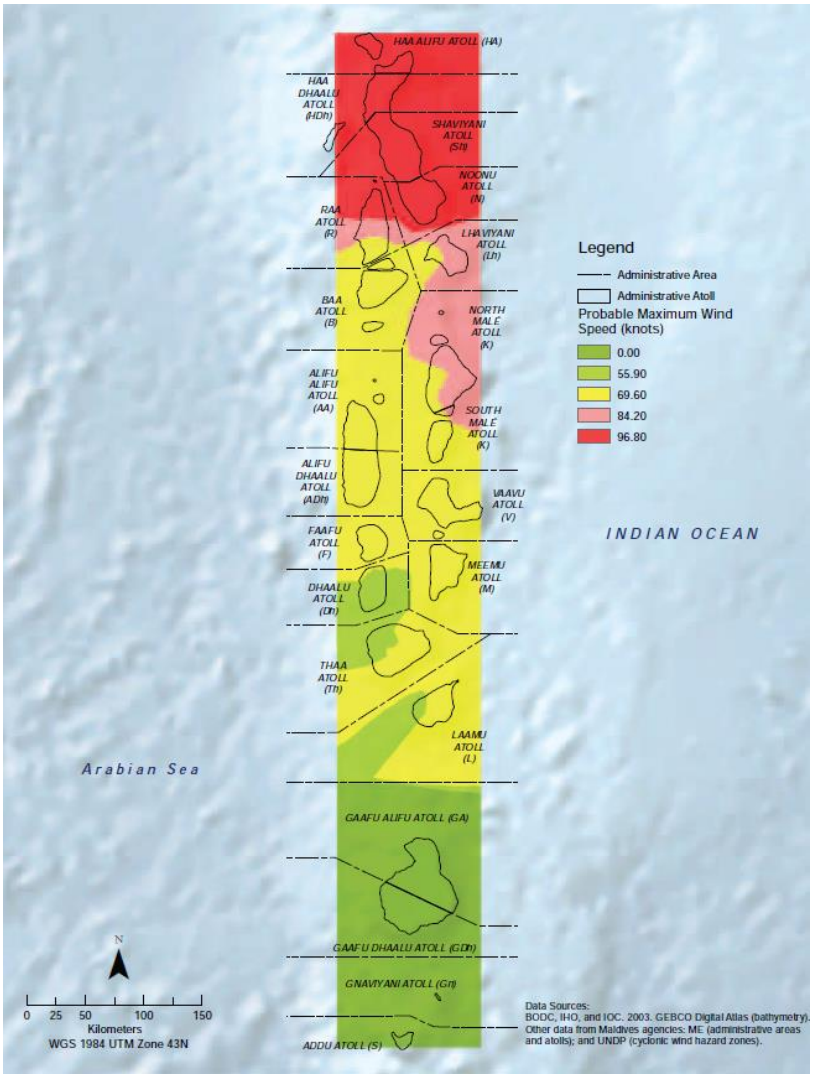


Figure 22: Cyclonic wind hazard map of the Maldives; from red to green, red being the highest at risk(source: Multi-hazard Risk Atlas of Maldives 2020)

5.7.3. Storm surge

According to the bathymetric surveys of the entire Maldives, the ocean slope towards the eastern side is steeper than the west coast which indicates that the eastern islands of the Maldives are more vulnerable to higher surge hazard compared to the western islands. Accordingly, the country has been divided into 5 broad storm surge hazard zones from 1-5, with 5 being the highest risk category. According to this zoning, *Kanuhura* is in moderate risk zone (UNDP, 2006).

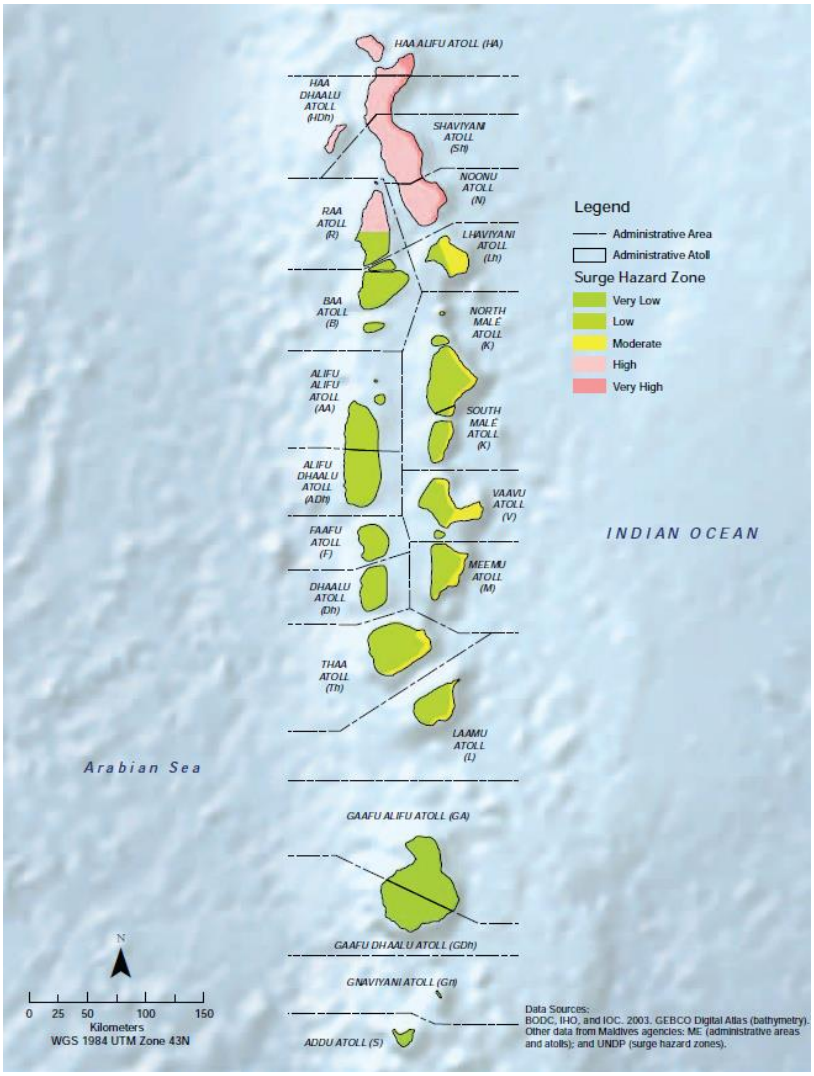


Figure 23: Storm hazard map of the Maldives from pink to green, pink being highest risk (source: Multi-hazard Risk Atlas of Maldives 2020).

5.7.4. Flooding

Rainfall data from Hulhule' meteorological station have been used to analyze the flood and drought years across Hulhule'region. Data has been standardized against the overall mean from each station. Deducing from standard deviation of rainfall from long-term mean, it can be concluded that if the difference between long-term mean and standard deviation is >1, that corresponding year is a flood year whereas if this difference is <-1 it may be considered a drought year.

As such, analysis of rainfall data from Hulhule' station shows that this part of the Maldives experienced more rain deficient years than heavy rainfall years. As for flooding, 5 years observed rainfall >1 standard deviation from the long-term mean (Figure 24) indicating that flooding is an uncommon occurrence at this part of the Maldives. In addition, the 10 year moving average predicts that 2021 will not be a flood year.

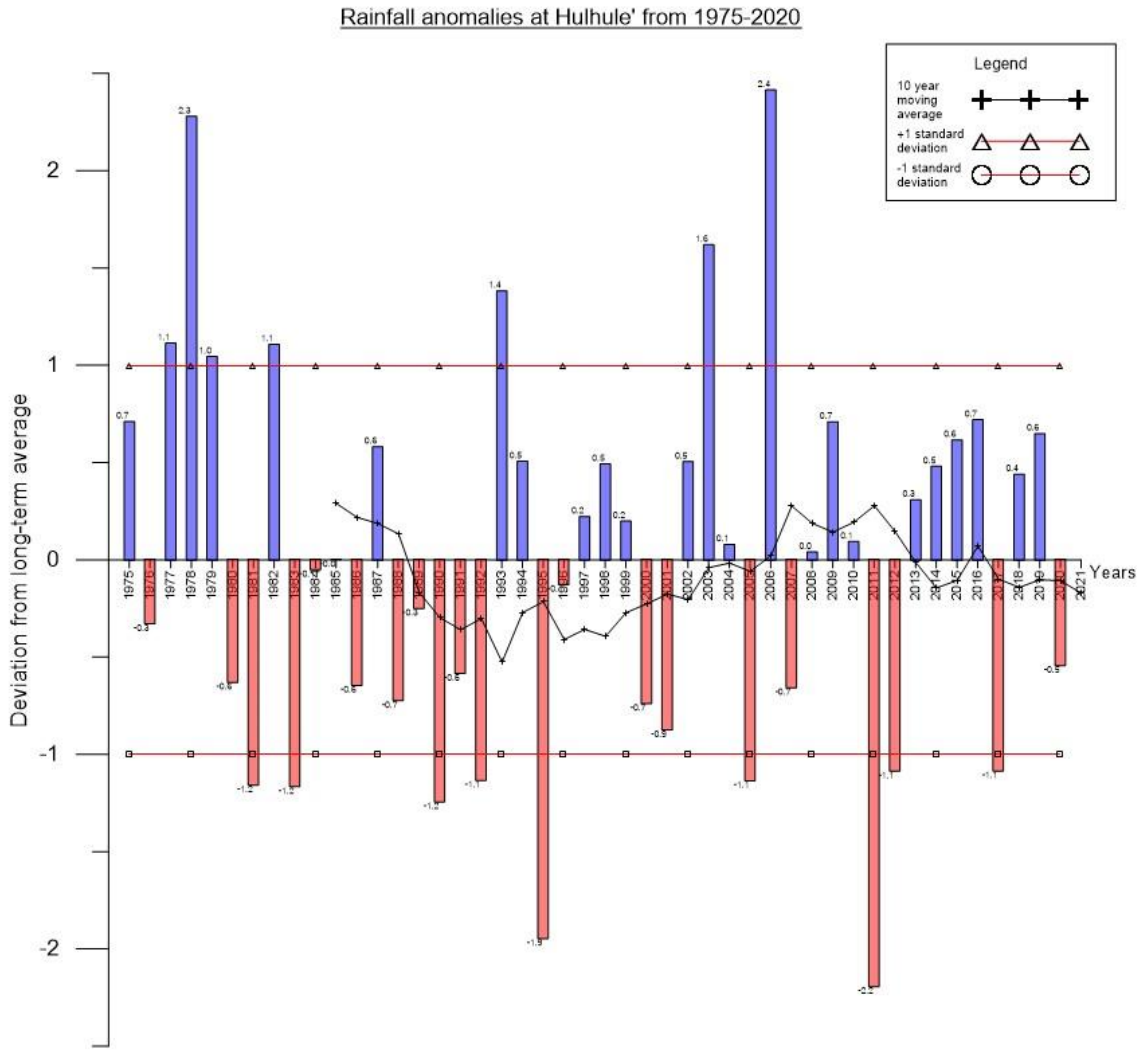


Figure 24: Rainfall anomalies for Hulhule' from 1975 to 2020 with the 10-year moving average. Red lines indicate +1 and -1 standard deviations from the mean. (Data obtained from the Bureau of Meteorology, Maldives).

However, there are other factors that greatly influence risk of flooding for instance alterations to the islands size, width and topography, an islands risk to flooding may vary despite similar rainfall patterns.

5.7.5. Seismic Activity

Seismic waves are created when the earth's lithosphere releases a sudden burst of energy shaking the surface of the planet. Earthquakes are manifested when fault lines or tectonic plates move due to these seismic waves. When this occurs at large magnitudes at the seabed, it can cause tsunamis. Only three major events of magnitude above 7.0 had struck the region between 1979 and 2004 (UNDP 2006).

Kanuhura is located in the Central region which is in the lowest risk zone.

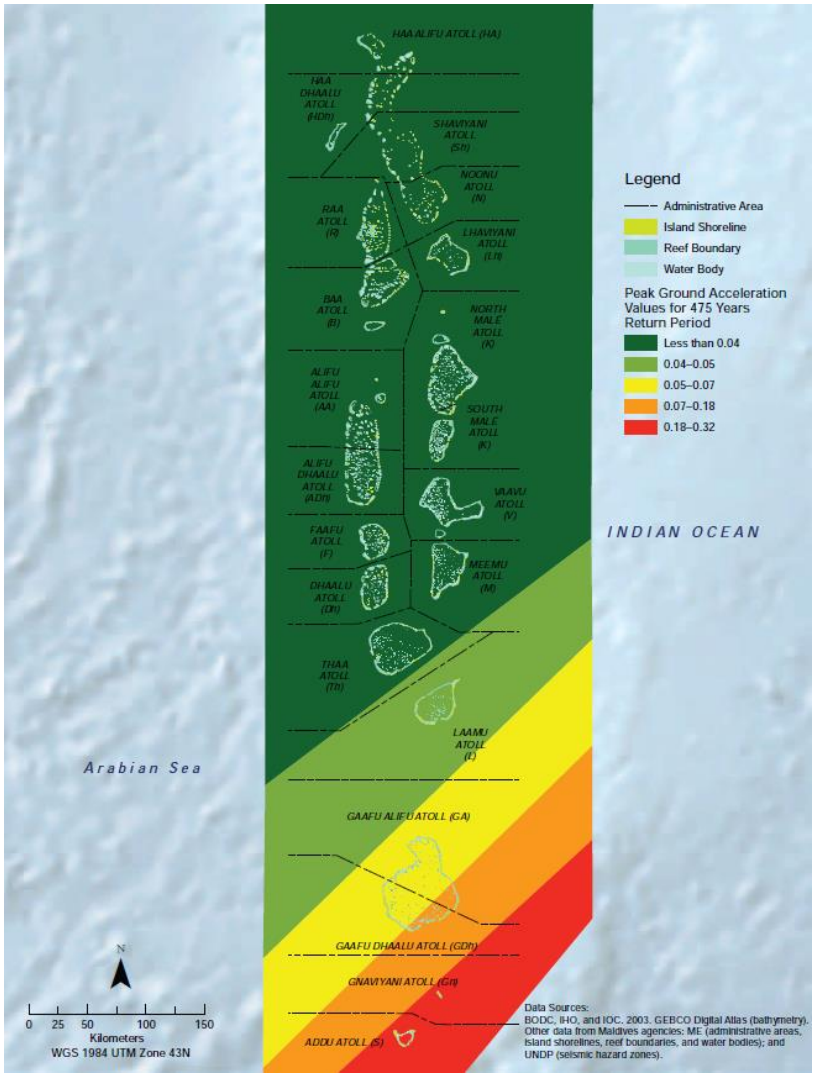


Figure 25 Seismic hazard zoning map of the Maldives from green to red, red being the highest at risk (source: Multi-hazard Risk Atlas of Maldives 2020)

5.7.6. Tsunami

Tsunamis are destructive oceanic waves generated due to disturbances on the sea floor such as earthquakes, volcanic eruptions, underwater landslides, or even meteorite impacts.

In 2004 the second largest tsunamigenic earthquake globally recorded hit Indonesia and generated tsunamis 3-10 meters high travelling across the Indian Ocean striking Maldives with waves ranging 1.2-4.2 m. Out of 198 inhabited islands, 13 were destroyed, 56 sustained major physical damage, and 121 faced moderate damage from flooding.

95% of tsunamis that effect Maldives are generated from the eastern source zones. The risk is high for eastern fringe of eastern atolls, though eastern fringe of some western atolls is also at high risk. By observing bathymetric contours, the islands have been categorised into 5 zones with 1 being the lowest hazard level. *Kanuhura* is in a very high-risk zone.

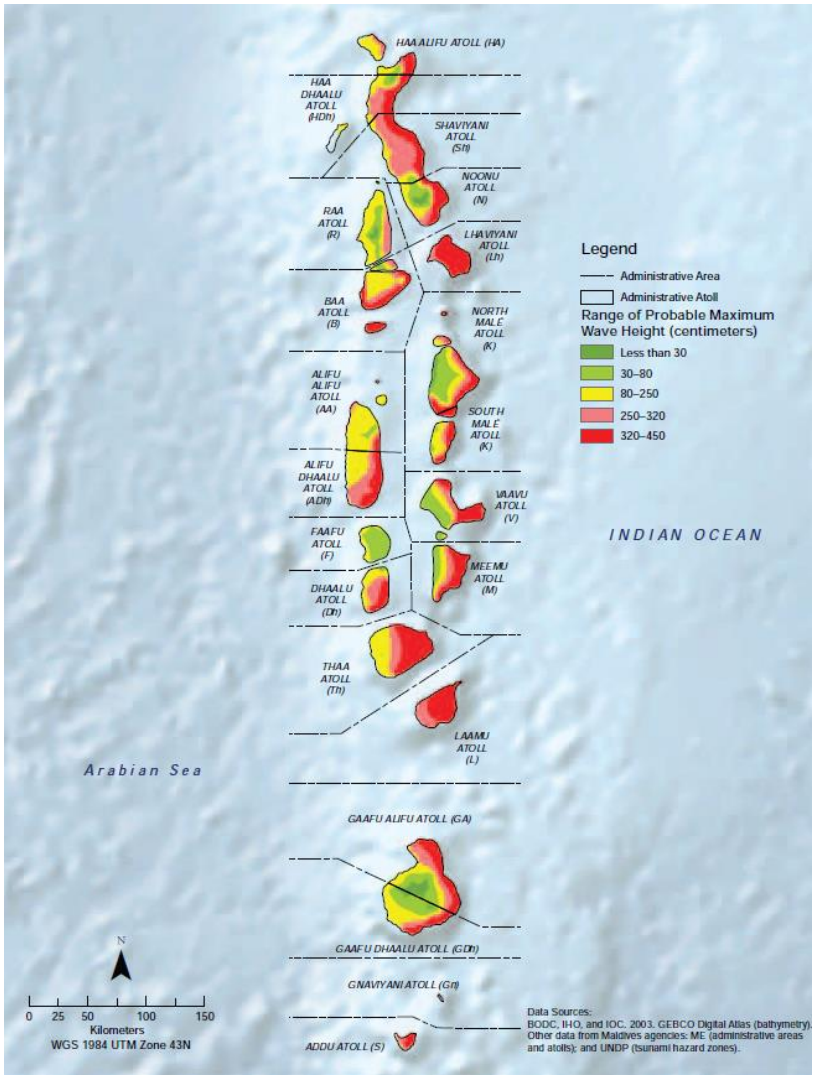


Figure 26: Tsunami hazard zoning map of Maldives (source: Multi-hazard Risk Atlas of Maldives 2020)

6. STAKEHOLDER CONSULTATION

An integral part of this EIA has been consultation with all relevant parties. As such stakeholder consultations were undertaken with the proponent, EPA and MoT.

6.1. Stakeholder consultation with proponent

Date: 02/07/2020

Time: 08:45 – 09:00 hours

Place: Kanuhuraa Maldives resort

Name	Designation	Organization	Contact
Mahfooz Abdul Wahhab	EIA Consultant	-	9994467
Ibrahim Rashihu Adam	EIA Consultant	-	7785434
Kelvin Lim Koko Vu	Project Manager	HPL Projects	012-4047177
Mohamed Riza	Head of Operations	Kanuhura Maldives	7786424

Following are the main discussions and suggestion made during the consultation meeting;

- 4 buggy roundabouts will be constructed. 4th roundabout will also connect the two existing platforms on the east side of the jetty.
- The 2 pools in water villas at either ends will be the only existing structures that would be demolished
- In 4 water villas will have kid rooms extended.
- Except for the columns all the villas will undergo refurbishment and renewal including timber decks and roofing of the villas
- Water villa jetty will also be refurbished in this project
- Some villas have been emptied of furniture and accessories prior to this project.
- Mobilization of the excavator will be carried out from the SW beach of the island.
- Football court will be used as temporary accommodation site for the workers. The site will be connected to the existing sewerage system of the resort.
- A cleared area on the southern side of the island will be used for material storage for the project.
- Excavator pathway initially will move from the existing service jetty on the Eastern side of the island to the project side avoiding all seagrass beds and coral life.
- Water villa jetty will be closed and fenced off as per MoT regulations during the construction phase.

6.2. Consultation with MoT

Date: 11/07/2021

Time: 10:46 hours

Place: Emailed comments

Name	Designation	Organization	Contact
Mohamed Sinan	Environment Officer	MoT	sinan@tourism.gov.mv

Following are the comments made regarding the project;

- Address all the requirements highlighted in the approved TOR.
- Proper waste management set-up shall be in exercised during the project implementation stage.
- To minimize environmental damage special care and protection measures need be to undertake during the project implementation stage.
- Illegal labor shall not be allowed during the project implementing stage.
- Should fulfill all regulatory requirements prior to the commencement of the project activities.

6.3. Consultation with EPA

Date: 05/07/2021

Time: 13:36 hours

Place: Email.

Name	Designation	Organization	Contact
Aishath Samiyya	Administrative Officer	EPA	aishath.samiyya@epa.gov.mv

Aishath mentioned that they are unable to arrange the requested meeting as they have a shortage of staff and that they will email if they have any specific comments regarding the project.

7. OPTIONS ASSESSMENT

The possible causes of actions, in place of another that would meet the same purpose and need, otherwise known as alternatives, have been well considered in this study as alternatives are essential to a sound decision-making process and central to an effective EIA.

With due consideration to the purpose and need for the proposed project, there are three alternatives identified for this project. The "no project" option, alternative locations and the foundation types. Details of which are further discussed below:-

7.1. Option 1: Maintain status-quo

The "do-nothing" option would mean a loss of potential economic activity and no impact on the Kanuhura island environment. The resort will not be able to cater to the new demands of the potential clients and this could mean a loss in competitiveness. In addition, the failure in the refurbishment of the rooms and the jetty will indicate a loss of effectiveness in the general functioning of the resort and delaying this might even lead to an unfortunate incident.

The proposed development is thought to pose mild impact to the environment and the intrinsic uncertainties can be overcome following a proper management.

7.2. Option 2: Alternative location for new water villa

If the new water villa is to be built in any other place of the lagoon, an additional jetty will be required, which would increase the overall impact to the marine environment and increase the disruption to the hydrodynamic flow of the island. Changing the location would also increase the cost and time taken for the construction phase of the project. Therefore, it is preferred to build the new water villa at the proposed location, within the proximity of the existing water villa jetty.

7.3. Option 3: Change location of the new pools

Currently the project involves construction of new pools which require an extension of the lower deck and introduction of new pillars for support. Changing the layout so that the upgrades fall in the existing blueprint can ensure a decrease in impact significance to the marine environment.

However, with the space restrictions the quality of services promised would not be met and resort would fail to the expectations of their target customers. In light of this, changing locations of the pools is not a viable option as it fall short when it comes meeting customers' expectations and the overall purpose of the project.

8. POTENTIAL IMPACT ANALYSIS

The impacts from any project can be categorized into two broad categories; constructional and operational impacts. Constructional impacts are the potential impacts which might arise during the construction stage of the proposed project. Operational impacts are the potential impacts which might arise once the newly constructed building become operational.

8.1. Impact Assessment methodology

The proponent and the consultants have conducted a risk-based environmental review as part of the planning process. Data has been drawn from a wide range of sources, including existing similar EIA reports. Similar EIA reports reviewed for the formulation of this EIA include but not limited to:-

- Environmental Impact Assessment for Partial renovation and Upgrade Works at Kanuhuraa, Lhaviyani Atoll, and
- Environmental Impact Assessment for first addendum to partial renovation and upgrade works of Four Seasons, Kuda Huraa

The impact assessment was conducted based on professional judgment and expertise of the consultants as well as evaluation of the baseline data and consultation with the stakeholders. This provides an outline on how to identify potential hazards associated with the proposal and evaluate the likelihood and consequences. The impact assessment methodology utilized was also consistent with the methodology outlined in AS/NZS ISO31000 Risk Management-Principles and Guidelines and UNEP Environmental Impact Assessment Training Resource Manual.

The first stage of this methodology was to identify potential impacts. To ensure that all potential impacts were identified, it was important that any specific environment and/or community impact issues were determined based on the locations of the project components as well as type of service to be provided. As such, the impacts identified were:-

1. **Constructional impacts:-**
    - Air quality
    - Noise pollution
    - Impacts to ground water quality
    - Impacts from waste
    - Mobilization impacts
    - Impacts on marine environment
    - Risk of accidents and pollution on workers
    - Impacts on landscape integrity and scenery
2. **Operational impacts:-**

- Impacts from noise
- Impacts from waste
- Impacts on air quality
- Impacts on marine environment
- Changes to hydrodynamics
- Impacts on landscape integrity and scenery
- Socio-economic impacts

Impacts were assessed using the following matrix (Table 13).

Table 13. Impact assessment matrix

Likelihood		Consequences				
		Minimal (1)	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
	Remote (1)	Negligible	Negligible	Very low	Low	Medium
	Unlikely (2)	Negligible	Very low	Low	Medium	High
	Possible (3)	Very low	Low	Medium	High	Very high
	Likely (4)	Low	Medium	High	Very high	Significant
	Certain (5)	Medium	High	Very high	Significant	Significant

Characteristics of the impacts on Table 13 is used to determine the consequences (minimal (1), minor (2), Moderate (3), Major (4), Catastrophic (5)). For each specific consequence there is 5 likelihood categories (Table 14). Therefore, if an impact has Moderate (3) consequence but a likelihood of Remote (1), then that impact would have "very low" significance. However if the likelihood is Certain (5) then the impact would have "Very high" significance

Criteria used for assessing the identified impacts are as follows. Note that the realistic and consequences were judges based on the design consideration for the proposed facility. These criteria were measured against the impact (if the impact occurred), to ecological and/or human health:-

- Likelihood:-
  - Remote- May occur only in exceptional circumstances;
  - Unlikely- Could occur at some time;
  - Possible- Might occur at some time;
  - Likely- More likely to happen than not (i.e. a probability of > 50 %); and
  - Certain- Will probably occur in most circumstances.
- Consequences:-
  - Minimal- Impact has no significant risk to environment either short term or long term;
  - Minor- The impact is short term and causes very limited risk to the environment ;
  - Moderate- Impact gives rise to some concern, may cause long term environmental problems but are likely short term and acceptable;

- Major- Impact is long term, small scale and environmentally risky. Impact severely damages the environment; and
- Catastrophic- Impact is long term and irreversible, large scale and detrimental to the environment.

The likelihood measures the probability of occurrence of an event whereas consequences evaluate the significance of impact on the environment in the event of an incident. Based on the likelihood and consequences for each of the identified impacts, the level of risk is determined (Table 13). In addition to the level of risk, other impact characteristics such as the type of impact, nature of the impact, impact range, impact duration as well as reversibility of the impacts are also assessed, grading scales for which are given on Table 14 below.

Table 14. Grading scale of the characteristics of impacts

Characteristic of impact	Grading	Explanation
Type	Direct	Direct impacts without intervening factors or intermediaries
	Indirect	Triggered by but not immediate effect of the proposed project
Nature	Positive	Impacts resulting in a desirable effect
	Negative	Impacts resulting in an undesirable effect
	Cumulative	Impacts of an action when combined with impacts from projects or actions that have been undertaken recently or will be carried out in the near future.
Range	Local	Impacts limited to project site
	Island	Impacts of importance at island level
	Atoll	Impact of importance at Atoll level
	Nation	Impacts of national character
Duration	Short-term	Occurring over a short period of time
	Intermittent	Impacts occurring at irregular intervals
	Long-term	Occurring over a long period of time
	Continuous	Impacts occurring continuously
Reversibility	Reversible	Previous state (or equivalent) can be restored
	Irreversible	Not able to alter the consequence of impact

8.2. Limitations and uncertainties in impact prediction

Risks and uncertainties are inherent in any environmental and ecological problem-solving technique and needs to be acknowledged and incorporated in any decision-making process. Risk is the chance that an adverse outcome occurs while uncertainty arises from an imperfect understanding of a system due to uncertainty about facts (McAlpine et al., 2010). Our understanding of the environment is limited mainly due to the lack of long-term data and complexity of the ecosystem. For example, the assessments were done during one season and impacts are predicted based on these assessments. However, how the magnitudes of these impacts and how they behave in nature during the other season is quite uncertain.

The potential environmental impacts from the proposed project are all predicted, hence there may be variables affecting the accuracy of these impacts due to natural variations such as site conditions and uncertainties in scales and magnitudes. While every attempt has been made to accurately predict the potential impacts from this project, there are unforeseen and uncertain

factors which might cause deviations in the impacts outlined herein. For instance, a natural phenomenon.

Moreover, assessment of existing conditions requires a benchmark against which these conditions can be compared, however, lack of such benchmarks is a great hindrance to analyzing the environmental impacts in some instances. In addition to this, limited time availability and lack of available factual information are among major limitations to impact predictions. In the Maldives, more often than not, limited availability of published information on environmental and social environment of the islands has led to the dependency on verbal communication with locals and island councils which are not always very accurate.

Anyhow, based on the risk assessment outlined above, the environmental impact assessment is set out below:-

8.3. Constructional impacts

Table 15. Predicted impacts and anticipated significance of impacts during construction phase of the project

Potential impacts	Likelihood	Consequence	Significance
Air quality- • GHG emissions • Dust	 Certain Certain	 Minimal Minimal	 Medium Medium
Noise pollution	Likely	Minor	Medium
Groundwater quality from oils and chemical spills;	Possible	Major	High
Generation of constructional and decommissioning waste	Likely	Major	Very high
Mobilization impacts • Barge and excavator • Workforce	 Possible Possible	 Major Major	 High High
Impacts to marine environment	Certain	Major	Significant
Risk of accidents and pollution on workers	Unlikely	Major	Medium
Impacts on landscape integrity and scenery	Likely	Minor	Medium

Impacts during construction phase of the project are mainly anticipated to be short-term and reversible (Table 16) as most impacts will last only for the duration of the construction phase of the project.

Table 16. Characteristics of predicted impacts during the construction phase of the project

Potential impact	Type	Nature	Range	Duration	Reversibility
Air quality- • GHG emissions • Dust	Direct	Negative & Cumulative	Local	Continuous	Reversible
Noise pollution	Direct	Negative	Local	Continuous	Reversible
Groundwater quality from oils and chemical spills;	Direct	Negative	Local	Intermittent	Irreversible
Generation of constructional and decommissioning waste	Direct	Negative	Local	Intermittent	Reversible
Mobilization impacts	Direct	Negative	Local	Short-term	Reversible

• Barge and excavator • Workforce					
Impacts to marine environment	Direct	Negative & Cumulative	Local	Short-term	Irreversible
Risk of accidents and pollution on workers	Direct	Negative	Local	Intermittent	Irreversible
Impacts on landscape integrity and scenery	Direct	Negative	Local	Continuous	Reversible

8.3.1. Impacts on air quality

Impacts on air quality during the constructional phase is a direct impact generally credited to operation of machinery and equipment which require electricity and vehicles which burn fuel. The main contributor would be the operation of the barge, excavator and land-based vehicles that transfer materials and equipment from the temporary site setup to the working areas. The negative impact to air quality would be due to the release of GHGs and any other air pollutants to the atmosphere.

Release of GHGs into the atmosphere during the construction phase is very low and for a short period of time, regardless this would contribute to the GHG emission of the nation; hence the cumulative nature of this impact. The rise in concentration of GHGs in the atmosphere has been a huge global environmental issue which is responsible for global warming, ocean acidification and many other environmental issues.

The other potential impact during the construction phase would be the release of dust during the operation of excavator and land-based vehicles. However, it is anticipated that a negligible amount of dust will be released due to 3 reasons. Firstly, the soil of Kanuhura is dhonveli and hence the grain size is larger to be easily dispersed into the air. Secondly, the material storage is in the Southern end of the Island, as such the vehicles would be travelling on the outer perimeter of the Island where tourist rooms will not be booked for the duration of the upgrade works. Finally, the resort has a good cover of vegetation on its perimeter which will stop any sand which gets blown from reaching inland.

All in all, since the contribution of GHGs due to this particular project compared to the nations budget and the likelihood of dust impacting the guests and people working on the resort is unlikely, this impact got a significance rating of Medium.

8.3.2. Noise pollution

Similar to air quality, impacts on noise level during the constructional phase is a direct impact generally credited to operation of machinery, equipment and vehicles. The highest noise would most likely be generated from the excavator that would be used to lay the columns for the new pools and new villa. During the construction phase the noise may scare away shy birds on the SE side of the Island as there would be moderately high noises coming from the refurbishment and construction works. Disturbances to guests due to noise pollution is unlikely as no villas will be booked on the Southern side of the Island. Noise disturbances to working

staff is likely as the back of house (BOH) area is close to material storage but the level of noise is anticipated to be low.

This impact would be alleviated once the construction works are finished and hence is reversible. Therefore, the consequences from this impact are moderate and hence this impact got a significance rating of very high.

8.3.3. Groundwater quality

Impacts to ground water quality is during the constructional phase is a direct impact credited to the operation of land-based machinery. The impact arises from the potential for occurrence of oils and chemical spills during the operation of these and use of any chemicals. In case of improper use of machinery and equipment, there is the possibility of oils and chemical spillage into the groundwater. Even though it could be minimized with regular maintenance, in the event that oils and chemicals do spill, the impacts could have moderate to major effects on the groundwater quality. Due to the moderate to major consequences and irreversible nature of the impact, this impact scored a significance rating of high.

8.3.4. Generation of constructional and decommissioning waste

A large volume of demolition waste would be generated after removing the existing timber decks of villas and jetty, roofing from the villas and existing pools. In addition, a lot of packaging waste would be generated from the cement, gravels, sand and other building materials used (more so than normal buildings as luxury villas of the resort will require more interior decoration). Therefore, large volume of waste would be generated during the construction phase and if the waste is not managed properly at the construction site, (the water villas of the resort) it could cause serious damage to the surrounding marine environment. This is because improper storage of packaging waste (plastics) could drift into the nearby coral reefs, iron bars thrown into the water can directly damage any corals on its path, and waste chemicals arising from construction activities could be leaked into the water below which could induce changes in the water quality.

However, if the waste generated properly stored and is removed from the project site in a timely manner, the impacts from wastes would be immediately alleviated. Therefore, the likelihood of this impact occurring is likely and hence this impact scored a significance rating of very high.

8.3.5. Mobilization impacts

Mobilization impacts for the project arises from two aspects; firstly, the mobilization of a barge with the excavator. Secondly the mobilization of the work force. The barge is proposed to dock at the southern side of the island to the South of the service jetty. And depending on

the draft of the barge and tug the tug boat may not be able to tow the barge up to the service jetty area. In this case the normal practice is to use the excavator itself to reach the shore. The pathway from the access channel to the shore is almost full of sea grass beds which could get damaged due to this. Although, the top part of the sea grass will be damaged, its rhizomes lie deep inside the sea bottom hence it is expected to recover once construction works ceases. Fish will be able to move away but slow-moving marine organisms maybe squashed by the bucket of the excavator. As sea grass beds acts as important nursery beds for juveniles, it is important to keep their surrounding environment as pristine as possible, the death of seagrass beds even for a short duration could hence cause significant impacts to the species that depend on them. Hence this could cause significant damage to the marine environment.

Mobilization of the work force causes impact from two aspects; firstly, temporary housing facilities for the work force. Secondly the health implications to the working staff and tourists staying on the resort due to the Covid19 pandemic. Temporary housing facility is not anticipated to cause any impacts as prefab houses will be used and the houses will utilize the existing resorts utility scheme. If the workers are mobilized to the resort without proper screening as indicated by the HPA then there is the risk of an outbreak of the corona virus on the resort.

Therefore, considering the above-mentioned factors, the mobilization impacts scored a significance rating of High as this impact is possible and the consequences are major.

8.3.6. Impacts on marine environment

Impacts on the marine environment due to this project arises from three aspects; firstly, direct damage to corals, seagrass beds and sessile marine organisms. Secondly, from turbidity and sedimentation. Thirdly, indirect and cumulative impacts arising from increasing GHGs. Direct damages to corals are caused from the operation of the excavator and the construction of the new villa. The excavator will need to move from the southern end of the island to the construction site (the water villas on the resort). The proponent has confirmed that they will follow the path of least coral and sea grass growth in order to minimise the direct damages to corals. However, the corals present in the new water villa area will be damaged as the placement of prefabricated footings for the water villa pools requires the excavator to enter this area of reef flat, dig out sand and coral rubble, place the footings and re-fill the resulting gaps with the same sand. As such this activity represent, loss of habitat, physical removal of substratum and associated biota from the seabed at the excavation/trenching location as well as burial of material due to subsequent deposition. The magnitude of the impact is less as only one new villa is proposed to be constructed under this project. There are no naturally growing corals on the substratum around the existing water villas and jetty, but there are coral frames planted near the central area of the jetty. These coral frames will be relocated to another area on the reef before the construction starts.

Turbidity and sedimentation are caused due to the sediment plume that will be generated due to the operation of the excavator. While the excavator is working on the existing water villas, it is not anticipated to severely impact the corals as the existing water villas are situated further away from the reef crest where there are live corals. Furthermore, the measures currents indicate that the sediment plume will most likely flow southwards without reaching the reef crest. However, as the new water villa is much closer to the reef crest, the sediment plume generated from here would reach live corals growing near the reef crest. The negative impacts include stress on photosynthetic organisms due to increased turbidity as a result of re-suspension of excavated material. Increased turbidity levels of the water decrease intensity of light through the water column which reduces photosynthesis rates. In addition, sessile marine organisms maybe smothered due to sedimentation which could again hinder its metabolic processes increasing stress on them further.

While the contribution to GHGs from this project maybe negligible, it is the cumulative nature of the impact that is concerning which arises from global warming and ocean acidification. The reason why there is so much concern about global warming is that it increases the temperature of the oceans as the ocean absorbs more heat. While many of the fishes maybe able to tolerate the rise in temperature, the corals are less tolerant. Nonetheless many of the reef fish species depend on the coral reef as a home and few fish species even depend directly on the corals for food and shelter. In a recent paper published by Strona et al, 2021 states that in a hypothetical world where coral reefs are not present the local tropical fish richness across the globe would decline by half. Ocean acidification is the process by which the pH of the oceans decreases due to more dissolving of CO_2 from the atmosphere into the oceans (Ferrero, 2018). Apart from impacts from temperature, the corals and other Calcium Carbonate skeleton based marine organisms are at great risk as lower pH would mean that these organisms would have a hard time maintaining their Carbonate skeletons. Therefore, just as higher temperatures threaten the marine organisms, ocean acidification also threatens marine life to a great extent.

Therefore, considering the above-mentioned factors, the impact on marine environment scored a significance rating of “significant” as this impact is certain and the consequences are Major.

8.3.7. Risk of accidents and pollution on workers

As typical of any construction project, there lies the risk of accidents and pollution on workers as well on the local population from this project as well. There is always the inherent risk of health and safety due workplace incidents. Even though these are unlikely events the consequence of such an event would be catastrophic, therefore this impact is significant.

8.3.8. Impacts on landscape integrity and scenery

As the resort would still be in operation during the construction phase of the project, eventhough the accessibility to the project site would be restricted to the guests, the view of construction works would be a direct negative impact on the scenery and landscape integrity of the resort. The likelihood of this impact is likely with minor consequences as some guests might dislike the view of construction and offer complaints to the resort management. Therefore, the impact significance is regarded as high.

8.4. Operational impacts

Table 17. Predicted impacts and anticipated significance of impacts during operation phase of the project

Potential impact	Likelihood	Consequence	Significance
Impacts from noise	Remote	Minor	Negligible
Impacts from waste	Unlikely	Major	Medium
Impacts on air quality	Unlikely	Minor	Very low
Impacts of marine environment	Certain	Major	Significant
Changes to hydrodynamics	Unlikely	Moderate	Low
Impacts on landscape integrity and scenery	Certain	Moderate	Very high
Socio-economic impact	Certain	Major	Significant

Unlike constructional impacts, operational impacts are anticipated to be more long-term and irreversible (Table 18). It should be noted that with the application of proper mitigation measures as outlined in section 9 of this report, almost every negative impact could be minimized.

Table 18. Characteristics of the predicted impacts during the operation phase of the project

Potential impact	Type	Nature	Range	Duration	Reversibility
Impacts from noise	Direct	Negative	Local	Intermittent	Reversible
Impacts from waste	Direct	Negative	Island	Short-term	Reversible
Impacts on air quality	Direct	Negative	Local	Long-term	Reversible
Impacts of marine environment	Direct	Negative	Local	Long-term	Irreversible
Changes to hydrodynamics	Direct	Negative	Local	Continuous	Reversible
Impacts on landscape integrity and scenery	Direct	Positive	Island	Continuous	Reversible
Socio-economic impact	Direct	Positive	Atoll	Continuous	Reversible

8.4.1. Impacts from noise

It is expected that minimal noise will be generated during the operational phase as the new villa will also incorporate into the current resort scheme and theme of the resort quiet destination and so the operations would not result in significantly loud noise to scare away the wildlife. The likelihood of this impact is remote, while the consequences are minor. Therefore the significance of this impact is negligible.

8.4.2. Impacts from waste

Addition of the villa and the addition of pools to existing water villas, will increase the volume of waste generated. If the solid waste is not stored appropriately there is chance of it being carried into surrounding environment. In the case of liquid waste, if the sewer connections are not properly installed it could lead to leakages. In addition to polluting the marine environment, such a spillage will lead to indirect impacts concerning aesthetics as well as health implications. Although this impact poses significant risks due to the unlikely nature of the impact, the impact is considered to be medium. The waste waters generated by the new facilities will be sent to the resort's existing sewerage treatment plant (STP). This is using the widespread aerated flow method in a batch sequence.The wastewater will be conveyed by gravity from the facilities to the end of the existing jetty where it can connect to the resort's reticulation system. It is not expected that this will cause a major increase in any chemical parameters due to the large dilution of the treated effluents. Solid, liquid and kitchen waste will be increase from the operations of the resort from the kitchen, workshops and powerhouse. Waste oil, if not managed properly poses risk to groundwater through contamination.

The likelihood of this impact is unlikely, while the consequences are regarded as major. Therefore, the significance of this impact is regarded as medium.

8.4.3. Impacts on air quality

The new pools and facilities will cause an increase of the energy requirement of the resort. However, the increase in demand for electricity can be catered by the existing powerhouse operations of the resort. Since the same capacity of the gensets are going to be used as of now, a significant increase in emissions is unlikely. Therefore, the significance of this impact is regarded as very low.

8.4.4. Impacts on marine environment

The existing sewerage plant capacity is able to cater for the increase in sewer effluent from the proposed project. However, the increase in sewer effluents will increase the negative impact to the marine environment. The existing RO plant capacity is not sufficient to meet the demands of the addition of pools, as such an additional 250cbm module is to be added to the current RO plant operations. The expansion in RO plant operations will increase the volume of the brine discharge which would further exacerbate the negative impacts to the marine environment from the water production facilities of the resort. The likelihood of this impact while the consequence of the impact to be major. The significance of the impact is regarded as "significant"

8.4.5. Changes to hydrodynamics

Additional pillars will be needed to support the new pools at the water villas and deck extensions. However, as water will be able to flow in between the pillars, it is unlikely to cause and major change to the hydrodynamics of the area. Therefore, the significance of this impact is regarded as low.

8.4.6. Impacts on landscape integrity and scenery

The improvement of the resort facilities by the addition of pools in the existing water villas and the addition of the new villa is anticipated to have a positive impact on the landscape integrity of the resort. Furthermore, the visual appeal of the water villa of the infrastructure is envisaged to be improved for the tourists staying in these amenities. The likelihood if these impacts are certain while the consequences are moderate. Therefore, the significance of the impact can be regarded as very high.

8.4.7. Socio-economic impacts

The increase and improvement of resort operations is envisaged to result in increase economic gains to the proponent. Furthermore, new employment opportunities are to be open during the operational phase of the current project. The impact is likely with a positive level 5 consequences. The impact can be regarded as “significant”.

9. ENVIRONMENTAL MANAGEMENT

This section describes the environmental and operational management systems and plans for the proposed development including practical mitigation measures for all identified impacts, a risk management plan, measures for sustainable development as well as environmental monitoring programs.

9.1. Proposed mitigation measures

The mitigation measures outlines in Table 19 below is proposed with due consideration to their cost effectiveness and feasibility to be implemented. The mitigation measures mainly relate to handling practices, design and quality of the proposed development and appropriate trainings which would ensure that environmental impacts would be minimized as effectively as possible.

It is the responsibility of the implementing agency to adhere to the proposed mitigation measures and bear any costs related to establishing them.

Table 19. Proposed mitigation measures for the identified risks during the construction and operation phases of the proposed project

Aspects	Mitigation Measures	Implementing Agency	Estimated Cost
CONSTRUCTION PHASE			
Air Quality	• Daily maintenance of vehicles and machinery • Use of light fuel (low sulfur content) • Avoid unnecessary use of machinery	Proponent and Contractor	Included within contractual cost
Noise Pollution,	• Well maintenance of vehicles and machinery • Avoid unnecessary use of machinery • Restrict working hours to daytime only • Workers could wear voice cancelation headphones	Proponent and Contractor	Included within contractual cost
Groundwater Quality	• Oil / chemical handling procedures should be made known to all staff members • Follow the corresponding chemical handling procedure when handling chemicals • All machinery and equipment should be well maintained to avoid accidental spillage	Proponent and Contractor	Included within contractual cost

	• Relevant staff members should be well trained about proper use of machinery and equipment • Have emergency oil spill cleanup crew on standby during construction • Proper care should be taken as not to spill any oils or chemicals into the ground • Proper care should be taken during machinery transfer to avoid accidental oil leakage		
Waste	• Littering, accidental disposal and spillage of any construction wastes should be avoided by pre-planning ways of their transportation and unloading • Careful planning of the work activities can also reduce the amount of waste generated • Waste segregation on-site and reuse as much as possible • Health and safety materials should be made available to workers specifying instructions on how to handle hazardous wastes and how to act during a chemical spill	Proponent and Contractor	Included within contractual cost
Mobilization impacts	• Laborers shall be supervised by the site supervisor to avoid any socially or culturally unacceptable behavior • Limit access routes of vessels, excavators and heavy machinery to a small area • Anchorage of barges and carrier vessels should be limited to a smaller area; • Heavy machinery and equipment operators should be well trained; • Park the heavy machinery within the work site to avoid unnecessary transfer • Usage of heavy machinery and equipment should be restricted to smaller areas (eg take the shortest route possible when accessing to work site); • Avoid unnecessary usage of machinery and equipment	Proponent and Contractor	Included within contractual cost

Marine impacts	• Ensure all work is carried out during low tide and in calm weather conditions • Use of sedimentation control measures such as sand bund and silt screens if necessary • Restrict movement of barges and excavators to a narrow area only; • Commence works at a slow pace to allow for vagile organism to escape work site; • Ensure all project activities remain within the project boundary • Take spill containment measures • Ensure that the staff are well informed of the mitigation measures and the significance of the matter	Proponent and Contractor	Included within contractual cost
Risk of accidents	• Proper signs should be installed and work area restricted with tape • All working staff must be well trained on occupational health and safety • All safety equipment should made provided • Unauthorized entry of unwanted people must be restricted • In case of accidents, workers should be taken to the nearest regional hospital immediately and if the need be, to Male' • In case of oil/chemical spills, clean up kits shall be available at all times; • Emergency cleanup crew shall be on standby at all times; • Firefighting equipment must be made available at work site;	Proponent and Contractor	Included within contractual cost
Impacts on landscape integrity and scenery	• Put appropriate signage and restrict guest movement within the periphery of project boundary • Inform guest of the ongoing works • Restricting project works from high guest activity times and schedule projects in harmony with the resort operations and services	Proponent and Contractor	Included within contractual cost
OPERATIONAL PHASE			
Noise	• Inform guest regarding the sensitive nature of the island environment	Proponent	N/A
Impacts from waste	• Littering, accidental disposal and spillage of any wastes should be avoided by pre-planning and training of	Proponent	

	staff and information provided to guests • Waste segregation and reuse as much as possible • Ensure proper operation and maintenance of utility systems in order to minimize spill and pollution • water quality monitoring according to operation and maintenance manual • In case of leakages, proper maintenance shall be done to prevent further leaks • Ensure the condition of the outfall is good and functional • Waste oil should be well contained and stored safely at a designated area • Waste oils should be taken to Thilafushi for proper disposal at regular intervals		Included in resort operational cost
Impacts on air quality	• All exhaust pipes will be fitted with filters and according to URA standards • Well maintenance of exhaust pipes and the filters • Generators must be well maintained • Dislodging of soot or any harmful chemicals should be immediately reported • Raising the chimney height above canopy of the island	Proponent	Included in resort operational cost
Impact on marine environment	• Wastewater shall be treated prior to disposal • Ensure outfall location is a potential mixing zone • Ensure the condition of the outfall is good and functional • Marine water testing according to operating license • Monitoring of water quality parameters around the discharge location to determine the extent of plume and to confirm plume does not enter inside the harbor basing • Due to the additional large volume of brine that is expected during operational phase, the brine outfall which is currently situated in the	Proponent	

	lagoon, is recommended to be extended beyond the reef's edge		
Changed to hydrodynamics	• Monitoring of shoreline for any sudden changes • Ensuring the outer vegetation zone is well maintained	Proponent	2000 USD bi-annually

9.2. Risk management and incident response

Risk management procedures in this project are strengthened by adopting a more systematic risk management approach to safety. This is achieved by identifying all foreseeable hazards (as stated in section 8 of this report), assessing the risk of each hazard and providing a means to control the risks (mitigation measures).

9.3. Sustainable development management policy

The design and implementation of the project ensures that the proposed project is sustainable. As such, measures adopted to promote sustainable development include some guiding principles as well as components incorporated into the project design. These include:-

- Ensure environmental compliance with the Governmental policies and regulations;
- Protect people, property and the local environment;
- Reduce ecological impacts of the services provided; and
- Increase customer satisfaction.

9.4. Managing uncertainties

Uncertainty is an integral part of an EIA as EIA preparation involves prediction. The two types of uncertainties associated with the EIA process include those associated with the process and those associated with predictions. With the former, the question is whether the most important impacts have been identified and whether the recommendations will be acted upon. In order to reduce such uncertainties, a wide range of stakeholders have been consulted (Section 6) in the EIA process in order to minimize the risk of missing important impacts. For the latter, the uncertainty is in the accuracy of the findings. This can be improved by research and quality of the survey.

It should also be noted that even though EIA cannot give a precise picture of the future, it enables uncertainties to be better managed and is an aid to better decision making.

9.5. Environmental monitoring

Monitoring is an essential part of the EIA and project implementation and serves 3 purposes:-

1. Ensures that the proposed mitigation measures are being implemented;

2. Evaluates whether the proposed mitigation measures are working effectively; and
3. Validates the accuracy of models or projections that were used during impact assessment process.

The purpose of monitoring is to compare the predicted impacts with that of the actual impacts, particularly if the impacts are either very important or the scale of the impact cannot be predicted accurately. The results of monitoring can then be used to manage the environment, particularly to highlight problems early on so an action can be taken.

Monitoring should not be seen as an open-ended commitment to data collection and to minimize the expenses associated with collecting unnecessary data, the data collection should cease when the need for monitoring ceases. Therefore, it is important that a proper monitoring schedule is adhered to. Conversely, monitoring may also indicate the need for more intensive study. The information obtained from monitoring can be extremely useful for future EIAs in making them more accurate as well as more effective.

The baseline data collection for the proposed development was undertaken in July 2021. Baseline surveys were conducted to determine the reference range, so that comparisons can be made during the monitoring to determine the change.

All monitoring activities must be carried out under supervision of a registered EIA consultant. Details of the monitoring program are given in Table 20 below.

Table 20. Environmental monitoring plan proposed for the proposed development

Parameter	Locations	Method	Indicators	Frequency	Cost / MRF
CONSTRUCTION PHASE					
Groundwater	Temporary site	Water quality test	TPH	Every 3 months during construction	1500
Waste	Construction sites	Visual inspection	Improper management of waste	Every 3 months during construction	500
Marine environment	Construction sites and Control	Water quality test Benthic substrate Analysis Fish census	Compare with baseline	Every 3 months during construction	15000
OPERATIONAL PHASE					
Marine environment	Near water villas and Control	Water quality test Benthic substrate Analysis Fish census	Compare with baseline	Every 3 months after construction for 1 year and annually for 5 years	15000
Hydrodynamics	Around the island	Measurement of currents	Compare with baseline	Every 3 months after construction for 1 year and annually for 5 years	3000
Coastline	Around the island	Map shoreline	Changes to shoreline from	Every 3 months after construction	35000

			longtime baseline	for 1 year and annually for 5 years	
Pool water quality	All pools	Water quality test	pH; 7.2 – 7.6 Free chlorine; 1 – 3 mg/L Total Alkalinity; 80 – 140 mg/L Calcium Hardness; 200 – 400 mg/L	Daily	Incorporated in resort operation

Monitoring reports must be submitted to the EPA as specified under the monitoring schedule below:-

Table 21. Monitoring schedule recommended for the proposed development assuming that the project commences in August 2021 and completes on August 2022

Description	**Date**
EIA Decision statement issued	August 2021
Project commencement	August 2021
Monitoring report during construction- 1	November 2021
Monitoring report during construction - 2	February 2022
Monitoring report during construction - 3	May 2022
Monitoring report during construction - 4	August 2022
Monitoring report during operation – 1	November 2022
Monitoring report during operation – 2	February 2023
Monitoring report during operation – 3	May 2023
Monitoring report during operation – 4	August 2023
Monitoring report during operation – 5	August 2024
Monitoring report during operation – 6	August 2025
Monitoring report during operation – 7	August 2026
Monitoring report during operation – 8	August 2027
Monitoring report during operation – 9	August 2028

9.6. Monitoring Report Format

Following is the environmental monitoring report format expected for this project. The report will include the details of the methods used to collect data, sampling sites, sampling frequency, results and analysis. All data collected in the monitoring period shall be presented in the monitoring without bias and data shall be compared with the baseline values presented in this EIA report. This will require a surveyor and an environmental consultant.

Introduction

Description of initial EIA

Specify the author of monitoring report

Purpose

Describe the purpose of the monitoring

Methods

Describe the methods used to collect data

Sampling sites

Geographic coordinates

Results

Present results for the monitoring period

Comparison with baseline

Conclusion

Specify of environmental thresholds are being exceeded

Propose any additional mitigation measures

10. JUSTIFICATION AND CONCLUSION

The purpose of this EIA is to critically analyze and assess the potential environmental impacts associated with the proposed additional water villa, expanding existing water villas and associate works and propose the solutions and preferred alternatives as well as mitigation measures to minimize any negative impacts whilst trying to derive the maximum positive impacts from the project.

Kanuhura Maldives is looking to improve their services by upgrading its existing facilities with some modifications to the current buildings. Essentially the upgrade is required in order to diversify the current facilities looking forward to meet the growing demand for exotic tourism ventures. The additional of pools and new water villa will definitely improve the aesthetics of the resorts Villas. Thereby improving the standard of services being provided to the tourists by the resort.

The primary objective of the proposed project is to carry out the following works in the Kanuhura resort:

- New water villa
- Addition of pools, refurbishment and expansion of existing water villas
- Refurbishment of jetty and addition of buggy facilities
- Upgrade of water production capacity

The major impacts of the proposed project during the construction phase are the impacts to the marine environment, majorly resulting from the construction works in the over water villas resulting from turbidity and sedimentation. Other impacts include impacts arising from mobilization, waste generation during constructional and decommissioning, impacts from oil and chemical spill and risk of accidents on the workers with other similar impacts. The major impact during operational phase is on the marine environment, which is mainly the increase of brine and sewerage waste generation from increased water demand by the new pools. High positive impacts on the landscape integrity and economic benefits are also visaged from the proposed project.

Major mitigation measures include, undertaking proper sedimentation controls and restricting the movement of barges and excavators to a narrow area. Care should also be also be given to ensure that the workforce will abide by the health and other regulatory measures to minimize the risk of the Covid-19 episode within the workforce. It is also proposed to extension of the brine line beyond the reefs edge as currently the brine line is established in the center of the lagoon to mitigate the environmental impacts to the marine environment during the operational phase.

Main alternatives that were studied were the no-project option, alternative locations to the new water villa and the changes to the proposed design of the pools. However, on further

observation, it was noted that it would be more beneficial to proceed with the project as proposed.

In terms of environmental monitoring, it is recommended to monitor the water quality, benthic substrate, fish census and waste generation during the construction phase of the project. Furthermore, continuation of monitoring the marine environment is recommended in the operational phase with monitoring the hydrodynamics, coastline and water quality monitoring of the proposed pools.

The socioeconomic benefits during the operations far outweigh the negative impacts of the construction phase of the proposed project. Hence, with the mitigation measures outlined in the report, it is recommended to proceed with the project as planned.

11. ACKNOWLEDGEMENTS

Consultants would like to extend sincere gratitude to everyone who have contributed to this report. Thanks are due to the stakeholders who kindly contributed their expertise and fair judgement regarding this project. Representatives of proponent are highly appreciated for their generosity in providing any requested information for the compilation of this EIA report.

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13. APPENDICES

APPENDIX A- LIST OF ABBREVIATIONS

EIA	Environmental Impact Assessment
MNPHI	Ministry of Planning Housing and Infrastructure
MEA	Maldives Energy Authority
MoEnv	Ministry of Environment, Climate change and Technology
EPA	Environmental Protection Agency
ToR	Terms of Reference
DN	Decision Note
MPHRE	Ministry of Planning, Human Resource and Environment
MFDA	Maldives Food and Drug Authority
MNDF	Maldives National Defense Force
MWSC	Male' Water and Sewerage Company
WAMCO	Waste Management Corporation
UNFCCC	United Nations Framework Convention on Climate Change
GHG	Greenhouse gas
UN	United Nations
CBD	Convention on Biological Diversity
SAARC	South Asian Association for Regional Corporation
STELCO	State Electric Company Limited
MWSC	Maldives Water and Sewerage Company
GPS	Global Positioning System
SST	Sea surface temperature
TPH	Total Petroleum Hydrocarbon
UNDP	United Nations Development Program

APPENDIX B- TERMS OF REFERENCE

No: 203-ECA/PRIV/2021/252

Terms of Reference for Environmental Impact Assessment for additional water villa, expanding existing water villas and associated works in Lh. Kanuhura

The following is the Terms of Reference (ToR) for undertaking **the EIA for construction of additional water villa, expanding existing water villas and associated works in Lh. Kanuhura.** The Proponent of the Project is **Kanuhura Maldives.** The Consultant of the Project is **Mahfooz Abdul Wahhab (EIA P22/2016)**

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 project and, if applicable, the background information of the project/activity and the tasks already completed. Objectives of the development activities should be specific and if possible quantified. Define the arrangements required for the environmental assessment including how work carried out under this contract is linked to other activities that are carried out or that is being carried out within the project boundary. Identify the donors and the institutional arrangements relevant to this project. .

2. **Study area –** Submit a minimumA3 size scaled plan with indications of proposed development area. Specify the agreed boundaries of the study area for the environmental impact assessment highlighting the proposed development location and size. The study area should include adjacent or remote areas, such as relevant developments and nearby environmentally sensitive sites (e.g. coral reef, sea grass, mangroves, marine protected areas, special birds site, sensitive species nursery and feeding grounds). Relevant developments in the areas must also be addressed including residential areas, all economic ventures and cultural sites.

3. **Scope of work** – The report should be categorised into the following components:

Task 1. Description of the proposed project – Provide a full description and justification of the relevant parts of the upgrade works works, using maps at appropriate scales where necessary. The following should be provided (all inputs and outputs related to the proposed activities shall be justified):

- Project justification

- Project details;
- Water villa with pool 02 bedroom suite (1 Nos.)
- Addition of new kid's room extension, MEP room with timber deck extension, new swimming pool with timber deck and new bedroom slab extension in 02 standard water villas with kids room
- Addition of new MEP room with timber deck extension, new swimming pool with timber deck and new bedroom slab extension in 16 standard water villas
- Additional buggy roundabout (03 Nos.)
- Additional buggy roundabout (02 Nos.)
- Environmental monitoring during construction activities;
- Emergency plan during spillages
- Measures to protect environmental values during construction and operation phase i.e. sedimentation control;

Pool construction

- Location and design of the pools
- Justification of location and designs
- Water source for pools
- Details of vegetation clearance (if any)

Project Management

- Labour requirements and (local) labour availability;
- Housing of temporary labour
- Waste management during construction and operation
- Project management (include scheduling and duration of the project and life span of facilities; communication of construction details, progress, target dates, construction/operation/closure of labour camps, access to site, safety, equipment and material storage, fuel management and emergency plan in case of spills).

Task 2. Description of the environment – Assemble, evaluate and present the environmental baseline study/data regarding the study area and timing of the project (e.g. monsoon season). 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.

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, reef transects, vegetation transects and manta tows sites for posterior data comparison. Information should be divided into the categories shown below:

Climate

- Temperature, rainfall, wind, waves, evaporation rates (including extreme conditions)
- Risk of hurricanes and storm surges;

Geology and geomorphology

- Offshore/coastal geology and geomorphology (use maps);
- (Seasonal) patterns of coastal erosion and accretion, and
- Characteristics of seabed sediments to assess direct habitat destruction and turbidity impacts during construction;

Hydrography/hydrodynamics (use maps)

- Tidal ranges and tidal currents;
- Wave climate and wave induced currents;
- Wind induced (seasonal) currents;
- Sea water quality measuring these parameters: temperature, pH, salinity, turbidity (from the construction sites and from at least one control site).

Ecology

- Identify marine protected areas (MPAs) and sensitive sites such as breeding or nursery grounds for protected or endangered species (e.g. coral reefs, spawning fish sites, nurseries for crustaceans or specific sites for marine mammals, sharks and turtles). Include description of commercial species, species with potential to become nuisances or vector.
- Quantitative marine assessment (coral cover and fish census survey) of the proposed construction sites and at the reef adjacent to those sites and from at least one control site;
- Coastal environment at the locations where coastal protection would be undertaken;
- Benthic and fish community monitoring around the island.

Hazard vulnerability:

- Vulnerability of area to flooding and storm surge.
- Risk of hurricanes and storm surges;

Absence of facilities in the country to carry out the water quality tests will not exempt the proponent from the obligation to provide the necessary data. The report should outline the detailed methodology of data collection utilized to describe the existing environment.

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. Legal requirements:

Task 4. Potential impacts (environmental and socio-cultural) of proposed project, incl. all stages – The EIA 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 following:

Impacts on the natural environment

- Changes in flow velocities/directions, resulting in changes in erosion/sedimentation patterns, which may impact shore zone configuration/coastal morphology;
- Loss of marine bottom habitat, both in the borrow area as well as due to enlargement of the islands, resulting in (temporary) loss of bottom life, which may impact fish stocks and species diversity and density of crabs, shellfish etc.;
- Impacts on unique or threatened habitats or species (coral reefs, sea turtles etc.), and
- Sediment dispersal in water column, possibly resulting in changes in visibility, smothering of coral reefs and benthic communities and affecting fish and shellfish etc.;
- Impacts of noise, vibration and disturbance;
- Impacts on landscape integrity/scenery.
- Impacts of noise, vibration and disturbance;

Impacts on the socio-economic environment

- Impacts of the coastal protection works on the public, stakeholders and tourism ventures (nearby resorts and dive sites);
- Impacts on employment and income, potential for local people to have (temporary) job opportunities (and what kind) in the execution of the works;
- Health impacts; Including COVID-19 related safety measures that will be in place;
- Level of protection against hazards like sea level rise, storm surges, etc.

Construction related hazards and risks

- Pollution of the natural environment (e.g. oil spills, discharge of untreated wastewater and solid waste, including construction waste)
- Risk of accidents and pollution on workers

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". This should include alternative coastal protection measures, alternative designs, alternative materials; alternative locations. The report should highlight how the best location was determined. All alternatives must be compared according to international standards and 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.

Task 6. Mitigation and management of negative impacts – Identify possible measures to prevent or reduce significant negative impacts to acceptable levels. These will include both environmental and socio-economic mitigation measures with particular attention paid to sedimentation control and future changes in coastal processes. Measures for both construction and operation phase shall be identified. Cost the mitigation measures, equipment and resources required to implement those measures. The confirmation of commitment of the developer to implement the proposed mitigation measures shall also be included. An Environmental management plan for the proposed project, identifying responsible persons, their duties and commitments shall also be given. In cases where impacts are unavoidable arrangements to compensate for the environmental effect shall be given.

Task 7. Development of monitoring plan (see appendix)– Identify the critical issues requiring monitoring to ensure compliance to mitigation measures and present impact management and monitoring plan for coastal modification, beach morphology, sediment movement around the island. Ecological monitoring will be submitted to the EPA to evaluate the damages during construction, after project completion and every three months thereafter, up to one year and then on a yearly basis for five years after. The baseline study described in task 2 of section 2 of this document is required for data comparison. 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.

- Coastal erosion and accretion changes around the island;
- Water quality, especially turbidity;
- Impacts from sedimentation on nearby coral reefs, benthic system, seagrass beds and fish and invertebrates communities;
- Condition of the sensitive ecosystems and marine resources;
- Environmentally sound site clearance;

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 all stakeholders, government authorities such as MOT engineers/designers, development managers, staff and members of the general public. The EIA report should include a list of people/groups consulted, their contact details and summary of the major outcomes.

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 atoll 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.

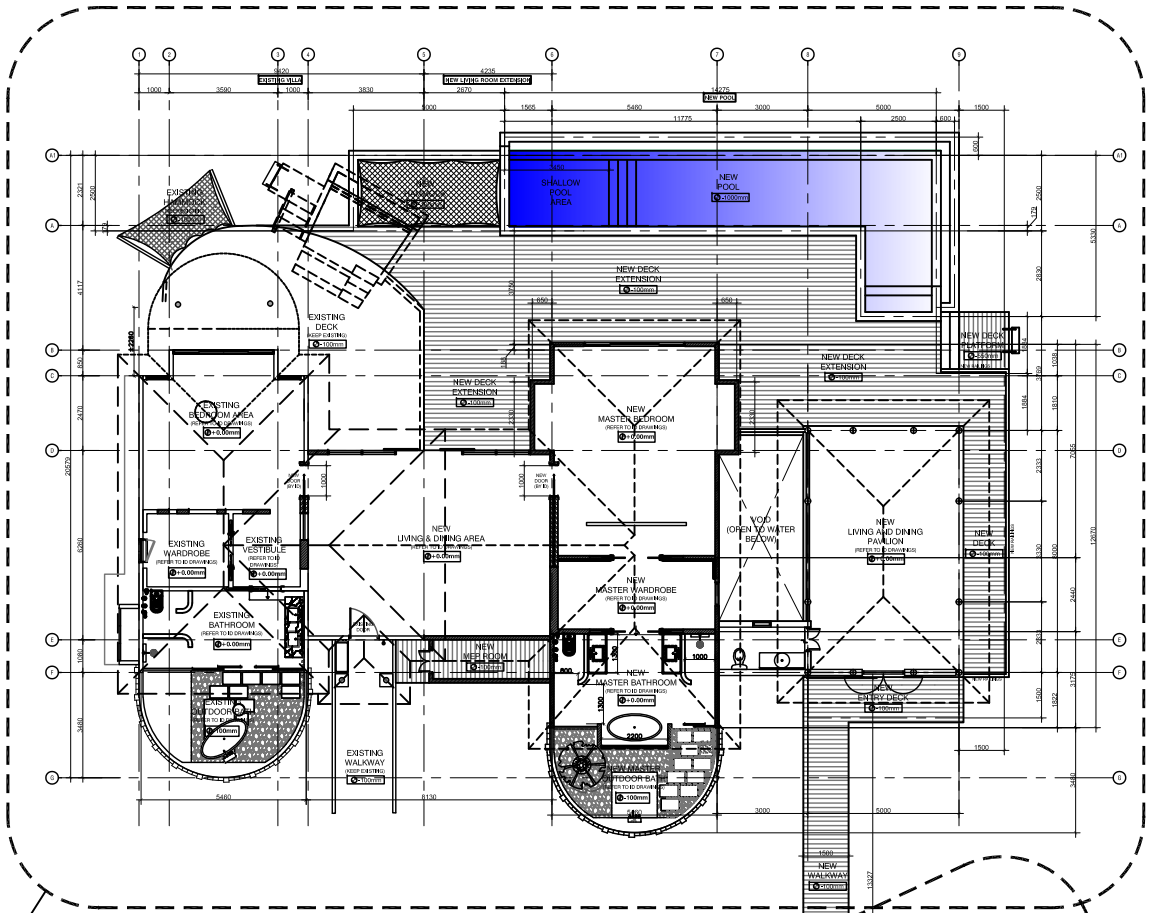
Presentation- The environmental impact assessment report, to be presented in digital format, will be concise and focus on significant environmental issues. It will contain the findings, conclusions and recommended actions supported by summaries of the data collected and citations f or any references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

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.

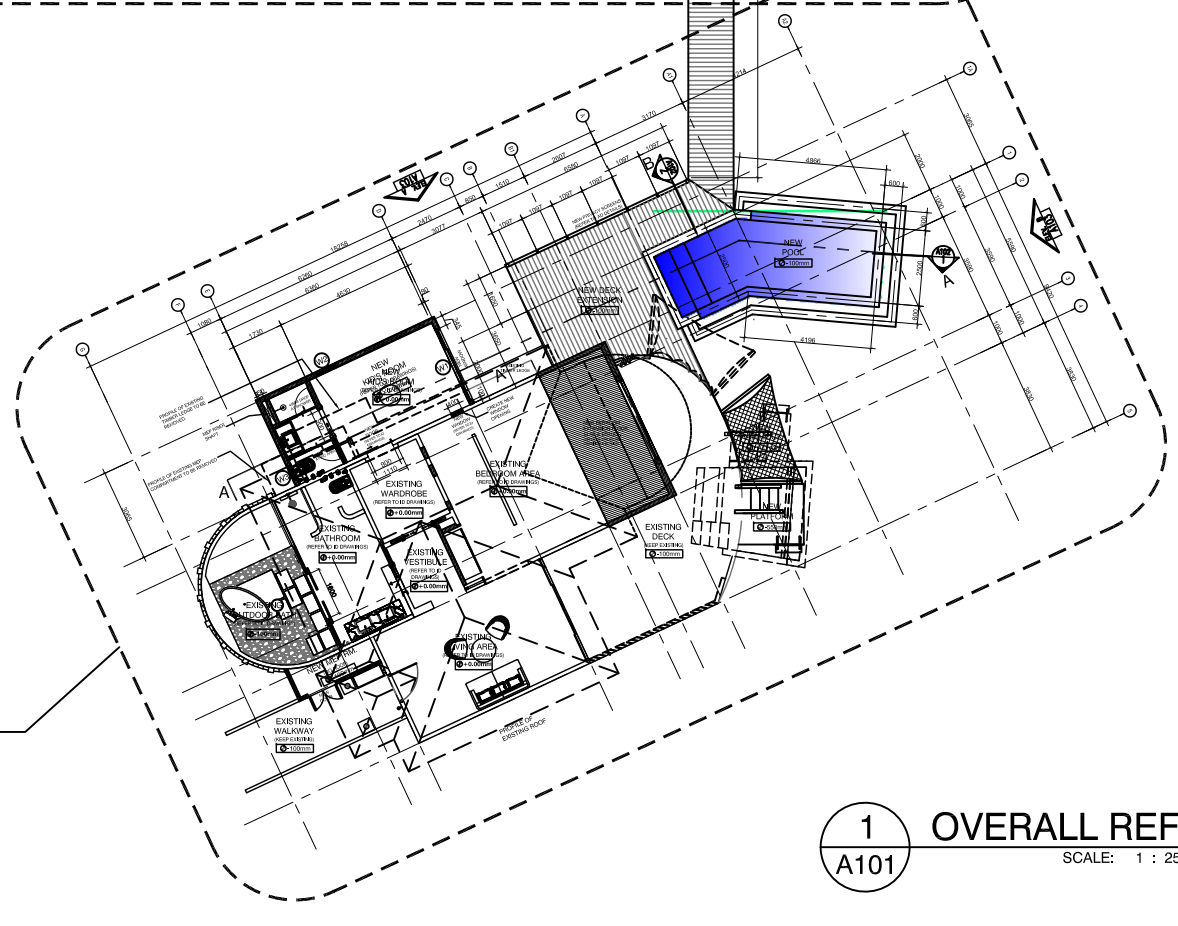
……

27th June 2021

APPENDIX C- DETAIL DRAWINGS FOR UPGRADE WORKS



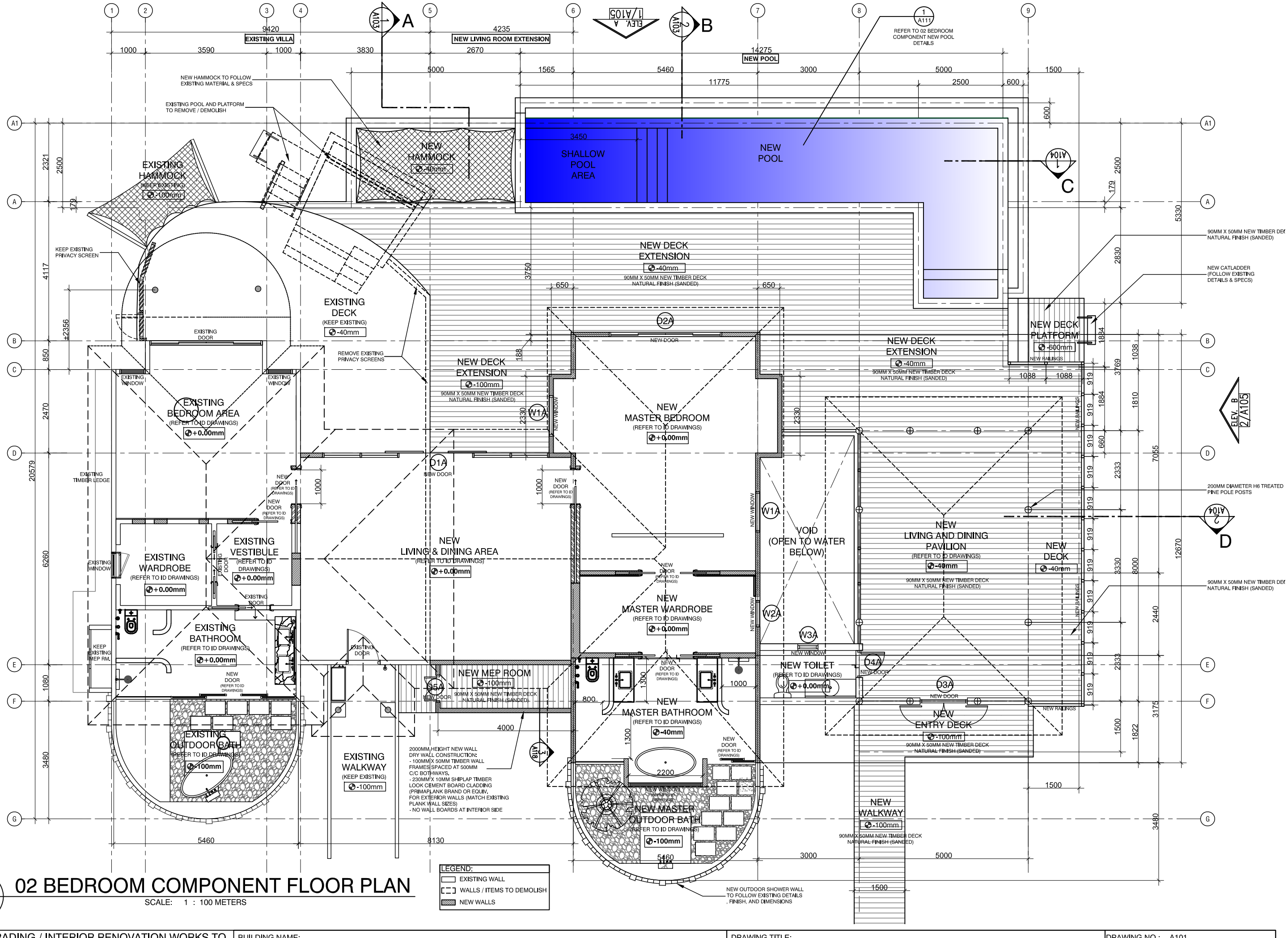
02 BEDROOM COMPONENT
(REFER TO ARCH DRAWINGS
A101 & A103 TO A105)



3RD BEDROOM COMPONENT
(REFER TO ARCH DRAWINGS
A102 & A106 TO A110)

1 / A101 **OVERALL REFERENCE PLAN**
SCALE: 1 : 250 METERS

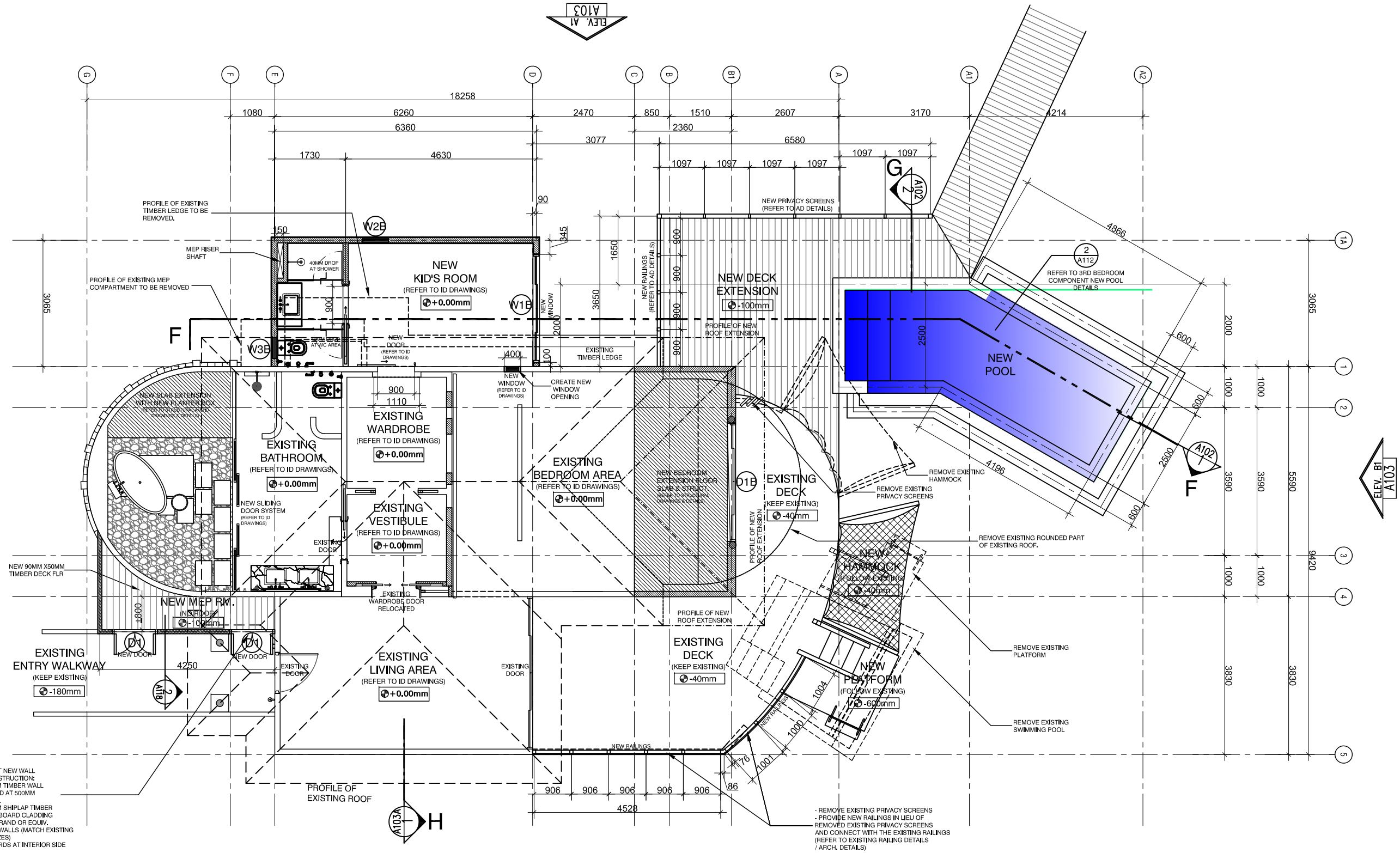
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: REFERENCE PLAN	DRAWING NO.: A100 REVISION NO.: DATE: 08 JUNE 2021



1 / A101 — 02 BEDROOM COMPONENT FLOOR PLAN

SCALE: 1 : 100 METERS

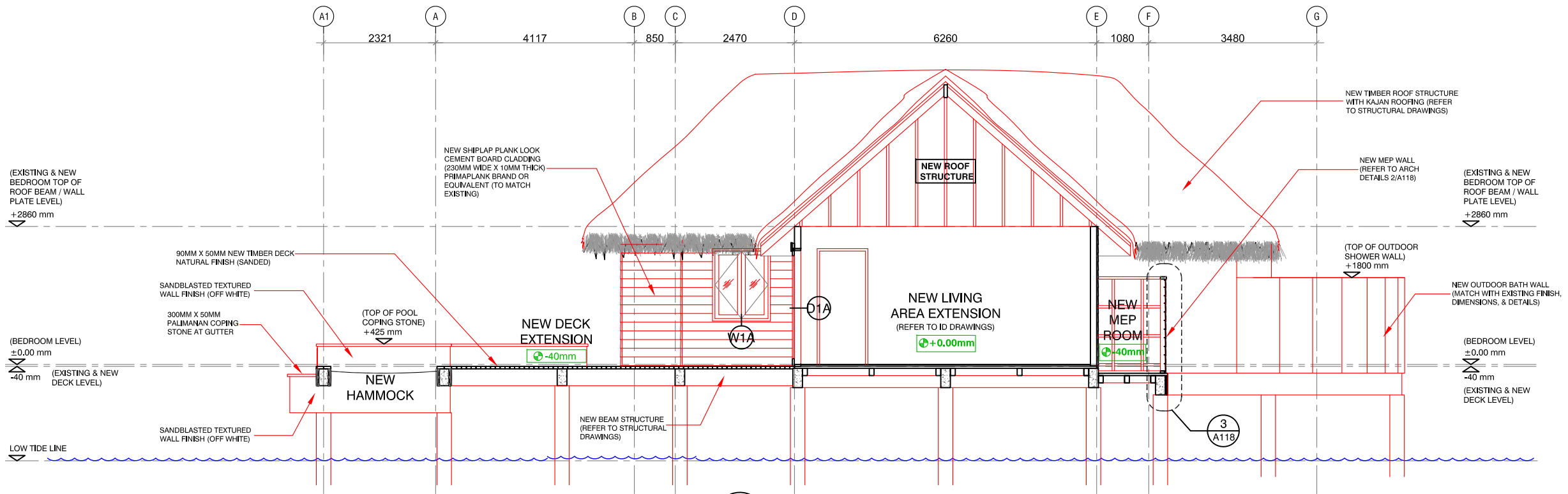
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 02 BEDROOM COMPONENT FLOOR PLAN	DRAWING NO.: A101 REVISION NO.: DATE: 08 JUNE 2021



1 / A102 — 3RD BEDROOM COMPONENT FLOOR PLAN

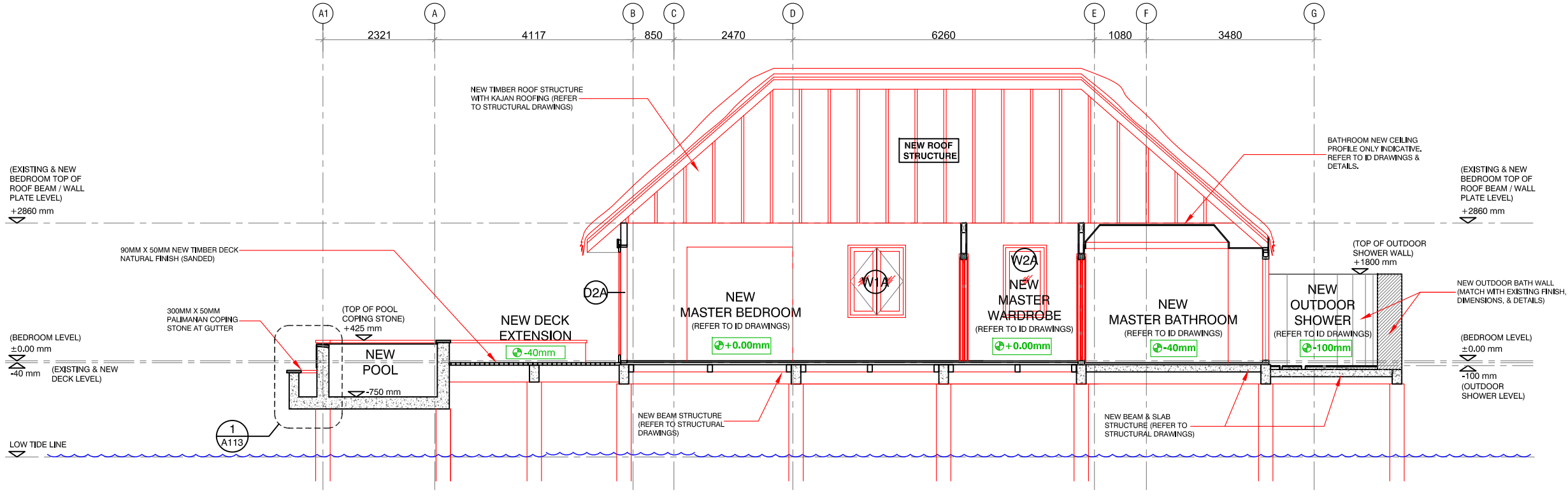
SCALE: 1 : 100 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 3RD BEDROOM COMPONENT FLOOR PLAN	DRAWING NO.: A102 REVISION NO.: DATE: 08 JUNE 2021



1 / A103 SECTION THRU A-A

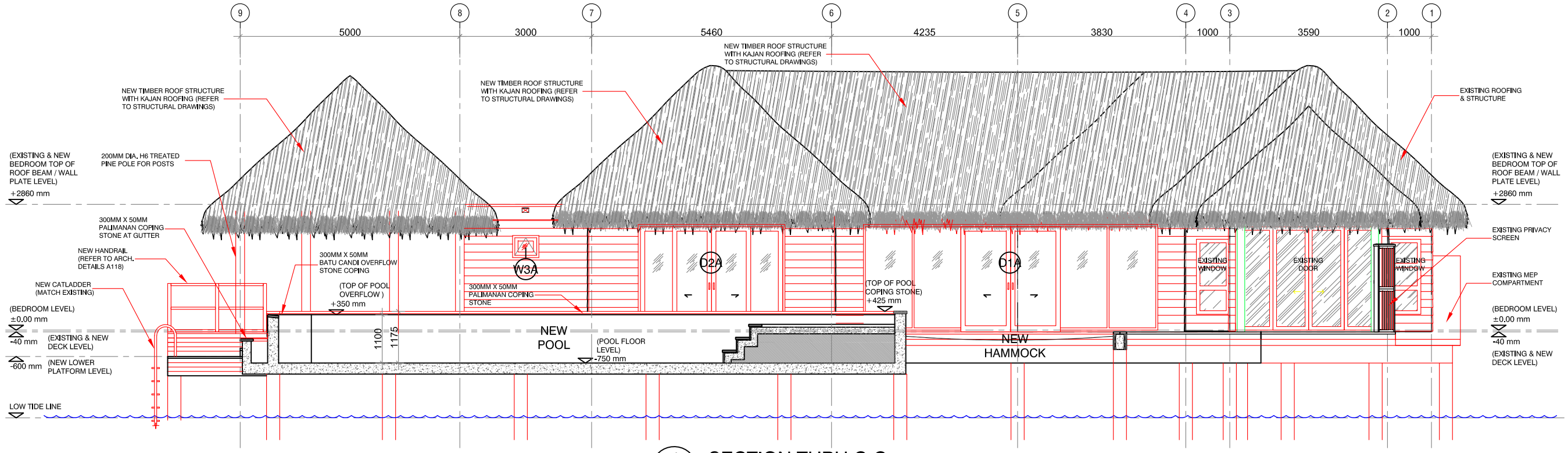
SCALE: 1 : 100 METERS



2 / A103 SECTION THRU B-B

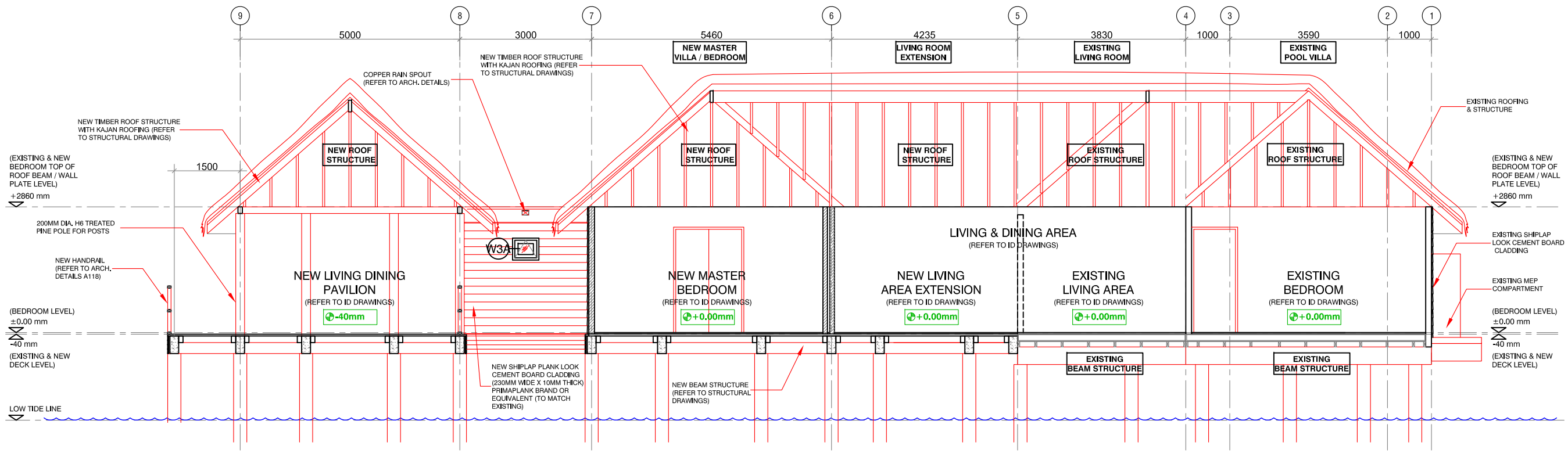
SCALE: 1 : 100 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: SECTION A-A & SECTION B-B (02 BEDROOM COMPONENT)	DRAWING NO.: A103 REVISION NO.: DATE: 08 JUNE 2021



1 / A104 **SECTION THRU C-C**

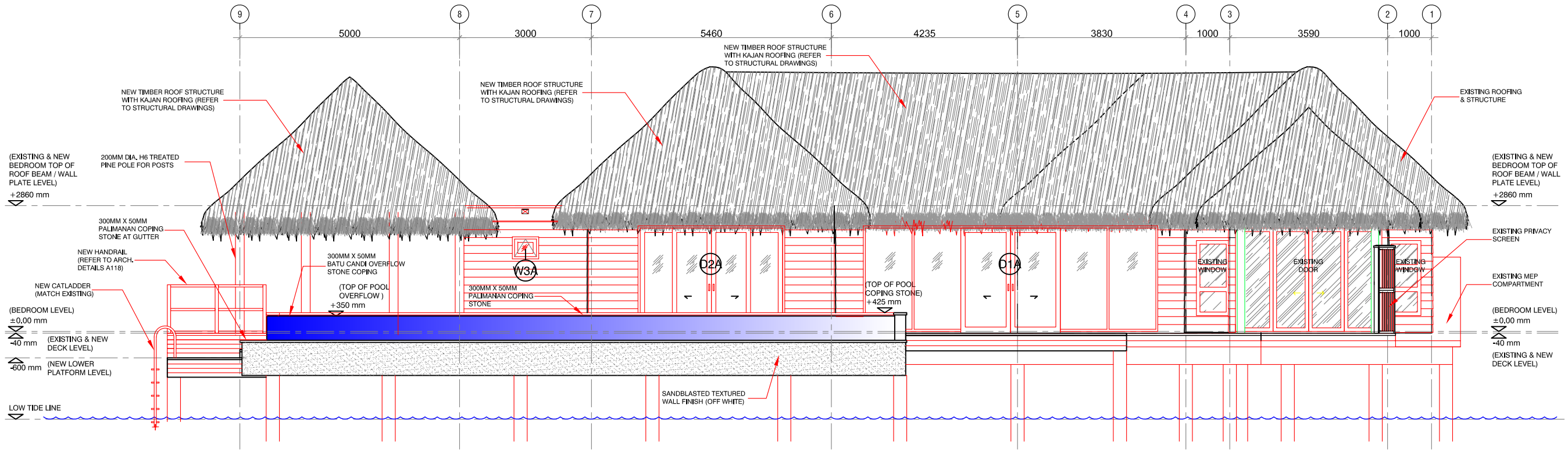
SCALE: 1 : 100 METERS



2 / A104 **SECTION THRU D-D**

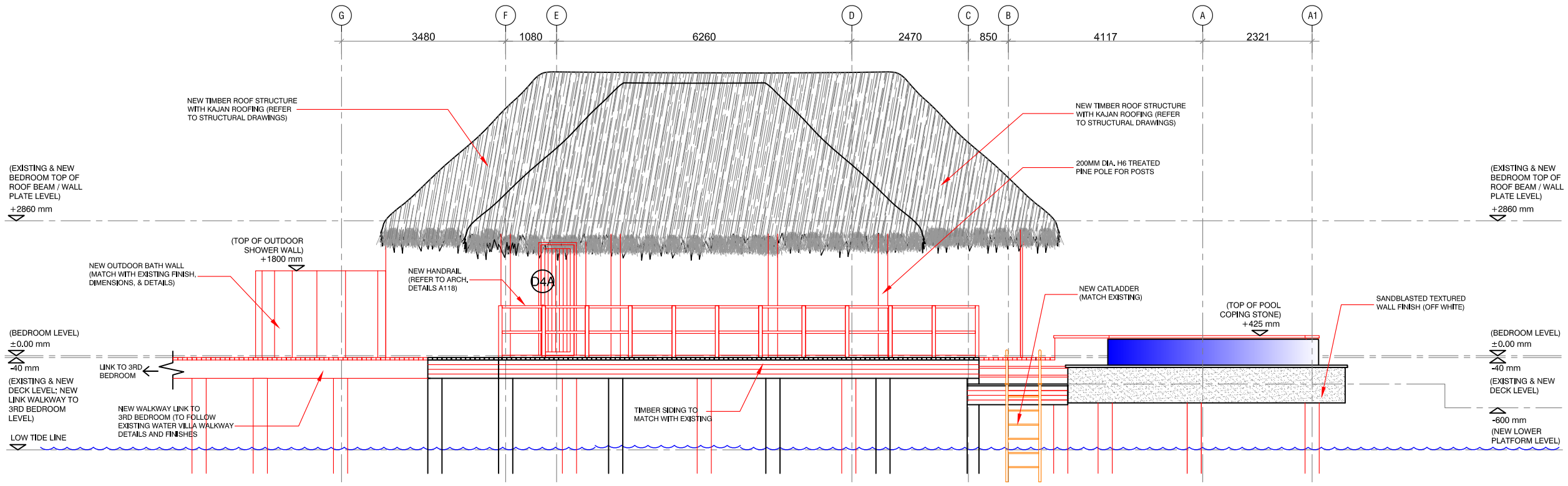
SCALE: 1 : 100 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: SECTION C-C & SECTION D-D (02 BEDROOM COMPONENT)	DRAWING NO.: A104 REVISION NO.: DATE: 08 JUNE 2021



1 A105 **ELEVATION "A"**

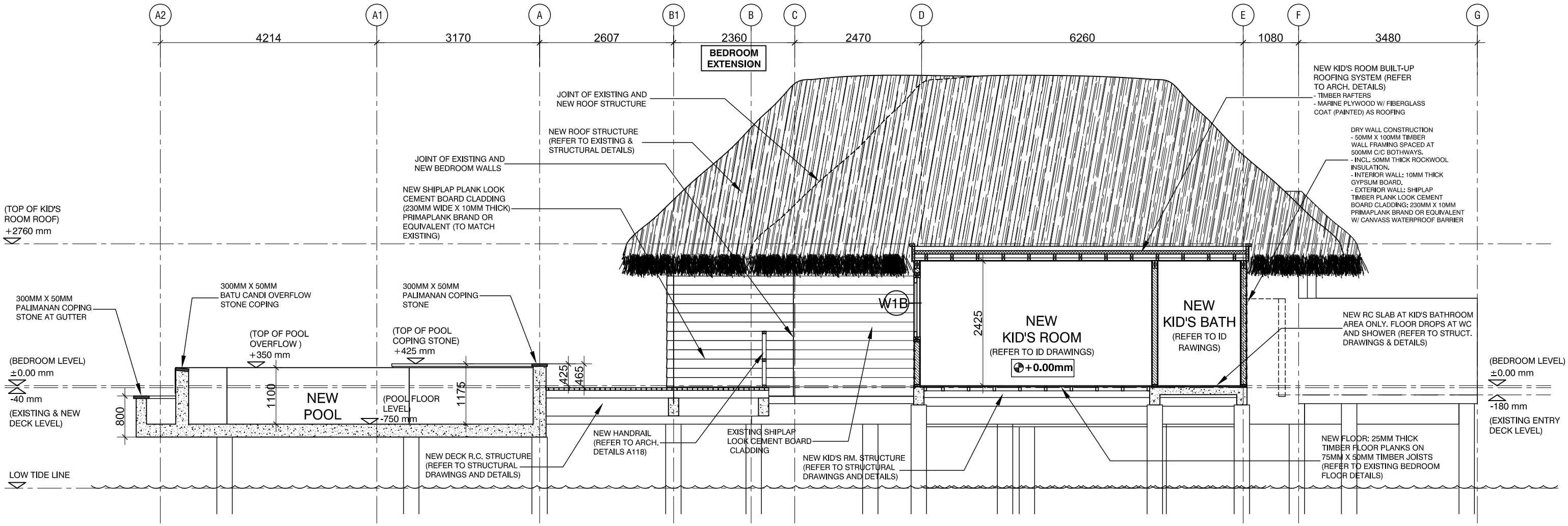
SCALE: 1 : 100 METERS



2 A105 **ELEVATION "B"**

SCALE: 1 : 100 METERS

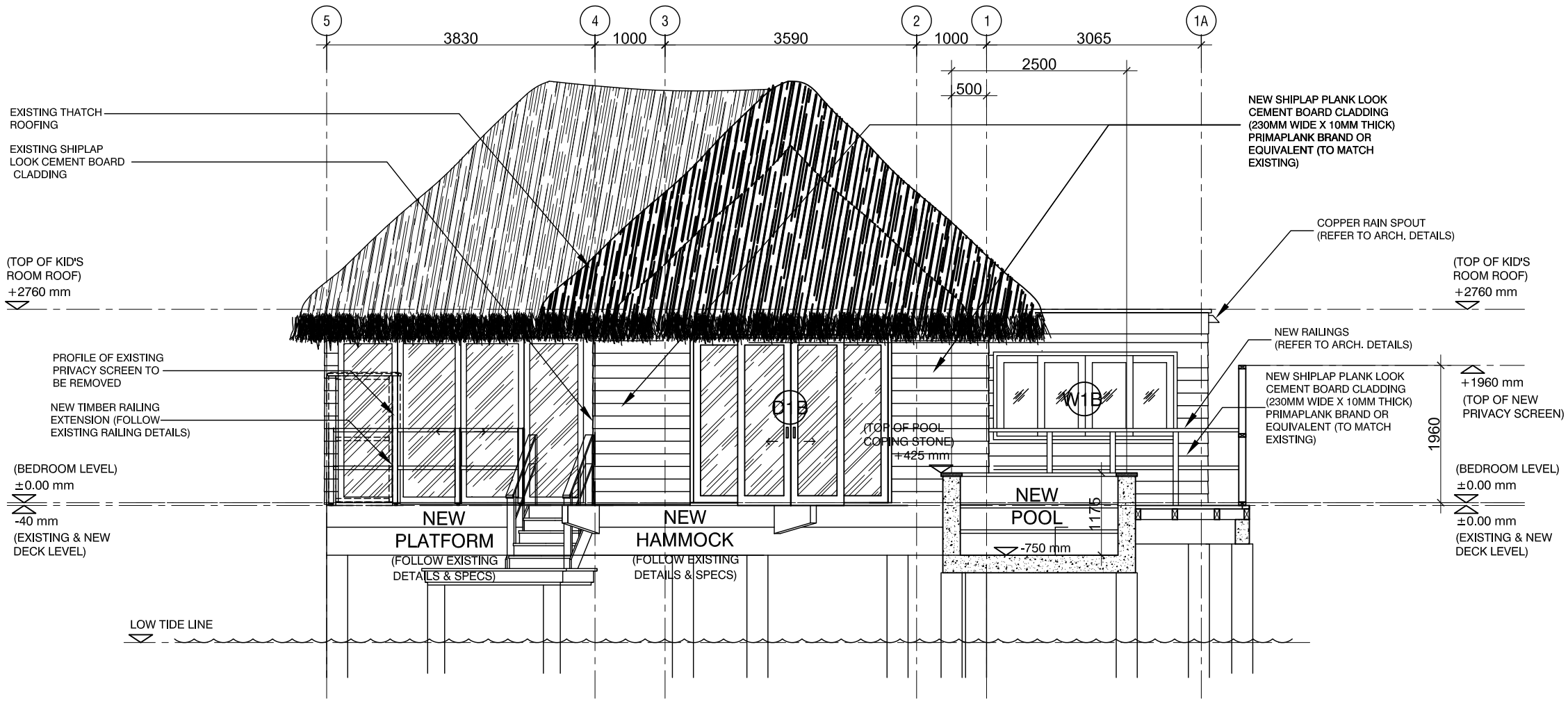
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: ELEVATIONS "A" & "B" (02 BEDROOM COMPONENT)	DRAWING NO.: A105 REVISION NO.: DATE: 08 JUNE 2021



1 / A106 SECTION THRU E-E

SCALE: 1 : 75 METERS

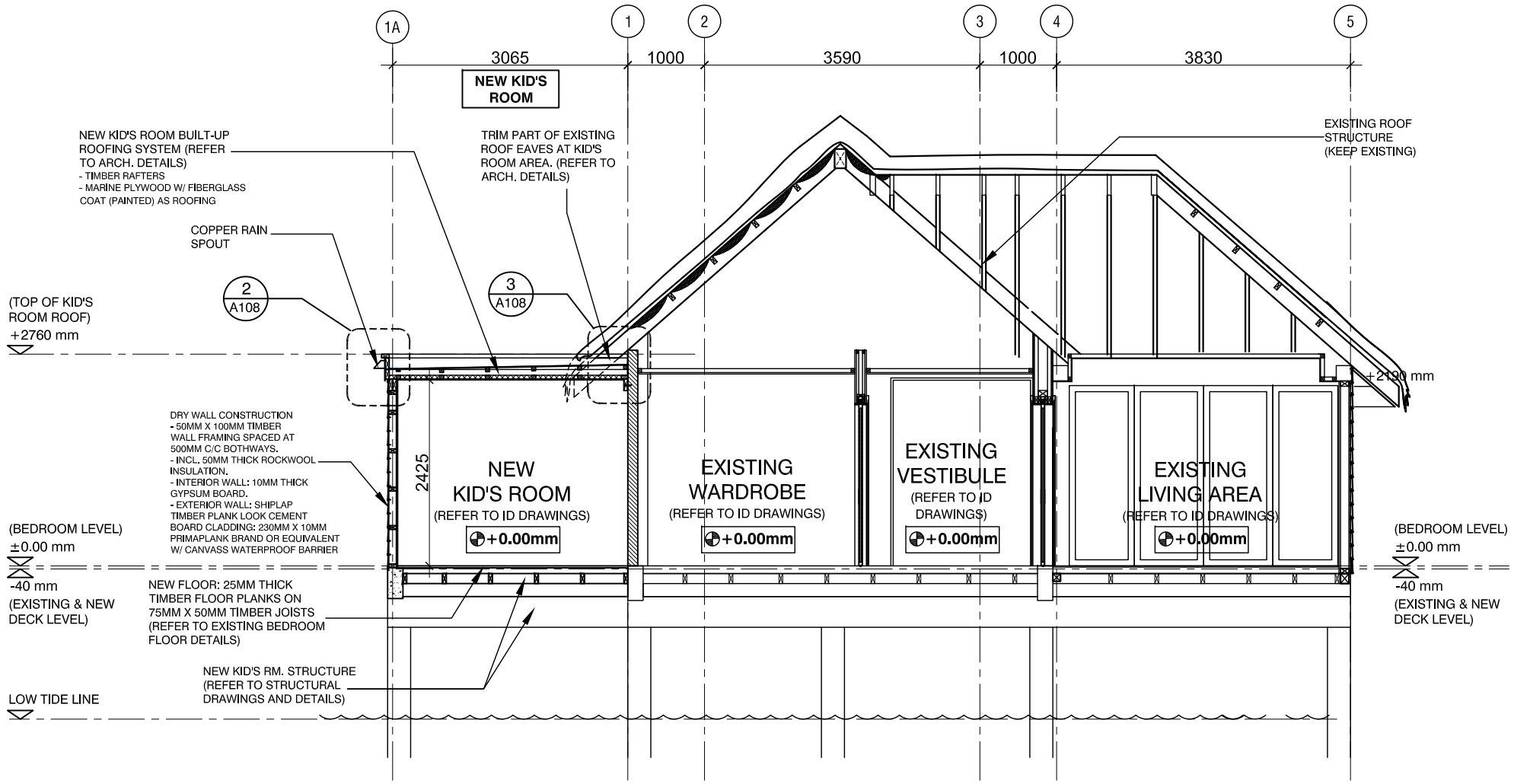
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: SECTION E-E (3RD BEDROOM COMPONENT)	DRAWING NO.: A106 REVISION NO.: DATE: 08 JUNE 2021



1 / A107 SECTION THRU F-F

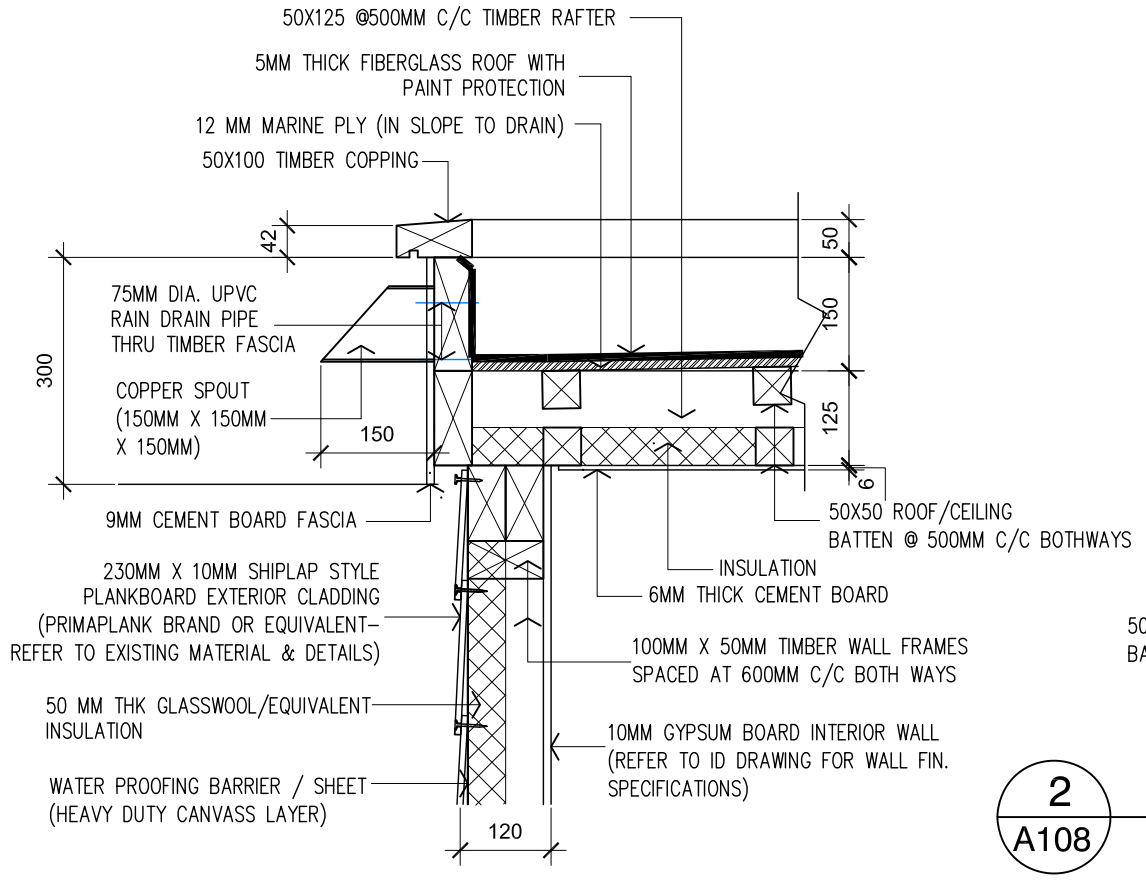
SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: SECTION F-F (3RD BEDROOM COMPONENT)	DRAWING NO.: A107 REVISION NO.: DATE: 08 JUNE 2021



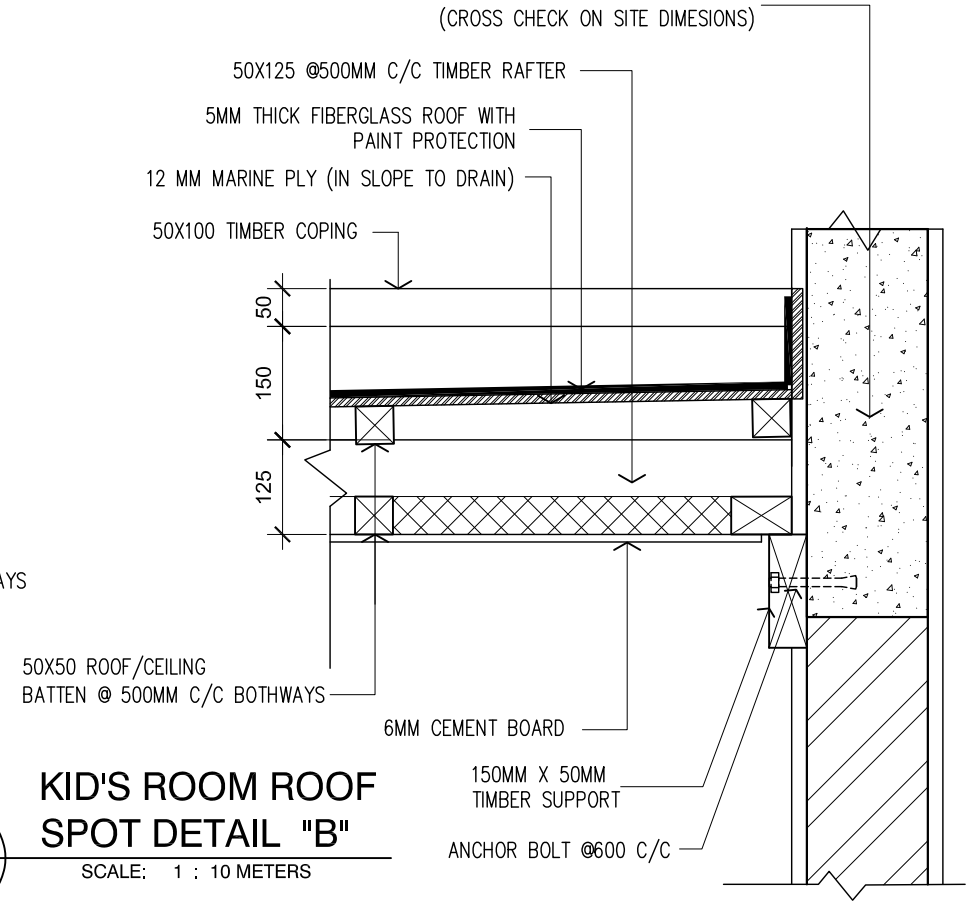
1 / A108 SECTION THRU G-G

SCALE: 1 : 75 METERS



2 / A108 KID'S ROOM ROOF SPOT DETAIL "A"

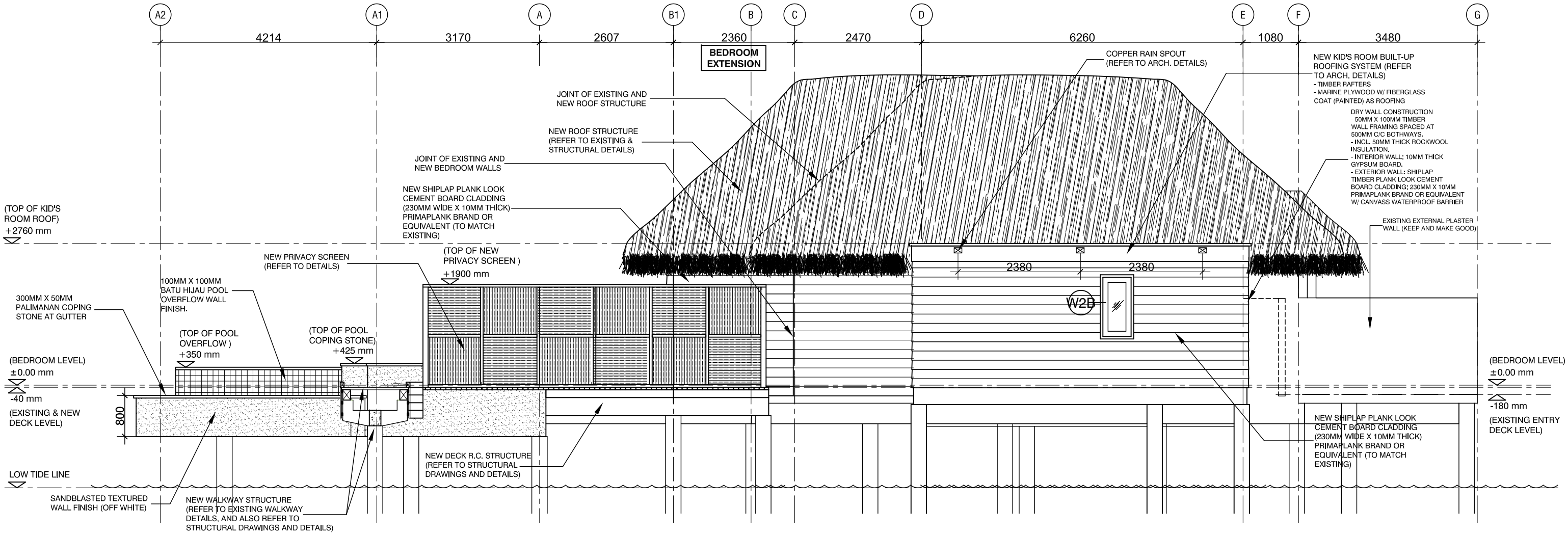
SCALE: 1 : 10 METERS



2 / A108 KID'S ROOM ROOF SPOT DETAIL "B"

SCALE: 1 : 10 METERS

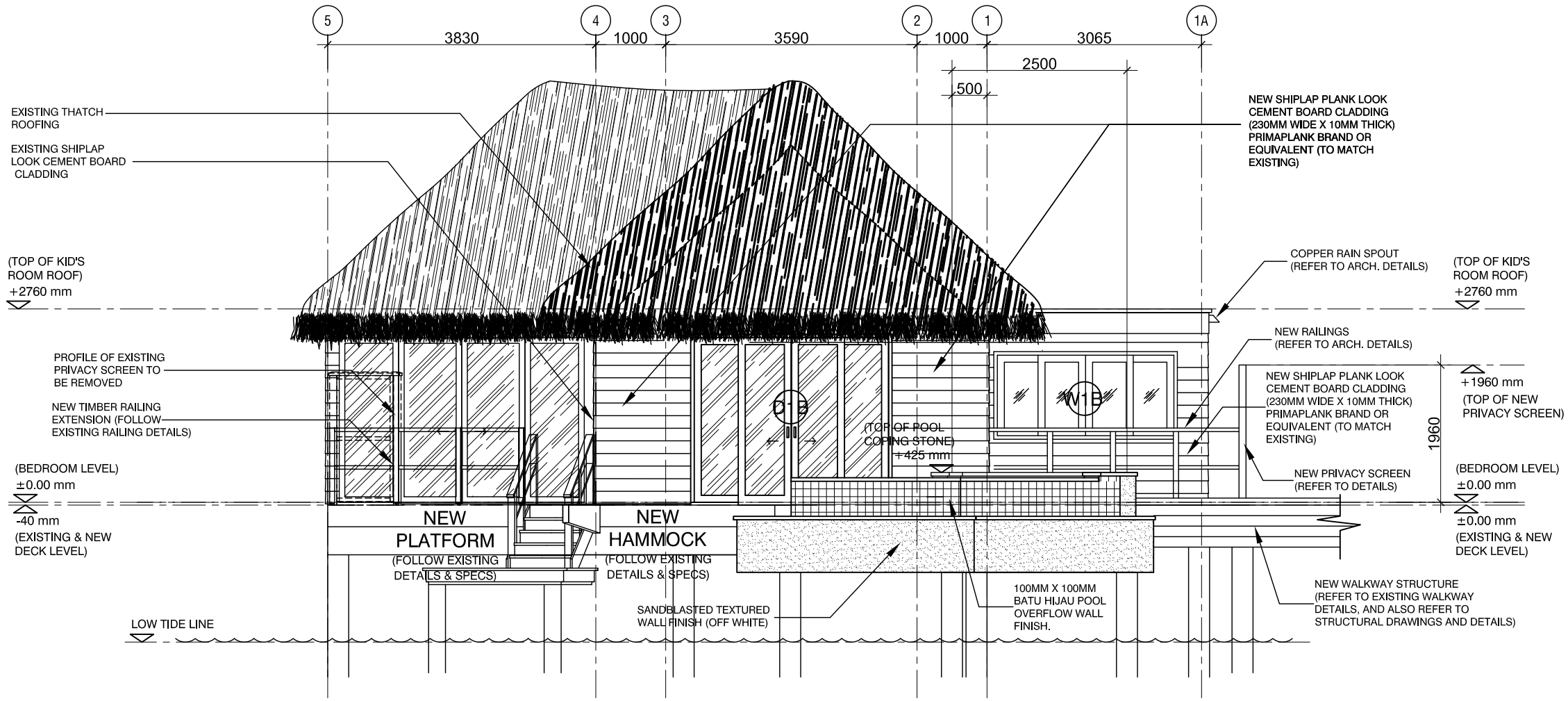
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: SECTION G-G & KID'S ROOM ROOF DETAILS (3RD BEDROOM COMPONENT)	DRAWING NO.: A108 REVISION NO.: DATE: 08 JUNE 2021



1 / A109 ELEVATION "A1"

SCALE: 1 : 75 METERS

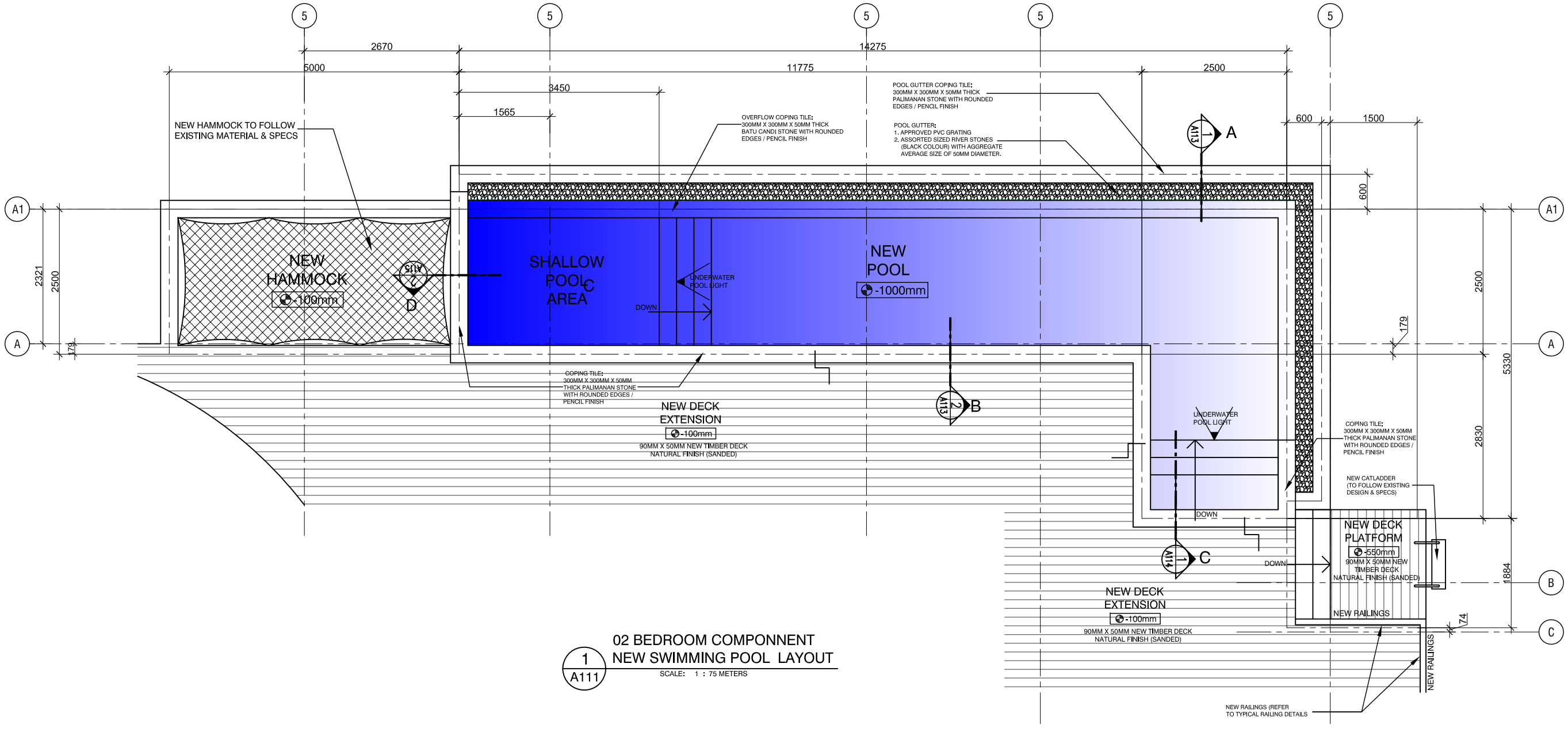
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: ELEVATION "A1" (3RD BEDROOM COMPONENT)	DRAWING NO.: A109 REVISION NO.: DATE: 08 JUNE 2021



1 / A110 ELEVATION "B1"

SCALE: 1 : 75 METERS

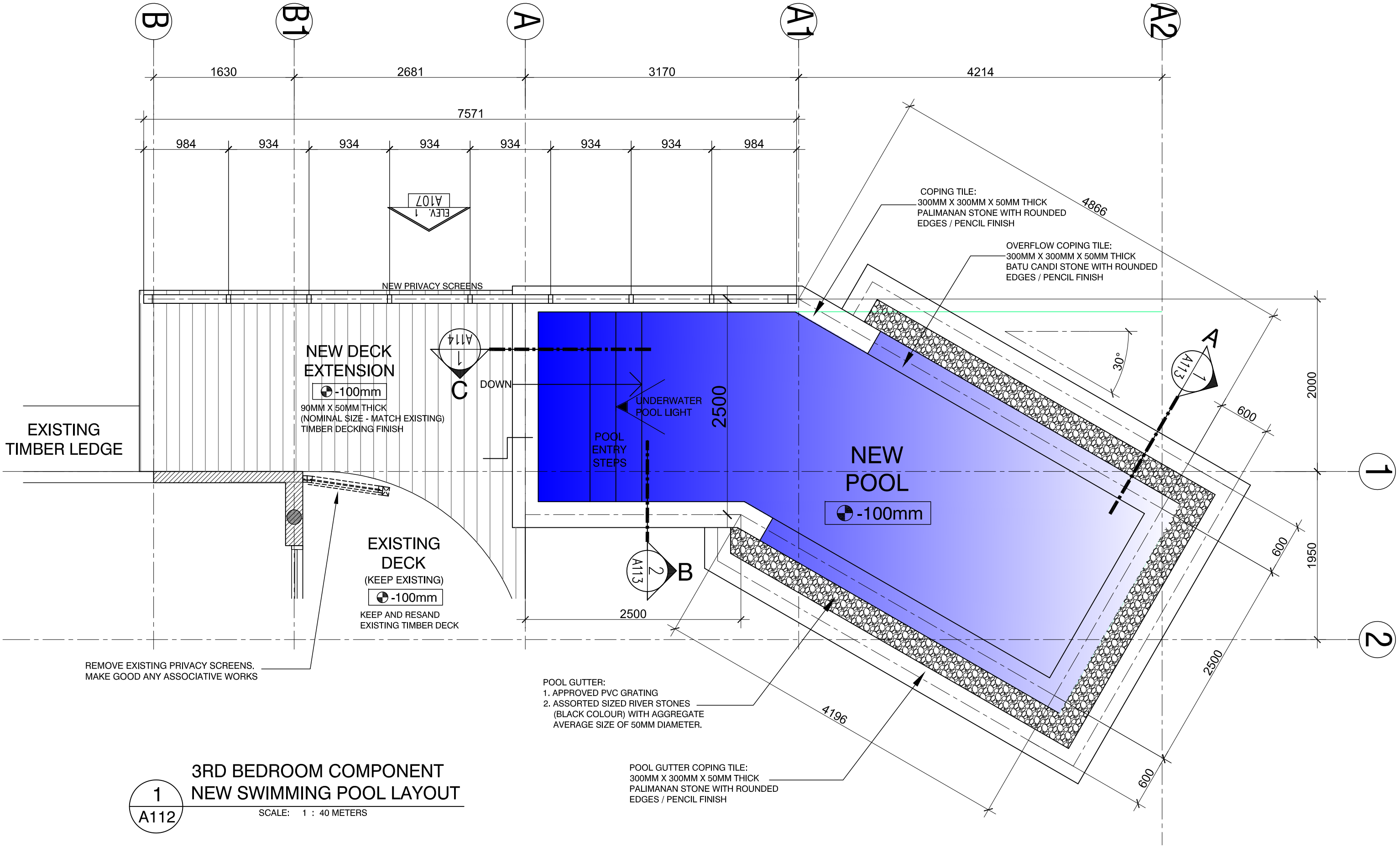
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: ELEVATIONS "B1" (3RD BEDROOM COMPONENT)	DRAWING NO.: A110 REVISION NO.: DATE: 08 JUNE 2021



1 / A111 — 02 BEDROOM COMPONNENT NEW SWIMMING POOL LAYOUT

SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 02 BEDROOM COMPONENT NEW POOL LAYOUT	DRAWING NO.: A111 REVISION NO.: DATE: 08 JUNE 2021

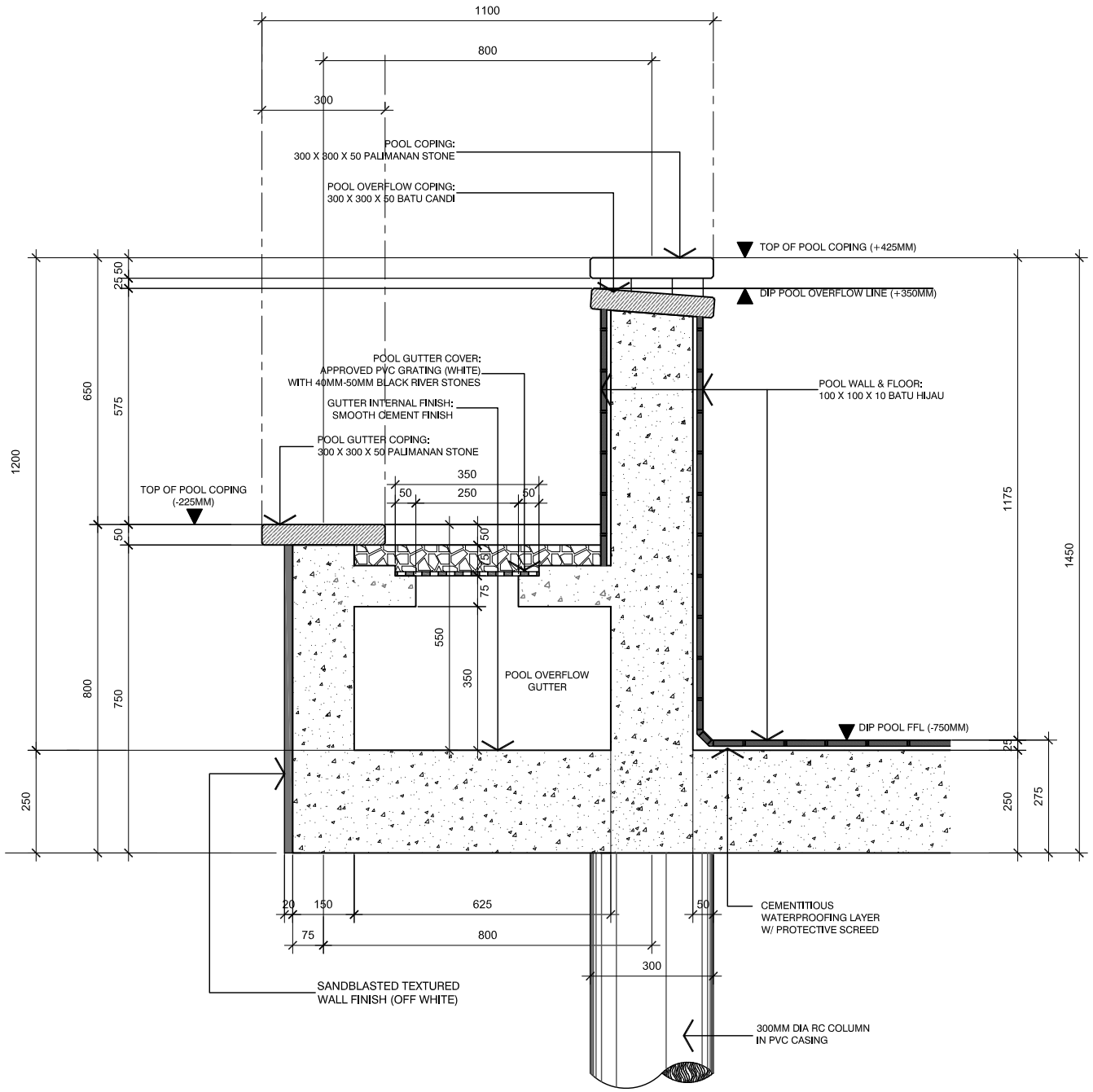


1 / A112

3RD BEDROOM COMPONENT NEW SWIMMING POOL LAYOUT

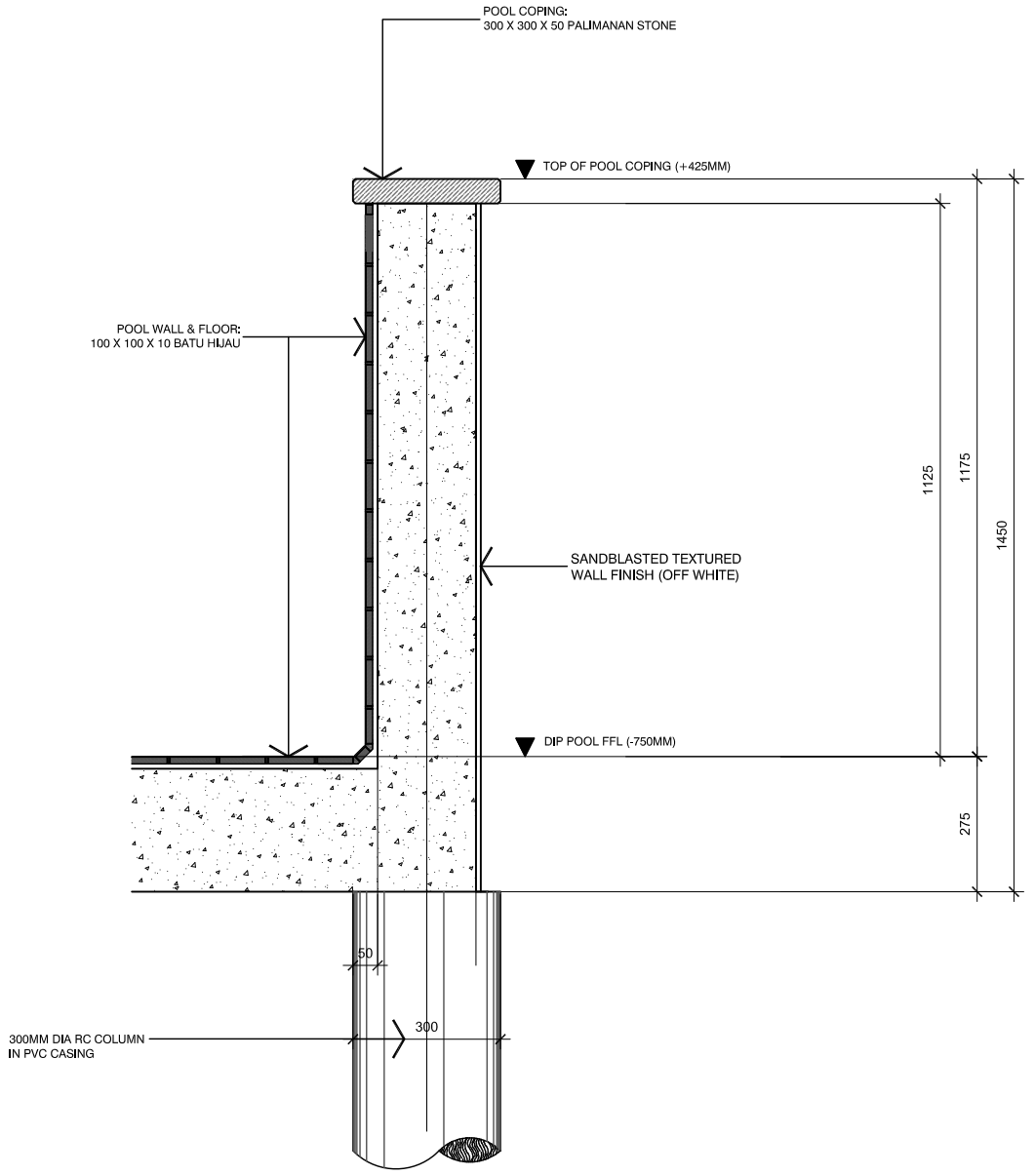
SCALE: 1 : 40 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 3RD BEDROOM COMPONENT NEW POOL LAYOUT	DRAWING NO.: A112 REVISION NO.: DATE: 08 JUNE 2021



1 / A113 POOL DETAIL "A"

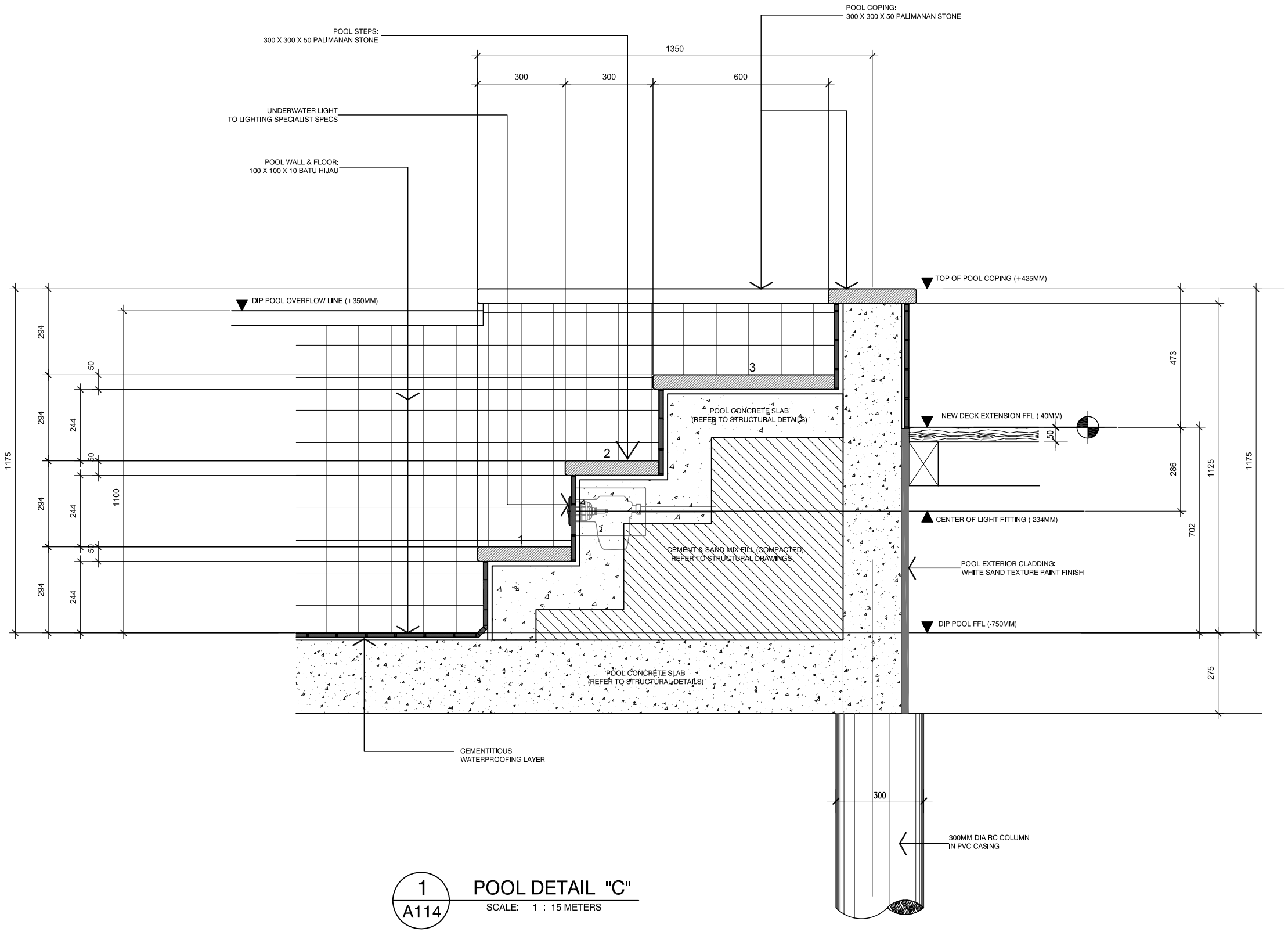
SCALE: 1 : 15 METERS



2 / A113 POOL DETAIL "B"

SCALE: 1 : 15 METERS

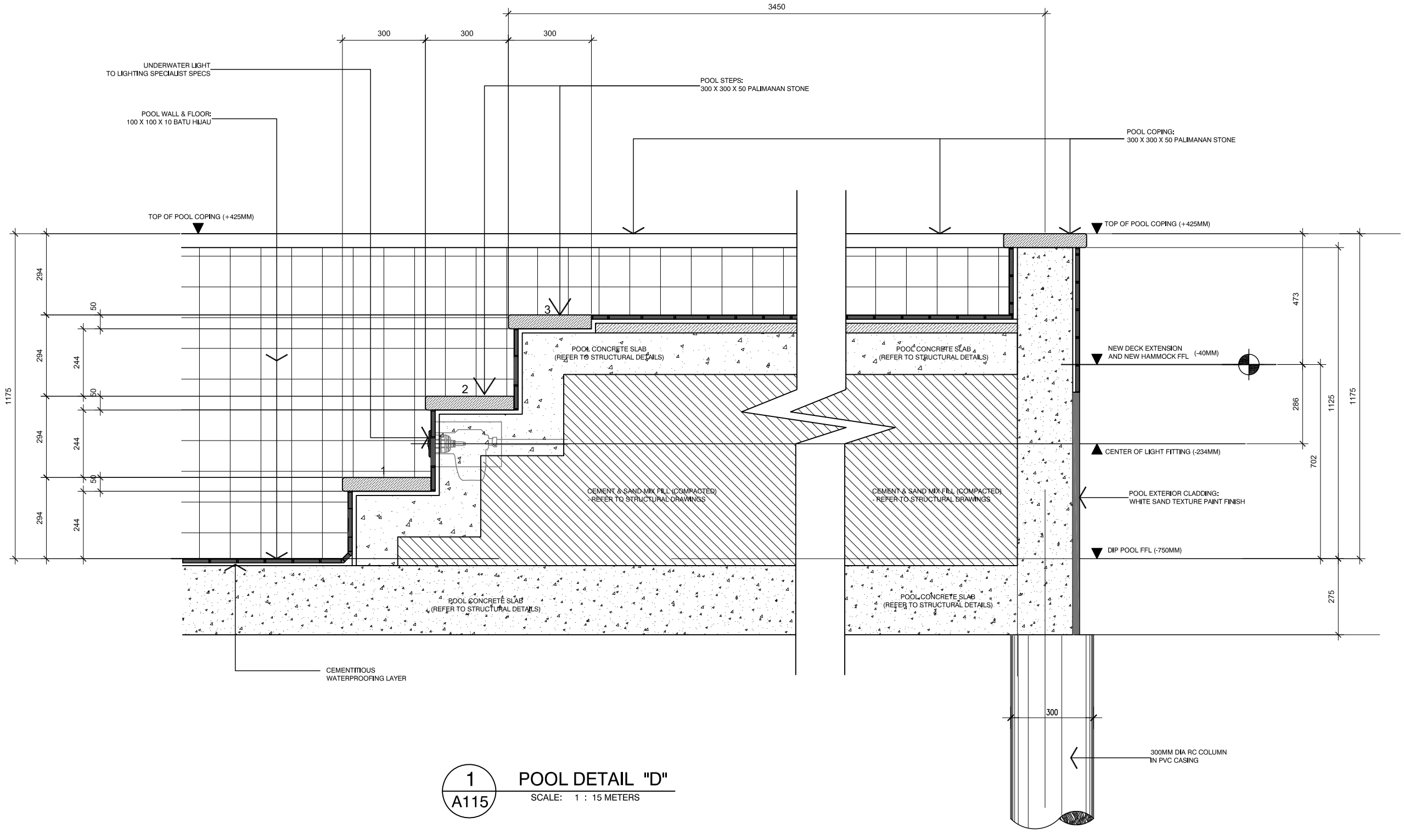
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: NEW POOL DETAILS "A" & "B"	DRAWING NO.: A113
			REVISION NO.:
			DATE: 08 JUNE 2021



1 / A114 POOL DETAIL "C"

SCALE: 1 : 15 METERS

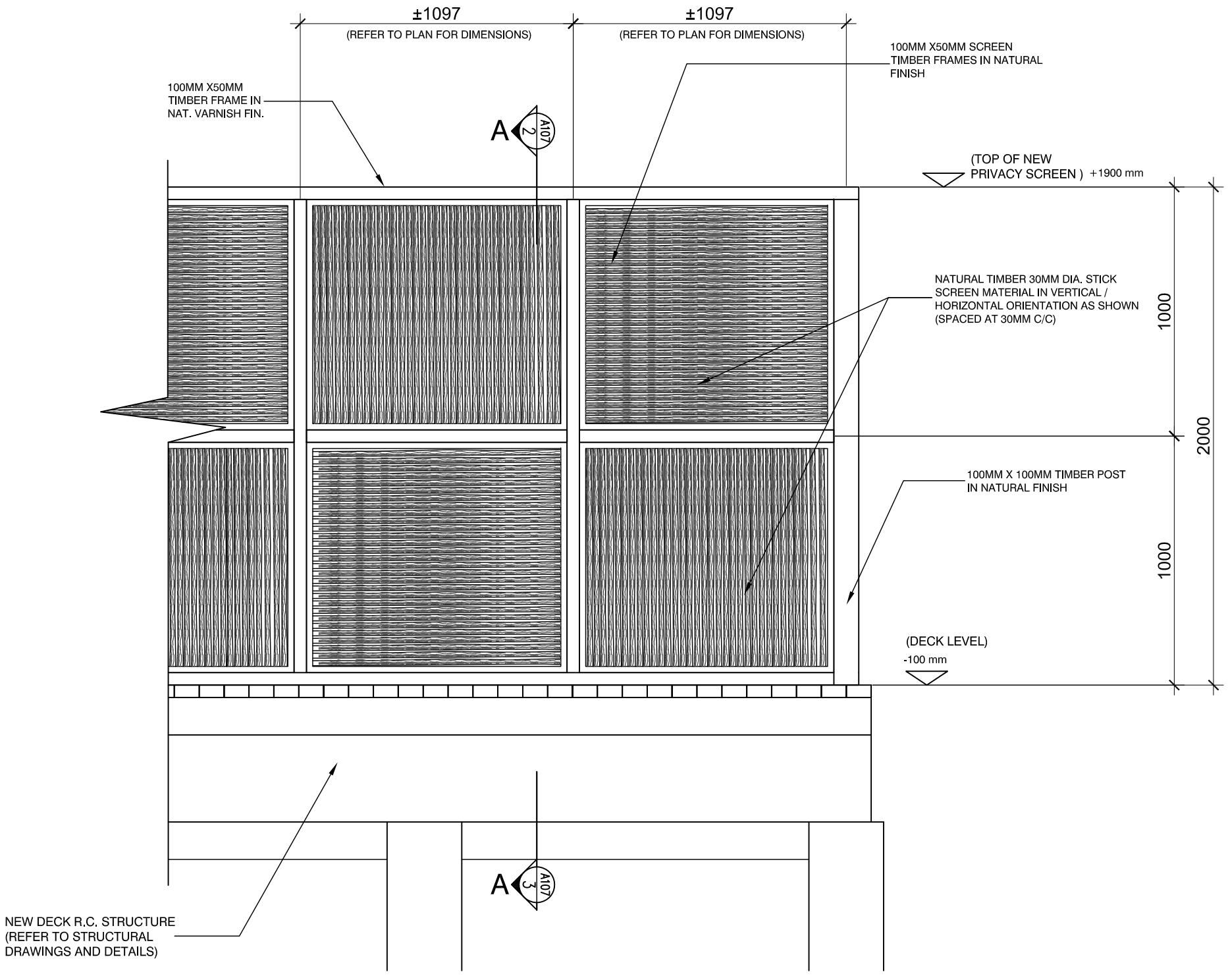
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: NEW POOL DETAILS "C"	DRAWING NO.: A114 REVISION NO.: DATE: 08 JUNE 2021



1 / A115 POOL DETAIL "D"

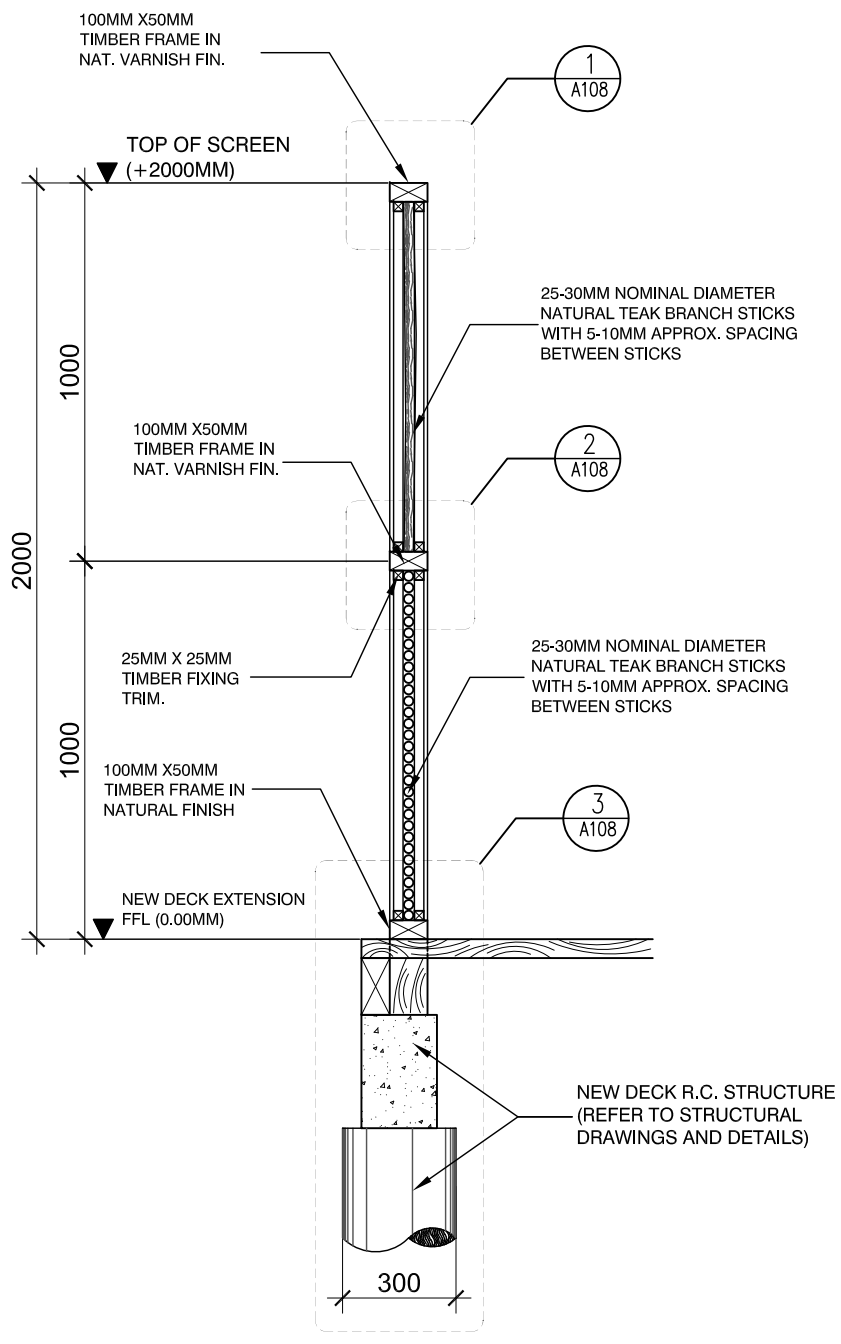
SCALE: 1 : 15 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: NEW POOL DETAILS "D"	DRAWING NO.: A115 REVISION NO.: DATE: 08 JUNE 2021



1 / A116 TYPICAL NEW PRIVACY SCREEN ELEVATION

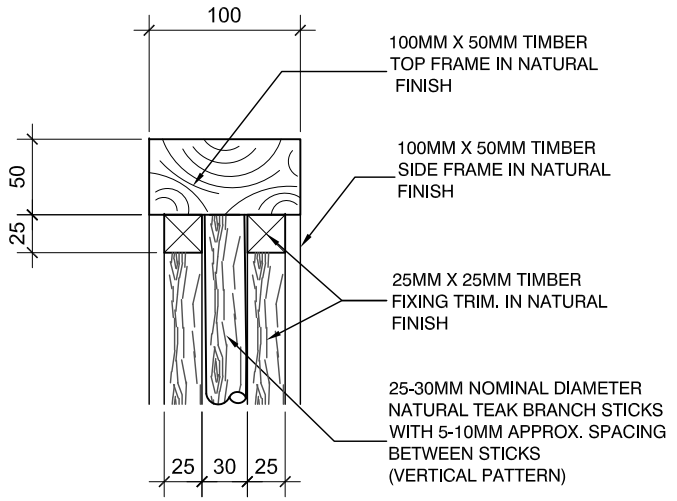
SCALE: 1 : 30 METERS



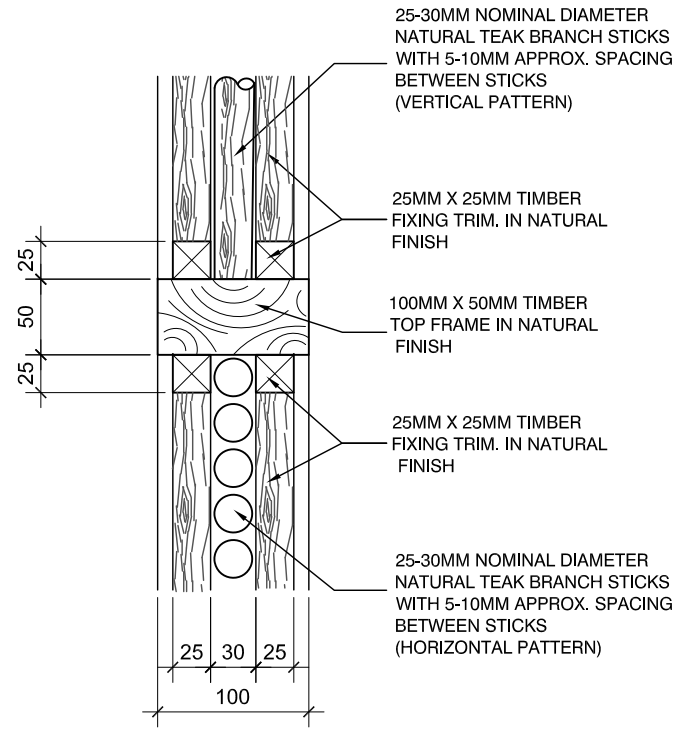
2 / A116 TYPICAL NEW PRIVACY SCREEN SECTION "A"

SCALE: 1 : 30 METERS

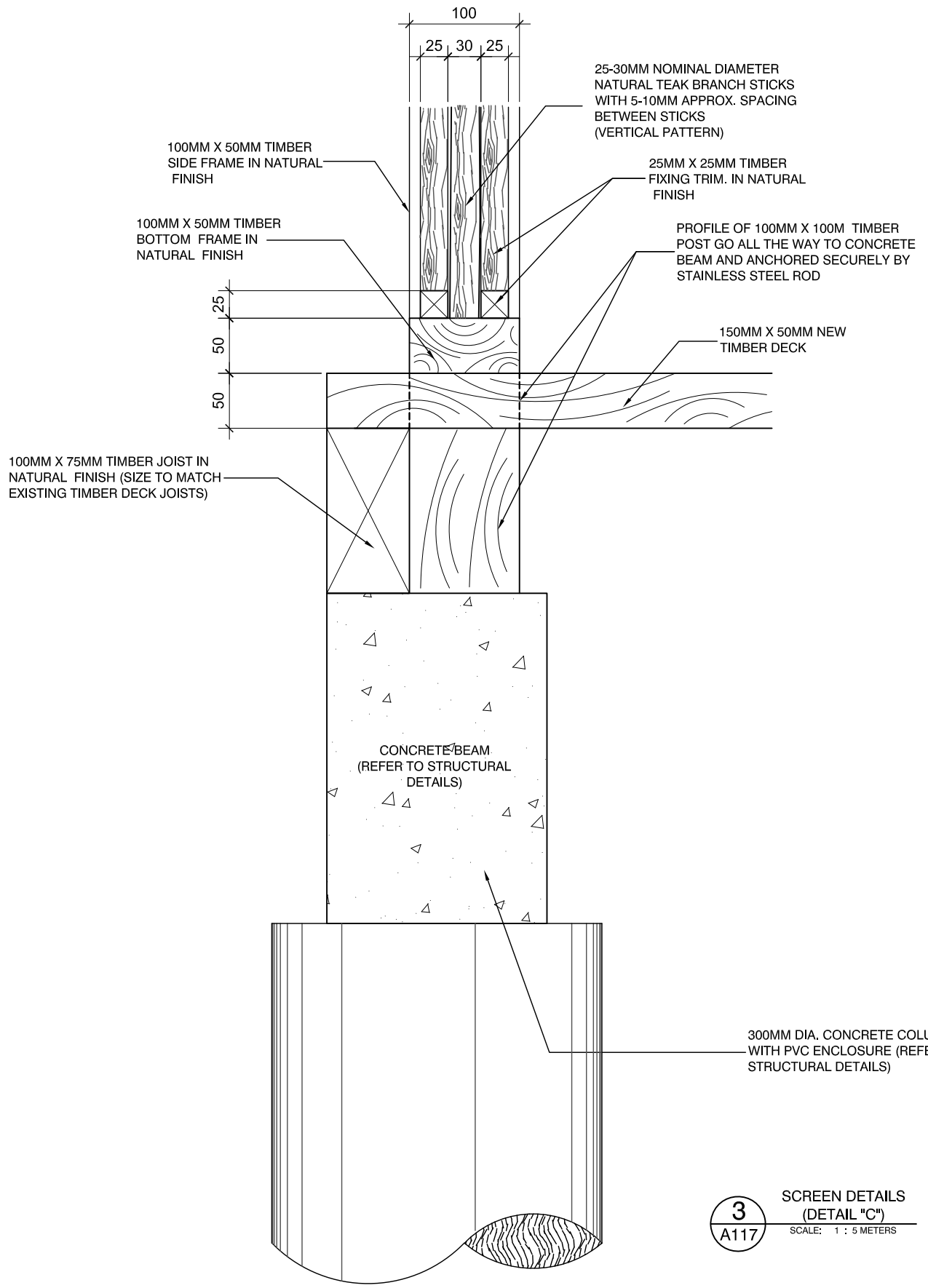
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: TYPICAL NEW PRIVACY SCREEN ELEVATION & SECTION	DRAWING NO.: A116 REVISION NO.: DATE: 08 JUNE 2021



1 A117 SCREEN DETAILS (DETAIL "A")
SCALE: 1 : 5 METERS

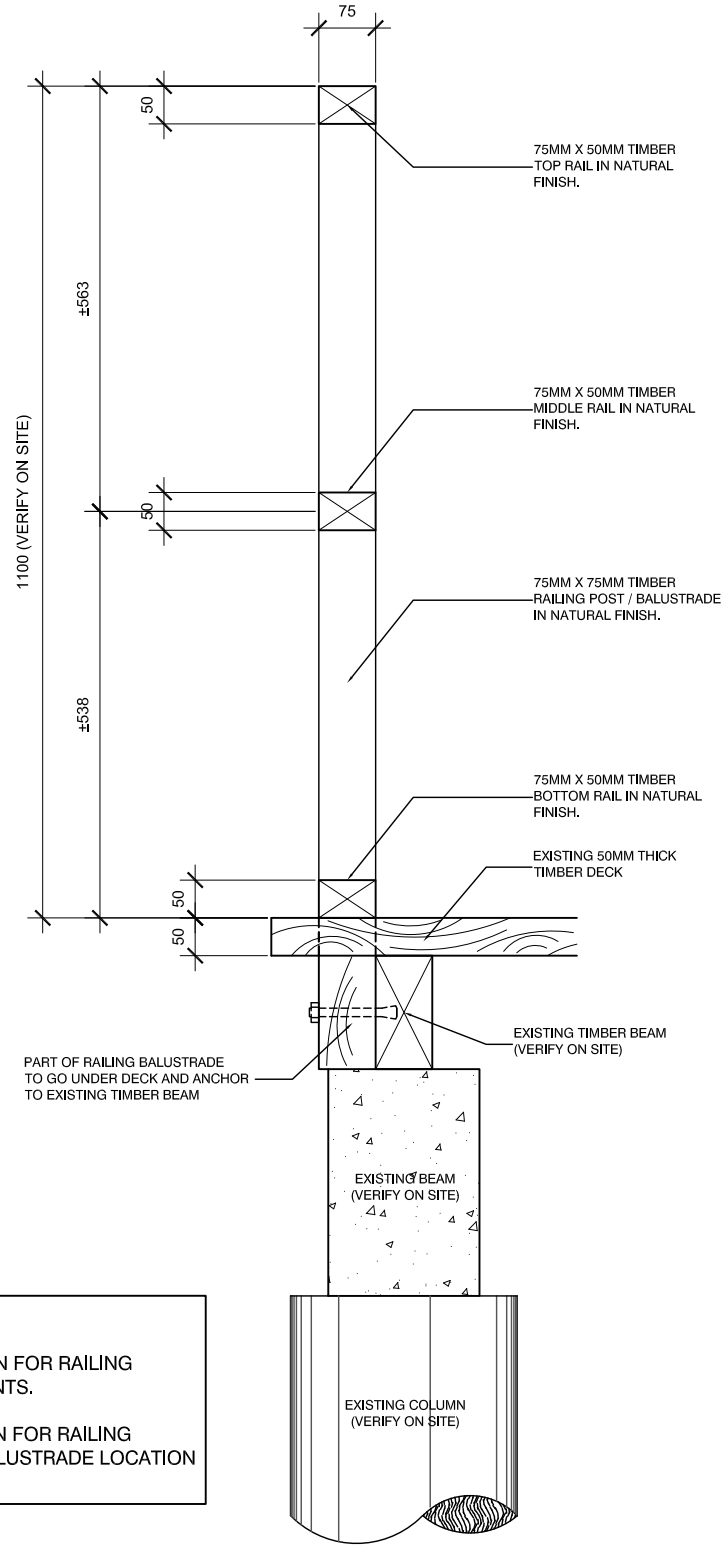


2 A117 SCREEN DETAILS (DETAIL "B")
SCALE: 1 : 5 METERS



3 A117 SCREEN DETAILS (DETAIL "C")
SCALE: 1 : 5 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: TYPICAL NEW PRIVACY SCREEN DETAILS "A", "B", & "C"	DRAWING NO.: A117 REVISION NO.: DATE: 08 JUNE 2021



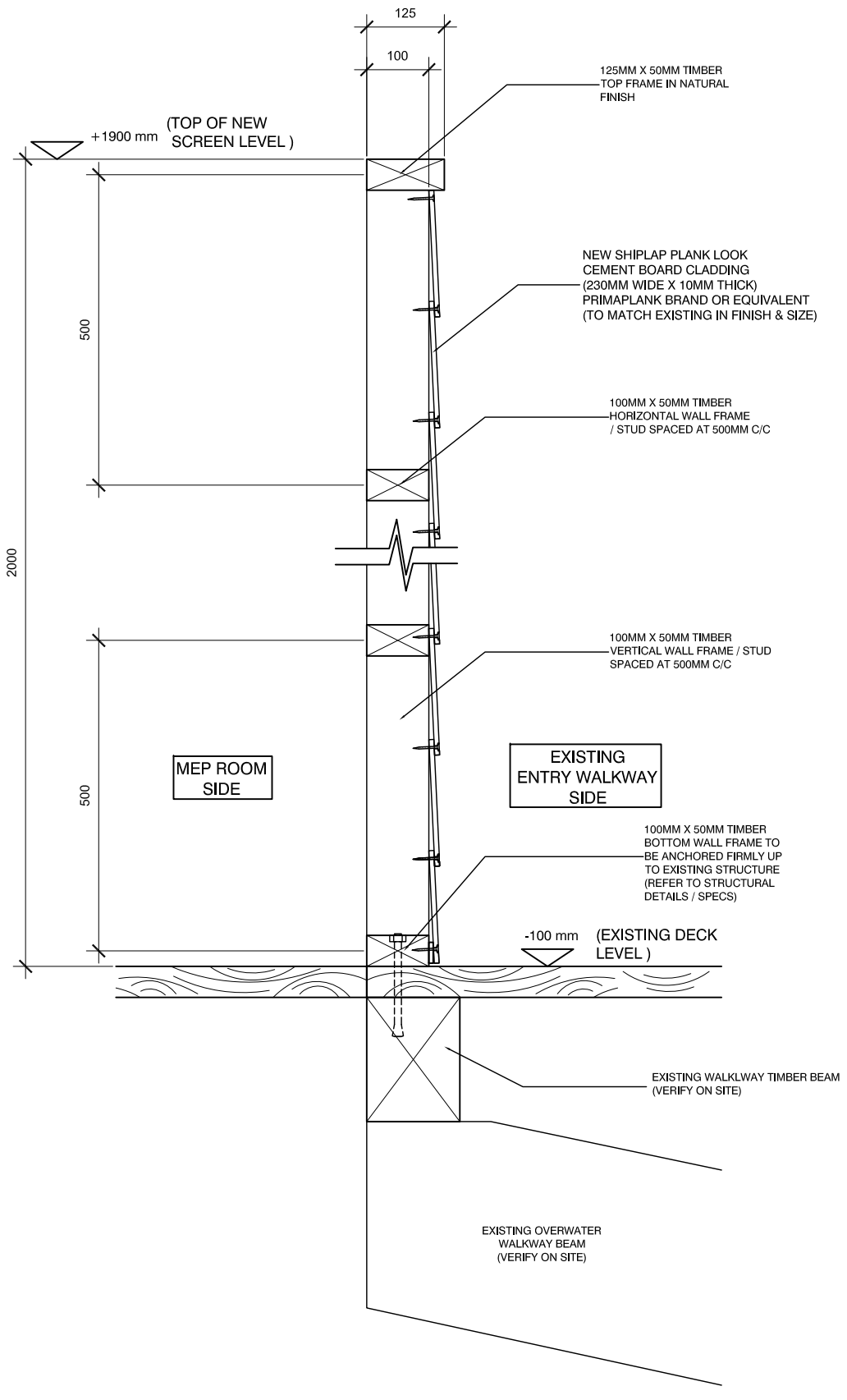
NOTES:

A. REFER TO FLOOR PLAN FOR RAILING SETTING OUT AND EXTENTS.

B. REFER TO FLOOR PLAN FOR RAILING VERTICAL SUPPORT / BALUSTRADE LOCATION AND SPACING.

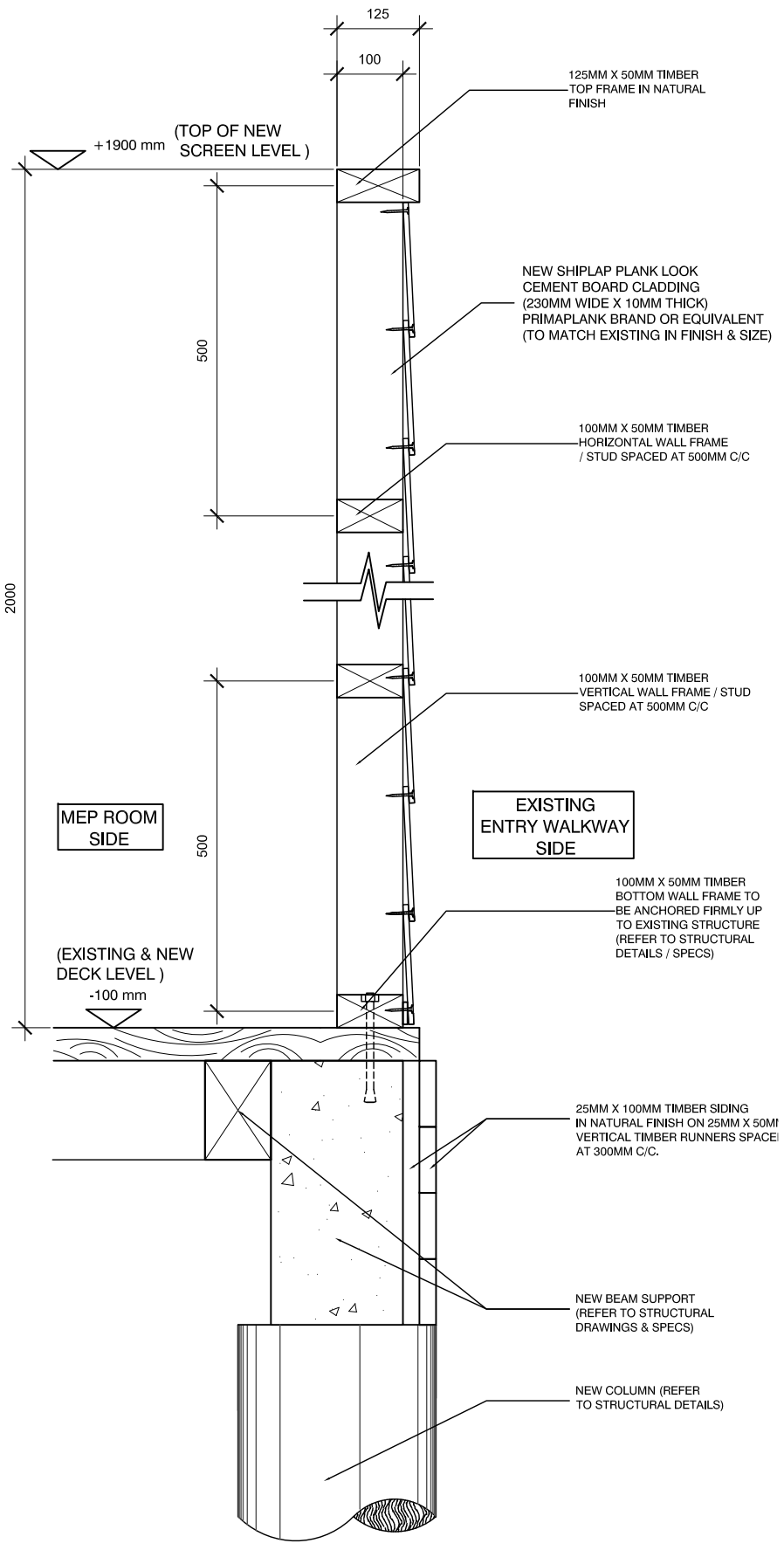
1 / A118 TYPICAL NEW RAILING SECTION DETAIL

SCALE: 1 : 10 METERS



2 / A118 TYPICAL NEW MEP ROOM WALL SECTION DETAIL "A"

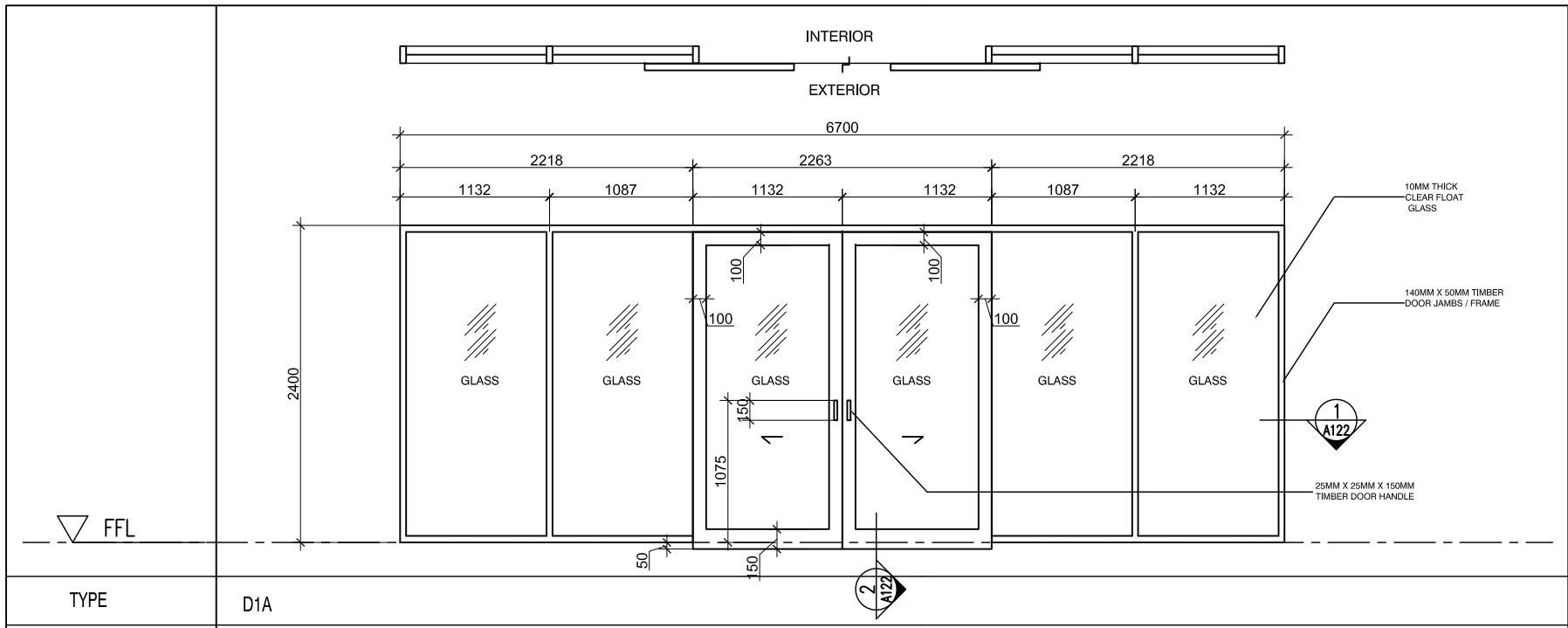
SCALE: 1 : 10 METERS



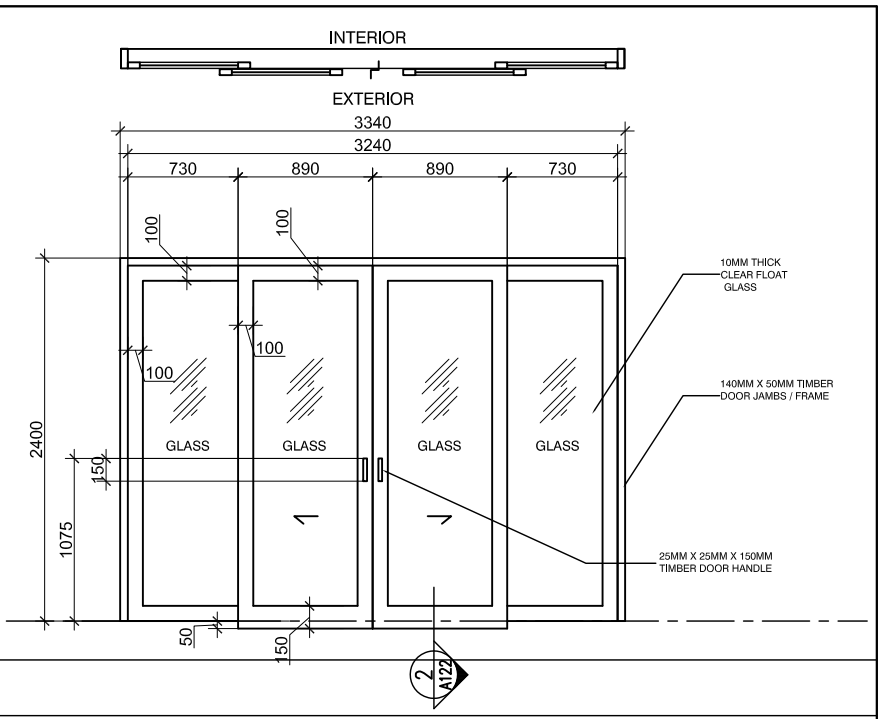
3 / A118 TYPICAL NEW MEP ROOM WALL SECTION DETAIL "B"

SCALE: 1 : 10 METERS

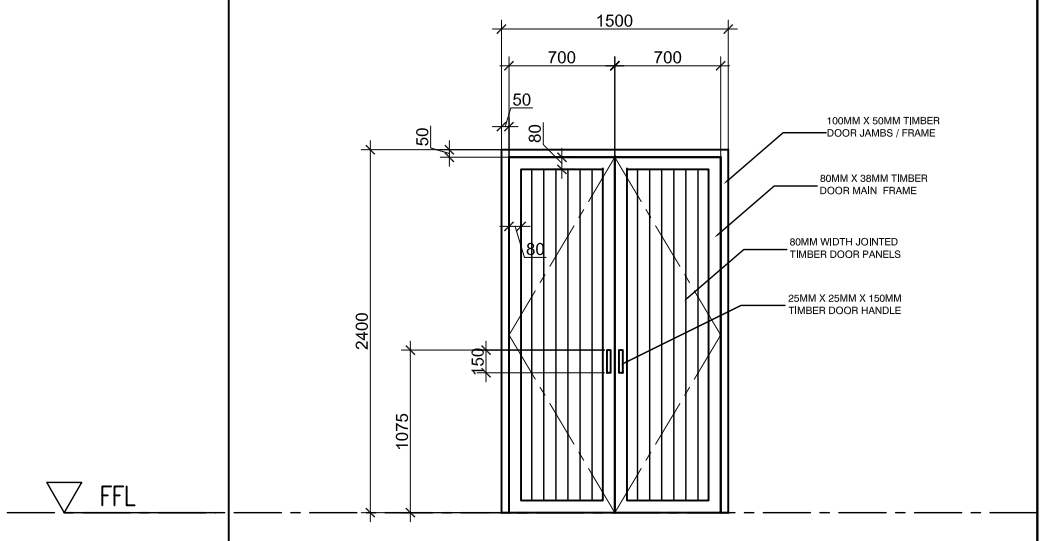
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: NEW RAILING SECTION & NEW MEP ROOM WALL SECTIONS	DRAWING NO.: A118 REVISION NO.: DATE: 08 JUNE 2021



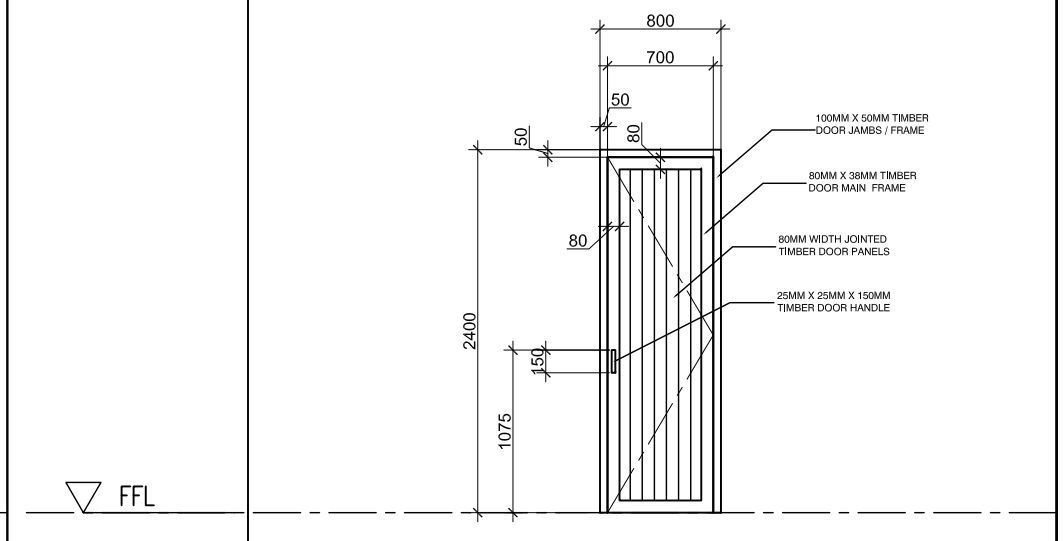
TYPE	D1A
QUANTITY	1
LOCATION	NEW LIVING DINING AREA
REMARKS	- TIMBER (APPROVED HARDWOOD) SLIDING DOORS WITH 10MM THICK CLEAR FLOAT FIXED GLASS - 140MM X 50 FIXED TIMBER JAMBS (REBATED) - TONE / COLOUR TO MATCH WITH EXISTING MAIN ENTRY DOOR (REFER TO ID FINISHES SCHEDULE) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : STAINLESS STEEL HOOK TYPE SLIDING DOOR LOCK (W/ THUMBTURN INSIDE, ONLY PULL AT EXTERIOR (FLUSHED STAINLESS STEEL) - SLIDING DOOR TRACK SYSTEM : CONTRACTOR TO SUBMIT FOR APPROVAL (STAINLESS STEEL BODY & SMOOTH OPERATION.) SPECIFIED BRAND : HENDERSON BRAND SOLTAIRE SERIES



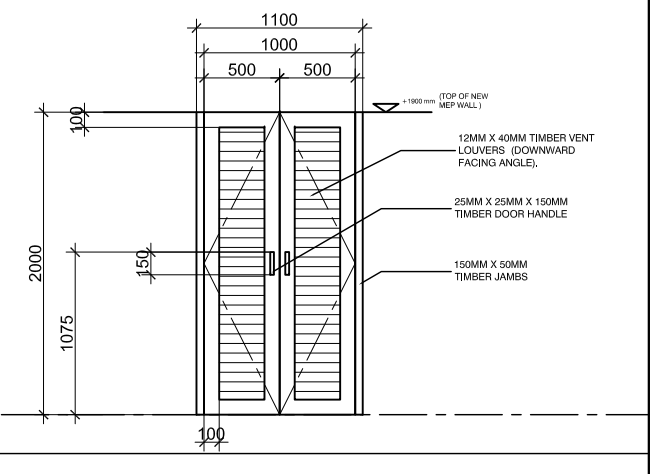
TYPE	D2A
QUANTITY	1
LOCATION	NEW MASTER BEDROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) SLIDING DOORS WITH 10MM THICK CLEAR FLOAT FIXED GLASS - 140MM X 50 FIXED TIMBER JAMBS (REBATED) - TONE / COLOUR TO MATCH WITH EXISTING MAIN ENTRY DOOR (REFER TO ID FINISHES SCHEDULE) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : STAINLESS STEEL HOOK TYPE SLIDING DOOR LOCK (W/ THUMBTURN INSIDE, ONLY PULL AT EXTERIOR (FLUSHED STAINLESS STEEL) - SLIDING DOOR TRACK SYSTEM : CONTRACTOR TO SUBMIT FOR APPROVAL (STAINLESS STEEL BODY & SMOOTH OPERATION.) SPECIFIED BRAND : HENDERSON BRAND SOLTAIRE SERIES



TYPE	D3A
QUANTITY	1
LOCATION	NEW LIVING DINING PAVILION
REMARKS	- TIMBER (APPROVED HARDWOOD) SOLID DOUBLE SWING PANEL DOOR - ONE / COLOUR TO MATCH WITH EXISTING MAIN ENTRY DOOR (REFER TO ID FINISHES SCHEDULE) - LOCKSET : DEADBOLT CYLINDER AT BOTH SIDES - DOOR HARDWARE (HINGES, BARREL BOLTS, SCREWS, ETC.) SHALL BE OF HIGH QUALITY STAINLESS STEEL. CONTRACTOR TO SUBMIT SAMPLES FOR APPROVAL.

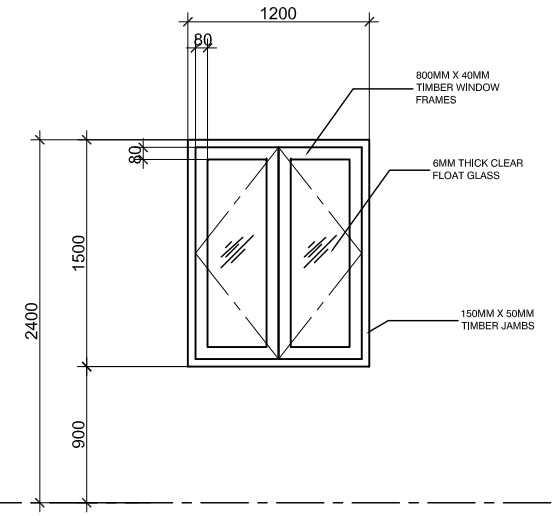


TYPE	D4A
QUANTITY	1
LOCATION	NEW TOILET @ LIVING DINING PAVILION
REMARKS	- TIMBER (APPROVED HARDWOOD) SOLID SINGLE SWING PANEL DOOR - ONE / COLOUR TO MATCH WITH EXISTING MAIN ENTRY DOOR (REFER TO ID FINISHES SCHEDULE) - LOCKSET : DOOR KNOB WITH EMERGENCY OPENER & OCCUPANCY INDICATOR FACING OUTSIDE ; THUMBTURN IN KNOB FACING BATHROOM. - DOOR HARDWARE (HINGES, BARREL BOLTS, SCREWS, ETC.) SHALL BE OF HIGH QUALITY STAINLESS STEEL. CONTRACTOR TO SUBMIT SAMPLES FOR APPROVAL.

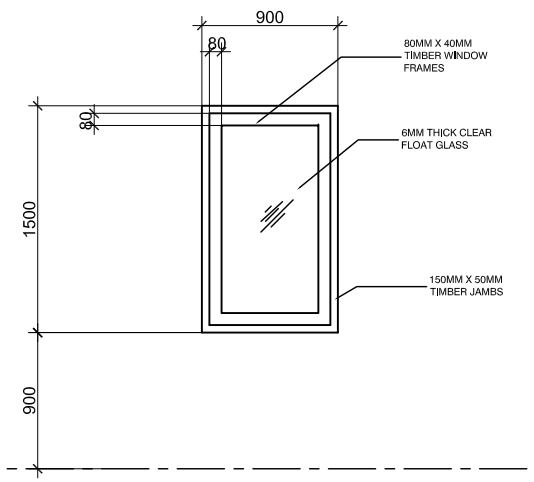


TYPE	D5A
QUANTITY	1
LOCATION	NEW MEP ROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) SWING DOOR WITH TIMBER VENT LOUVERS (DOWNWARD FACING ANGLE). - WOOD TONE / COLOUR TO MATCH WITH MAIN ENTRY DOOR (REFER TO ID SPECS) - LOCKSET : STAINLESS STEEL DEADBOLT (KEY CYLINDER FACING OUT, THUMBTURN AT INTERIOR SIDE)

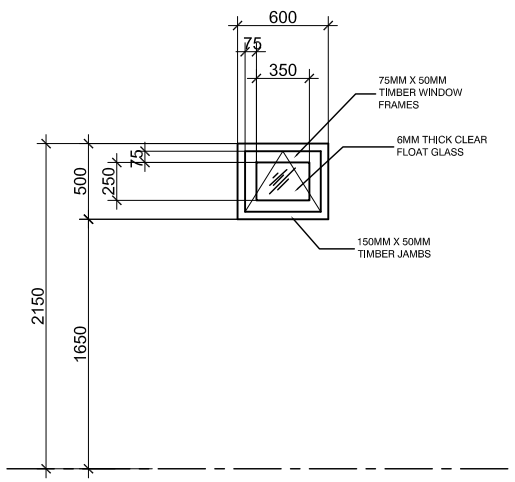
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 02 BEDROOM COMPONENT SCHEDULE OF NEW DOORS	DRAWING NO.: A119 REVISION NO.: DATE: 08 JUNE 2021



TYPE	W1A
QUANTITY	2
LOCATION	NEW MASTER BEDROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) CASEMENT WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE CASEMENT WINDOW LOCK & CASEMENT WINDOW STAYS (ALL STAINLESS STEEL)

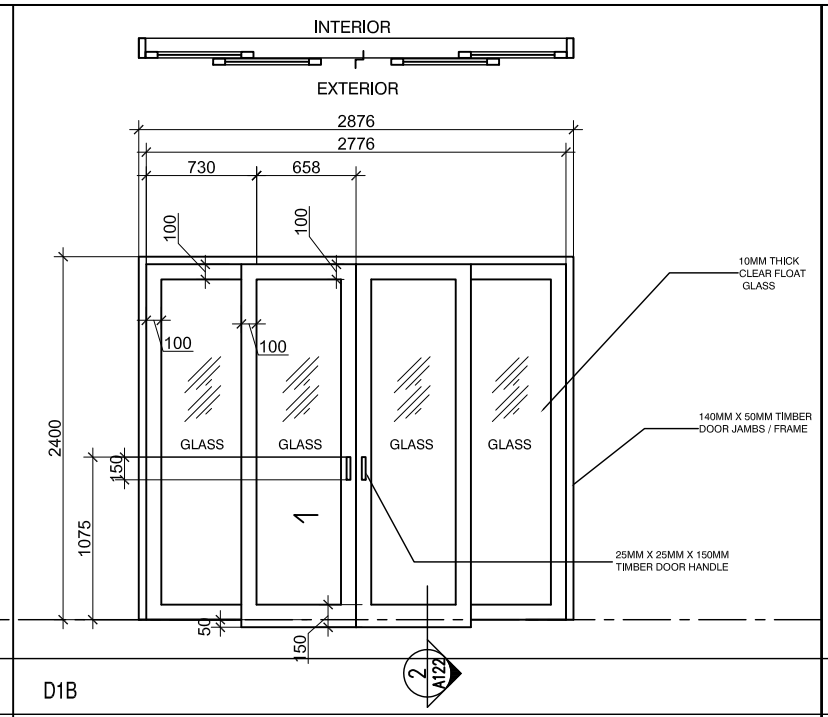
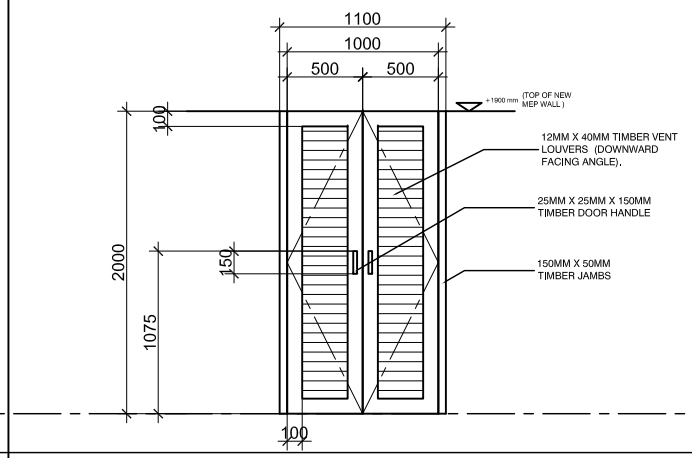


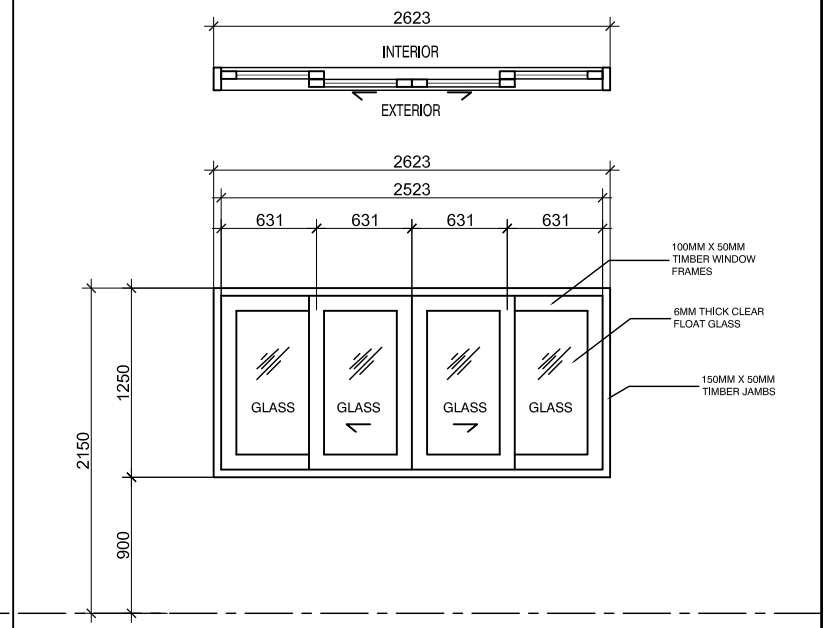
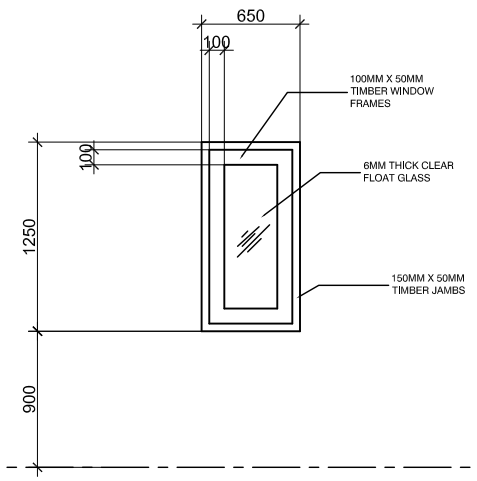
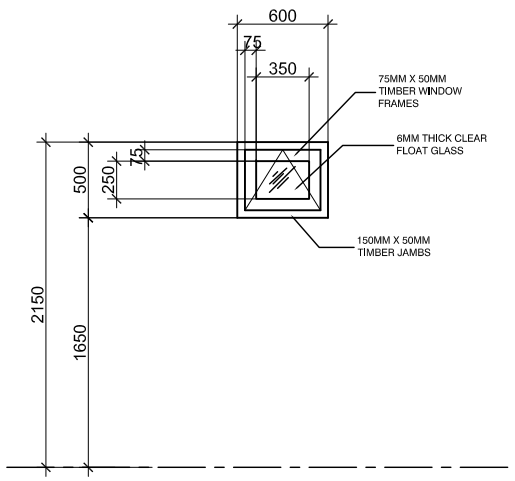
TYPE	W2A
QUANTITY	1
LOCATION	NEW MASTER BEDROOM WARDROBE AREA
REMARKS	- TIMBER (APPROVED HARDWOOD) FIXED WINDOWS WITH 6MM THICK CLEAR FLOAT GLASS - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR



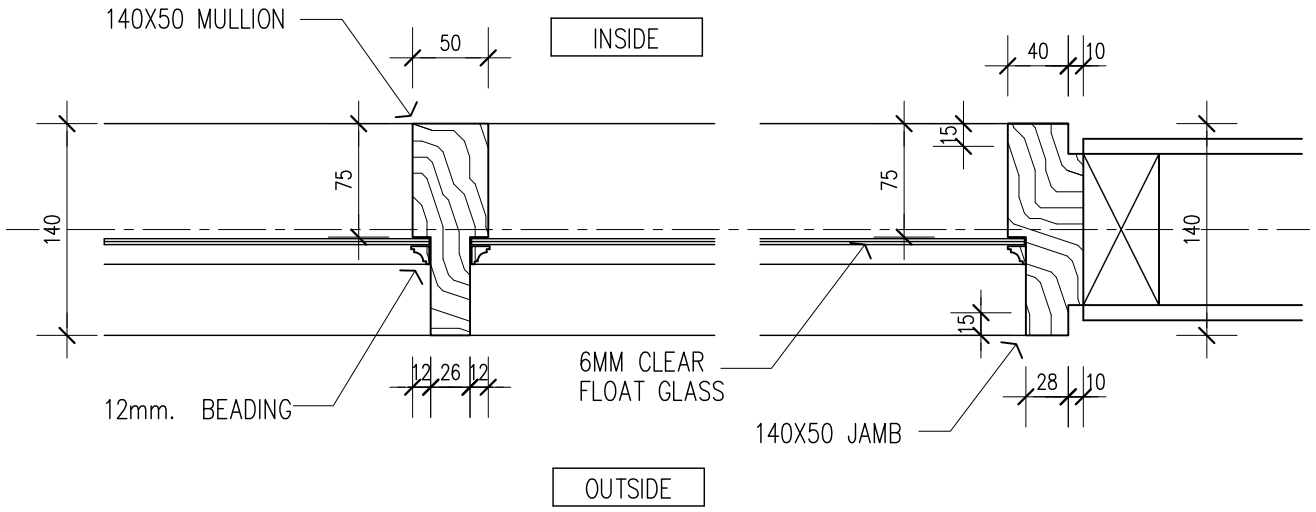
TYPE	W3A
QUANTITY	1
LOCATION	NEW TOILET @ LIVING DINING PAVILION
REMARKS	- TIMBER (APPROVED HARDWOOD) CASEMENT WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE CASEMENT WINDOW LOCK & CASEMENT WINDOW STAYS (ALL STAINLESS STEEL)

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 02 BEDROOM COMPONENT SCHEDULE OF NEW WINDOWS	DRAWING NO.: A120 REVISION NO.: DATE: 08 JUNE 2021

					
TYPE	D1B	TYPE	D2B	TYPE	
QUANTITY	1	QUANTITY	1	QUANTITY	
LOCATION	MASTER BEDROOM	LOCATION	NEW MEP ROOM	LOCATION	
REMARKS	- TIMBER (APPROVED HARDWOOD) SLIDING DOORS WITH 10MM THICK CLEAR FLOAT FIXED GLASS - 140MM X 50 FIXED TIMBER JAMBS (REBATED) - TONE / COLOUR TO MATCH WITH EXISTING MAIN ENTRY DOOR (REFER TO ID FINISHES SCHEDULE) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : STAINLESS STEEL HOOK TYPE SLIDING DOOR LOCK (W/ THUMBTURN INSIDE, ONLY PULL AT EXTERIOR (FLUSHED STAINLESS STEEL) - SLIDING DOOR TRACK SYSTEM : CONTRACTOR TO SUBMIT FOR APPROVAL (STAINLESS STEEL BODY & SMOOTH OPERATION.) SPECIFIED BRAND : HENDERSON BRAND SOLTAIRE SERIES	REMARKS	- TIMBER (APPROVED HARDWOOD) SWING DOOR WITH TIMBER VENT LOUVERS (DOWNWARD FACING ANGLE). - WOOD TONE / COLOUR TO MATCH WITH MAIN ENTRY DOOR (REFER TO ID SPECS) - LOCKSET : STAINLESS STEEL DEADBOLT (KEY CYLINDER FACING OUT, THUMBTURN AT INTERIOR SIDE)	REMARKS	

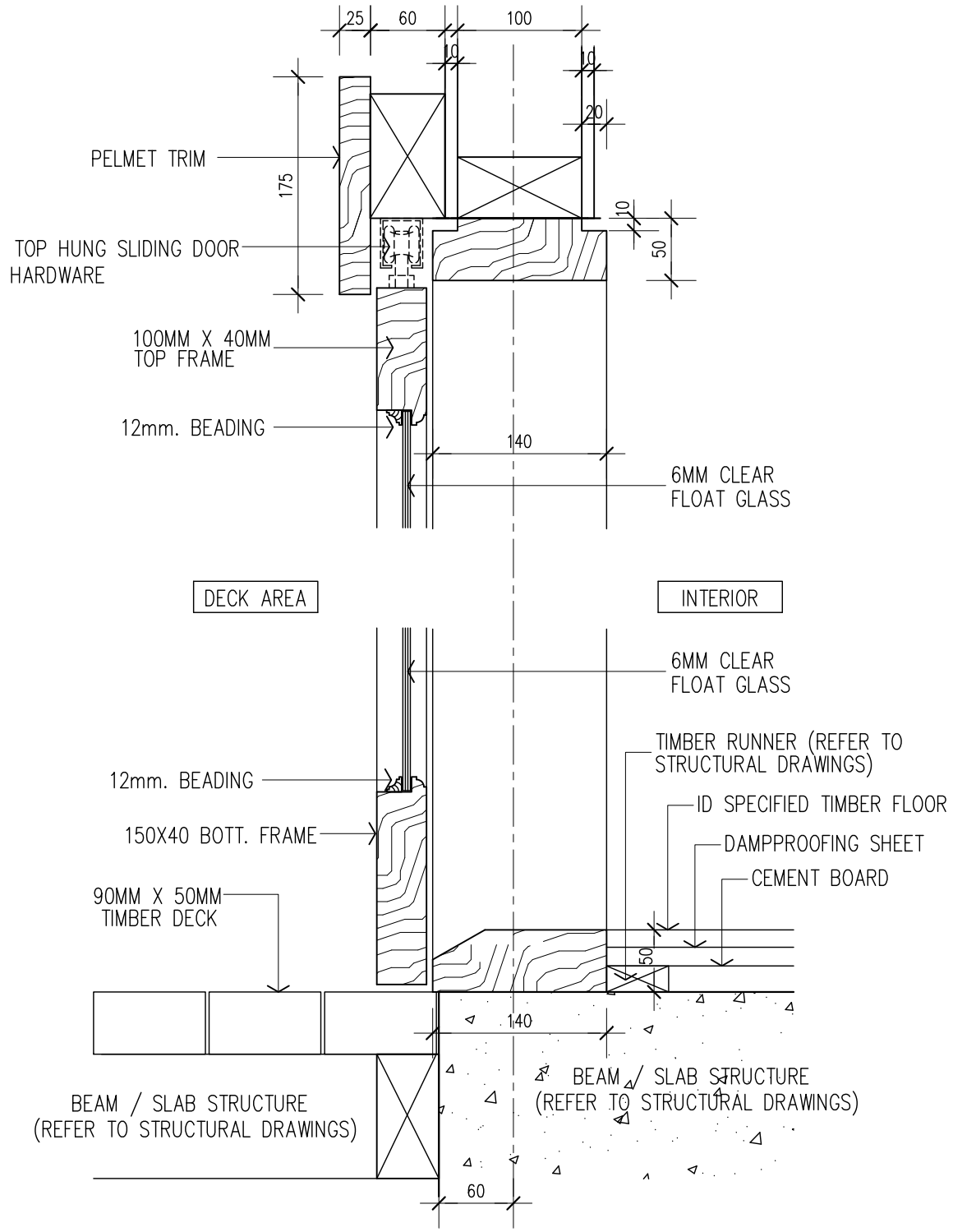
					
TYPE	W1B	TYPE	W2B	TYPE	W3B
QUANTITY	1	QUANTITY	1	QUANTITY	1
LOCATION	KID'S ROOM BEDROOM	LOCATION	KID'S ROOM BEDROOM	LOCATION	KID'S ROOM BATHROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) SWING WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE SLIDING DOOR LOCK (W/ THUMBTURN) - SLIDING TRACK SYSTEM : CONTRACTOR TO SUBMIT FOR APPROVAL (STAINLESS STEEL BODY & SMOOTH OPERATION.)	REMARKS	- TIMBER (APPROVED HARDWOOD) FIXED WINDOWS WITH 6MM THICK CLEAR FLOAT GLASS - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR	REMARKS	- TIMBER (APPROVED HARDWOOD) CASEMENT WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE CASEMENT WINDOW LOCK & CASEMENT WINDOW STAYS (ALL STAINLESS STEEL)

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: 3RD BEDROOM COMPONENT SCHEDULE OF NEW DOORS & WINDOWS	DRAWING NO.: A121 REVISION NO.: DATE: 08 JUNE 2021



1 / A122 **DETAIL 01** TYPICAL FIXED GLASS & JAMBS / MULLIONS DETAILS

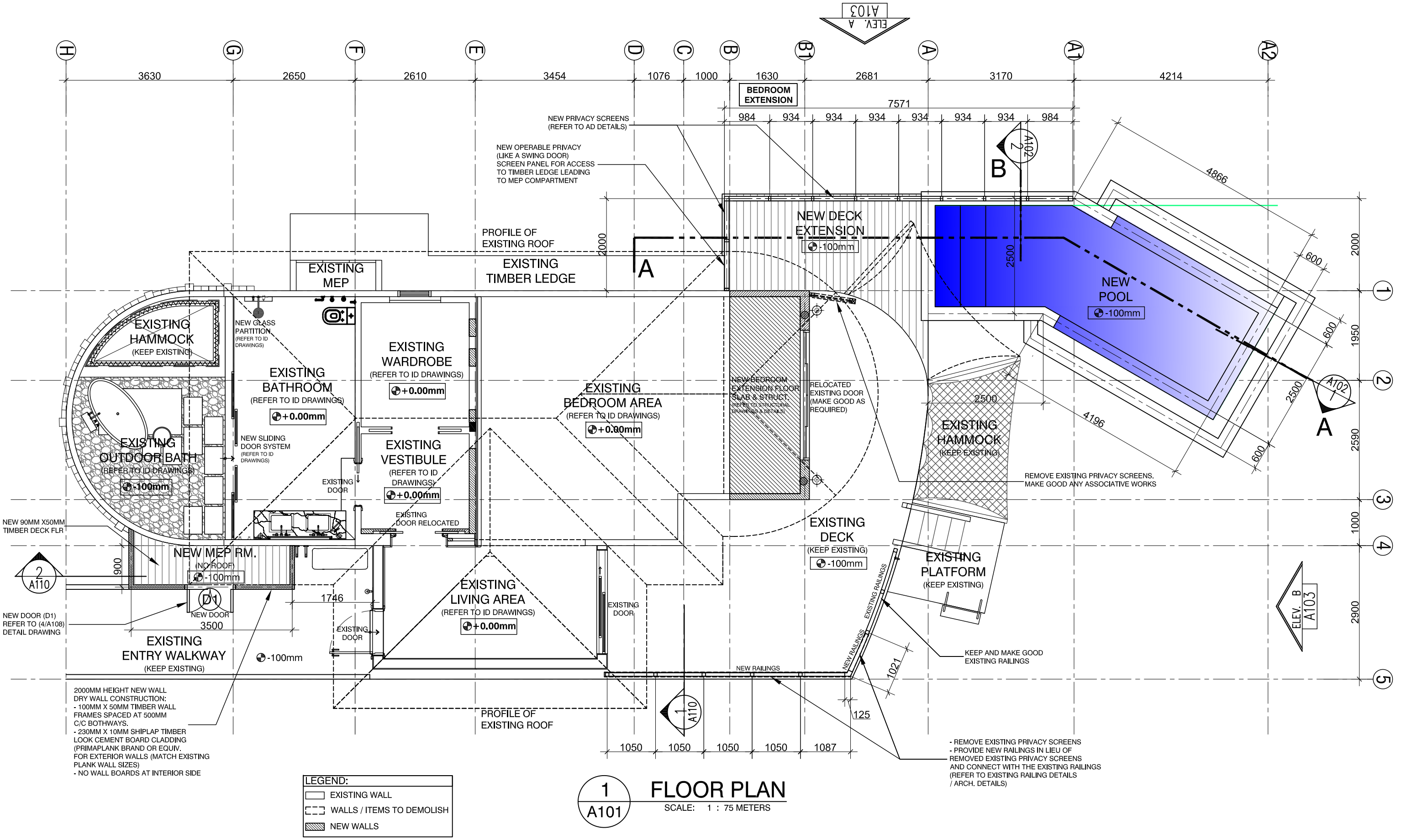
SCALE : 1 : 5 METERS



2 / A122 **DETAIL 01** TYPICAL SLIDING DOOR TOP & BOTTOM DETAILS

SCALE : 1 : 5 METERS

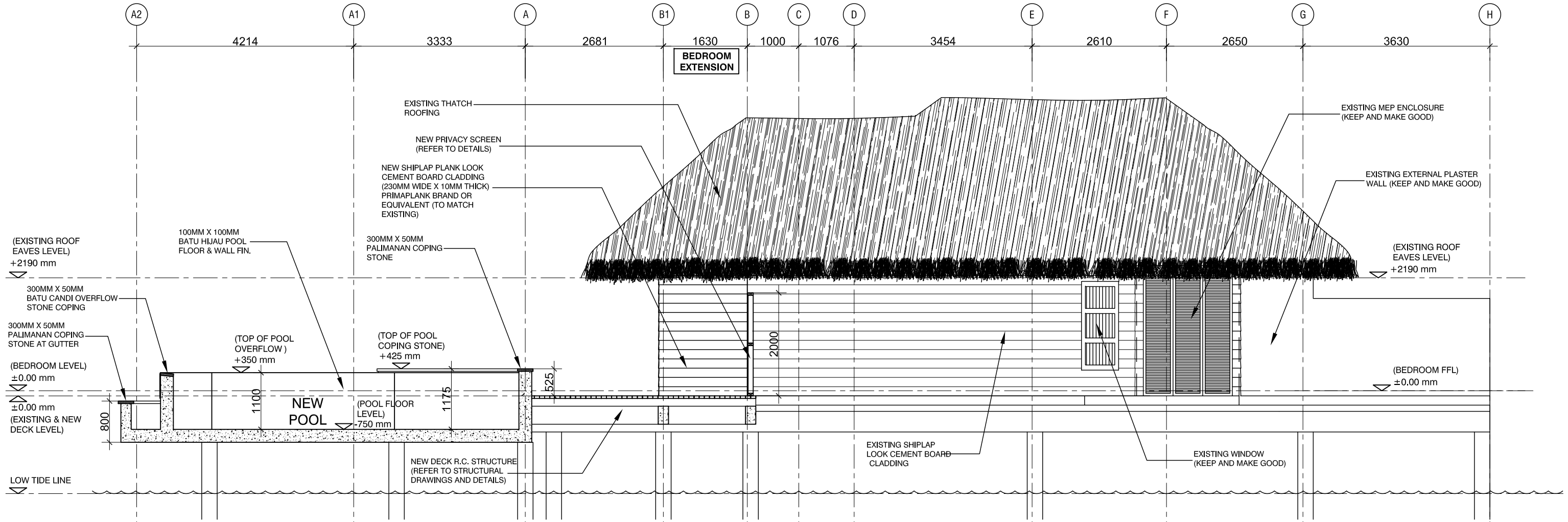
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: WATER VILLA W/ POOL CONVERT TO 3 BEDROOM WATER VILLA	DRAWING TITLE: TYPICAL DOOR & WINDOW DETAILS	DRAWING NO.: A122 REVISION NO.: DATE: 08 JUNE 2021



1 / A101 **FLOOR PLAN**

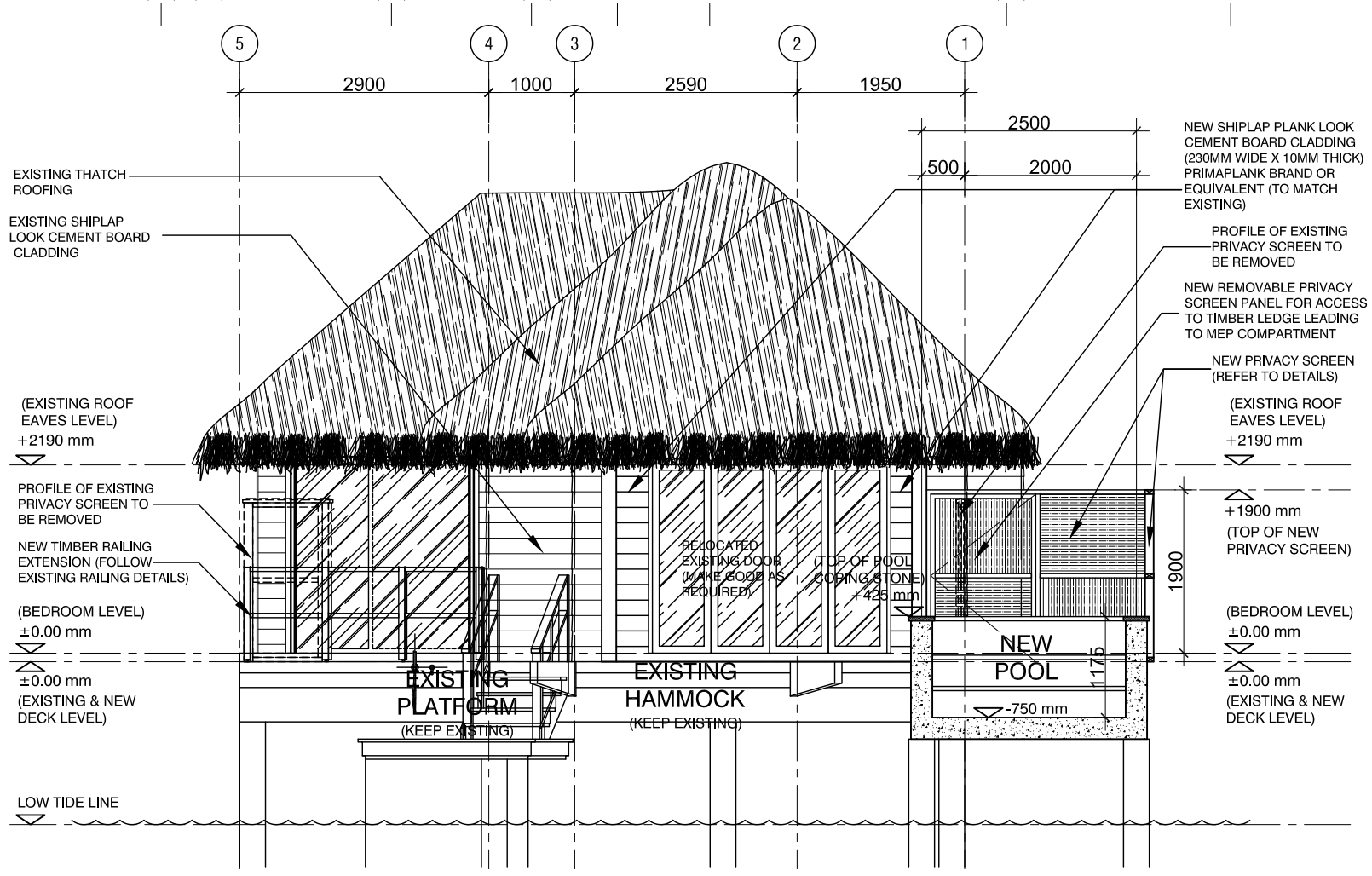
SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: FLOOR PLAN	DRAWING NO.: A101
			REVISION NO.:
			DATE: 28 MAY 2021



1 / A102 SECTION THRU A-A

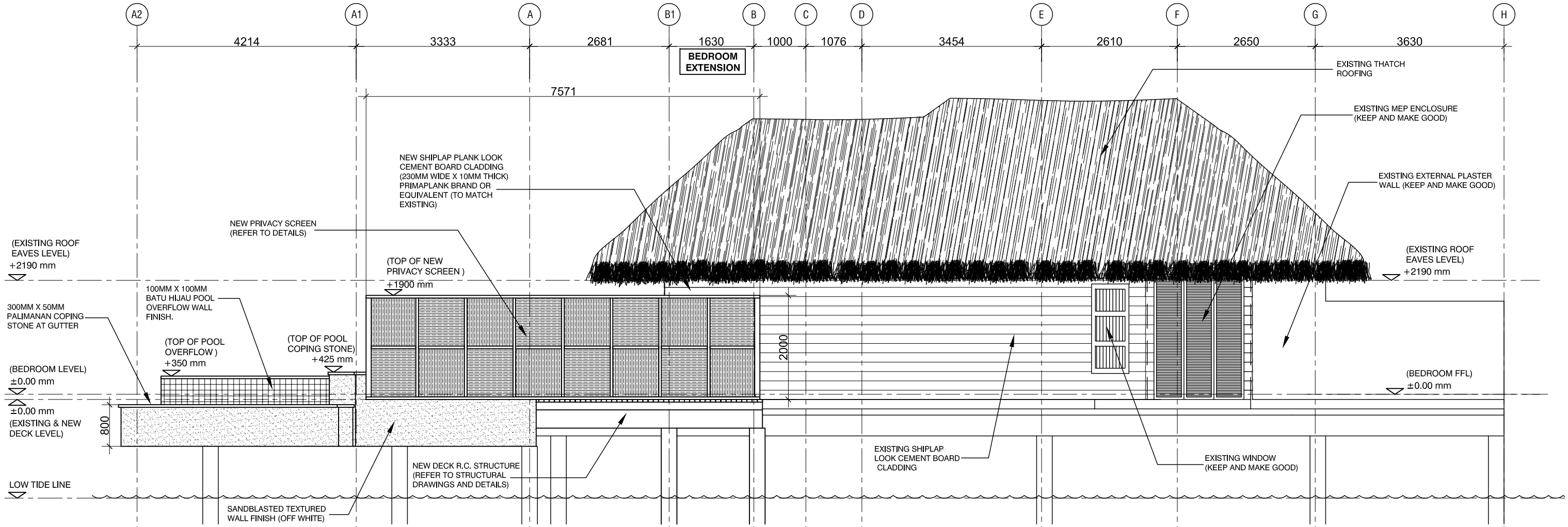
SCALE: 1 : 75 METERS



2 / A102 SECTION THRU B-B

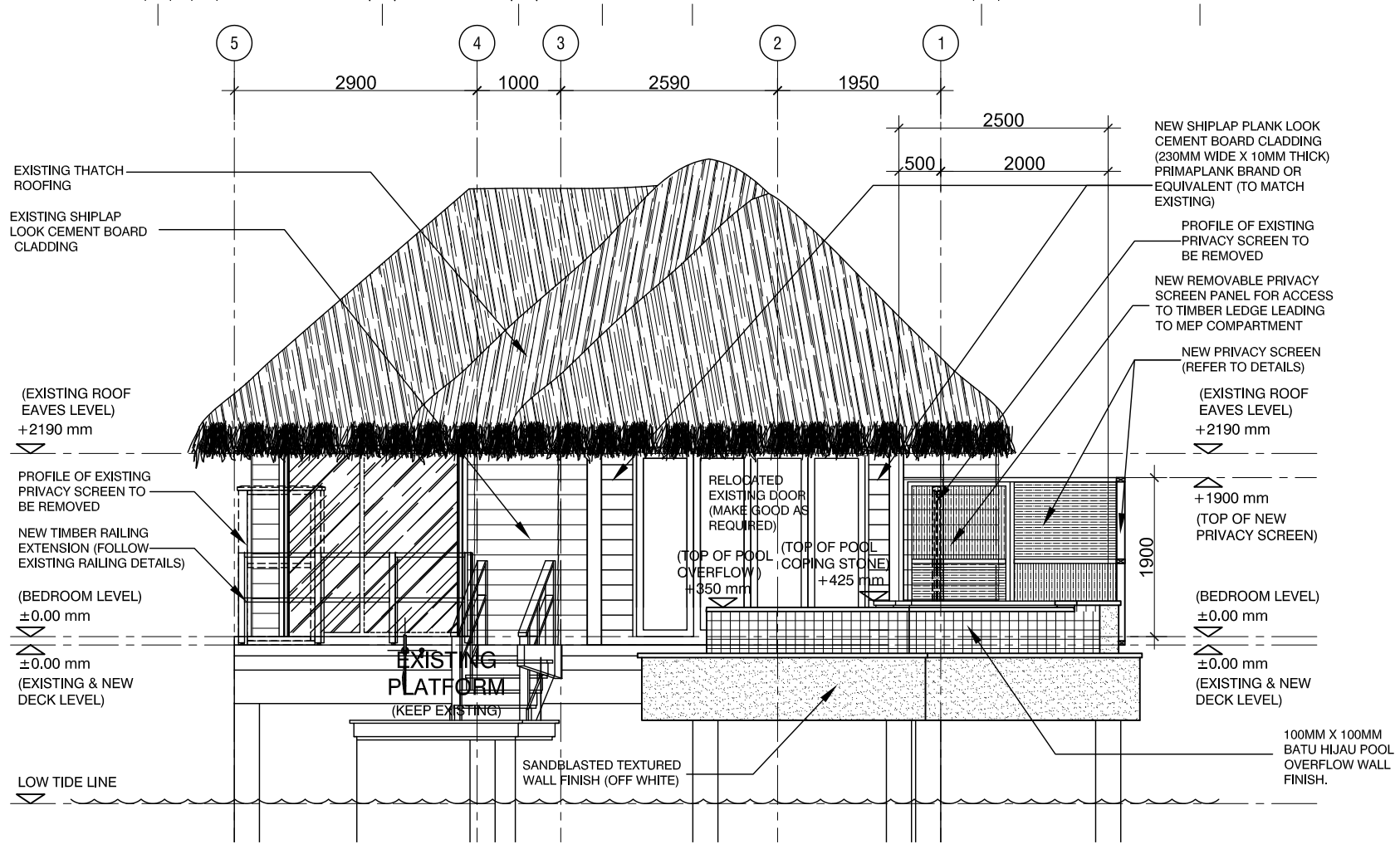
SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: SECTIONS A-A & SECTIONS B-B	DRAWING NO.: A102 REVISION NO.: DATE: 28 MAY 2021



1 / A103 **ELEVATION "A"**

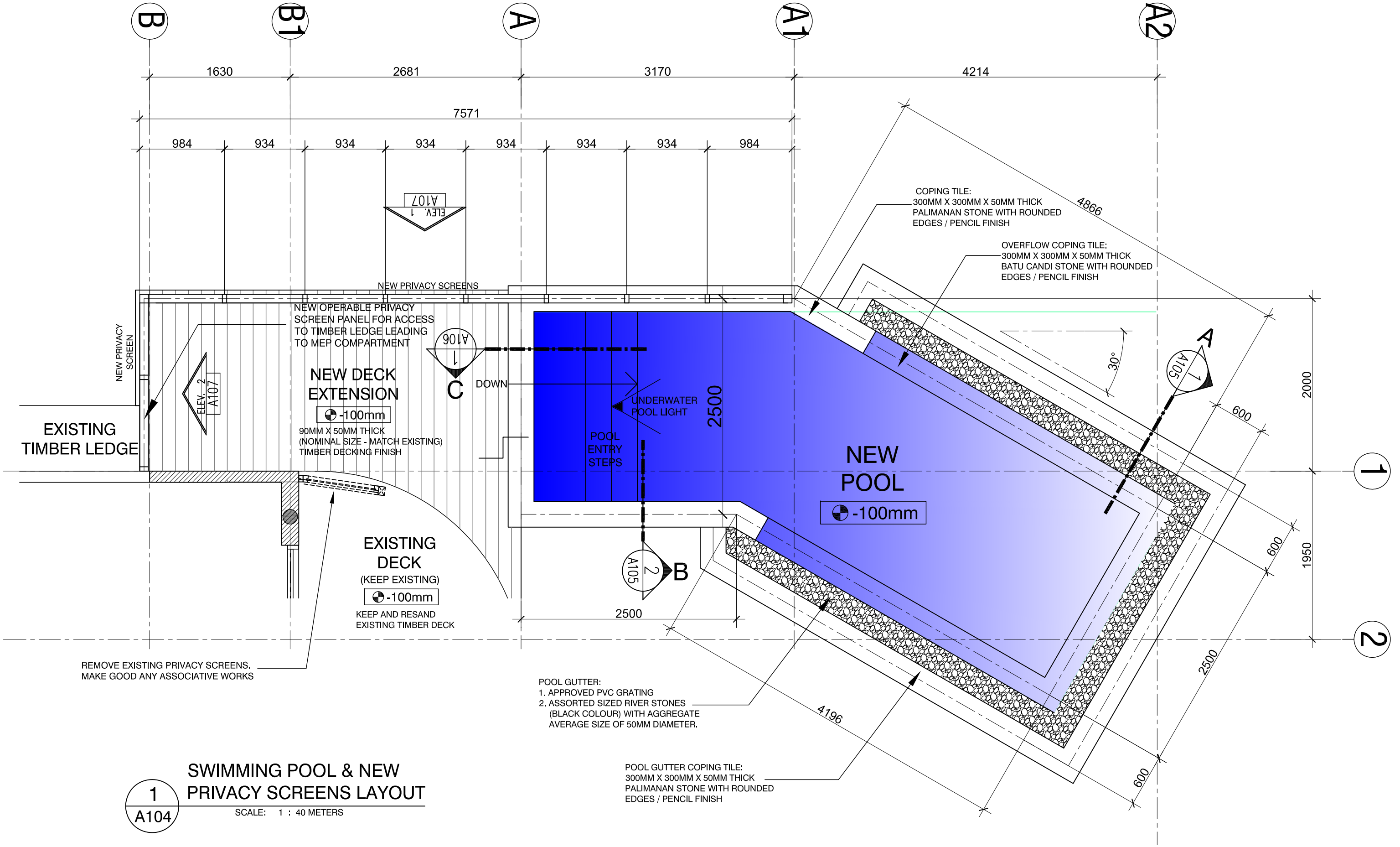
SCALE: 1 : 75 METERS



2 / A103 **ELEVATION "B"**

SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: ELEVATIONS "A" & "B"	DRAWING NO.: A103 REVISION NO.: DATE: 28 MAY 2021

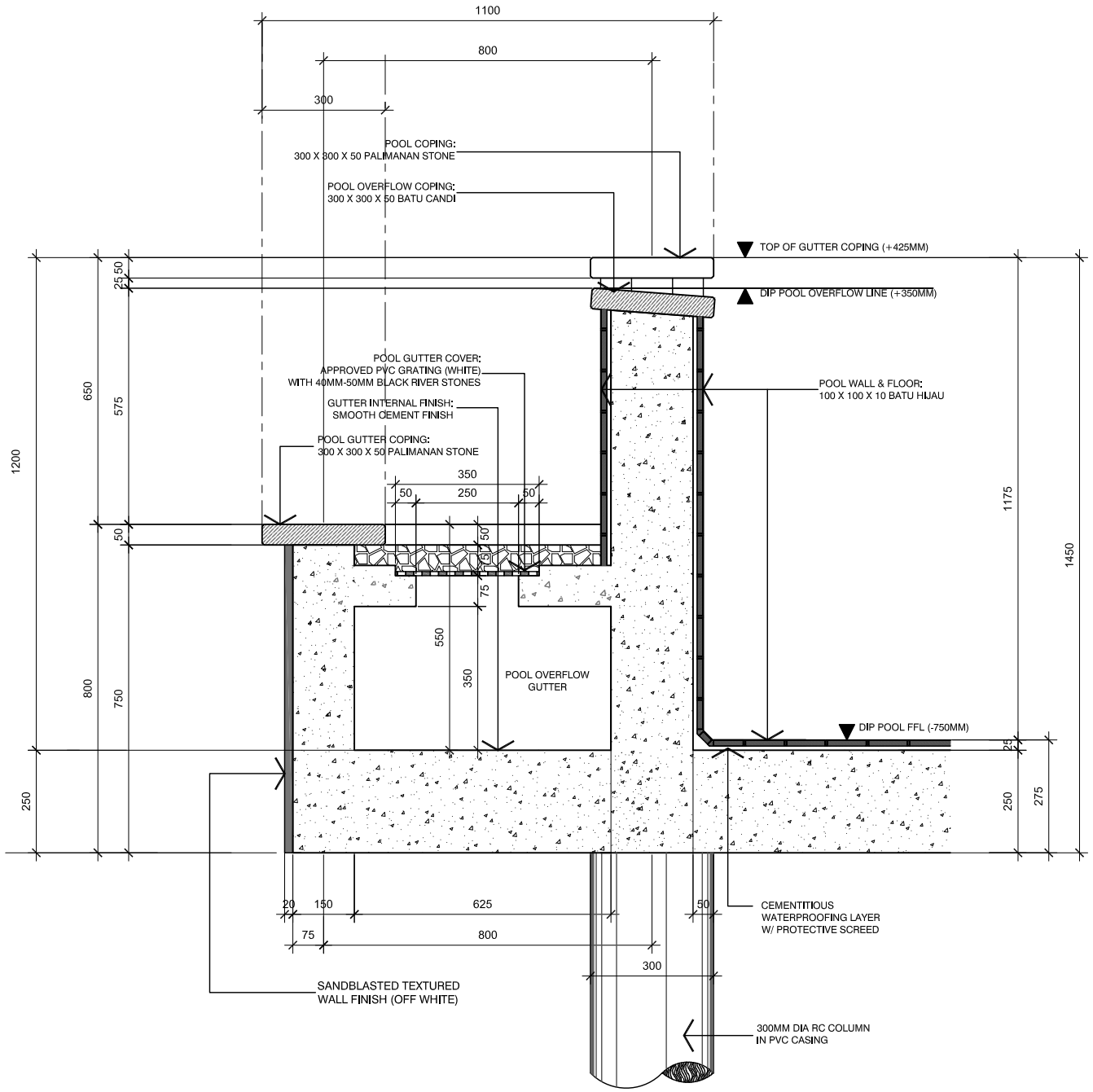


1 / A104

SWIMMING POOL & NEW PRIVACY SCREENS LAYOUT

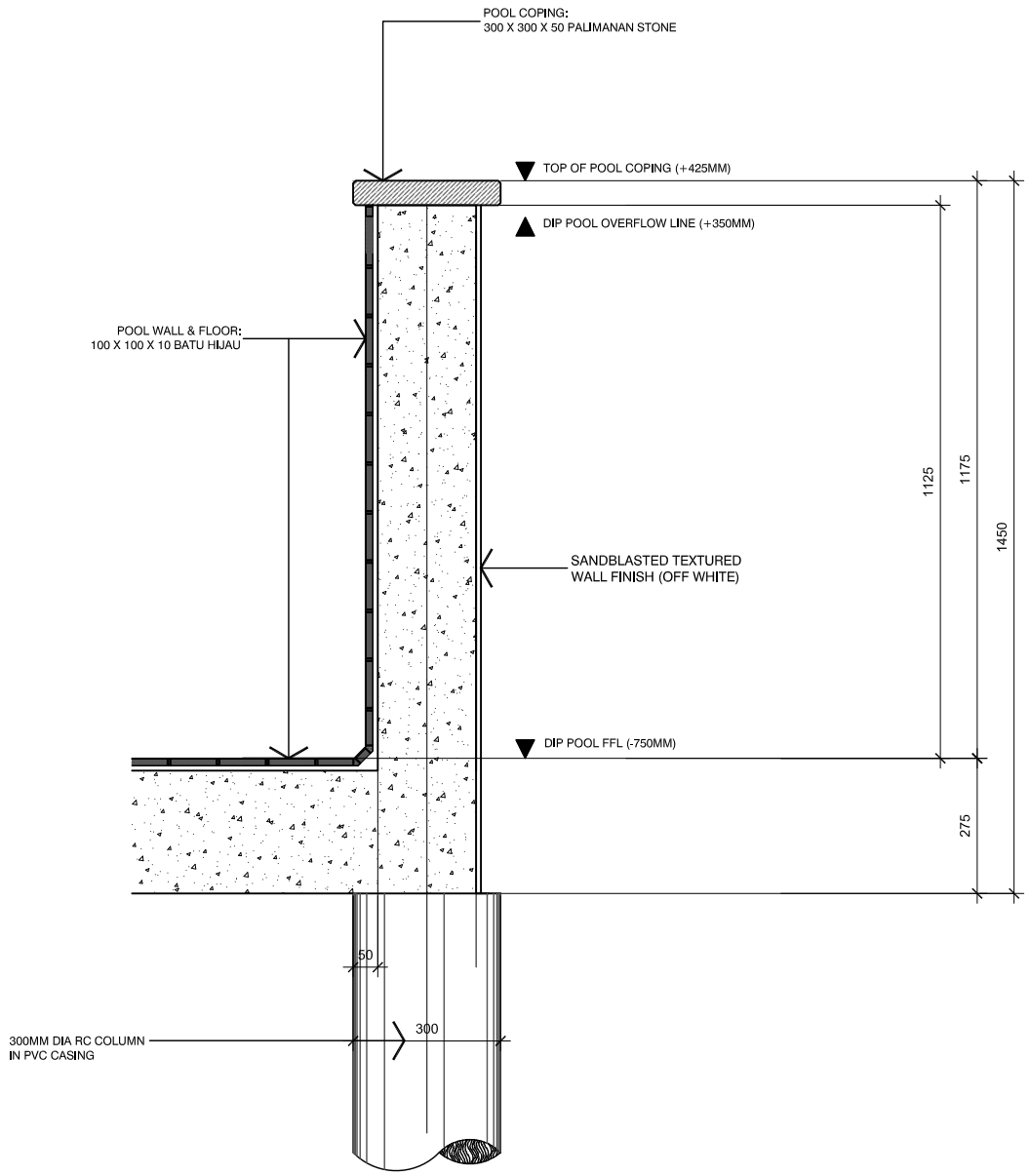
SCALE: 1 : 40 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: SWIMMING POOL DETAIL LAYOUT	DRAWING NO.: A104 REVISION NO.: DATE: 28 MAY 2021



1 / A105 POOL DETAIL "A"

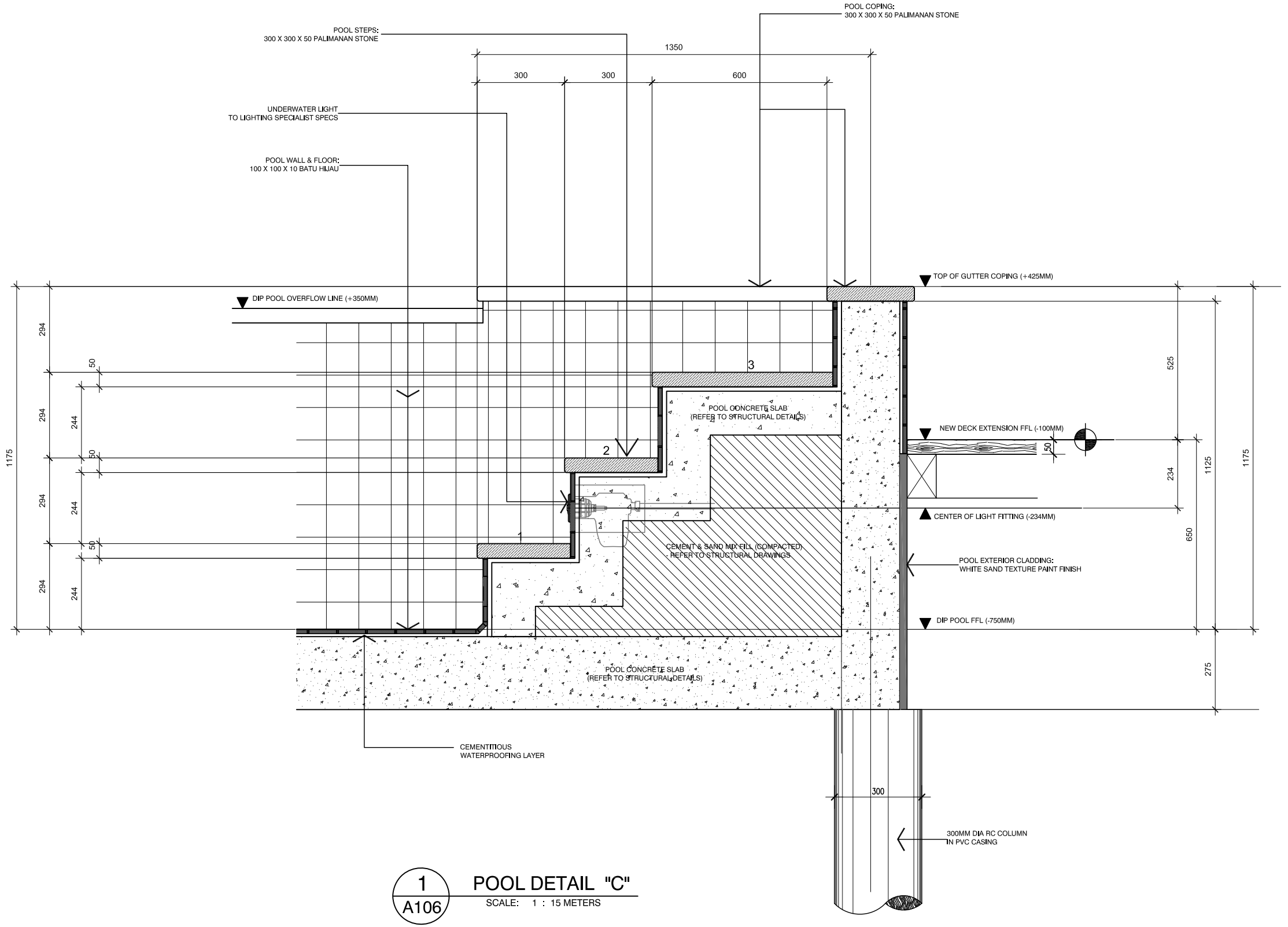
SCALE: 1 : 15 METERS



2 / A105 POOL DETAIL "B"

SCALE: 1 : 15 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: SWIMMING POOL DETAILS A & B	DRAWING NO.: A105 REVISION NO.: DATE: 28 MAY 2021

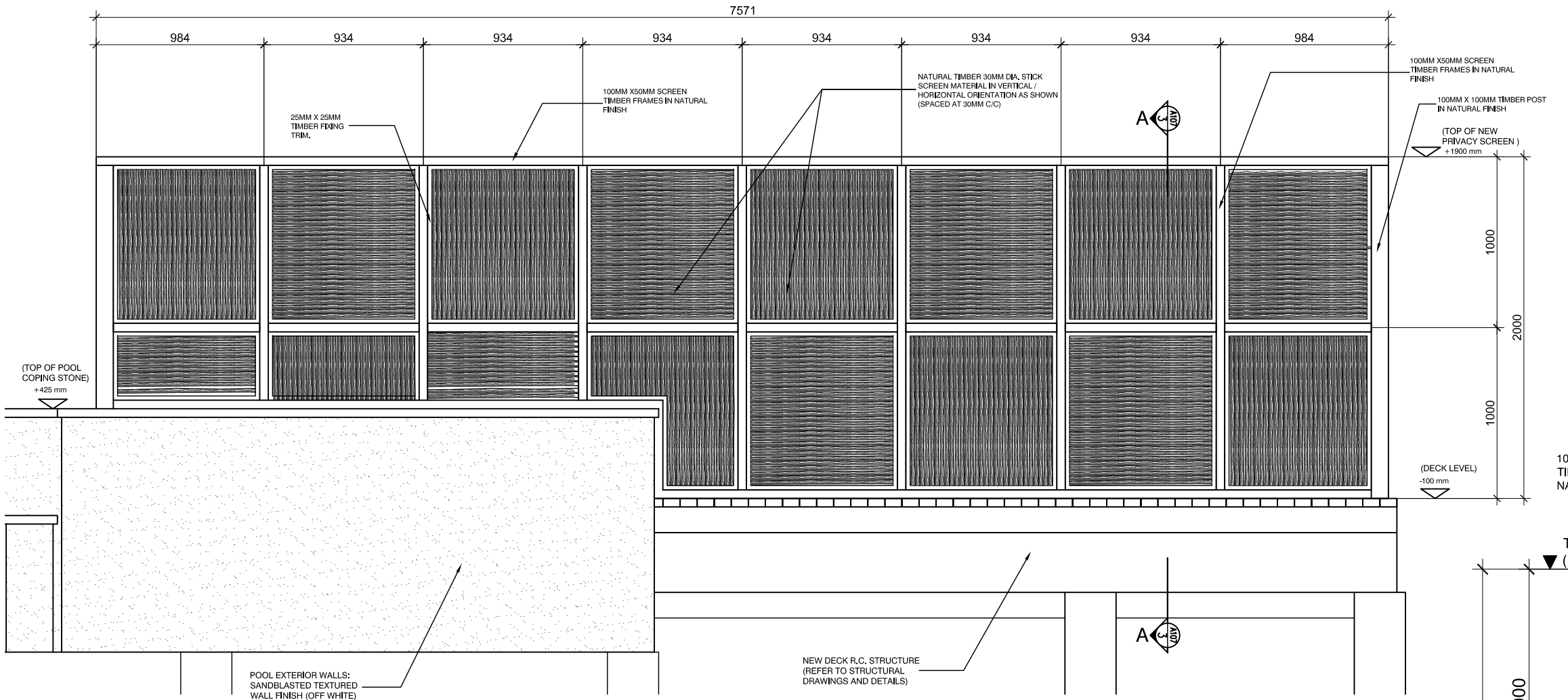


1
A106

POOL DETAIL "C"

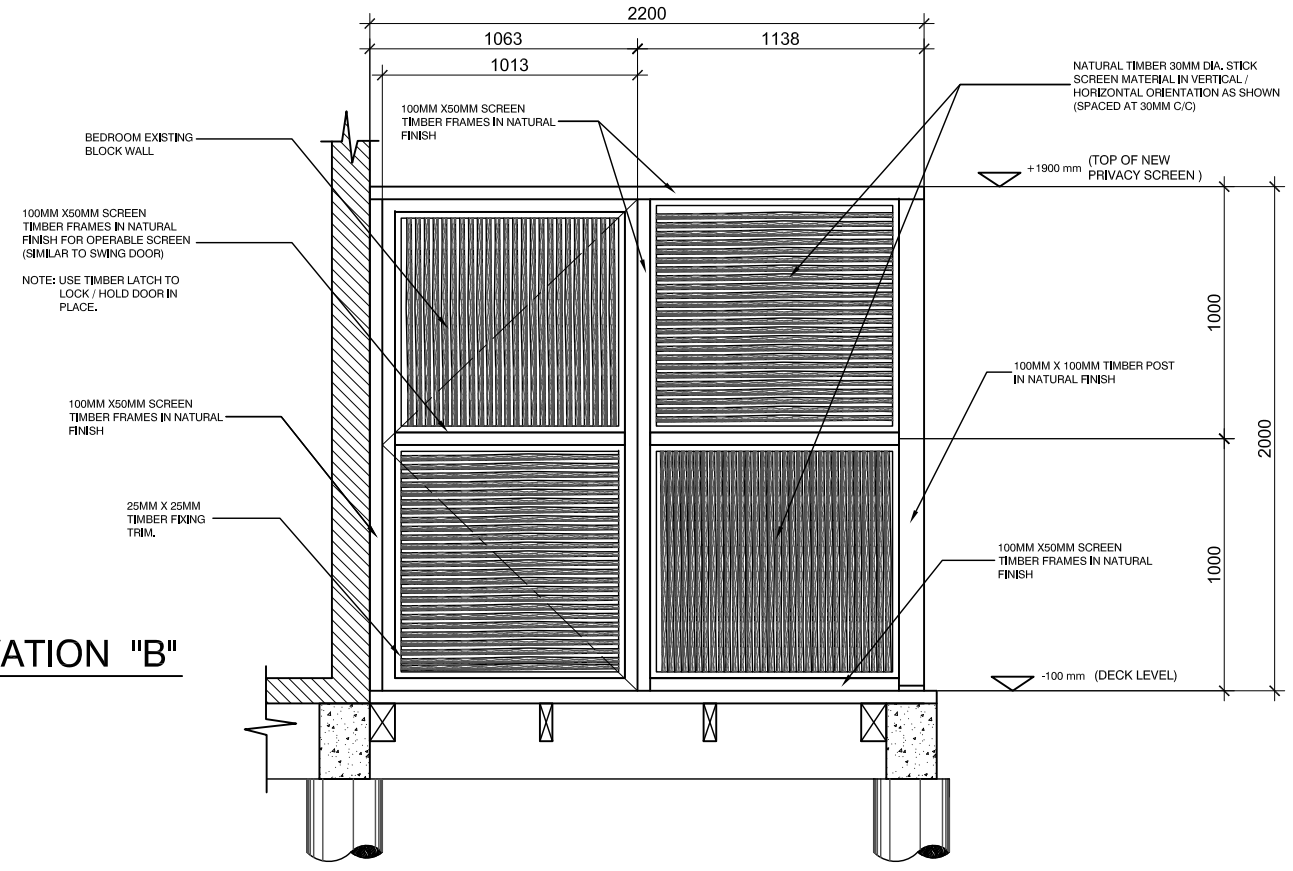
SCALE: 1 : 15 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: SWIMMING POOL DETAILS C	DRAWING NO.: A106 REVISION NO.: DATE: 28 MAY 2021



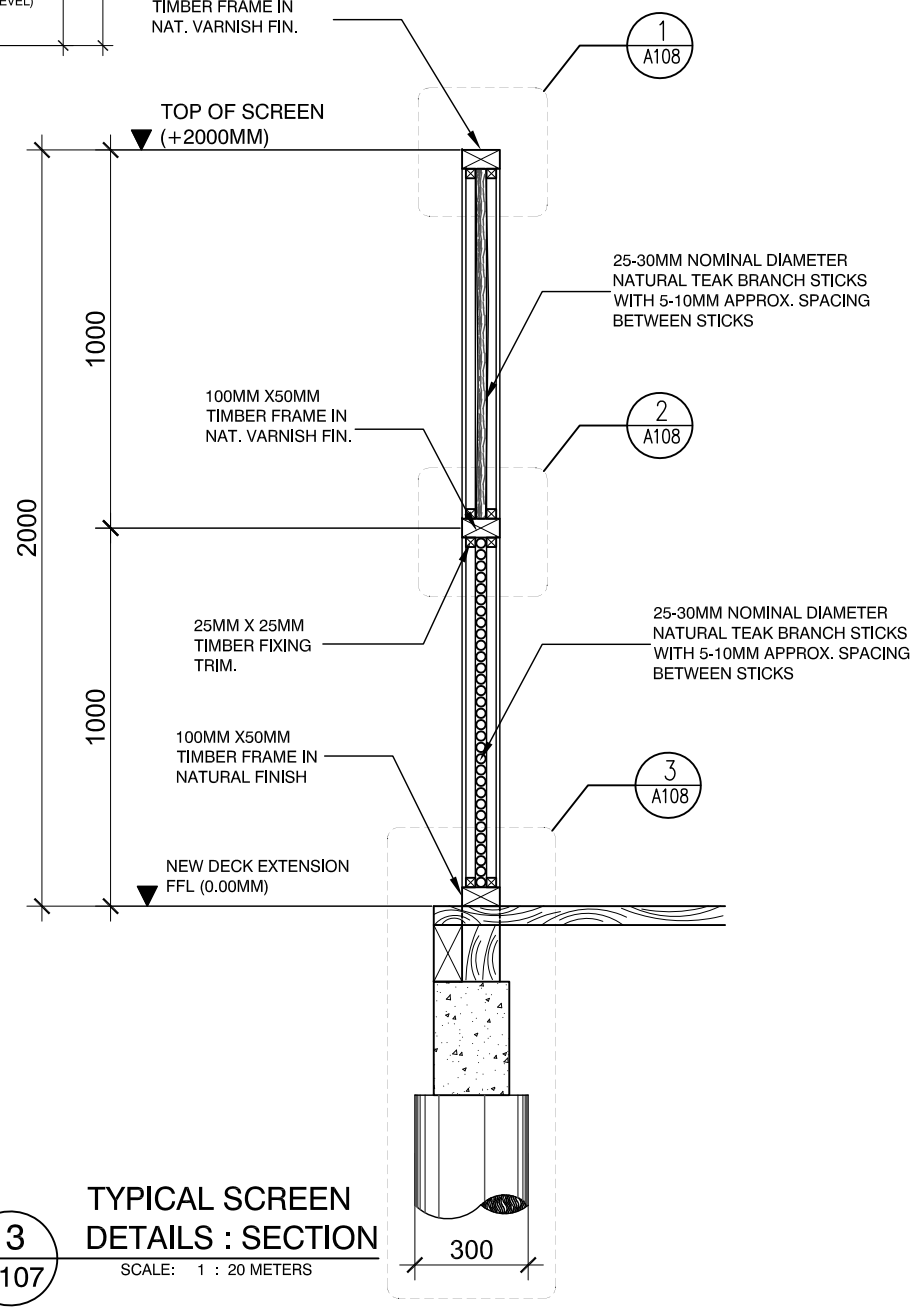
1 / A107 NEW PRIVACY SCREEN ELEVATION "A"

SCALE: 1 : 30 METERS



2 / A107 NEW PRIVACY SCREEN ELEVATION "B"

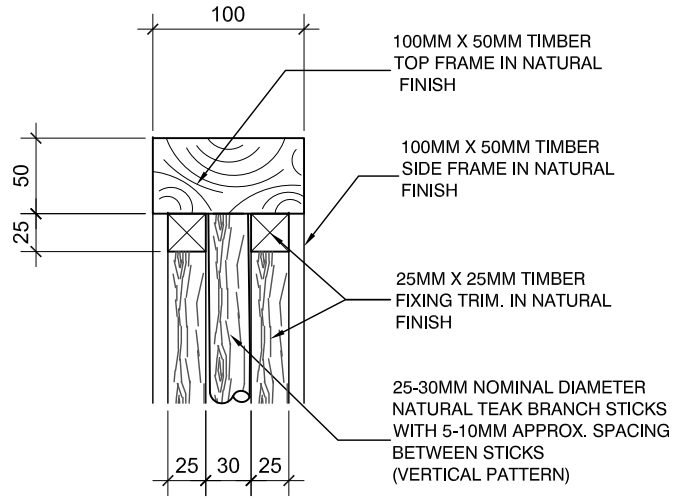
SCALE: 1 : 30 METERS



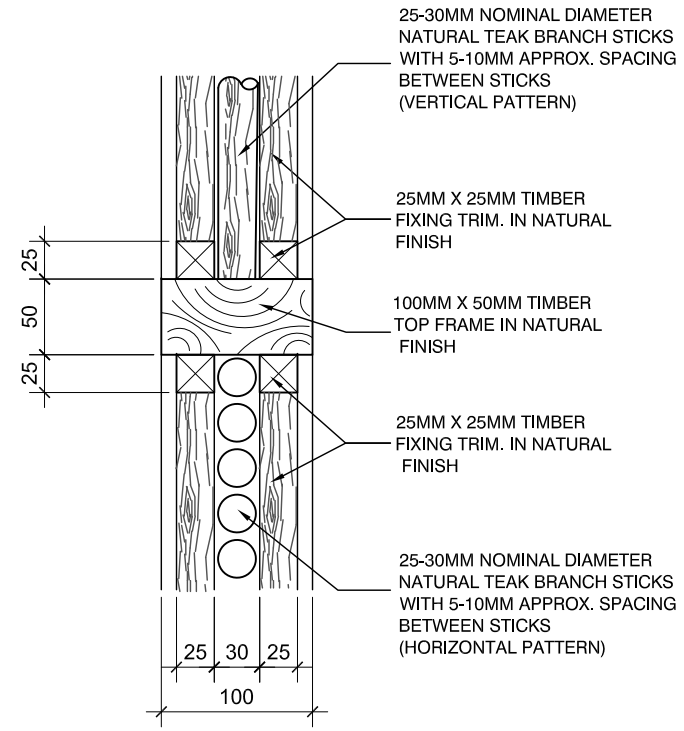
3 / A107 TYPICAL SCREEN DETAILS : SECTION

SCALE: 1 : 20 METERS

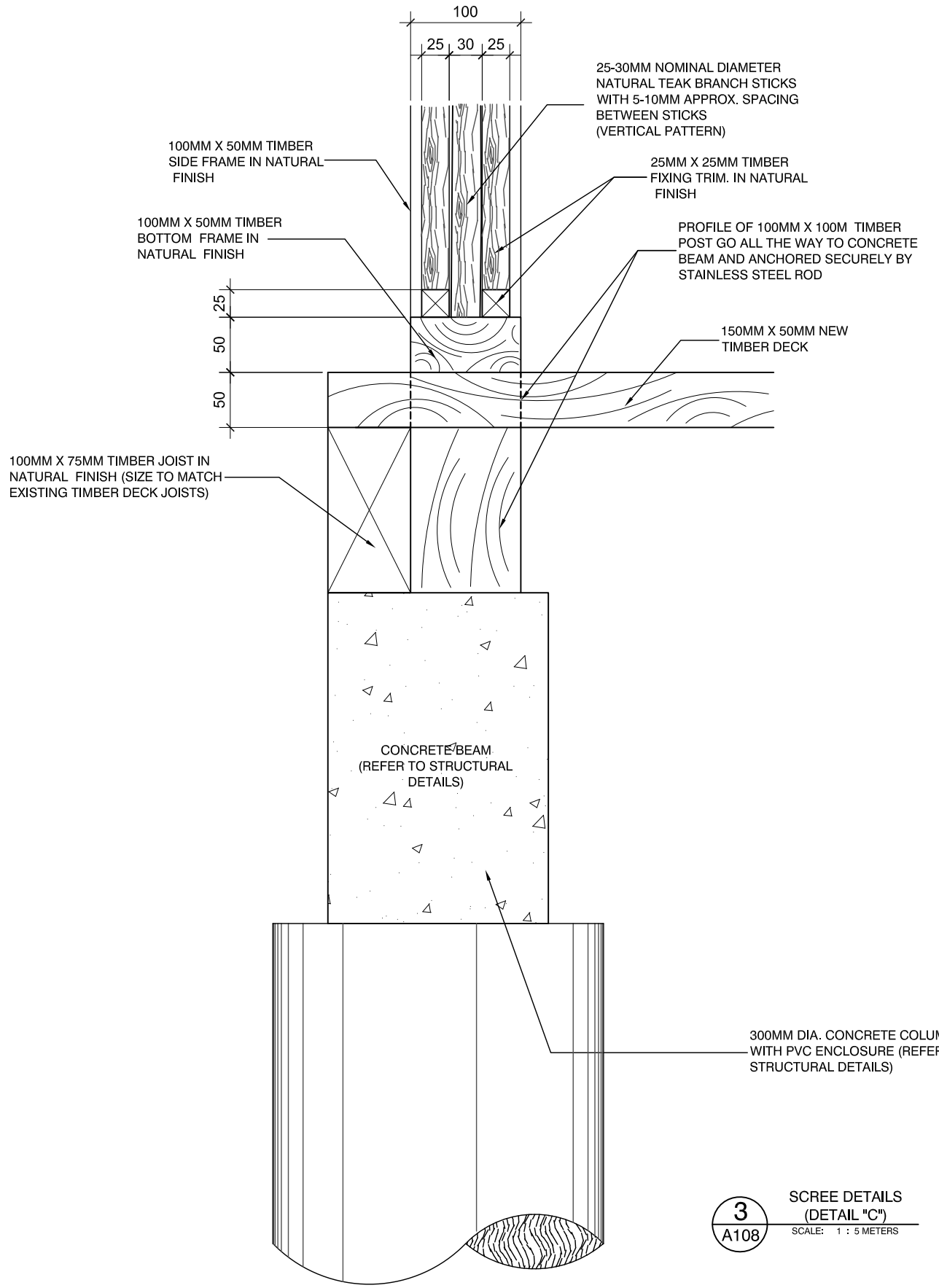
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: NEW PRIVACY SCREEN ELEVATIONS & SECTION	DRAWING NO.: A107 REVISION NO.: DATE: 28 MAY 2021



1 / A108 SCREE DETAILS (DETAIL "A")
SCALE: 1 : 5 METERS

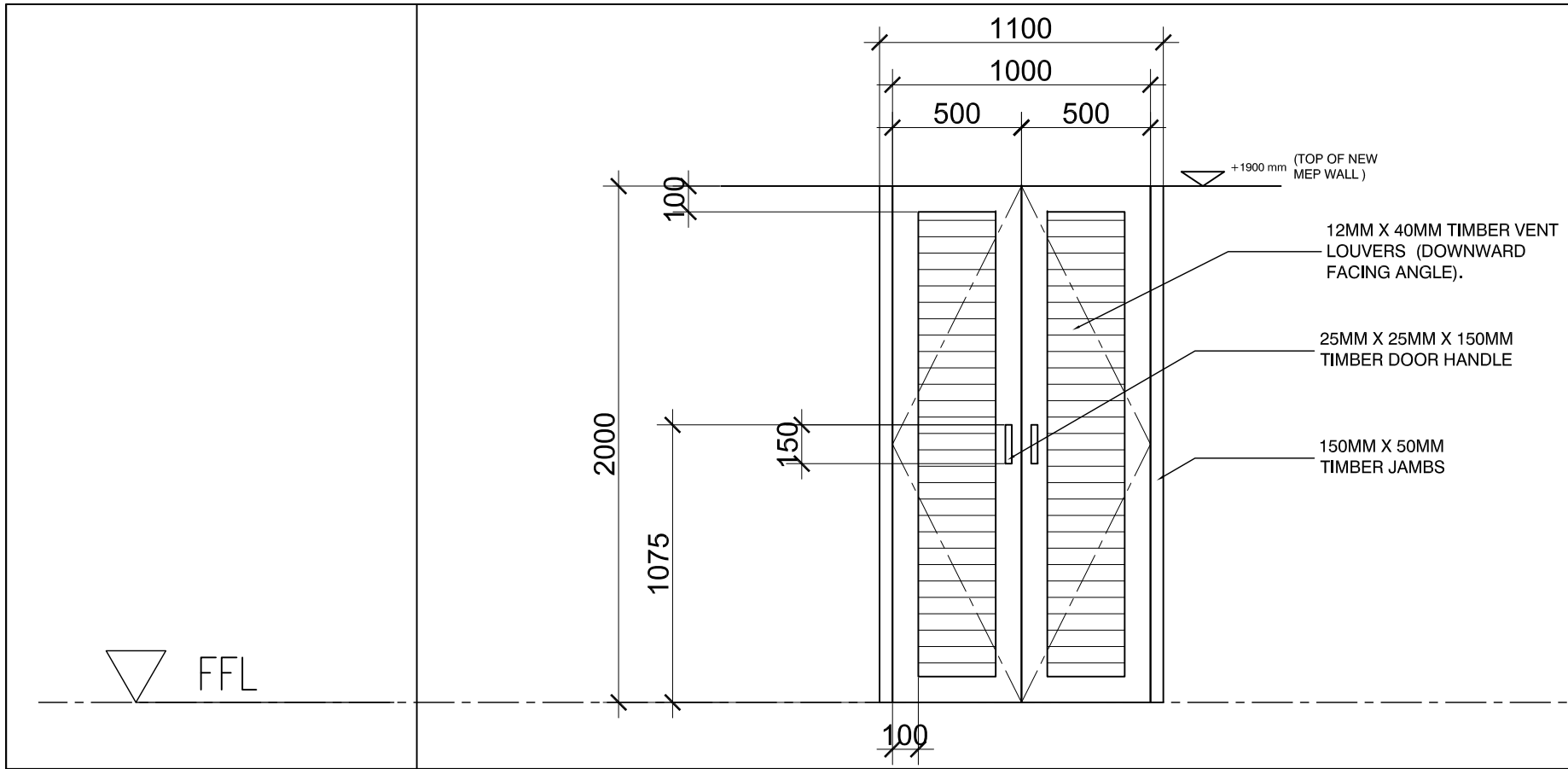


2 / A108 SCREE DETAILS (DETAIL "B")
SCALE: 1 : 5 METERS



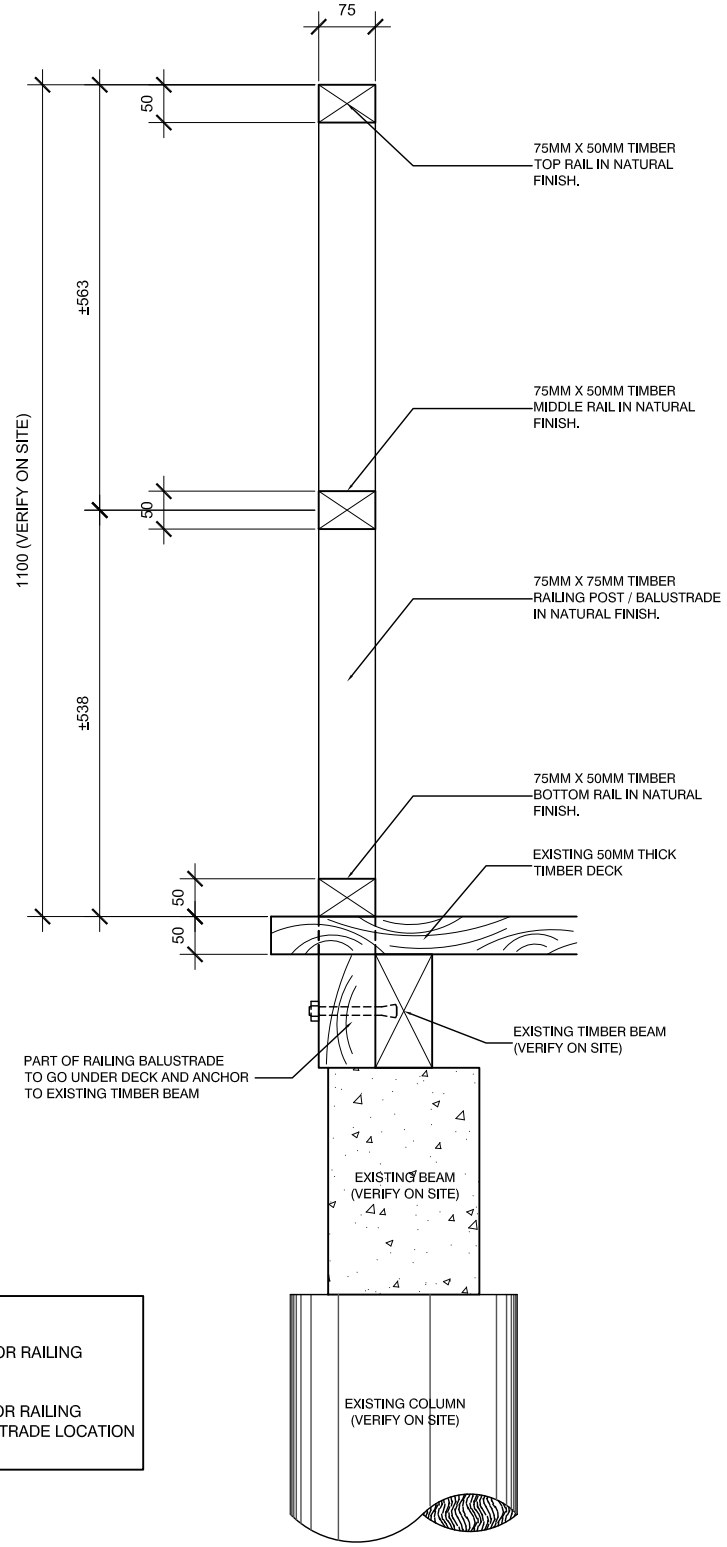
3 / A108 SCREE DETAILS (DETAIL "C")
SCALE: 1 : 5 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: NEW PRIVACY SCREEN DETAILS	DRAWING NO.: A108
			REVISION NO.:
			DATE: 28 MAY 2021



TYPE	D1
QUANTITY	1
LOCATION	NEW MEP ROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) SWING DOOR WITH TIMBER VENT LOUVERS (DOWNWARD FACING ANGLE). - WOOD TONE / COLOUR TO MATCH WITH MAIN ENTRY DOOR (REFER TO ID SPECS) - LOCKSET : STAINLESS STEEL DEADBOLT (KEY CYLINDER FACING OUT, THUMBTURN AT INTERIOR SIDE)

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: NEW DOOR SCHEDULE	DRAWING NO.: A109 REVISION NO.: DATE: 28 MAY 2021



NOTES:

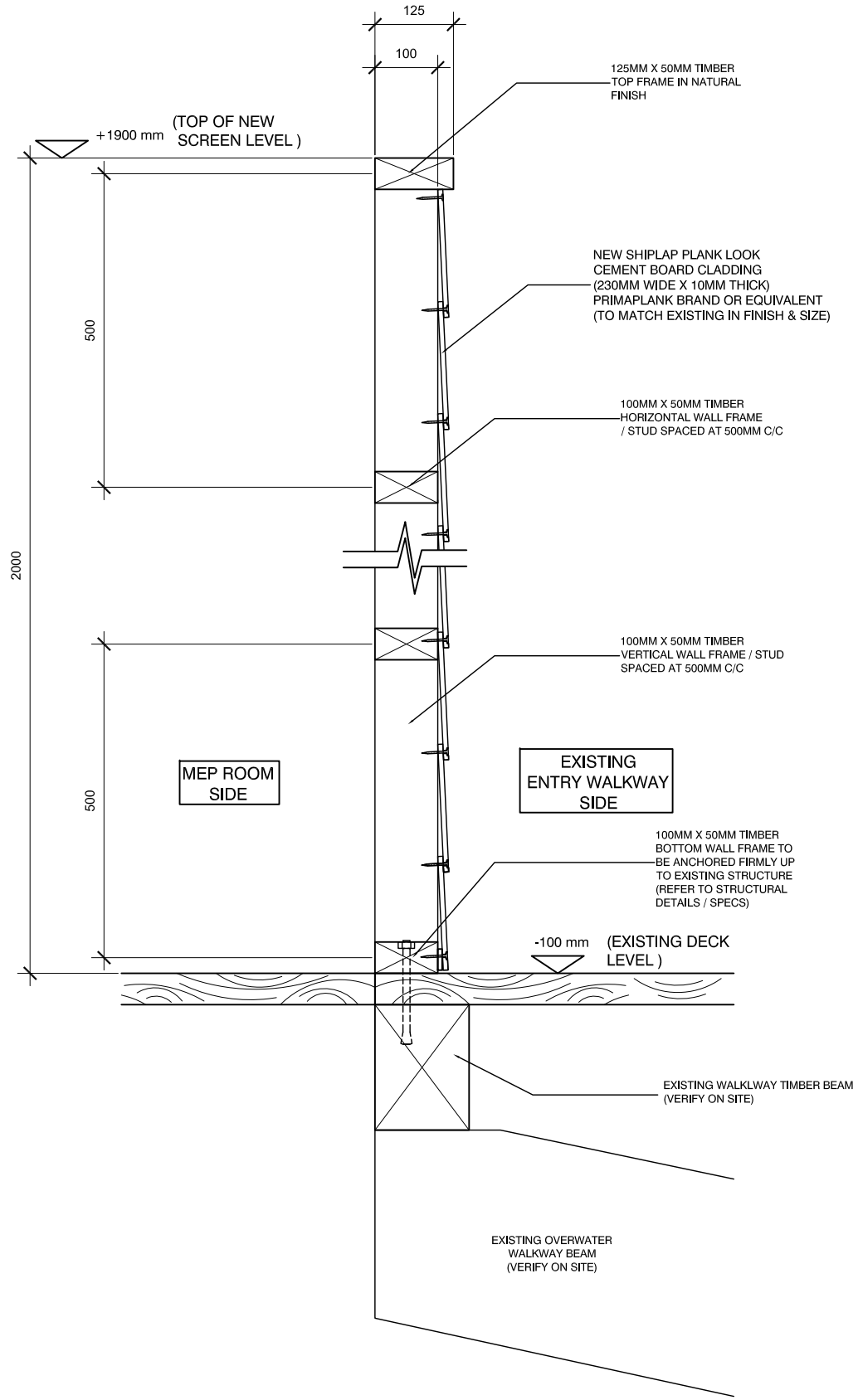
A. REFER TO FLOOR PLAN FOR RAILING SETTING OUT AND EXTENTS.

B. REFER TO FLOOR PLAN FOR RAILING VERTICAL SUPPORT / BALUSTRADE LOCATION AND SPACING.

TYPICAL NEW RAILING SECTION DETAIL

1 / A110

SCALE: 1 : 10 METERS

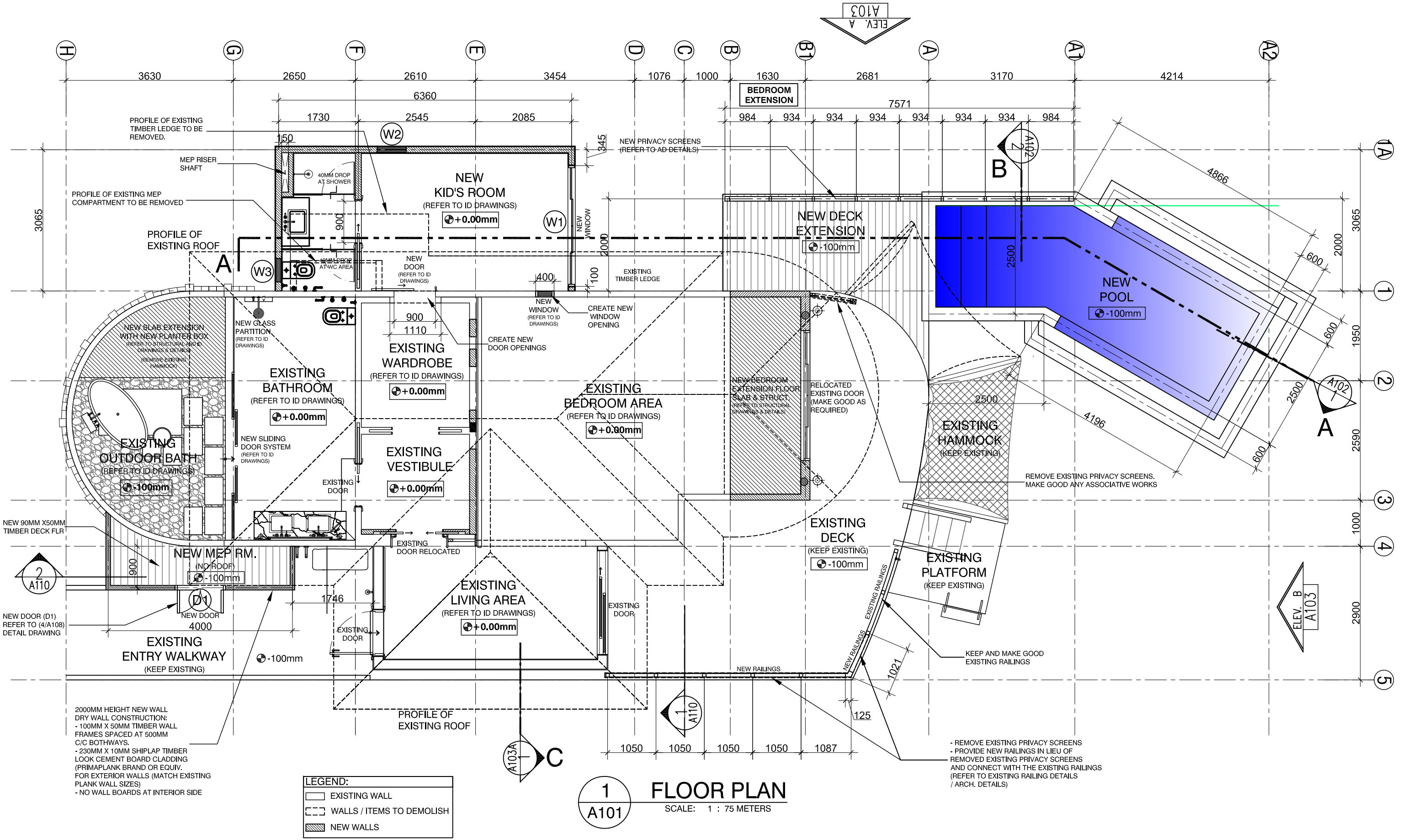


NEW MEP ROOM WALL SECTION DETAIL

2 / A110

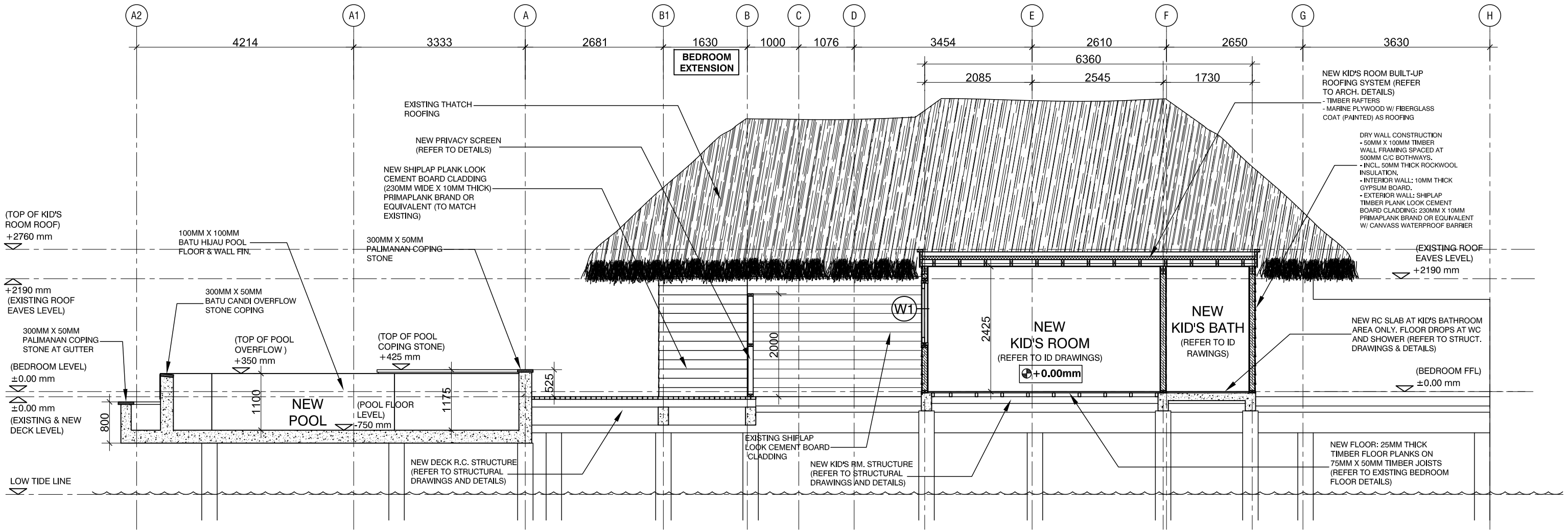
SCALE: 1 : 10 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA	DRAWING TITLE: NEW RAILING SECTION & NEW MEP ROOM WALL SECTION	DRAWING NO.: A110 REVISION NO.: DATE: 28 MAY 2021



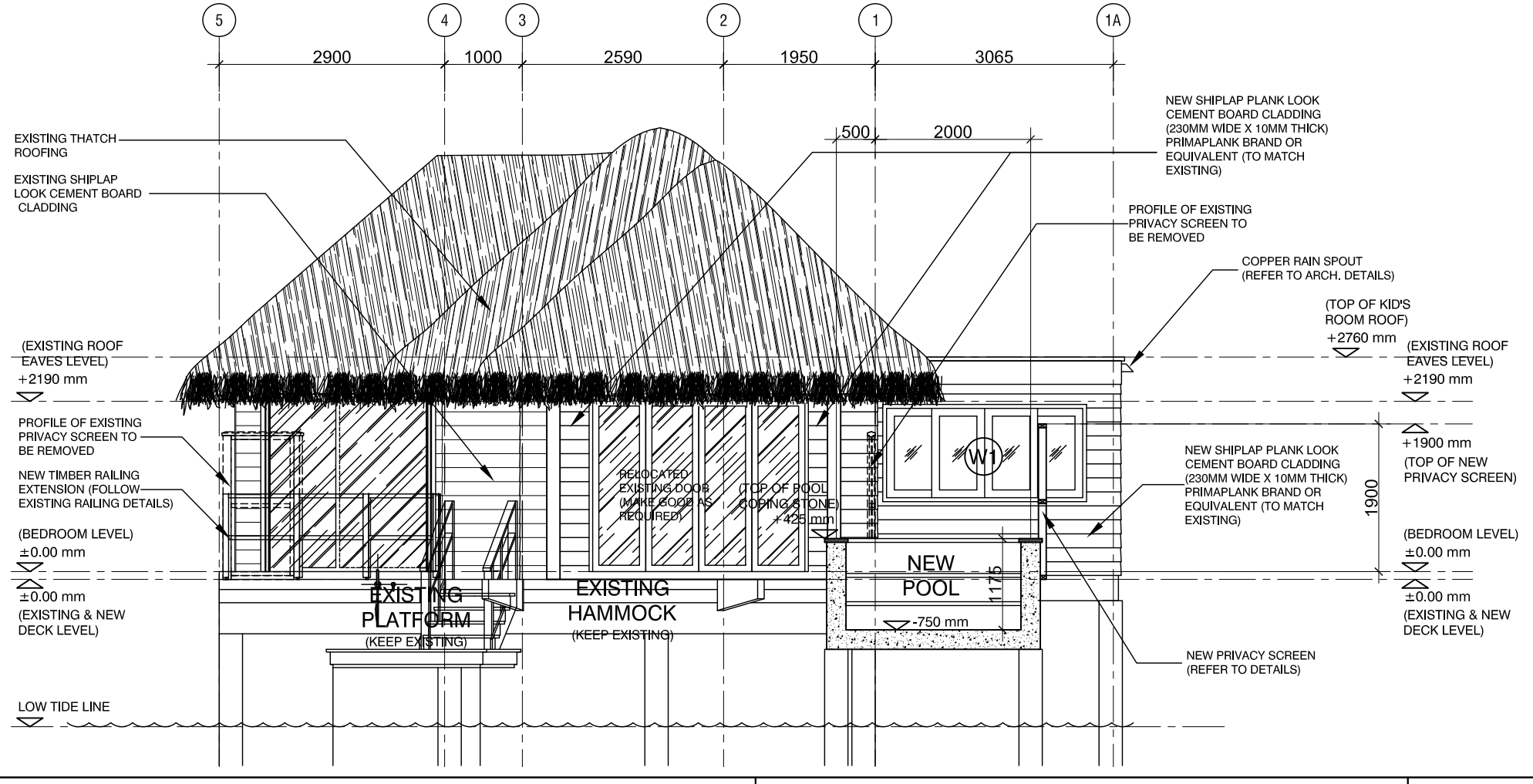
1 / A101 FLOOR PLAN
SCALE: 1 : 75 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: FLOOR PLAN	DRAWING NO.: A101
			REVISION NO.:
			DATE: 28 MAY 2021



1 / A102 SECTION THRU A-A

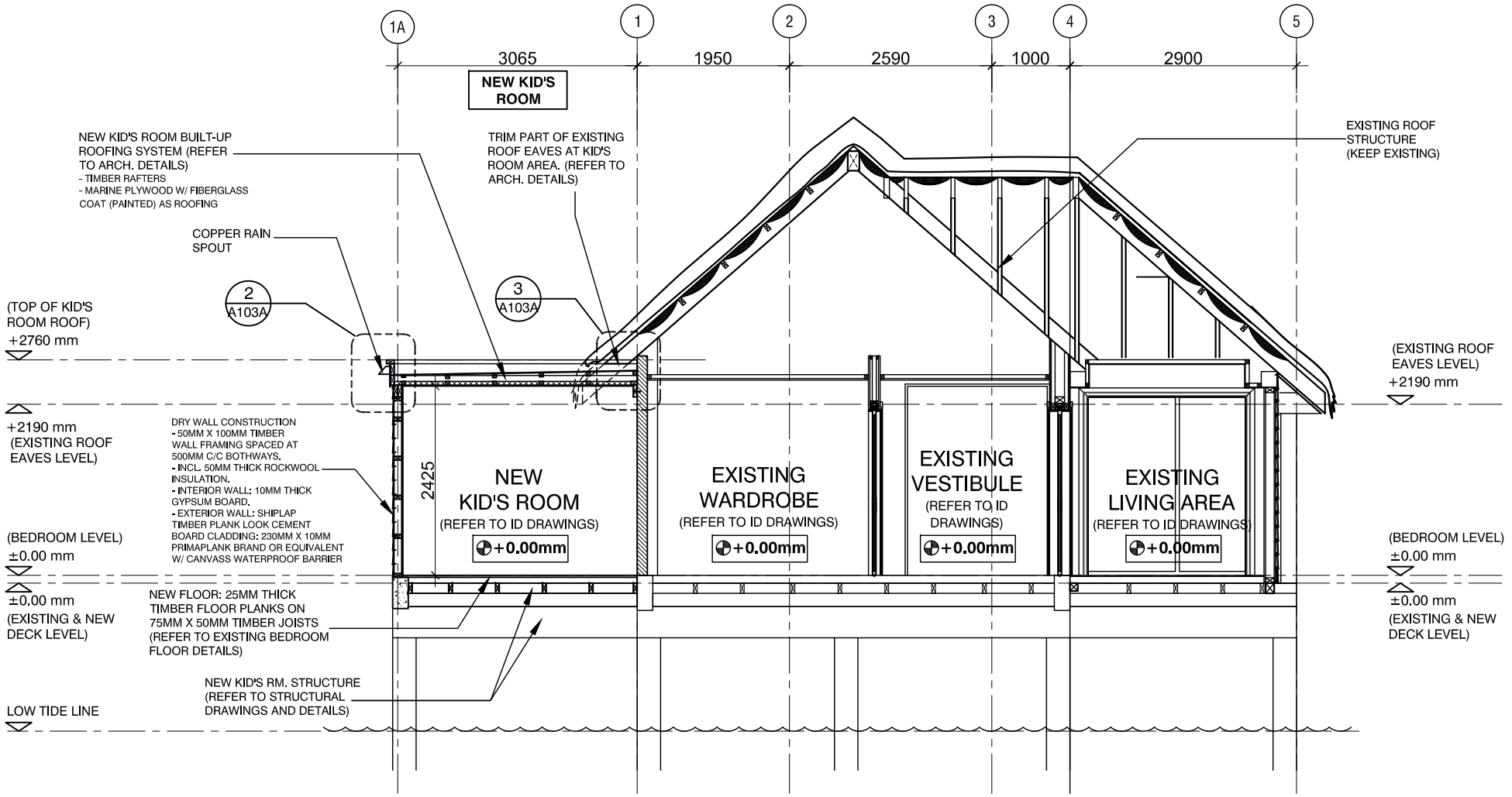
SCALE: 1 : 75 METERS



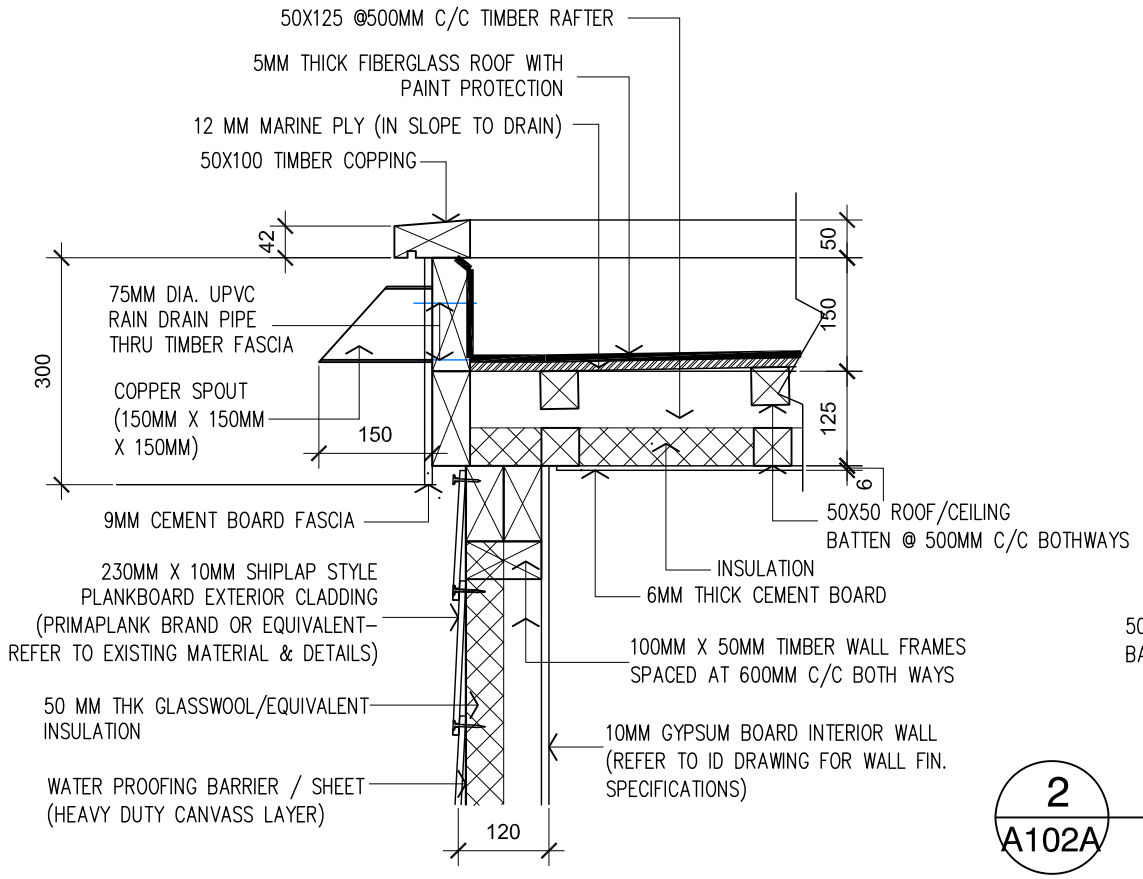
2 / A102 SECTION THRU B-B

SCALE: 1 : 75 METERS

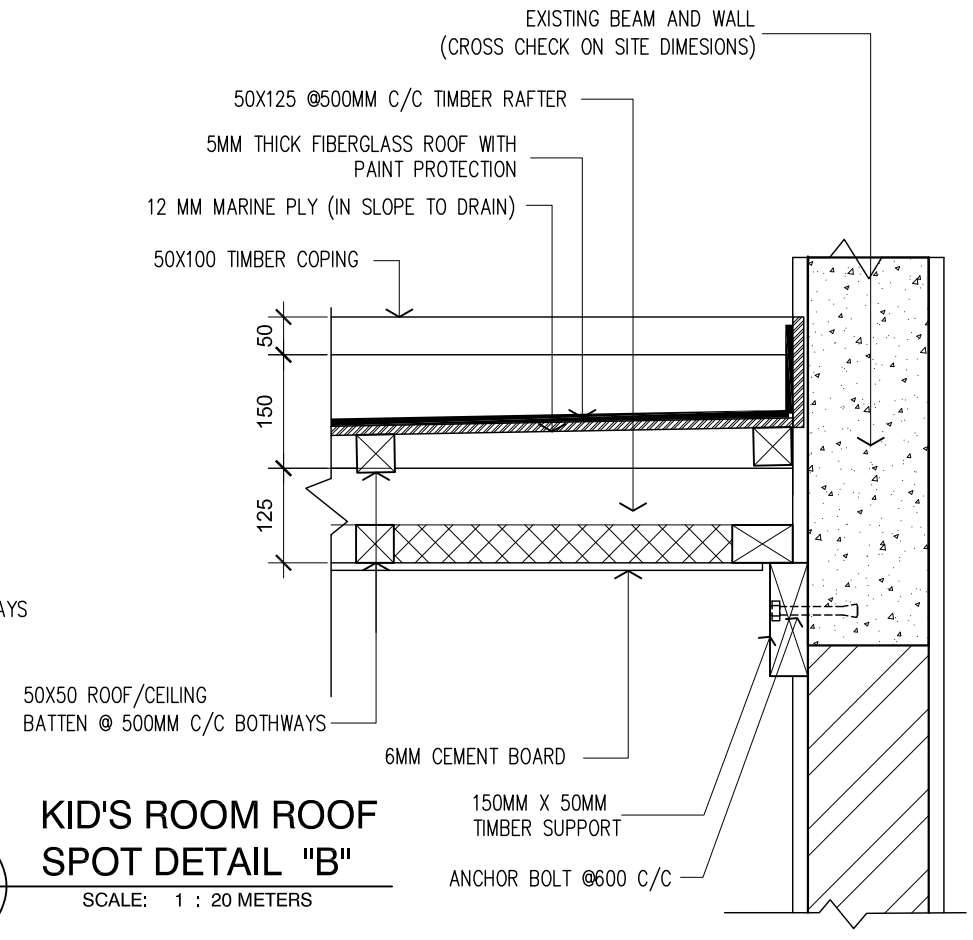
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SECTIONS A-A & SECTIONS B-B	DRAWING NO.: A102 REVISION NO.: DATE: 28 MAY 2021



1 / A102A — SECTION THRU C-C
SCALE: 1 : 75 METERS

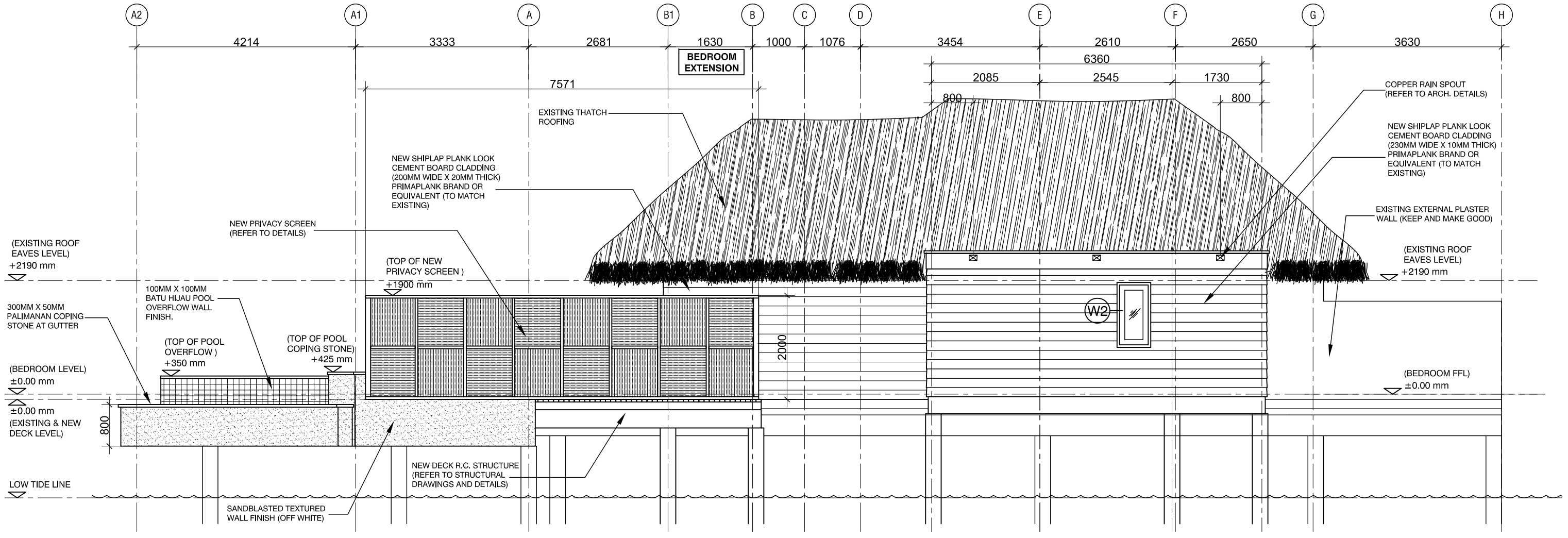


2 / A102A — KID'S ROOM ROOF SPOT DETAIL "A"
SCALE: 1 : 20 METERS



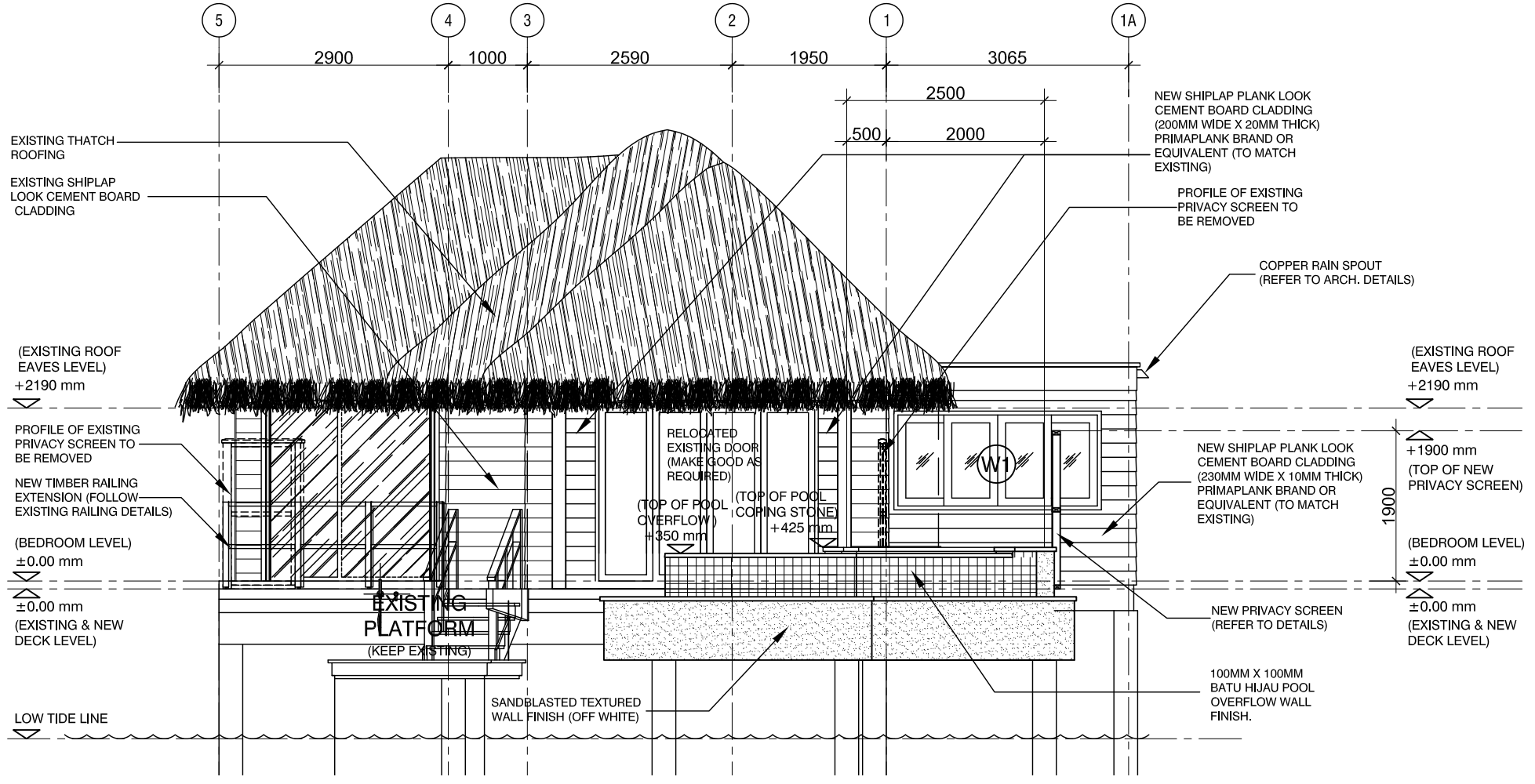
2 / A102A — KID'S ROOM ROOF SPOT DETAIL "B"
SCALE: 1 : 20 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SECTION C-C & KID'S ROOM ROOF DETAILS	DRAWING NO.: A102A REVISION NO.: DATE: 28 MAY 2021



1 / A103 **ELEVATION "A"**

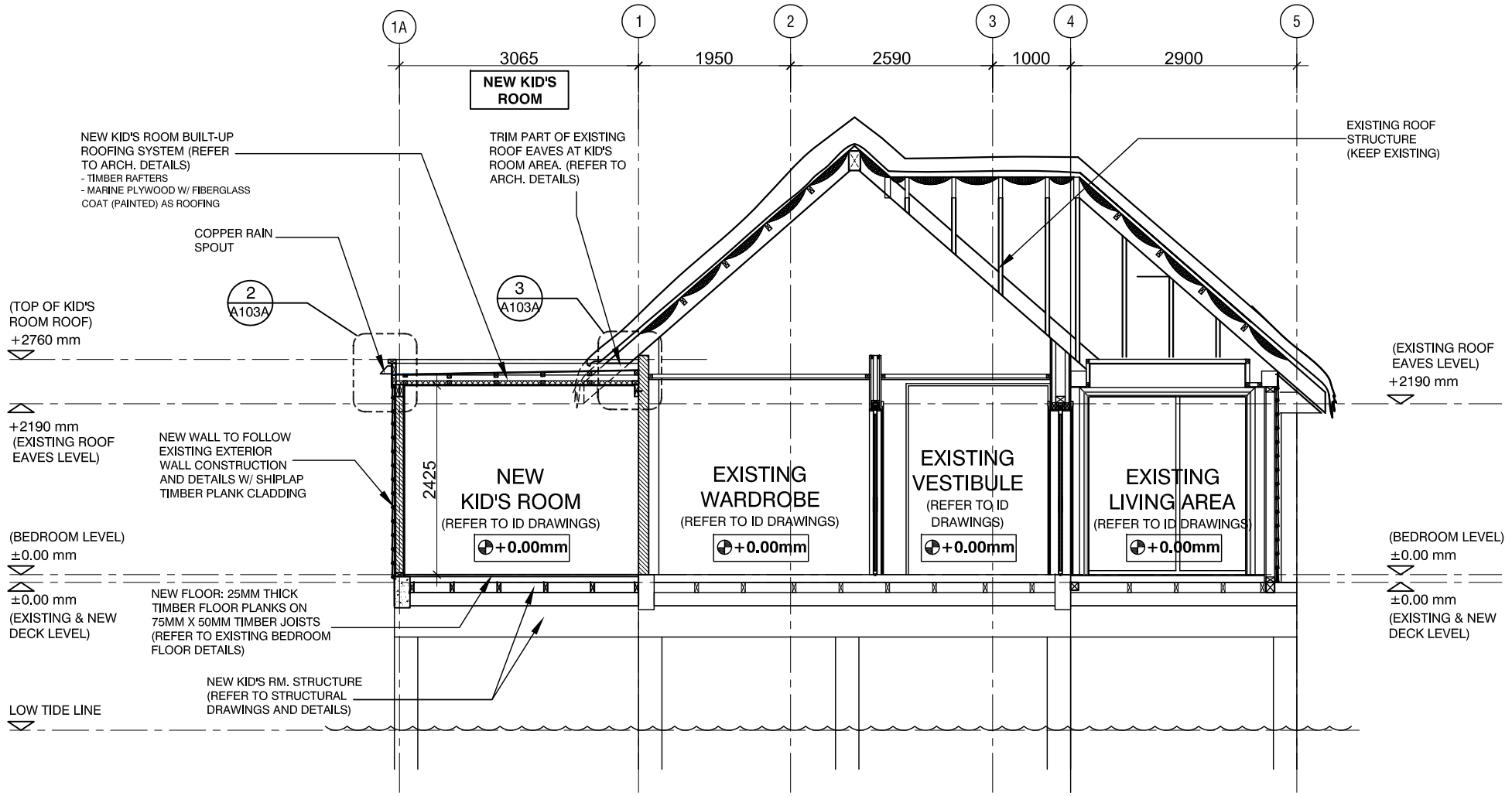
SCALE: 1 : 75 METERS



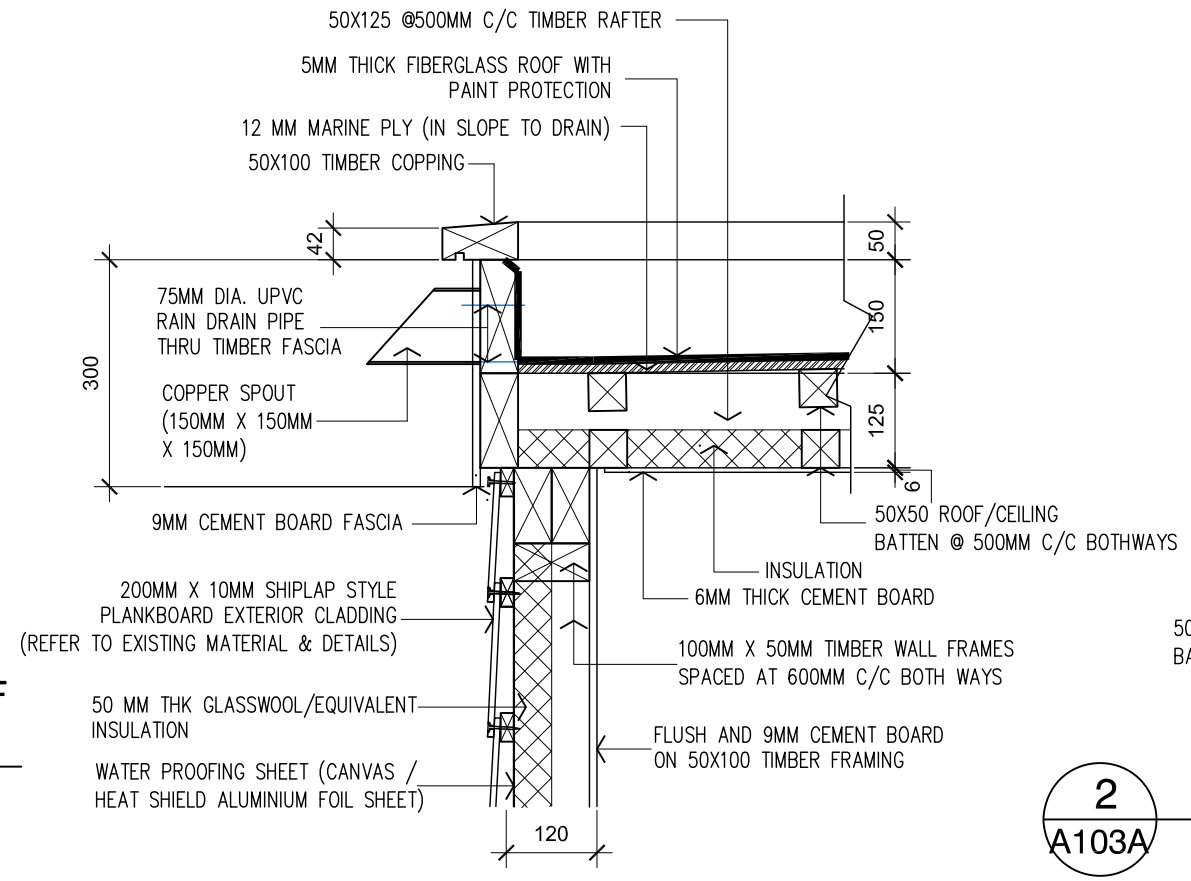
2 / A103 **ELEVATION "B"**

SCALE: 1 : 75 METERS

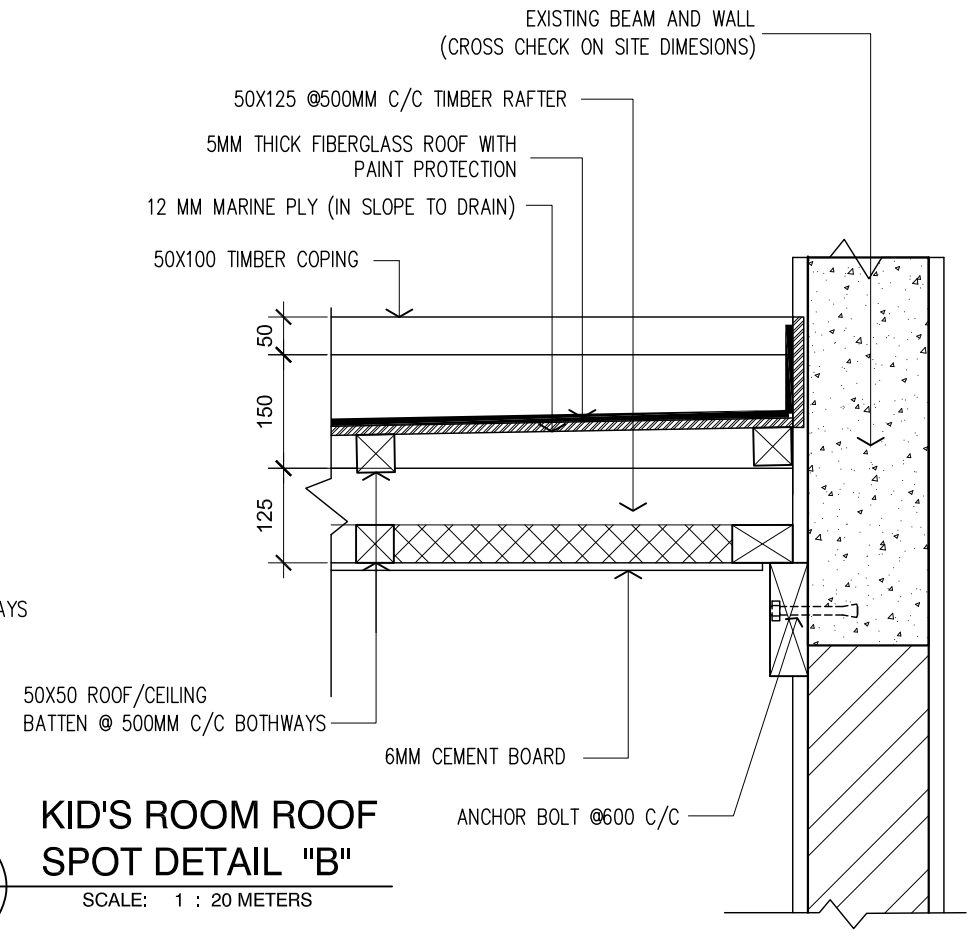
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: ELEVATIONS "A" & "B"	DRAWING NO.: A103 REVISION NO.: DATE: 28 MAY 2021



1 A103A — SECTION THRU C-C
SCALE: 1 : 75 METERS

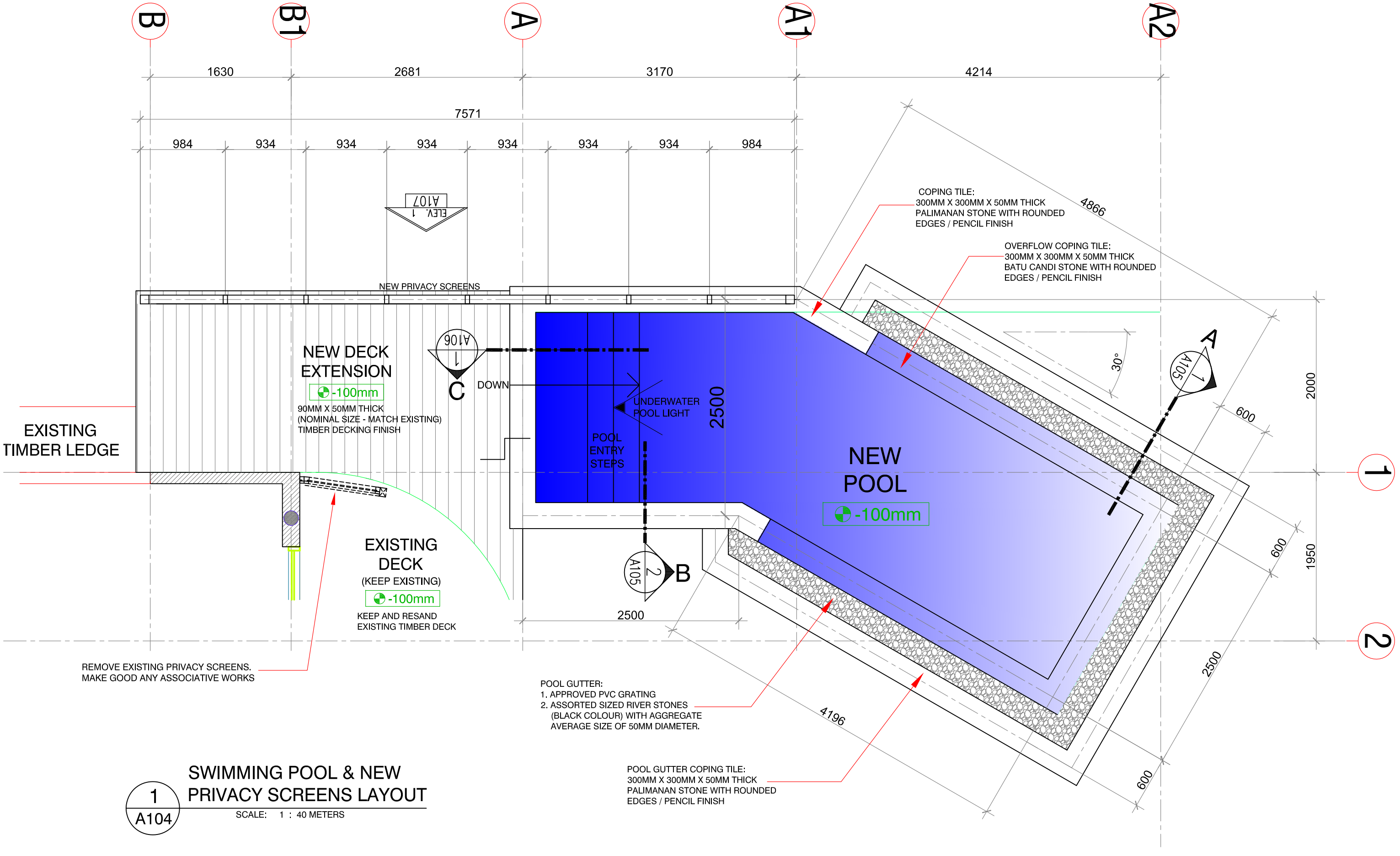


2 A103A — KID'S ROOM ROOF SPOT DETAIL "A"
SCALE: 1 : 20 METERS



2 A103A — KID'S ROOM ROOF SPOT DETAIL "B"
SCALE: 1 : 20 METERS

2021 UPGRADING WORKS SIX SENSES KANUHURA	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SECTION C-C & KID'S ROOM ROOF DETAILS	DRAWING NO.: A103A REVISION NO.: DATE: 05 MAY 2021

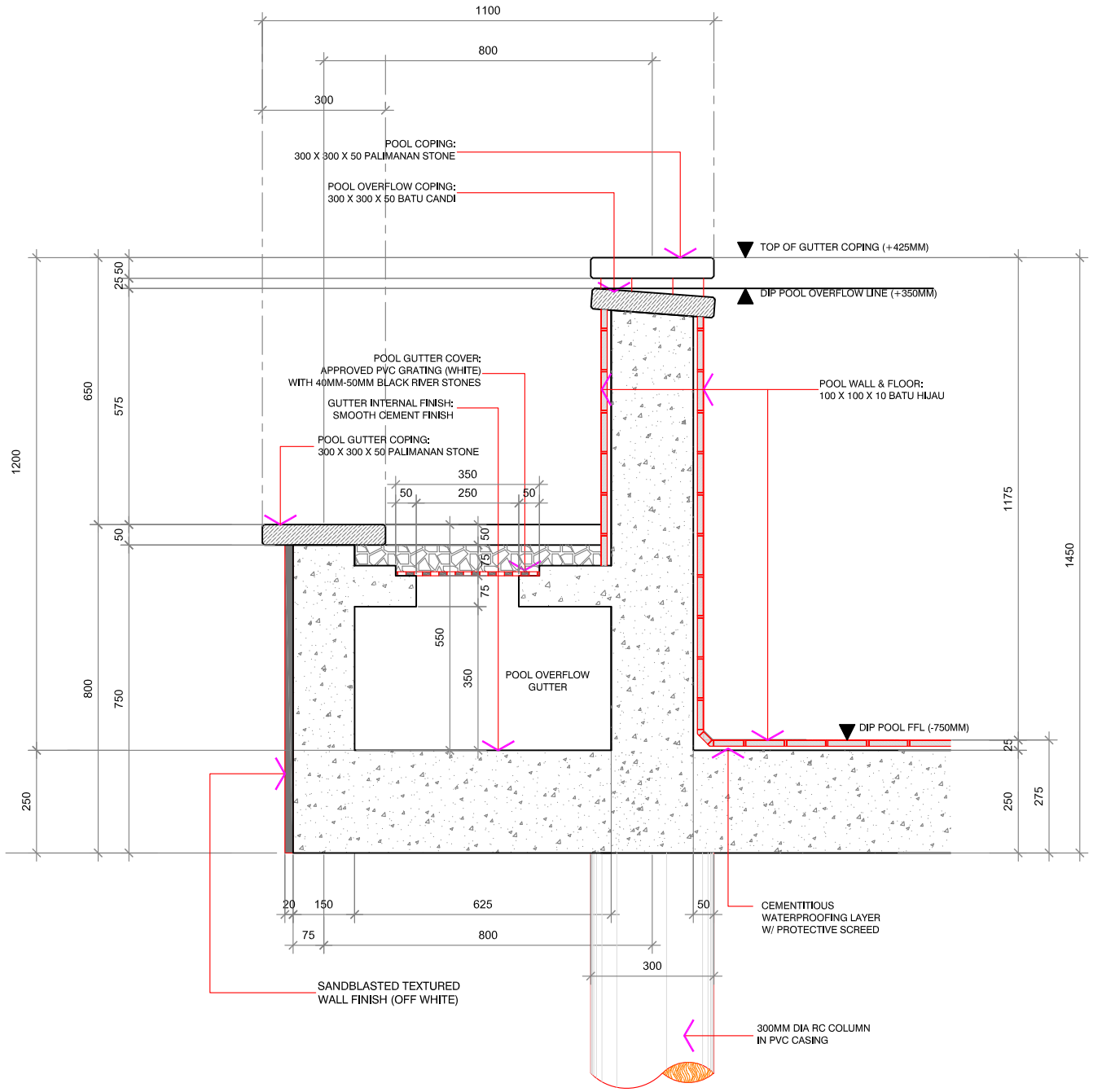


1
A104

SWIMMING POOL & NEW PRIVACY SCREENS LAYOUT

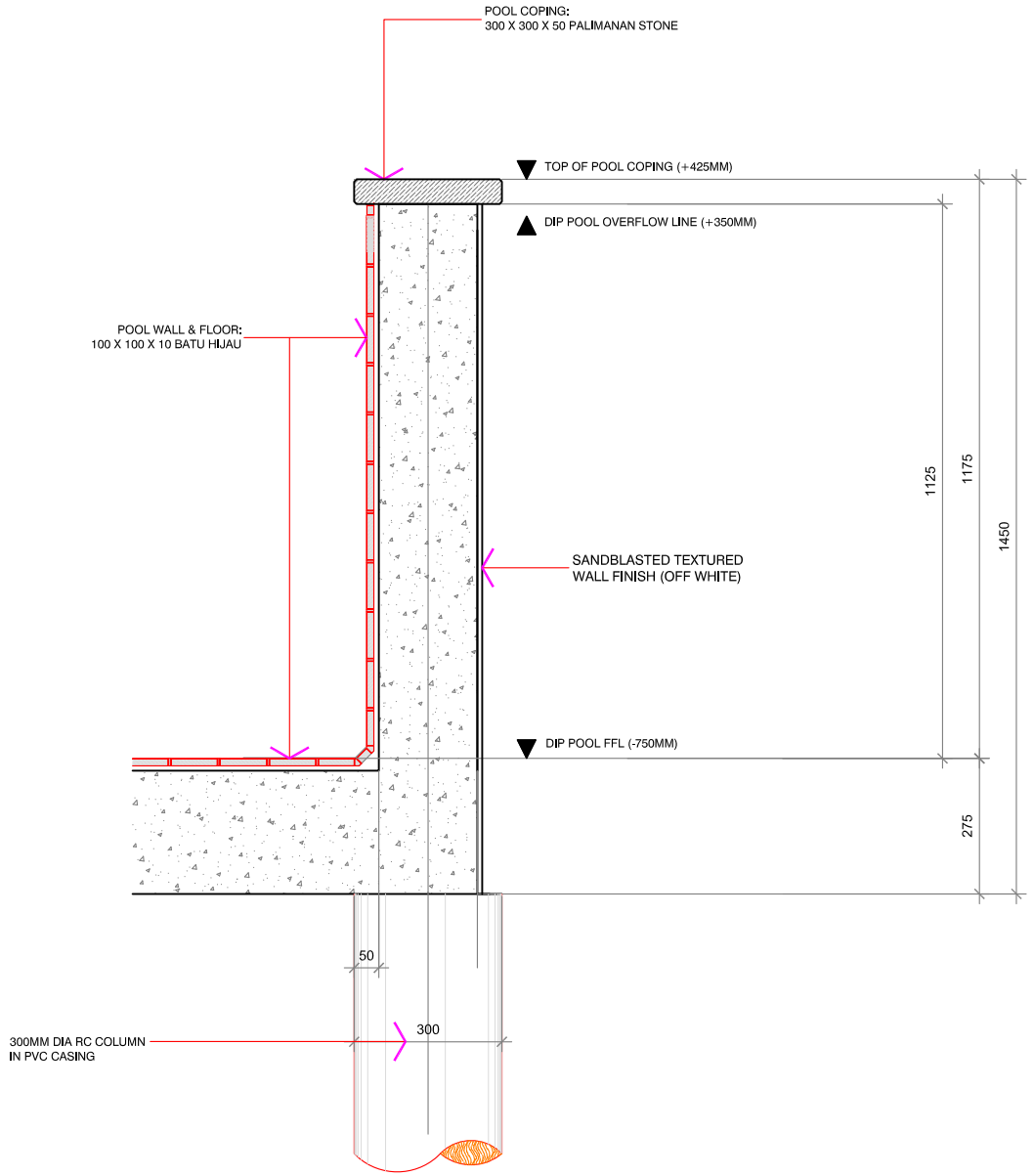
SCALE: 1 : 40 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SWIMMING POOL DETAIL LAYOUT	DRAWING NO.: A104 REVISION NO.: DATE: 28 MAY 2021



1 / A105 POOL DETAIL "A"

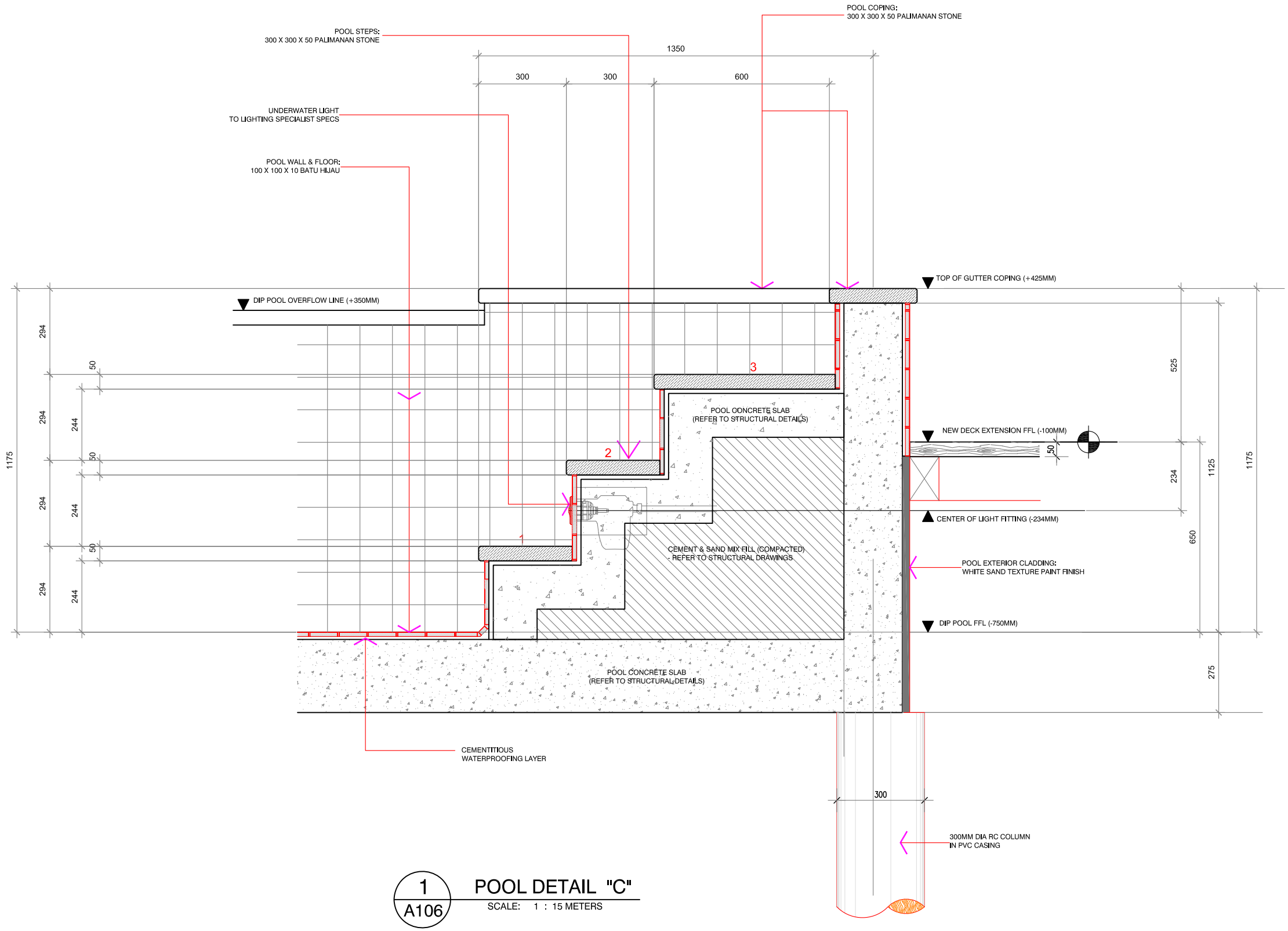
SCALE: 1 : 15 METERS



2 / A105 POOL DETAIL "B"

SCALE: 1 : 15 METERS

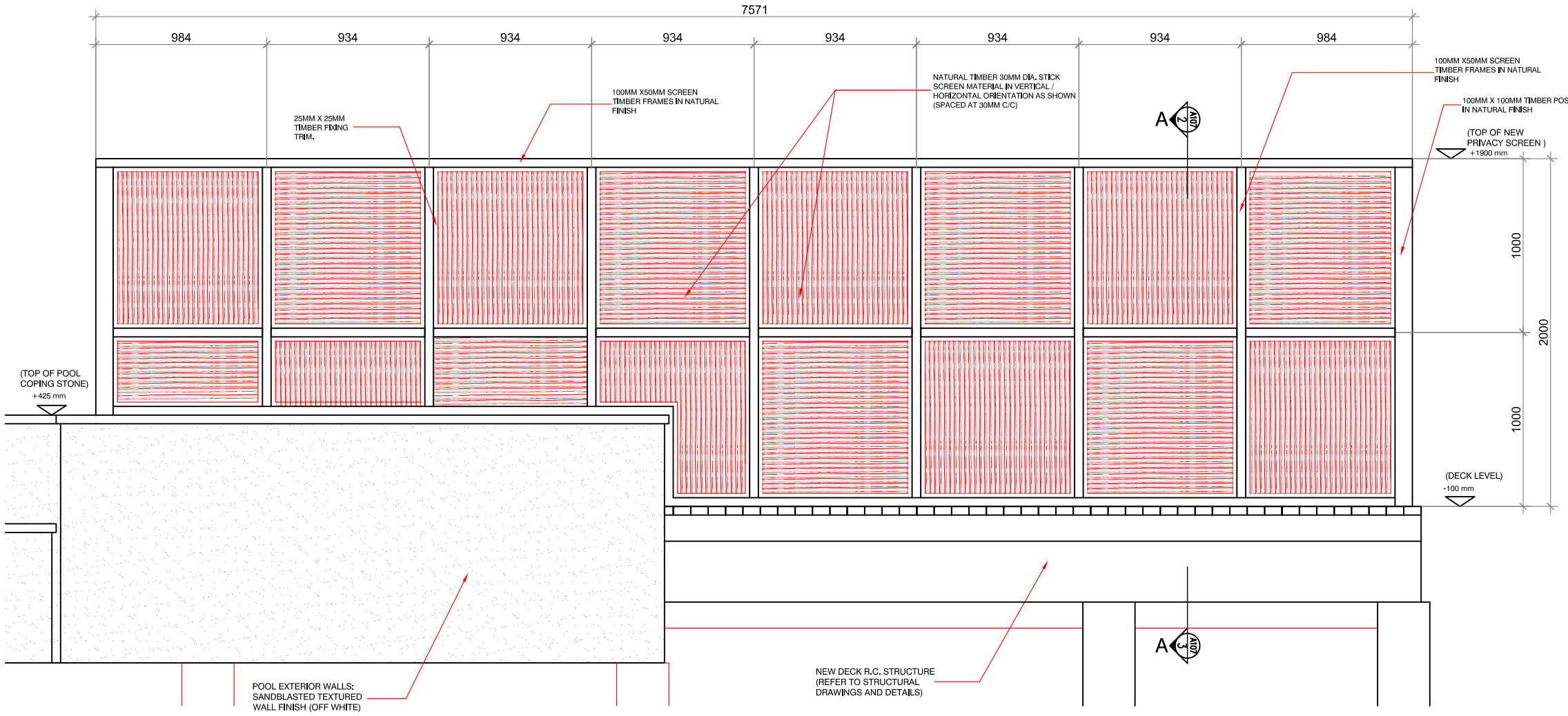
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SWIMMING POOL DETAILS A & B	DRAWING NO.: A105
			REVISION NO.:
			DATE: 28 MAY 2021



1 / A106 POOL DETAIL "C"

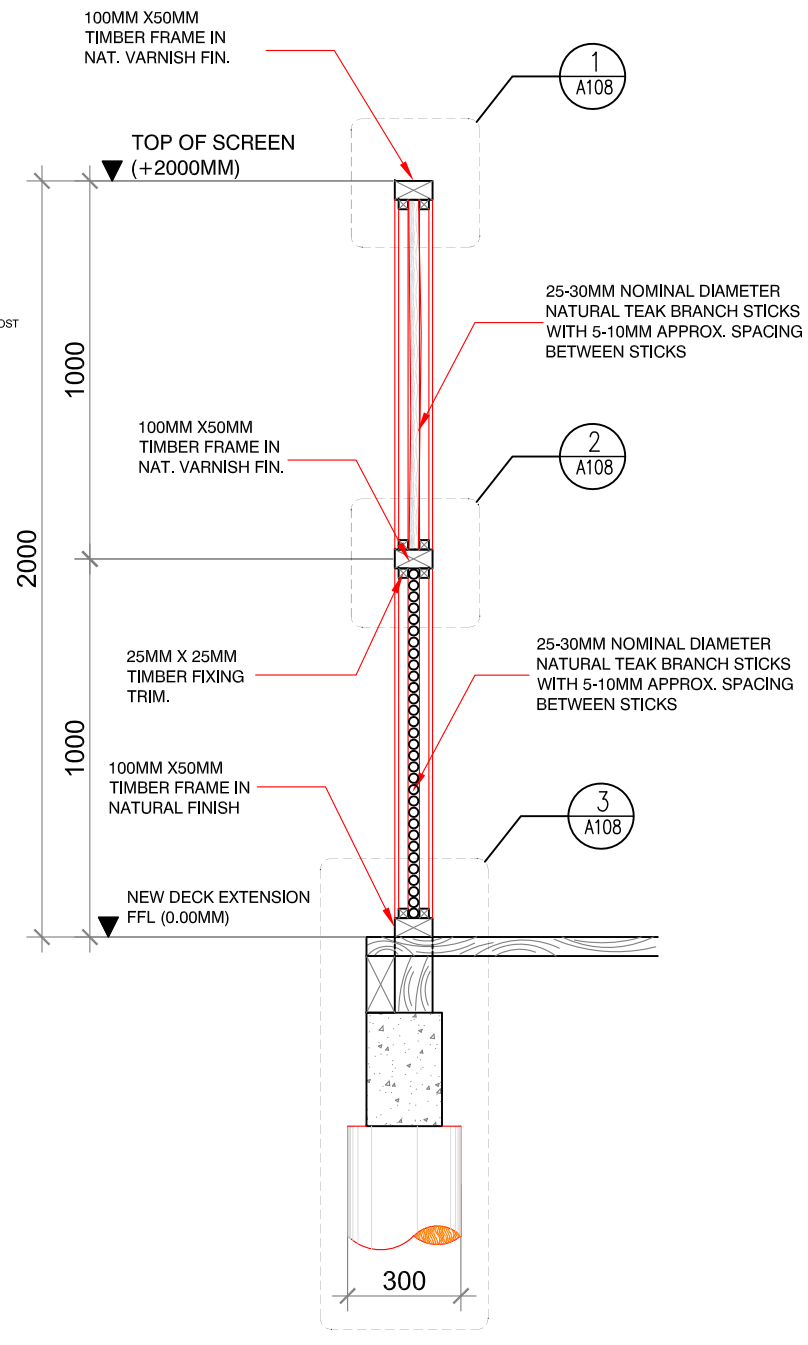
SCALE: 1 : 15 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: SWIMMING POOL DETAILS C	DRAWING NO.: A106
			REVISION NO.:
			DATE: 28 MAY 2021



1 A107 NEW PRIVACY SCREEN ELEVATION "A"

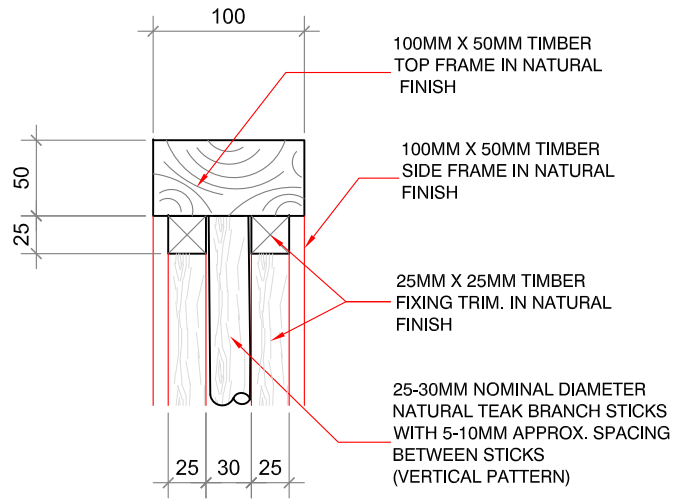
SCALE: 1 : 30 METERS



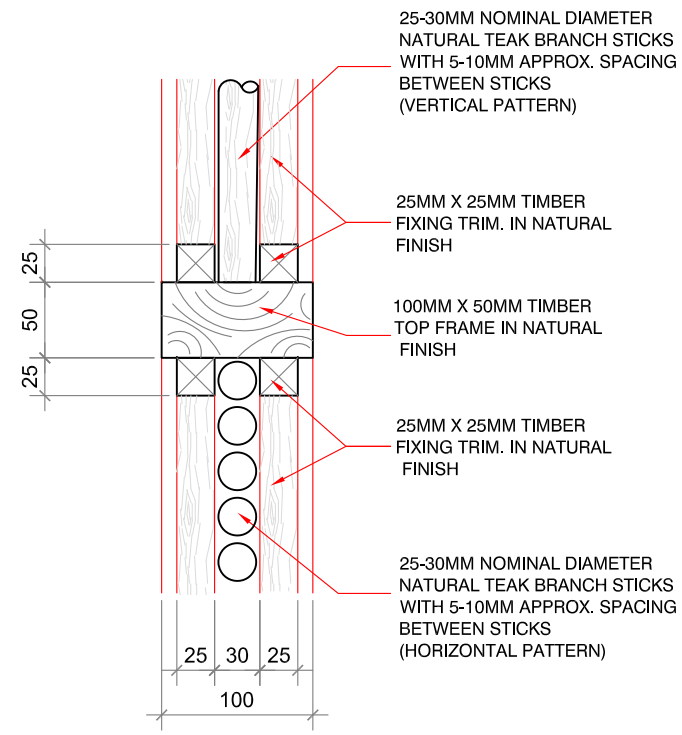
2 A107 TYPICAL SCREEN DETAILS : SECTION "A"

SCALE: 1 : 20 METERS

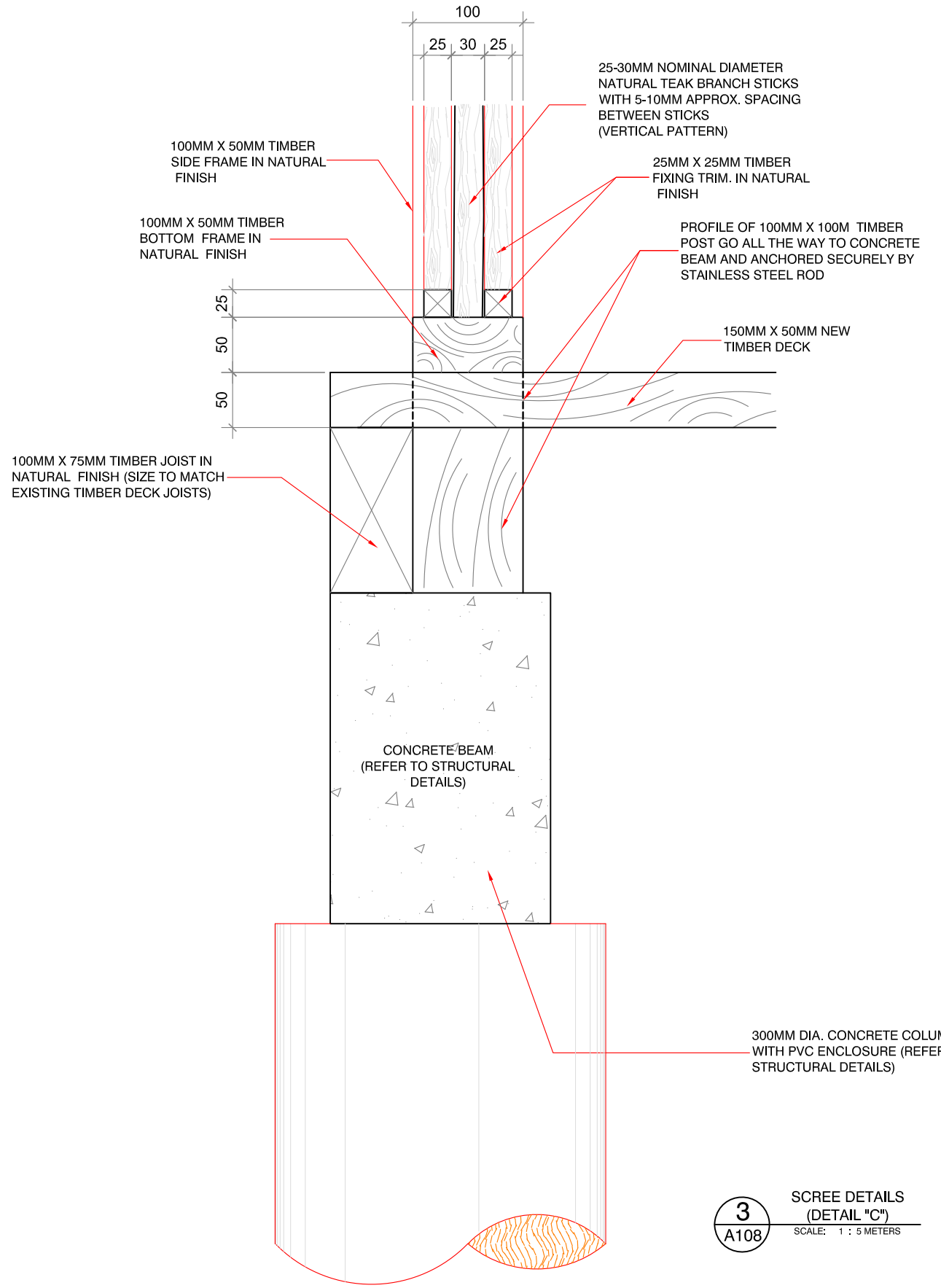
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: NEW PRIVACY SCREEN ELEVATIONS & SECTION	DRAWING NO.: A107 REVISION NO.: DATE: 28 MAY 2021



1 A108 SCREE DETAILS (DETAIL "A")
SCALE: 1 : 5 METERS

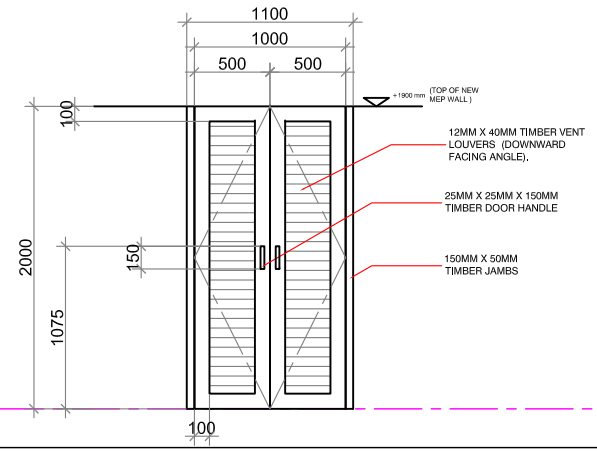
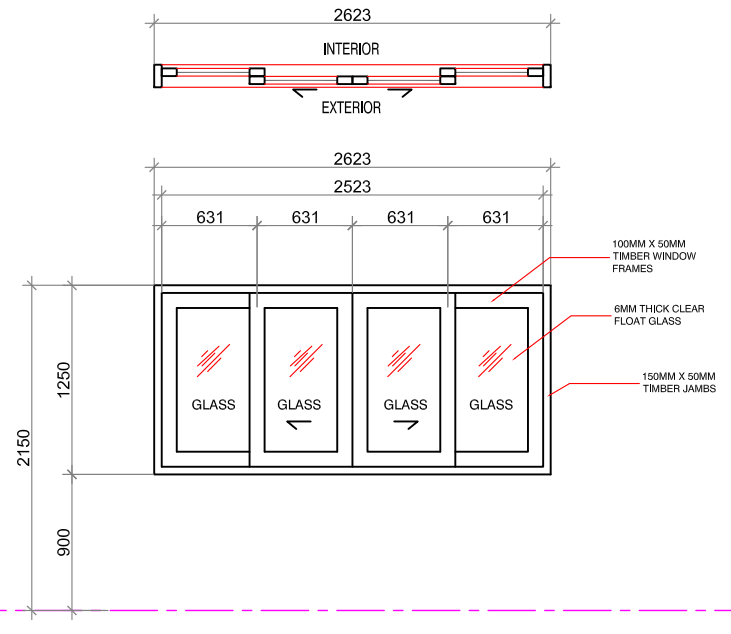
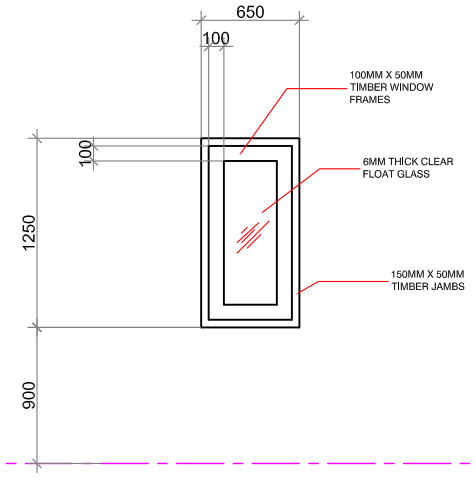
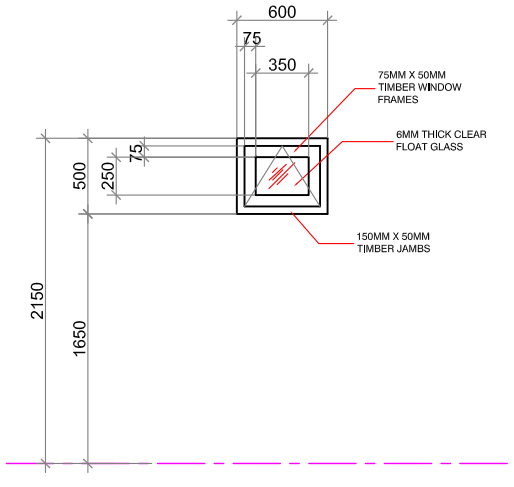


2 A108 SCREE DETAILS (DETAIL "B")
SCALE: 1 : 5 METERS

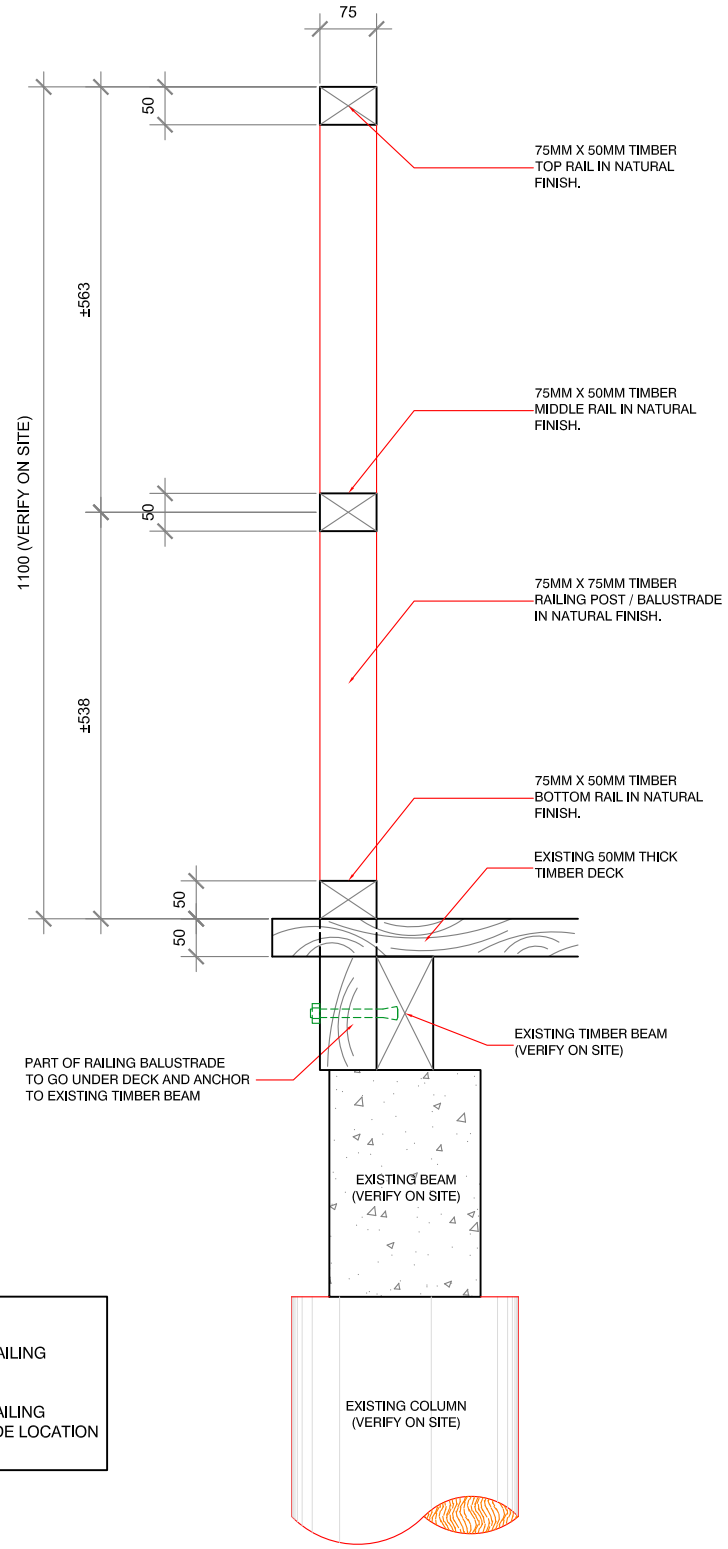


3 A108 SCREE DETAILS (DETAIL "C")
SCALE: 1 : 5 METERS

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: NEW PRIVACY SCREEN DETAILS	DRAWING NO.: A108 REVISION NO.: DATE: 28 MAY 2021

FFL		FFL		FFL	
TYPE	D1	TYPE		TYPE	
QUANTITY	1	QUANTITY		QUANTITY	
LOCATION	NEW MEP ROOM	LOCATION		LOCATION	
REMARKS	- TIMBER (APPROVED HARDWOOD) SWING DOOR WITH TIMBER VENT LOUVERS (DOWNWARD FACING ANGLE). - WOOD TONE / COLOUR TO MATCH WITH MAIN ENTRY DOOR (REFER TO ID SPECS) - LOCKSET : STAINLESS STEEL DEADBOLT (KEY CYLINDER FACING OUT, THUMBTURN AT INTERIOR SIDE)	REMARKS		REMARKS	
FFL		FFL		FFL	
TYPE	W1	TYPE	W2	TYPE	W3
QUANTITY	1	QUANTITY	1	QUANTITY	1
LOCATION	KID'S ROOM BEDROOM	LOCATION	KID'S ROOM BEDROOM	LOCATION	KID'S ROOM BATHROOM
REMARKS	- TIMBER (APPROVED HARDWOOD) SWING WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE SLIDING DOOR LOCK (W/ THUMBTURN) - SLIDING TRACK SYSTEM : CONTRACTOR TO SUBMIT FOR APPROVAL (STAINLESS STEEL BODY & SMOOTH OPERATION.)	REMARKS	- TIMBER (APPROVED HARDWOOD) FIXED WINDOWS WITH 6MM THICK CLEAR FLOAT GLASS - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR	REMARKS	- TIMBER (APPROVED HARDWOOD) CASEMENT WINDOWS WITH 6 MM THICK CLEAR FLOAT GLASS - 100MM X 50 FIXED TIMBER JAMBS (REBATED) - PAINT FINISH (TO MATCH EXISTING WINDOWS AND DOORS PAINT FINISH) - TIMBER BEADING FOR FIXING GLASS TO FACE EXTERIOR - LOCKSET : HOOK TYPE CASEMENT WINDOW LOCK & CASEMENT WINDOW STAYS (ALL STAINLESS STEEL)

PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: NEW DOOR & WINDOWS SCHEDULE	DRAWING NO.: A109 REVISION NO.: DATE: 28 MAY 2021



NOTES:

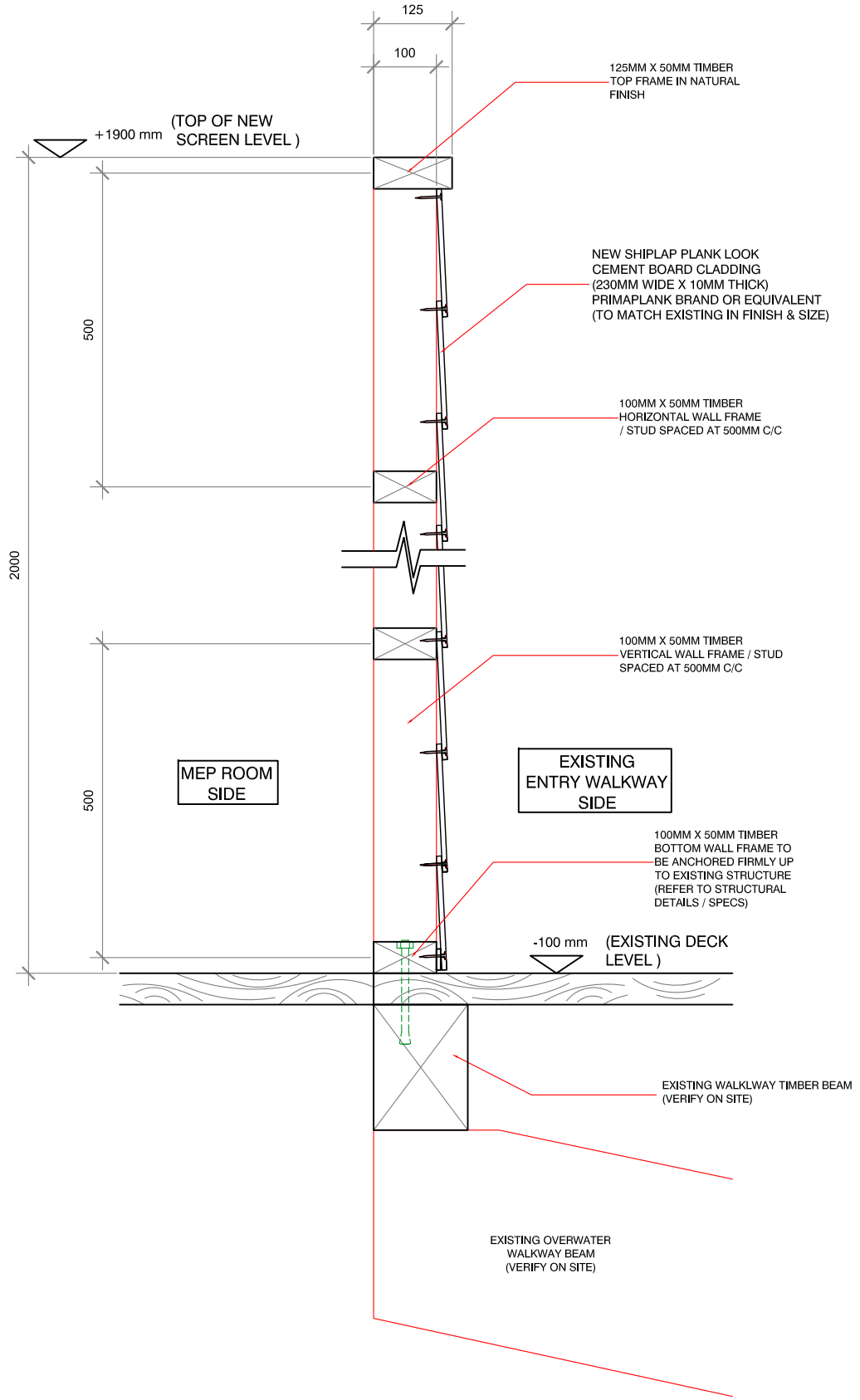
A. REFER TO FLOOR PLAN FOR RAILING SETTING OUT AND EXTENTS.

B. REFER TO FLOOR PLAN FOR RAILING VERTICAL SUPPORT / BALUSTRADE LOCATION AND SPACING.

1 A110

TYPICAL NEW RAILING SECTION DETAIL

SCALE: 1 : 10 METERS



2 A110

NEW MEP ROOM WALL SECTION DETAIL

SCALE: 1 : 10 METERS

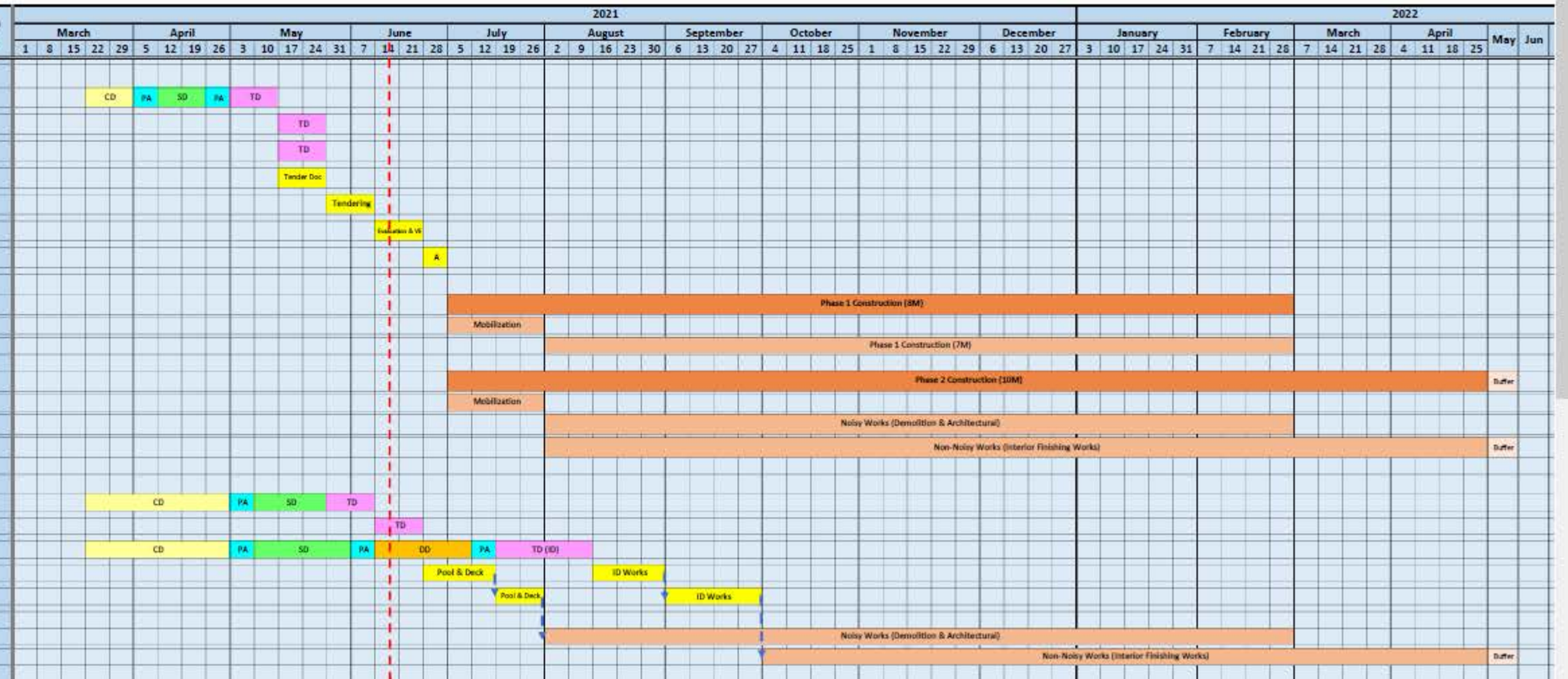
PROPOSED UPGRADING / INTERIOR RENOVATION WORKS TO EXISTING WATER VILLAS, KANUHURA MALDIVES , LHAVIYANI ATOLL, MALDIVES (THE "WORKS")	BUILDING NAME: STANDARD WATER VILLA W/ KID'S ROOM (FAMILY VILLA)	DRAWING TITLE: NEW RAILING SECTION & NEW MEP ROOM WALL SECTION	DRAWING NO.: A110 REVISION NO.: DATE: 28 MAY 2021

APPENDIX D- DETAIL WORK SCHEDULE

SIX SENSES KANUHURA

PROGRAMME FOR WATER VILLAS RENOVATION WORKS (Rev 4)

	Description	Start Date	End Date	Duration (Weeks)
A	**Water Villas**			
.1	Architectural Drawings (Standard & Family)	25-03-21	14-05-21	8
.2	Structural & MEP Drawings (Standard & Family)	17-05-21	28-05-21	2
.3	ID Drawings (Standard & Family)	17-05-21	31-05-21	2
.4	Tender Documentation	17-05-21	31-05-21	2
.5	Tendering	31-05-21	14-06-21	2
.6	Evaluation & Value Engineering	14-06-21	25-06-21	2
.7	Award Approval	28-06-21	30-06-21	1
.8	Construction			
	i) **Phase 1 (9 Villas at South)**	01-07-21	28-02-22	35
	a) Mobilization (HPA Approval, Quarantine)	01-07-21	31-07-21	5
	b) Phase 1 Construction	01-08-21	28-02-22	31
	ii) **Phase 2 (11 Villas at North)**			
	a) Mobilization (HPA Approval, Quarantine)	01-07-21	31-07-21	5
	b) Noisy Works (Demolition & Architectural)	01-08-21	28-02-22	31
	c) Non-Noisy Works (Interior Finishing Works)	01-08-21	30-04-22	39
.9	3.5BR Suite			
	i) Architectural Drawings	22-03-21	10-06-21	12
	ii) Structural & MEP Drawings	10-06-21	22-06-21	2
	iii) ID Drawings	22-03-21	13-08-21	21
	iv) Quotation	01-07-21	31-08-21	9
	v) Evaluation, Value Engineering & Award	19-07-21	30-09-21	11
	vi) Construction			
	a) Pool & Deck	01-08-21	28-02-22	31
	b) Interior Finishing Works	01-10-21	30-04-22	31



APPENDIX E- WATER SAMPLING RESULTS

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: 500187544

Customer Information:
Mahfooz Abdull Wahhab
A293039

K.villingili -

Report date: **05/07/2021**
Test Requisition Form No: **900192052**
Sample(s) Recieved Date: **04/07/2021**
Date of Analysis: **04/07/2021 - 04/07/2021**

Sample Description ~	Kanuhuraa P1	P2	P3	**TEST METHOD**	**UNIT**
Sample Type ~	Sea Water	Sea Water	Sea Water		
Sample No	83219610	83219611	83219612		
Sampled Date ~	01/07/2021 11:00	01/07/2021 11:00	01/07/2021 11:00		
PARAMETER	**ANALYSIS RESULT**				
Physical Appearance	Clear with particles	Clear with particles	Clear with particles		
pH *	8.18	8.19	8.20	Method 4500-H+ B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	-
Salinity	34.49	33.97	34.39	Method 2520 B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	‰
Temperature	23.6	23.9	23.9	Electrometry	°C
Turbidity *	0.127	0.119	0.131	HACH Nephelometric Method (adapted from HACH 2100N Turbidimeter User Manual)	NTU

Keys: ‰ : Parts Per Thousand, **°C** : Degree Celcius, **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 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

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: 500187544

Customer Information:
Mahfooz Abdull Wahhab
A293039

K.villingili -

Report date: **05/07/2021**
Test Requisition Form No: **900192052**
Sample(s) Recieved Date: **04/07/2021**
Date of Analysis: **04/07/2021 - 04/07/2021**

Sample Description ~	C	**TEST METHOD**	**UNIT**
Sample Type ~	Sea Water		
Sample No	83219613		
Sampled Date ~	01/07/2021 11:00		
PARAMETER	**ANALYSIS RESULT**		
Physical Appearance	Clear with particles		
pH *	8.26	Method 4500-H+ B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	-
Salinity	33.43	Method 2520 B. (adapted from Standard methods for the examination of water and waste water, 23rd edition)	‰
Temperature	24.0	Electrometry	°C
Turbidity *	0.123	HACH Nephelometric Method (adapted from HACH 2100N Turbidimeter User Manual)	NTU

Keys: ‰ : Parts Per Thousand, **°C** : Degree Celcius, **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.
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********** END OF REPORT **********

APPENDIX G- APPROVED SITE PLAN

بسم الله الرحمن الرحيم

MINISTRY OF TOURISM
REPUBLIC OF MALDIVES

Ref: 88-DS/PRIV/2021/1065 16th June 2021

Mr. Mohamed Riza,
Director of External Affairs,
Leisure Oceans Pvt Ltd,
H.Millenia Tower, #02-01,
Ameer Ahmed Magu,
Male',
Republic of Maldives.

Dear Mr. Riza,

Re: Concept Approval of Kanuhura in Lhaviyani Atoll.

We refer to the submissions made on 26th May 2021, requesting to approve the development concept of Kanuhura in Lhaviyani Atoll.

A conditional approval is hereby granted to the development concept submitted for the project subjected to the fulfillment of the following requirement and procedures:

- Submission and approval of environmental clearance report.
- Submission and approval of the detail drawings for the project.
- Development shall comply with all conditions specified in the lease agreement.
- Built up area percentage and carrying capacity of the facility shall comply with the existing regulations.

Please note that this approval will also be based on the rules, regulations and practices of this Ministry and concerned government authorities.

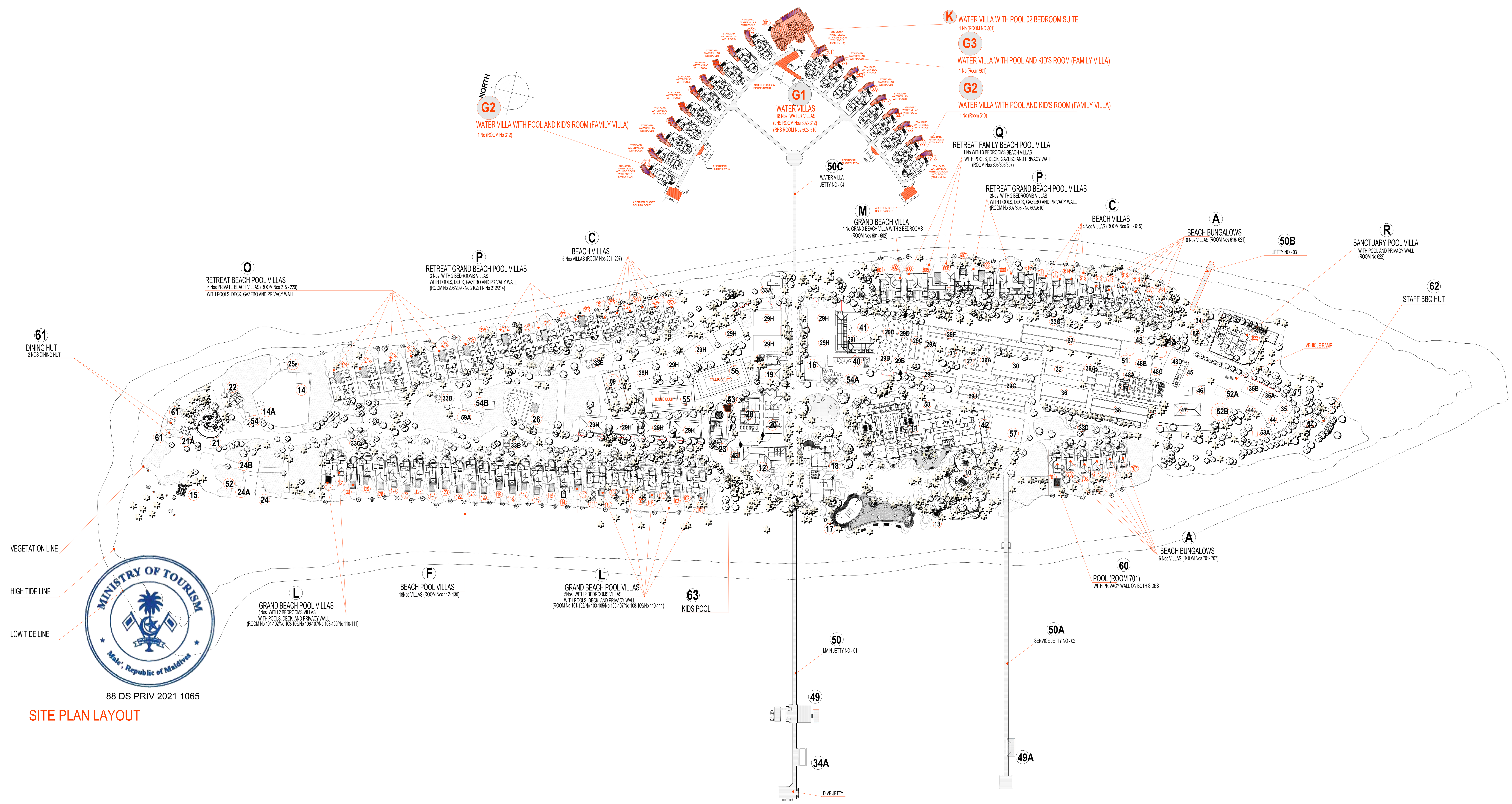
Furthermore, please be informed that once the physical construction work begins, you are required to arrange an inspection within 30 days from the commencement of the physical construction and also submit the development progress report before the 15th of each calendar month. We make note that upon completion of the project, the bed capacity of the resort would be 80 guest units (97 guest rooms, 194 beds) and the total build up area of the island is 14.81% (24,473.14 sqm) of the total land area 165,194.00 sqm.

Thank you.

Yours Sincerely,

Fathimath Samaah
Assistant Director

AI/DS



S/N	Buildings	Area/Unit (sq mts)	No. of Units	Total Floor Area
	GUEST VILLAS			
A	**Beach Bungalow** (Room Nos 616-621 & Nos 701-707)	62.87	12	816.00
C	**Beach Villas** (Room Nos 201-207 & Nos 611-615)	62.87	10	848.00
F	**Beach Pool Villas** (Room Nos 112 - 130)	63.27	18	1,526.40
L	**Grand Beach Pool Villas** (Room Nos 101-102/103-105/106-107/108-109/110-111/131-132)	119.71	6	718.26
M	**Grand Beach Villa** (Room No 601/602)	159.98	1	159.98
O	**Retreat Beach Pool Villas** (Room Nos 215-220)	72.32	6	433.92
P	**Retreat Grand Beach Pool Villas** (Room Nos 208-209/210-211/212-214/608-609/610-611)	135.60	5	678.00
Q	**Retreat Family Beach Pool Villa** (Room No 605-606-607)	270.95	1	270.95
R	**Sanctuary Pool villa** (Room No 622)	201.77	1	201.77
	PUBLIC AREAS			
10	**Amano - All Day Dining**	550.63	1	547.00
11	**Bottega/Kokaa Spa & Main Kitchen**	1,968.30	1	2,270.20
12	**Reception - Fenda Lounge**	479.16	1	467.90
13	**Fogo - Brazilian Cuisine**	16.78	1	13.10
14	**Chefs Herb Garden (New Glass House)**	65.06	1	65.06
14A	**Kitchen at Chef Garden**	13.15	1	13.15
15	**Iru Beach Lounge**	26.61	1	26.61
16	**Deli/Bridal Suite & Salon**	214.69	1	214.69
17	**Cowry Club (Pool Bar)**	198.38	1	198.38
18	**Games Room & Retail Shop**	622.34	1	622.34
19	**Aerobics**	95.09	1	95.09
20	**Dive Centre**	349.79	1	349.79
21	**Dagas - Maldivian Fusion Cuisine (Veli Café)**	765.70	1	765.70
21A	**Dagas Dining Pavilion**	22.58	1	22.58
22	**Restroom at Dagas**	38.11	1	38.11
23	**Kids Club**	136.59	1	136.59
24	**Water Sports Center**	61.51	1	61.51
24A	**Equipment Storage**	90.62	1	90.62
24B	**Board Canoe Rack**	90.62	1	90.62
25A	**Wheel Centre**	72.86	1	72.86
25B	**Ayurvedic Pavillion**	25.08	1	25.08

	SUPPORT FACILITIES			
26	**General Manager (GM) Villa**	267.65	1	288.60
27	**Coffee Shop**	74.02	1	74.02
28	**Dive & Financial Accomodation**	221.38	1	227.80
	STAFF FACILITIES			
29A	**Junior Staff 5 units**	90.93	2	181.80
29B	**Junior Staff 5 units(Extension of staircase to First floor)**	278.54	2	249.20
29C	**Junior Staff 8 units**	143.36	1	143.36
29D	**Junior Staff 6 units (Extension of staircase to First floor)**	236.68	2	215.40
29E	**Junior Staff + HR**	209.50	1	209.50
29F	**Junior Staff + Laundry + Casual workers**	482.30	1	34.00
29G	**Junior Staff + Tuck shop**	394.08	1	394.00
29H	**Senior staff accommodation**	218.80	12	2,625.60
29I	**New Staff Room Accommodation (BSA)**	350.49	1	354.10
29J	**Senior Staff Acoomodation**	322.53	1	354.10
30	**Staff Mess**	460.66	1	460.66
31	**Recreational Hut**	57.65	1	57.65
32	**Staff Training room**	198.70	1	198.70
33A	**Housekeeping Hut A**	46.20	1	46.20
33B	**Housekeeping Hut B**	7.74	2	15.48
33C	**Housekeeping Hut C**	10.90	2	21.80
33D	**Housekeeping Hut D**	15.90	1	15.90
33E	**Housekeeping Hut E**	15.34	1	15.34
34	**Security Hut**	10.30	1	11.20
34A	**Security Office at Jetty**	48.00	1	48.00
35	**Storage Shed 1**	84.76	1	84.70
35A	**Storage Shed 2**	47.80	1	47.80
35B	**Carpentry shed 1**	111.78	1	111.78
36	**Main Store**	373.40	1	373.40
37	**Engineering Store**	768.20	1	768.20
38	**Maintenance Store**	412.48	1	412.48
39	**Power House & Desalination Plant**	808.64	1	808.64
39A	**Brine Tank (6.1m2)**	6.14	1	6.14
40	**Radio room**	20.80	1	20.80
41	**Mosque**	233.76	1	233.76
42	**Cold Store at Main Kitchen (No11)**	46.55	1	46.55
43	**Communication room**	64.30	1	64.30
44A	**Exisitng Incinerator**	33.00	1	33.00
44B	**Incinerator Compactor Bottles Crusher**	48.00	1	48.00
45	**Garbage area**	92.30	1	92.30
46	**Mechanical workshop**	46.75	1	46.75
47	**Carpentry shed**	140.56	1	140.56

48	**GRP Grey water tank**	20.20	1	20.20
48A	**Processed Sewage Treatment Sludge**	92.58	1	92.58
48B	**Raw Sewage**	32.69	1	32.69
48C	**Sewage Treatment Plant**	85.80	1	85.80
48D	**Plantroom**	240.95	1	240.95
49	**Arrival Jetty Hut + External Decking**	116.85	1	116.85
49A	**Service Jetty Hut**	48.00	1	48.00
50	**Main Jetty No1**	-	1	-
50A	**Service Jetty No2**	-	1	-
50B	**Jetty No3**	-	1	-
50C	**Water Villa Jetty No4 (1483m2)**	-	1	-
51	**Water Tank 1**	28.01	1	28.01
51A	**Water Tank 2**	45.03	1	45.03
52	**Petrol and Disel Hut**	9.26	1	9.26
52A	**Diesel Tank 1 (62.4m2)**	62.62	1	62.62
52B	**Diesel Tank 2 (119.5m2)**	119.87	1	119.87
53	**Telecom Antenna Hut 1**	14.20	1	14.20
53A	**Antenna Hut 2 (12.4m2)**	13.48	1	13.48
54	**Pump Station 1**	8.96	1	8.96
54A	**Pump Station 2**	38.52	1	38.52
54B	**Pump Station 3**	38.69	1	38.69
55	**Tennis Court 1**	-	1	-
56	**Tennis Court 2**	-	1	-
57	**Mini Soccer Pitch**	-	1	-
58	**Badminton Court**	-	1	-
59	**Orchid Garden 1**	-	1	-
59A	**Orchid Garden 2**	-	1	-
60	POOL (ROOM 701)	-	1	-
61	DINING HUT	8.30	2	16.60
62	STAFF BBQ HUT	34.50	1	34.50
63	KIDS CLUB POOL	-	1	-
PROPOSED STRUCTURES				
G1	**Water Villas with Pool** (Room Nos 302-311 & 502-509)	88.80	16	1,420.80
G2	**Water Villas with Pool and Kid's Room (Family Villa)** (Room No 312 & 510)	108.80	2	217.60
G3	**Water Villas with Pool and Kid's Room (Family Villa)** (Room No 501)	120.10	1	120.10
K	**Water Villas with Pool 02 Bedroom Suite** (Room No 301)	226.00	1	226.00
	TOTAL PROPOSED AREA			1,984.50

LAND AREA (QM): 165,194
TOTAL PROPOSED BUILT UP AREA (SQM): 24,473.14
TOTAL BUILT UP PERCENTAGE (%) : 14.81

SHIYARCH

No.	Revision	Checked By	Date
1	-	-	-

Project Title: KANUHURA MASTERPLAN UPDATING

Client: SRL KANUHURA LTD

MASTERPLAN

Drawing Title: MASTERPLAN

Architect: SHIYAZ FAKIR	Interior Designer: -
Drawn By: MUNISH	Checked By: -
Paper: -	Project No: 113_2021
Date: MAY 2021	Scale: AS GIVEN

Drawing No: /01

APPENDIX H- EVIDENCE OF REPORT SUBMISSION TO ATOLL COUNCIL

Gmail

in:sent

Compose

Inbox

Starred

Snoozed

Sent

Drafts 1

[Gmail]/Trash/gmail<20…

More

Meet

New meeting

Join a meeting

Hangouts

Mahfooz

No recent chats

Start a new one

EIA_additional water villa, expanding existing water villas and associated v

Mahfooz AbdullWahhab <mahfoozabdullwahhab@gmail.com>

to secretariat, Mohamed, Ibrahim

Dear Sir,

Please follow below link for EIA for additional water villa, expanding existing water villas and associated works in Lh. Kanuhur

https://drive.google.com/drive/folders/1OMmDr9Q1jCmO1-maJkKm1o63btuONGlu?usp=sharing

Best,

Mahfooz Abdul Wahhab
Environmental Consultant
(+960) 9994467

Kanuhuraa EIA

Reply Reply all Forward