

FINAL VALIDATION REPORT OF “REFORESTATION AND RESTORATION OF DEGRADED MANGROVE LANDS, SUSTAINABLE LIVELIHOOD AND COMMUNITY DEVELOPMENT IN MYANMAR”



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Project Title	Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar
Version	1.1Aa
Report ID	2016-IQ-MD-40

Report Title	Final Validation report of “Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar”
Client	Worldview International Foundation (WIF)
Pages	103
Date of Issue	26-02-2017
Prepared By	RINA Services SPA

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Summary:

RINA Services S.p.A. (RINA), commissioned by Worldview International Foundation (WIF) has performed the validation of the project activity “Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar”.

The scope of validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the VCS Standards, on the basis of the project design document and related project documents in order to confirm that the project design as documented, is sound and reasonable and meets the identified criteria.

The validation consisted of the following three phases: (i) document review, (ii) on-site assessment, (iii) the resolution of outstanding issues and the issuance of the final validation report

During this validation, 11 Corrective Action Requests (CARs), 07 Clarification Requests (CLs) were identified related to the project baseline, implementation or operations of the proposed VCS project activity in relation to all relevant VCS requirements and the applied baseline and monitoring methodology AR-AM0014, version 03.0. These, findings have been discussed in Appendix 1 of the report.

In conclusion, it is RINA's opinion that the project activity “Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar” meets all relevant requirements for VCS standard and guidelines and correctly applies the baseline and monitoring methodology AR-AM0014, Afforestation and reforestation of degraded mangrove habitats”, Version 03.0 dated 04/10/2013

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1 INTRODUCTION

1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a VVB against the requirements of the VCS, on the basis of the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Verified Carbon Units (VCUs).

1.2 Level of Assurance

The validation has been carried out by reviewing the VCS-PD /01/, emission reduction sheet and supporting documents (refer below section 2.2) made available to the RINA assessment team and information collected through performing site visit, interviews and document review. Based on review of above mentioned documents, the assessment team is of the opinion that the level of assurance is reasonable and that the GHG assertions are free of material errors, omissions and misrepresentations. The validation opinion is assured provided the credibility of all above documents.

The final validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for VCS and CDM validation and verification.

The verification team and the technical reviewers consist of the following personnel.

Role	Last Name	First Name	Country
Team Leader & Validator	Menon	Rekha	India
Technical Expert	Nambiar	Dhanya	India
Technical Reviewer 1	Principe	Geisa	Brazil
Technical Reviewer 2 and Technical Expert	C. Beck	Talita	Brazil

1.3 Summary Description of the Project

Project Proponent	Worldview International Foundation
Title of the project activity	Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar
Baseline and monitoring methodology	AR-AM0014, Afforestation and reforestation of degraded mangrove habitats", Version 03.0 dated 04/10/2013
Location of the project activity	The proposed project is implemented on 2146.48 Ha of the degraded lands of Magyi, Thabawkan and Thaegone village tracts of the Northern part of Ayeyarwady Division of Myanmar
Projects crediting period	15/06/2015 to 14/06/2035

2 VALIDATION PROCESS

2.1 Method and Criteria

Validation was conducted using RINA procedures in line with the requirements specified in the Rules for the Use of the VCS Standards and applying standard auditing techniques. The validation consisted of the following three phases:

- Document review;
- Follow-up actions (field visit)
- The resolution of outstanding issues and the issuance of the final validation report.

The following sections outline each step in more detail.

Sampling and data testing activities were planned to address any risk where the likelihood of a material discrepancy not being detected by the audit team was judged to be unacceptably high. The validation plan also took the sampling plan into account.

2.2 Document Review

The updated PD, version 1.0 of 31/05/2017 and version 2.0 of 16/11/2017 and version 3.0 of 01/02/2018 /01/, in particular the applicability of the methodology, the baseline determination, the emission reduction calculations provided in the form of a spreadsheet (VCU calculations MM mangrove - FINAL.xlsx) version 02 submitted on 23/11/2017 and (VCU calculations MM

mangrove – Feb 2018.xlsx) version 03 submitted on 01/02/2018, and the documents listed in the table below, were reviewed during the onsite – audit..

/01/	Worldview International Foundation: VCS-PD for the project activity " Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", version 1.0 of 31/05/2017, version 2.0 of 16/11/2017 and version 3.0 of 01/02/2018
/02/	Worldview International Foundation: ER spread sheets (VCU calculations MM mangrove - FINAL.xlsx), version 01 submitted on 10/08/2017, version 2.0 of 16/11/2017 Worldview International Foundation: ER spread sheets (VCU calculations MM mangrove – REVISED), version 02 submitted on 23/11/2017 Worldview International Foundation: ER spread sheets (VCU calculations MM mangrove – REVISED), version 03 submitted on 01/02/2018
/03/	CDM Executive Board: Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities" (version 01.0.0), dated 25/11/2011
/04/	WIF: Non permanence risk report, version 1.0 of 31/05/2017 WIF: Non permanence risk report, version 2.0 of 15/11/2017
/05/	CDM Executive Board: Demonstration of eligibility of lands for A/R CDM project activities, version 02.0, dated 04/10/2013
/06/	CDM Executive Board: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2), dated 24/07/2015
/07/	CDM Executive Board: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (version 03.1), dated 24/07/2015
/08/	CDM Executive Board: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"(version 02.0), dated 04/10/2013
/09/	CDM Executive Board: Estimation of non-CO ₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0_, dated 25/11/2011
/10/	CDM Executive Board: Approved large scale CDM methodology AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats", dated 04/10/2013

/11/	CDM Executive Board: Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, version 01 dated 19/10/2007
/12/	CDM Executive Board: Guidelines for objective demonstration and assessment of barriers, version 01 of 16/10/2009
/13/	CDM Executive Board: Calculation of the number of sample plots for measurements within A/R CDM project activities, version 02.1.0 of 26/11/2010
/14/	WIF: Risk report calculation tool
/15/	WIF: Landsat Images of 2003 & 2013 for Magyi, Thabakawn and Thaegon regions
/16/	WIF: Google earth files: Project boundary KML files Version 01 submitted on 31/05/2017 WIF: Google earth files: Project boundary KML files Version 02 submitted on 16/11/2017 WIF: Google earth files: Project boundary KML files Version 03 submitted on 01/02/2018
/17/	WIF: Project boundary files with geo-coordinates in excel format, Version01 submitted on 31/05/2017 WIF: Project boundary files with geo-coordinates in excel format, Version02 submitted on 16/11/2017 WIF: Project boundary files with geo-coordinates in excel format, Version03 submitted on 01/02/2018
/18/	WIF: Project boundary Shape files of the region Magyi, Thabakawn and Thaegon Version 1.0 dated 31/05/2017, version 2.0 dated 16/11/2017 and version 3.0 dated 01/02/2018.
/19/	WIF: Land use maps of Magyi, Thabakawn and Thaegon regions
/20/	MoU between University of Patheingyi and WIF on Development of Mangrove park and Mangrove gene bank for Research & Development in support of Mangrove Restoration in Myanmar, dated 15/11/2013

/21/	MoU between University of Pathein and WIF on validation and sale of CO ₂ offsets to international buyers, dated 15/07/2016
/22/	Amendment of the MoU between University of Pathein and WIF for the extension of contract and increased land area dated 21/05/2017
/23/	Agreement between WIG and Theagon community, dated 21/05/2017 Agreement between WIG and Thabawkan community, dated 21/05/2017
/24/	MoU between WIF and Forest Department for , capacity building, research, Mangrove restoration with community development and biodiversity/rescue of endangered endemic orchids, dated 11/08/2017
/25/	Regional Ministry of Agriculture, Livestock , Natural Resource & Environment: to confirm that the 1100 ha land area have been handed over to the village tract Magrove Conservation committee, Thabawkan for 30 years and can be extended for 120 years, aslo confirming the forest definition of Myanmar, dated 17/05/2017
/26/	Regional Ministry of Agriculture, Livestock , Natural Resource & Environment: to confirm that the 750 ha land area have been handed over to the village tract Magrove Conservation committee, Thaegon for 30 years and can be extended for 120 years, aslo confirming no forest in the allocated land dated 17/05/2017
/27/	Regional Ministry of Agriculture, Livestock , Natural Resource & Environment: to confirm that the 728 ha of land handed over to Pathein University doesn't have forest, dated 18/05/2017. Extension of area applied to 785 Ha.
/28/	Letter from Forest Department to support WIF in restoration and rehabilitate mangrove forests, dated 08/08/2017
/29/	Pathein University: Soil Carbon Measurement for Magyi area, dated 27/04/2015 along with the soil test data sheet, which was performed by University Research centre, Yangon.
/30/	WIF: Soil Carbon calculation (SoilCarbon_Myanmar_LRA2.xlsx) submitted on 15/08/2017
/31/	Article on carbon sequestration on Mangrove forest by Daniel M. Alongi, 04/2014
/32/	Carbon sequestration by mangrove plantation and a natural regeneration stand in the ayeyarwady delta region, Myanmar bu Ya Min Thant, dated 30/06/2012
/33/	Mangrove Service Network: Annual growth rate of Mangroves in Ayeryarwady region for Rhizophora and Bruguiera species , dated 05/01/2017

/34/	Preparation of baseline data mangrove ecosystem in Bintan Island by CV Ideas
/35/	WIF: sample plot calculation (sample plot calculation VCS Myanmar mangrove. Xlsx), (2015 planted sample plots.xlsx), (2016 planted sample plots.xlsx) and (2017 planted sample plots.xlsx) submitted on 15/08/2017
/36/	RINA: Field note and Interview sheet with stakeholders(Thabawkan village, Thaegon village, Magyi village), WIF , project consultants, Forest Department and Pathein University.
/37/	VCS: AFOLU requirements, V 3.6 of 21/06/2017
/38/	VCS: Standard, V 3.7 of 21/06/2017
/39/	WIF: Minutes of board meeting, dated 20/03/2012
/40/	WIF: Minutes of board meeting, dated 21/04/2014
/41/	Email from Letten foundation on rejection of loan for mangrove planation, dated 15/01/2015
/42/	Letter from Start board: approval on funding the mangrove planation , provided the project applies for VCS, dated 20/01/2015.
/43/	Agreement between WIF and A.S Brdr.Michaelsen, dated 15/09/2015
/44/	WIF: Minutes of board meeting, dated 21/12/2015
/45/	WIF: Forest inventory and survey report of Magyi area, dated 04/2015
/46/	WIF: Forest inventory and survey report of Theagon and Thabokkan areas, dated 05/2016
/47/	WIF: Socio economic survey report Magyi village tract, dated March 2015
/48/	WIF: Socio economic survey report Thabokkan village tract, dated February 2017
/49/	WIF: Socio economic survey report Thabokkan village tract, dated December 2016
/50/	Ministry of Education, Pathein University: authorizing WIF to market the carbon credits on behalf of Pathein university, dated 07/07/2015
/51/	Co-operative Bank Ltd: Loan rejection letter, dated 12/07/2017
/52/	Mangrove plantation in Ayerwady region by forest dept.
/53/	IPCC: Good practice guidance for landuse, land use change and forestry, dated 2003

/54/	WIF: Debit voucher for PO-315-016 (payment done for land clearing), dated 15/05/2015 ,
/55/	WIF ,Win Maung (Director, retd (Forest Dept.): Mangrove nursery and planting techniques for some important manfrove species, dated 01/2012
/56/	Coastal resource management project of the department of Environment and Natural resource: Mangrove management handbook
/57/	FAO Forestry Department: Mangrove forest management guidelines, 1994
/58/	Mangrove action project: 5 steps to successful ecological restoration of mangroves, dated 04/2006
/59/	WIF: employment contract of field assistant, dated 16/03/2015
/60/	WIF: employment contract of techncial assistant, dated 16/03/2015
/61/	Minimum wage proof: https://tradingeconomics.com/myanmar/minimum-wages , English Language, last accessed on 19/12/2017
/62/	RINA : Interview sheets with stakeholders dated 15/08/2017 to 17/08/2017
/63/	Letter from Air Mandalay to WIF on possibilities of buying credits from the proposed project on approval from VCS, dated 22/12/2014
/64/	WIF: Traning and capacity building for the staff at the mangrove plantation
/65/	WIF: Aerial image of the project location.
/66/	National land use policy of Myanmar : http://www.fao.org/faolex/results/details/en/c/LEX-FAOC152783/ : English Language, last accessed on 02/01/2018
/67/	National Biodiversity Strategy and Action Plan 2015-2020 (2015): http://www.fao.org/faolex/results/details/en/c/LEX-FAOC161482/ : English Language, last accessed on 02/01/2018
/68/	National Adaptation Programme of Action to Climate Change: http://www.fao.org/faolex/results/details/en/c/LEX-FAOC152937/ : English Language, last accessed on 02/01/2018
/69/	Myanmar Action Plan on Disaster Reduction 2012: http://www.fao.org/faolex/results/details/en/c/LEX-FAOC142708/ : English Language, last accessed on 02/01/2018
/70/	National Sustainable Development Strategy (2009) : http://www.fao.org/faolex/results/details/en/c/LEX-FAOC152933/ : English Language,

	last accessed on 02/01/2018
/71/	Laws and regulations including (National Environmental Policy (1994)), http://www.forestlegality.org/risk-tool/country/myanmar , English Language, last accessed on 02/01/2018
/72/	Forest Law (1992): http://www.fao.org/faolex/results/details/en/c/LEX-FAOC003290/ , English Language, last accessed on 02/01/2018
/73/	Protection of Wildlife and Conservation of Natural Areas Law (1994) http://www.fao.org/faolex/results/details/en/c/LEX-FAOC139132/ , English Language, last accessed on 02/01/2018
/74/	Forestry Master Plan (2001-2030) : http://www.fao.org/forestry/14871-095a15477c1192458cbb5d861551416d6.pdf , English Language, last accessed on 02/01/2018
/75/	Environmental conservation law (2012) : http://www.fao.org/faolex/results/details/en/c/LEX-FAOC139025/ , English Language, last accessed on 02/01/2018
/76/	Mangrove plantation in Rakhine area by Mangrove Service Network
/77/	Company registration certificate of WIF
/78/	Maung Maung Hteik and Associates: Audited reports of WIF for the year 04/2015 to 12/2016
/79/	WIF: Budget estimates for Mangrove plantation project.xlsx
/80/	NASA: Myanmar ecological forecasting : utilizing NASA earth observations to monitor, map analyse mangrove forests in Myanmar for enhanced conservation, May 2014
/81/	Stakeholders consultation: Meetings held at Thaegon village from 15/01/2016 to 01/09/2016 Meetings held at Thabokkan village from 08/07/2016 to 16/02/2017 Meetings held with forest dept officers , dated 18/12/2016 at WIF office, Magyi.
/82/	Myanmar Agenda 21 : http://www.un.org/esa/agenda21/natlinfo/countr/myanmar/natur.htm , in English Language, last accessed on 15/01/2018
/83/	FREDA: http://fredamyanmar.org/?page_id=174 , in English Language , last accessed on 15/01/2018
/84/	Mangrove Research Team, Patheingyi University: Preliminary Report on Area Survey for Mangrove Park (PUR/01) At MaGyi, Ayeyarwady Division
/85/	WIF: Receipts of Mangrove species seeds from Gwa, dated 20/03/2015 and 04/05/2017
/86/	WIF: Field measurement log sheets.

/87/	J. Boone Kauffman and Donato, D.C. (2012) Protocols for the measurement, monitoring and reporting of structures, biomass and carbon stocks in mangrove forests. CIFOR, Bogor, Indonesia, Working Paper No. (86)
/88/	Howard, J., Hoyt, S., Isensee, K., Telszewski, M., Pidgeon, E. (eds.) (2014). Coastal Blue Carbon: Methods for assessing carbon stocks and emissions factors in mangroves, tidal salt marshes, and seagrasses. Conservation International, Intergovernmental Oceanographic Commission of UNESCO, International Union for Conservation of Nature. Arlington, Virginia, USA.
/89/	Nguyen HT, Yoneda R, Ninomiya I et al. (2004) The effects of stand-age and inundation on carbon accumulation in mangrove plantation soil in Namdinh, Northern Vietnam. TROPICS Vol. 14 (1)
/90/	Allometric equation for biomass estimation proposed by Sukardjo and Yamada (1992)
/91/	Government of the Union of Myanmar, Ministry of Forestry, Forest Department, Forest Research Institute, Yezin : Physical and Chemical Properties of Mangrove Forest Soils by Daw Tin Tin Ohn, B.Ag. (Mdy.), M.S. (U.F) Researcher and U Sein Thet, B.Sc. (For.) (Rgn.), M.Sc. (ANU) Head of Division, Forest Research Institute Leaflet No. 6, 1991

2.3 Site Inspections

From 15/08/2017 to 17/08/2017, RINA visited the project site located on Magyi, Thabawkan and Thaegon village tracts of the Northern part of Ayeyarwady Division of Myanmar to resolve questions and issues identified during the document review of the PD. The audit team also conducted various interviews with the village committee leaders of all the three village tracts, where the project is proposed to be implemented. Further 55 villagers, including the charcoal burners from all the three village tracts were interviewed /36/.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	15/08/2017 to 17/08/2017	Dr. Arne Fjortoft (Secretary General)	WIF	VCS consideration, funding of the project, Commercial operation date of the project, Land tenure rights, Pre-project conditions
/b/	15/08/2017 to 17/08/2017	Mr. Win Maung (Project Manager)	WIF	Project implementation status, Project boundary, area covered, species selected, sample plot selection, planting technique used, survival rate, monitoring of the project.
/c/	15/08/2017 to 17/08/2017	Dr. Htay Aung (Professor)	Patheingyi University	Role of Patheingyi University, soil carbon studies, land rights, Environmental

				Socio-Economic Impacts, hydrological data.
/d/	15/08/2017 to 17/08/2017	Mr. Thulasi Varman	GIS&RS specialist	Baseline stratification, aerial and satellite imageries, project boundary, sampled plots.
/e/	15/08/2017 to 17/08/2017	Suraj A. Vanniarachchy (AFOLU carbon project development specialist)	Prime Carbon Co Ltd	Baseline, Data storage and Archiving procedures, Trainings, Site Preparation Activities, Baseline stratification, Sample plot calculation, Emission Reduction calculations, risk assessments and calculations, additionality, start date and crediting period.
/f/	15/08/2017 to 17/08/2017	Mr. Joacim Kontny (VCS Co-ordinator)	BIO-8	
/g/	15/08/2017	Mr. Min Aung (Range Officer)	Forest Department	Laws and policies, roles and responsibilities of forest department
/h/	16/08/2017	Chit San Village committee chairman	Thabawkan village tract	Land agreement between village committee and WIF, project impact on stakeholders, livelihood of the villagers, income generation, trainings, sustainable development and role and responsibility of villagers
/i/	16/08/2017	WIN Naing Oo (Kyu Taw Village) Eh Kalu (Poloung Village) Chit San (Nwengo Chaung Village) Than Kywe (Thaegone Village) Saw Ah Sah (Wet Thay Village) Umgint Than (Thaegone Village) All the above mentioned are Village Leaders	Thaegone village tract	

2.4 Resolution of Findings

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the project description. To guarantee transparency any findings raised regarding to the validation are incorporated in the Appendix 1 to this report.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project

The proposed project involves restoration of 2146.48 Ha of degraded mangrove habitat of the Magyi, Thabawkan and Thaegone village tracts, located in Northern part of Ayeyarwady Division of Myanmar. From the total 2146.48 Ha, 737.04 Ha covers Magyi region, 887.87 Ha from Thabawkan region and 521.57 from Thaegone village tract. During the site visit, it was understood that the project is planned to be implemented in phased manner. The project started the initial plantation activity in Magyi region in 2015 and aim to complete the same by 2017. Further, the other two regions Thabawkan and Thaegon village tracts will start the plantation activities in 2018 and finish the same by 2020.

The key drivers for the degradation and deforestation were due to agricultural expansion, charcoal production, mangrove clearing for aquaculture, increased population and salt production areas. This was also confirmed from the charcoal burners and village committee leader's /36/.

Apart from the restoration activities of mangroves, the other important objective of the project is poverty reduction with sustainable livelihoods in the coastal communities. Also, emphasising on conservation of bio-diversity and establishment of the first mangrove gene bank in Myanmar.

The species considered for the reforestation activity are *Rhizophora mucronata* Lam., *Rhizophora apiculata* Blume, *Bruguiera gymnorhiza* (L.) Lam., *Bruguiera cylindrica* (L.) Blume, *Bruguiera sexangula* (Lour.) Poir., and *Ceriops tagal* (Perr) CB.Rob, which are salt tolerant and are classified as mangrove species. All the 6 species listed above are widely seen in the project area. None of the species belong to invasive species list. Site observation by RINA team reveals that the selected species thrive well within the project area and the propagules can be easily raised in the nursery for plantation purpose.

The project belongs to sectoral scope 14 of AFOLU.

Type: Afforestation Reforestation Revegetation (ARR) subject to Wetland Restoration and Conservation (WCR) requirements as set out in Section 3.1.11 of the AFOLU Requirements.

The project is not a grouped project.

Thus, the project is eligible and is classified in accordance with the VCS requirements. Detailed assessment on the compliance of the project with the requirements of land eligibility and AFOLU requirements are further explained in the below sections of the report.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate.

Hence, RINA confirms that the description of the proposed VCS project activity, as contained in the VCS-PD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed VCS project activity.

Project proponent and other entities involved in the project

As per the VCS-PD, the project proponent is Worldview International Foundation and other entities involved in the project are the following:

- Pathein University: Land right owner and Research Partner.
- Thabawkan Village Tract Mangrove Conservation Committee: Land right holders and labour force
- Thaegone Village Tract Mangrove Conservation Committee: Land right holders and labour force
- Prime Carbon Co Ltd: AFOLU carbon project development specialist
- Forest Department: Land right recommendation and consultation for forest services
- Myanmar University of Forestry: Research partner
- Forest Research Institute: Research partner
- Ayeyarwady Regional Government: Land owner and local authority

The roles and responsibilities of project proponent and other entities involved in the project was checked by means of interviews during the site visit and also further checked with the MoUs and contracts signed /20/ to /28/.

Project start date

The start date of the project activity is 15/05/2015, which is the date of the land preparation, and is in accordance with section 3.2.1 of the AFOLU requirements, v 3.6 /37/. This date was cross checked against the “debit voucher for PO-315-016 (payment done for land clearing)”, /54/. The same was found to be acceptable by RINA. It is noted that the start date is after 8 March 2008, and according to Section 3.7.3 of the VCS Standard, the project validation shall be completed within five years of the project start date /38/. RINA is assuming to submit the documents for registration within 28/02/2018, which complies with the condition.

Project crediting period

The PP has chosen a crediting period of minimum of 20 years, which may be renewed at most four times with a total project crediting period not to exceed 100 years, for AFOLU projects. RINA confirms that the chosen crediting period is in accordance with the VCS standard, version 3.7 /38/. It is also confirmed that the project proponent has a robust plan in place to manage the project for the entire crediting period /55/ to /58/. This was further confirmed with the agreements WIF has signed with Pathein University, Theagon and Thabawkan communities /22/ /23/.

Project location

As discussed above, the proposed project involves restoration of 2146.48 Ha of degraded mangrove habitat of the Magyi, Thabawkan and Thaegone village tracts, located in Northern part of Ayeyarwady Division of Myanmar. From the total 2146.48 Ha, 737.04 Ha covers Magyi region, 887.87 Ha from Thabakwkan region and 521.57 from Thaegone village tract. The project proponent has provided a KML file with the geographical boundary of the each parcel of land included in the project /14//15/ /16/. There are altogether 465 land parcels included in the project,

and each one is provided with a unique identification number along with the corresponding geographic co-ordinate /19/

RINA confirms that VCS PD provides a complete project location description, which is in compliance with paragraph 3.4.1 of AFOLU requirements /37/: VCS Version 3.7 /38/. The project proponent has demonstrated control over the entire project area /24/ to /28/ as required by Section 3.4.2 of the AFOLU requirements: VCS Version 3.7.

Conditions prior to project initiation

During site visit RINA team has verified the condition existing prior to the project initiation through photographs, satellite imagery /16/ /17/ /18/ /19/ and also visiting Thabawkon and Theagon village areas where the plantation has not been carried out. RINA confirms that the project has not been implemented to generate GHG emission for the purpose of their subsequent removal.

Justification regarding the compliance of the project activity with Section 3.1.6 of the VCS AFOLU Requirements and Section 3.1.7 of the VCS AFOLU Requirements is provided in Section 2.2 of the PD and is discussed in Section 3.2.2 of this report.

Audit team has also validated the description given in the VCS PD section 1.10 regarding the present and prior environmental condition including information on climate, hydrology, topography, soil, vegetation and ecosystem and confirms that the information is documented in a fair and transparent manner /01/.

Project compliance with applicable laws, statutes and other regulatory frameworks

The project is in compliance with the following laws and regulations of the country

- National Land Use Policy (2006)
 - National Biodiversity Strategy and Action Plan 2015-2020 (2015)
 - National Adaptation Programme of Action to Climate Change (2012)
 - Myanmar Action Plan on Disaster Reduction 2012
 - National Sustainable Development Strategy (2009)
 - National Environmental Policy (1994)
- Forest Policy (1995) Myanmar also submitted its new Climate Action Plan to the UN Framework Convention on Climate Change (UNFCCC) on September 2015. (Intended Nationally Determined Contribution-INDC)

The detailed Myanmar Laws and regulations to support the project activities are as follows:

- Forest Law (1992)
- Protection Of Wildlife And Conservation Of Natural Areas Law (1994)
- Community Forestry Instruction (1995)
- Myanmar Agenda 21 (1997)
- Forestry Master Plan (2001-2030)
- Environmental law (2012)

Apart from the above RINA team also checked with the officers of forest depart on the laws and policies applicable to the project activity. This was further confirmed by the professor's from

Patheingyi University, chairman and village leaders of the respective village tract, where the project is proposed to be implemented. Noted that the project being a restoration and replantation activity is in compliance with the above mentioned laws.

Ownership and other programs:

- Project ownership

As discussed in the VCS-PD, it is checked that the project is non-grouped project and the entire project area is under the control of the project proponent. The project is implemented in three village tracts namely Magyi, Thabawkan and Thaegone in ShweThaung Yan Township, which is located in the Northern part of Ayeyarwady Division of Myanmar.

During the site visit, it was found that the proposed area of Magyi belongs to Patheingyi University and Patheingyi University has signed an MoU with WIF dated 15/07/2016 /21/ for validation and sale of CO₂ offsets to international buyers, and an amended agreement on 21/05/2017 for the extension of contract and increased land area /22/. Further to this, WIF has also signed MoU with Thabawkan village tract, signed by village committee leader dated 21/05/2017 and Thaegon village dated 21/05/2017 /23/.

The land ownership documents of the three regions were further checked with letters from the Regional Ministry of Agriculture, Livestock, Natural Resource & Environment /25/ /26/ and /27/. As per the letters the lands have been allocated to Patheingyi University, Thaegon village tract and Thabawkan village tract mangrove conservation committees for 30 years and with possibility of extension to 120 years /25/ /26/ and /27/.

Based on the above mentioned documents, RINA confirms that the project proponent has the right of use as it has in place an enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the land, vegetation or conservation or management process that generates GHG emission reductions or removals which vests the right of use in the project proponent as required by the clause 3.11.1 of the VCS Standard Version 3.7 /38/.

Emissions trading programs and other binding limits

The proposed project activity is an ARR project activity, and it is located in Least Developed Country (LDC). It was confirmed that Myanmar has no binding limits on GHG emissions or compliance requirements under international multilateral agreements. GHG removals generated by this project will not be used for compliance with binding limits to GHG emissions, since such limits are not enforced in Myanmar. There are no emissions trading programs in place in the country. Consequently, this project will only generate net GHG emission reductions on an additional and voluntary basis. The same has been confirmed in the VCS PD /01/.

Other forms of environmental credit sought or received and eligible to be sought or received

PP confirms that this project is not being used to create other forms of environmental credits /01/.

Participation under other GHG programs

PP has confirmed that there is no other form of GHG-related environmental credit generated by the proposed project activity /01/.

Rejection by other GHG programs

The proposed project has not applied under other GHG programs to get rejected.

Additional information relevant to the project, including:*Eligibility criteria for grouped projects*

As discussed above the project is not a grouped project. Thus this section is not applicable.

Leakage management for AFOLU projects

As per the methodology AR-AM0014, Version 3.0, “Afforestation and Reforestation of degraded mangrove forest” Leakage due to the displacement of agricultural activities in year t must be , estimated as per the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”; version 02.0. The audit site visit and interview with the stakeholders /36/ reveals that the project area is not used for any pre-project agricultural activities like crop cultivation or grazing activities. Hence there are no associated leakage emissions due to the implementation of project activity.

However, it is observed that cutting of mangroves for charcoal production has been a practice under the pre-project scenario. The socio-economic survey report submitted by project proponent reveals that there are around 50 villagers involved in these activities. Audit team has interviewed some of these villagers and found that they are now employed in the project and agreed not to involve in charcoal production activities. PP has also provided evidences that they have established a mangrove protection and monitoring committees with the intention of monitoring any illegal activities within the project /24/ /28/. These committees are responsible for routine check-up and report on future occurrence of any such leakage related issues.

Thus RINA confirms that the leakage management demonstrated in the VCS-PD is as per the section 3.6 and 4.6 of AFOLU requirements, v 3.6 /37/.

Commercially sensitive information

PP confirms that, there are no commercially sensitive information that are excluded from the public version of the project description /01/.

Sustainable development contributions

As per section 1.1 of VCS-PD, the project meets the sustainable development criteria by contributing to environmental benefit, social benefit and economic benefit of the country.

Restoration of mangroves forest on deforested and degraded lands will sequester significant amount of GHGs compared to baseline. Further, project will also improve the soil conditions; nutrition is retained on the land and thereby increase in water quality. In addition, the soil organic contents and mineral contents will be improved due to proper land management. Mangrove restoration will further result to increase fish resources.

The proposed project will create direct employment. The project will not only involve men but also involve the women. During the site visit, RINA interviewed the stakeholders (Charcoal burners, farmers, fisher men and boat drivers), and it was confirmed that the salary provided by the project proponent is comparatively higher than the minimum wage of the host country /59/ /60/ /61/. It was further confirmed that the stakeholders were trained on making efficient cook stoves, dying the clothes with natural colours etc. The increased salary will not only improve the livelihood but also

eliminate poverty. The project will further bring in transfer of know-how by hiring and training local employees.

RINA checked the contract agreements of the permanent employed labours with the evidences of the payments done /54/ /59/ /60/. It is confirmed that the daily wages provided were 5000 kyats per day, which is higher than that of minimum wage of 3600 kyats per day /61/. It is also checked that the stakeholders were also provided with skill enhancement trainings /64/.

Based on the above mentioned documents and interviews with the stakeholders RINA confirms that the project contributes to sustainable development.

3.2 Application of Methodology

3.2.1 Title and Reference

The proposed project activity applies the CDM methodology AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats" /10/. The project proponent applies version 3.0, which is the latest available in the UNFCCC site. Additionally the project applies the following tools:

- "Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities" (version 01.0.0); /03/
- "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2); /06/
- "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (version 03.1); /07/
- "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"(version 02.0); /08/
- "Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0); /09/
- "Calculation of the number of sample plots for measurements within A/R CDM project Activities' (version 2.1.0).
- "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities", (version 01)

3.2.2 Applicability

Audit team has reviewed the explanation provided in the VCS PD section 2.2 , for demonstrating that the project activity meets the requirements of the applicability criteria of the methodology. The following table gives RINA,s assessment on the justification provided.

Applicability condition	DoE assessment and justification
The land subject to the project activity is degraded mangrove habitat;	The lands belonging to the project that is proposed to be planted with mangroves get inundated during high tide and are all influenced by ambient salinity; therefore all areas fall under the wetland category. PP has used satellite imagery interpretation to prove that the land subjected to the project activity is degraded mangrove habitat.

	RINA checked the satellite images, project boundary shape files and KML files /15/ /16/ /17/ /18/ /19/ and confirm that the project area falls under degraded mangrove habitat. During the site visit and interviews with the village committee leaders, forest department officials and professors from Patheingyi University /62/, it was confirmed that the land subjected to the project activity was degraded mangrove habitat. Further, the letter from the regional Ministry of Agriculture, Livestock, Natural Resource & Environment, dated 17/05/2017 for Thabeik village tract, 18/05/2017 for Magyi village, and 17/05/2017 for Thabawkan village tract confirms that the land allocated for this project are well below the forest threshold /25/ /26/ /27/.
More than 90 per cent of the project area is planted with mangrove species. If more than 10 per cent of the project area is planted with non-mangrove species then the project activity does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area;	100% of the project area is proposed to be planted with mangrove species. The mangrove species selected are <i>Rhizophora mucronata</i> , <i>Rhizophora apiculata</i> , <i>Bruguiera gymnorrhiza</i> , <i>Bruguiera cylindrica</i> , <i>Bruguiera sexangula</i> and <i>Ceriops tagal</i> . This was further confirmed by physical verification at the planting site and also at the nurseries. There are no non-mangrove species selected for plantation.
Soil disturbance attributable to the A/R clean development mechanism (CDM) project activity does not cover more than 10 per cent of area.	During the site visit it was checked that the proposed project activity will not result in any kind of soil disturbances. The planting procedure involves either by propagules or seedling. Further no ploughing of land required.

As per point 4 of clause 2.2 of the methodology AR-AM0014, project activity applying this methodology shall also comply with the applicability conditions of the tools contained within the methodology and applied by the project activity. The following are the tools referred in the methodology and its justification.

Methodological tools	DoE assessment and justification
"Combined tool to identify the baseline	The applicability condition of this tool is

scenario and demonstrate additionality in A/R CDM project activities", (version 01)	assessed and explained in section 3.1 of this report.
"Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2);	PP has used this tool for estimation of change in carbon stock of trees in the project activity. There are no applicability conditions contained in this tool.
"Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (version 03.1)	This tool is not used since dead wood and litter pools are not included in the project activity. Justification is provided in the VCS PD
"Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" (version 04.0.0); a) The tool is applicable to all occurrence of fire within the project boundary. b) Non-CO₂ GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.	Reference to the applicability conditions of the tool: "Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" (Version 04.0) As per the VCS-PD burning biomass will be avoided, all the areas are degraded lands as per the FAO forest definition and no fire occurs /57/. Therefore this tool does not apply. During the site visit, it was checked that the plantation areas are covered with water and are subjected to low tide and high tide (also confirmed by means of aerial images /65/). Since most of the time the lands are submerged in water there is no need of any burning and also impossible to burn. Burning has not been any kind of management practice for mangrove replanting because of the tidal changes, also confirmed by means of Mangrove nursery and planting techniques for some important mangrove species /55/ and mangrove management handbook /56/.
Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" (version 02.0). This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands.	Site visit reveals that the project will not apply any activity that implies any drainage of wetlands directly or indirectly. There are no displacements of activities exist, so this tool is not applicable.

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

RINA team also confirms that Section 2.2 of the PD discusses that the area of the project was not drained for implementing the project. As described in the PD and as validated by RINA team during the site visit and interviews with local stakeholders, the lands where the project instance has been implemented are in a degraded Mangrove ecosystem due to man-made degradation (i.e., harvesting of charcoal and timber, and intensive aquaculture activities) and other natural causes, but that no drainage has occurred. Hence, the project area is in compliance with the requirements set in Section 3.1.6 and 3.1.7 of the VCS AFOLU Requirements.

3.2.3 Project Boundary

As discussed in above sections, the proposed project involves reforestation and restoration of 2146.48 Ha of degraded mangrove habitat of the Magyi, Thabawkan and Thaegone village tracts, located in Northern part of Ayeyarwady Division of Myanmar. From the 2146.48 Ha, 737.04 Ha covers Magyi region, 887.87 Ha from Thabakwkan region and 521.57 from Thaegone village tract. The project proponent has provided the details of the project area in the form of KML and shape files, Further, RINA auditors has conducted an eligibility assessment of the project area by using satellite imagery files (Landsat images of 2003 & 2013 for Magyi, Thabawkan and Thaegone region), Google earth imagery and other GIS files.

Initially, PP has submitted a project boundary file comprising an approximate area of 2265.47 Ha. However, during cross-checking with the satellite imageries, and the observation from physical site visit, it was found that many parcels are ineligible and hence removed from the project boundary. The final area shown in the revised VCS PD is 2146.48 Ha. To ensure complete transparency of the area included in the project, PP has provided a unique identification number for each parcel of land and the details regarding the area, land use/land cover class and the geographic co-ordinate of each parcel are prepared and enumerated as part of the project documents. The parcel boundaries are provided in the KML file and the corresponding details are extracted in the excel format /16/ /17/

As per section 4.3.1 of AFOLU requirements, the relevant carbon pools for AFOLU project categories are aboveground tree biomass (or aboveground woody biomass, including shrubs, in ARR), aboveground non-tree biomass (aboveground non-woody biomass in ARR projects), belowground biomass, litter, dead wood, soil (including peat) and wood products. As per the methodology AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats", the carbon pools selected for accounting of carbon stock changes are discussed in the below table:

Carbon pool	Selected	Justification/explanation
Above ground biomass	Yes	Major carbon pool subject to the project activity. The same has been accounted in the VCS-PD.
Below ground biomass	Yes	Carbon stock in this pool is expected to increase due to the implementation of the ARR

		VCS project activity. The same has been accounted in the VCS-PD
litter	No	Litter biomass is subjected to high turnover and displacement due to tidal currents. It is a conservative choice to exclude the pool from accounting because the project activity will not decrease the rate of accumulation of the litter. The same has not been accounted in the VCS-PD.
Dead wood	No	Selection of this carbon pool is optional and the PP doesn't want to claim emissions from dead wood. The approach used is conservative. The same has not been accounted in the VCS-PD.
Soil Organic Carbon	Yes	Carbon stock in this pool is expected to increase due to the implementation of the ARR VCS project activity. The same has been accounted in the VCS-PD

The baseline and project GHGs removals by sinks selected for accounting is discussed in the below table.

Source		Gas	Justification/explanation
Baseline removals	Changes in the carbon stock by trees actually present in the proposed project area in the baseline	CO ₂	Assumed as zero as per the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2); /06/ The details are provided in section 3.2.6 of this report
Project removals	Changes in the carbon stock by trees actually present in the proposed project area in the project	CO ₂	This source has been included. The same is as per the methodology and is accepted by RINA.
		CO ₂	Excluded, CO ₂ emissions due to burning of biomass are accounted as a change in carbon stock as per the methodology.
		CH ₄	Burning of woody biomass is not done during site preparation or any other activity during the project
		N ₂ O	Burning of woody biomass is not done during site preparation or any other activity during the project
Leakage	Leakage due to	CO ₂	Based on the physical inspection of site and

emissions	displacement of agricultural activities		interviews with the stakeholders, it was confirmed that there was no pre-project agricultural activities happening within the project boundary and thus the displacement of agricultural activities to other areas are not applicable to this project. Thus, the leakage emissions considered is zero.
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The validation of the project activity did not reveal other greenhouse gas emissions or removals occurring within the proposed project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 5% of total decreases in carbon pools and increases in emissions, or more than 5% of net anthropogenic removals by sinks, which are not addressed by CDM AR-AM0014 Version 3.0 /10/.

By checking the information and the project site, RINA can confirm that the project boundary and emission sources described in the VCS PD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

3.2.4 Baseline Scenario

As per the methodology CDM AR-AM0014, the project proponent has demonstrated the baseline scenario through the application of the 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1)/11/.

The following steps have been followed:

STEP 0. Preliminary screening based on the starting date of the A/R project activity

The starting date of the A/R VCS project is 15/05/2015 /54/, which is after 31/12/1999. It is checked that the incentives from the sale of carbon credits was seriously considered in the decision to proceed with the project activity, which was cross checked with the board minutes, dated 21/03/2012 /39/ and subsequent board minutes, dated 21/04/2014 and 21/12/2015. It was further confirmed that before the start date of the project, PP has consulted many investors for funding of the project, which was confirmed by email communication and letters dated 20/01/2015, 15/09/2015 and 22/12/2014 /42/ /43/ /63/. Thus, only after the positive response from the investors, PP has initiated the implementation of the project. The start date of the project, is 15/05/2015, which is the first payment made towards the implementation (land preparation) of the project, which is also the date of investment decision. The payments towards the land preparation were done by WIF funds. However, the other activities were carried out only after signing the contract with Bio8 dated 15/09/2015. Hence the validation team concludes that the project participant was aware of VCS much before the start of the project activity and VCS credits were seriously considered in the decision to implement the project activity. It is also confirmed that the PPs have taken continuous and real actions to secure VCS status for the project in parallel with its implementation, which was checked from the chronology of events discussed in section 2.4 of the VCS-PD /01/.

STEP 1: Identification of alternative land use scenarios to the proposed A/R VCS project activity.

Sub-step 1a: Identify credible alternative land use scenarios to the proposed VCS project activity

The following alternative land use scenarios have been identified as the plausible land use scenarios for the proposed ARR VCS project;

1. Continuation of the pre-project land use which is the degraded and abandoned lands
2. Mangrove reforestation & restoration of the land within the project boundary performed without being registered as a VCS ARR project

The above mentioned alternatives were checked during the site visit and also confirmed by interviewing stakeholders. The above listed alternatives are in compliance with local laws, which do not require the restoration of degraded lands and does not prohibit or require that degraded mangrove areas be left to regenerate naturally, confirmed by interviewing official from forest department and professor from Patheingyi University /36/. The letter from the Regional Ministry of Agriculture, Livestock, Natural Resources and Environment also have confirmed that these lands did not have any forests and are degraded /25/ /26/ /27/. Thus, the option of natural mangrove regeneration has not been considered as one of the alternative, which is accepted by RINA team.

Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

The project is in compliance with the following laws and regulations of the country

- National Land Use Policy (2006) /66/
- National Biodiversity Strategy and Action Plan 2015-2020 (2015) /67/
- National Adaptation Programme of Action to Climate Change (2012) /68/
- Myanmar Action Plan on Disaster Reduction 2012 /69/
- National Sustainable Development Strategy (2009) /70/
- National Environmental Policy (1994) /71/

Forest Policy (1995) Myanmar also submitted its new Climate Action Plan to the UN Framework Convention on Climate Change (UNFCCC) on September 2015. (Intended Nationally Determined Contribution-INDC)

The detailed Myanmar Laws and regulations to support the project activities are as follows /71/:

- Forest Law (1992) /72/
- Protection Of Wildlife And Conservation Of Natural Areas Law (1994) /73/
- Myanmar Agenda 21/82/
- Forestry Master Plan (2001-2030) /74/
- Environmental conservation law (2012) /75/

Apart from the above RINA team also checked with the officers of forest department on the laws and policies applicable to the project activity. This was further confirmed by the professor's from Patheingyi University, chairman and village leaders of the respective village tract /36/, where the project is proposed to be implemented. Noted that the alternatives mentioned above are in compliance with the legal and regulatory requirements.

Outcome of Sub-step 1b: The following are the most plausible and credible alternative land uses to the VCS ARR project activity which are in compliance with all applicable legal and regulatory requirements of Myanmar.

Alternative 1: Continuation of the pre-project land use which is the degraded and abandoned lands

Alternative 2: Mangrove reforestation & restoration of the land within the project boundary performed without being registered as a VCS ARR project.

STEP 2. Barrier analysis

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios.

The barriers considered are:

1. Investment Barrier, other than insufficient financial returns
2. Technological barriers;

Investment Barrier, other than insufficient financial returns

As discussed in the VCS PD, the main objective of the project is to establish and maintain a sustainably managed mangrove ecosystem for carbon sequestration, natural disaster risk reduction, poverty reduction with sustainable livelihoods in the coastal communities. It is to be also noted that the project does not generate any kind of revenue in terms of timber production or wood harvesting. The project is completely a non-profitable activity, with the intention to support the livelihoods of local community, by means carbon revenue generated from the proposed project.

Looking at the past history of similar mangrove reforestation projects in Myanmar it is noted that the projects have only been implemented with grants or other non-commercial finance terms (Government funds). Myanmar Government (Forest Department) has reforested mangroves mainly in Bogalay, Laputta and Pyarpon townships between the period of 2008-2016 on an area of 1,943 ha have been planted in Bogalay (242 ha/year) while an area of 1,781 ha have been planted in Laputta (222 ha/year). An area of 951 ha have been planted in Pyarpon between the period 2009-2016 (136 ha/year) /52/. The local NGO, Mangrove Service Network (MSN) has established around 575 ha of mangroves over the period of 2013-2017 with the funding from POSCO DAEWOO in Rakhine State (115 ha planting per year) /76/. Another local NGO, Forest Resource Environment Development and Conservation Association (FREDA) has planted 2,940 ha of mangroves in Pyarpon Township (Ayeyarwaddy Region) over a period of 20 years (147 ha planting per year) funded by different agencies /83/. In the past the planting of mangroves have been less than 150 ha per year by any NGO due to different constraints. Being a least developed country, the actual status or the data for the above referred plantation activities is not clear. The extent to which the mangrove plantation activity has already diffused in the geographical area of the proposed A/R VCS project activity is further explained in “common practice analysis”.

The PD demonstrates lack of access to capital by means of “Guidelines for objective demonstration and assessment of barriers”, version 01 of 16/10/2009 /12/. During the site visit, it was found that the project is implemented by WIF, with the support from Patheingyi University and local villager’s /36/. WIF (Worldview International Foundation) is an international non-government

organization (non-profit) /77/ and as discussed in above section, the other partners involved are the University of Patheingyi and local communities from three village tracts. WIF was established in 1979 /77/ and have been involved in projects in various issues: communication, health, agriculture and food security, environment, education, democracy and human rights. Worldview has worked in close cooperation with UN Agencies and other international and national partners. However, implementation of mangrove plantation is first of its kind to WIF. During the audit, RINA checked the audited reports of WIF for the year 04/2015 to 12/2016 by Maung Maung Hteik and Associates, certified public accountants /78/. From the “statement of financial position of WIF” it is clear that the WIF lacks the capital to implement the proposed project activity. However, the project started with WIF own contribution and subsequently funded by various other funders /78/. RINA checked the Budget proposed for mangrove plantation /79/, it is understood that though the project can be implemented with the available funds, however, to sustain throughout the crediting period, carbon credits are required. Moreover, the funds were assured only on the basis of VCS credits. It is also checked that for the continuity of the project throughout the crediting period, PP had also applied for bank loan, which got rejected stating the risk in these kinds of project and non-availability of any assets for the particular project /51/.

Technological Barrier

As discussed above, the PP doesn't have prior experience in implementation of mangrove forests. Thus, it is clear that they lack the technical know-how. During the site visit, it was confirmed that the proposed project will be implemented with the help of local communities /62/. The proposed project is a first attempt in the region to include the communities in mangrove replanting and restoration while enhancing their livelihoods. The lack of skilled labour can increase the mortality rate of the plants and thereby failure of the project. Thus, it's an additional expense for the PP to train the local communities and hire competent experts in the field of mangrove plantation /59/ /60/ /64/, which can be overcome, only by means of VCS credits.

During the site visit, it was checked that the project aims to plant 9.1 million plants in 2146.48 Ha. The seeds for the same are bought from the Gwa Township in Rakhine, which is the former Mangrove Rehabilitation and community development project area /85/. The best transportation method for seeds is by boat which takes around 7-8 hours per trip which involves higher costs than time consuming. Thus, the proposed project lacks the necessary planting materials and also lack of infrastructure to implement the project. As a result, the proposed project will only be possible due to a combination of factors, including infrastructure, logistics, awareness expertise, experience in working with the local communities, and the knowhow of WIF supported by VCS credits.

Outcome of Step 2a: Thus, based on the above mentioned documents, it is demonstrated that the investment barrier and technological barriers are credible and realistic barriers that prevent the implementation of alternative 2 (Mangrove reforestation & restoration of the land within the project boundary performed without being registered as a VCS ARR project).

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

As discussed in sub step-2a, alternative 2 (Mangrove reforestation & restoration of the land within the project boundary performed without being registered as a VCS ARR project) has been eliminated due to investment and technological barrier.

Outcome of Sub-step 2b: The land use types that are not prevented by any barriers are as follows.

Alternative 1: Continuation of the pre-project land use which is the degraded and abandoned lands

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

The steps involved in the decision tree has been followed in the VCS-PD, which results to baseline scenario : Continuation of the pre-project land use which is the degraded and abandoned lands. The Decision Tree allows continuing with Step 4: Common practice analysis.

Step 4 : Common Practice Analysis

The project is proposed to be implemented in Northern part of Ayeyarwady Division of Myanmar. However, the data on the forestry activities with similar scale in this region is not available and thus the host country, Myanmar is considered as the applicable geographical area for comparison with similar forestation activities.

It is checked that out of the total forest areas, only 4% belongs to mangrove forests in Myanmar /84/. As discussed above in the barrier analysis, the following are the data available on the mangrove plantation activities:

Details of the Mangrove Plantation activities in Myanmar

Period	Implemented by	Area in ha	Ha/year	Funded by
2008-2016	Forest Dept.	1,943 in Bogalay	242	Government of Myanmar /52/
		1,781 in Laputta	222	
		951 in Pyarpon	136	
2013-2017	Mangrove Service Network (MSN)	575 in Rakhine state	115	POSCO, DAEWOO /76/
1999-2018	Forest Resource Environment Development and Conservation Association (FREDA)	2940 in Pyarpon Township (Ayeyarwaddy Region)	147	ACTMANG, EED, Lion Club, MERN, DKH, Postal /83/

Proposed project		2146.48	.368	
2015-2020				

However the percentage of survival data for the above mentioned plantation activities are not available. RINA further crosschecked the successful ratio of these projects with officials from forest department and local stakeholders and it is understood that there has not been any systematic reforestation/or restoration efforts carried out that will generate forests on a large scale in the region. This was further confirmed by means of NASA studies /80/. The National Biodiversity Strategy and Action Plan, 2011 /67/ states that more than 100,000 ha has been cultivated by the Government. However, NASA studies confirm that only 46,200 ha of mangroves were left in 2013 /80/. It is therefore evident that these cultivation efforts have not been successful in increasing the mangrove forest cover in the area. The majority of attempts simply involved planting but there have been practical difficulties in maintaining in the long run and protect the mangroves from external threats due to lack of effective management practices. Thus, RINA is of the opinion that the proposed project is different in nature from the rest of the other project discussed above. During the site visit and also during the course of validation, it was found that being a least developed country no much data is available on the similar activities. Moreover, as per the “Guidelines for objective demonstration and assessment of Barriers”, version 01 /12/ “For projects in Least Developed Countries, it is sufficient to transparently describe the relevant barriers, as less stringency is needed with regards to data availability in the actual demonstration of barrier, as compared to the projects in other countries. Projects in Least Developed Countries are not bound by the provisions in this guideline and may use other approaches that are more adapted to the local circumstances. Thus, projects in Least Developed Countries can be assumed in general to face significant barriers to their implementation. At the same time, data availability in these countries is considerably limited which complicates the demonstration of additionality and therefore further increases transaction costs.

In view of the above, the project activity would not be a common practice in the geographical region of analysis and it would, therefore, be additional and the proposed project activity is not the baseline scenario. RINA confirms that all data, rationales, assumptions, justifications, and documentation provided by the project participants to support demonstration of additionality are credible and reliable, which was checked and verified at the time of validation. RINA considers the reasoning for the proposed project additionality demonstration is credible and reasonable i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered VCS A/R project activity.

3.2.5 *Additionality*

Please refer to section 3.2.4 above.

3.2.6 *Quantification of GHG Emission Reductions and Removals*

GHG emission removals have been calculated by applying the equations given in the methodology AR-AM0014 “Afforestation and reforestation of degraded mangrove habitats” (Version 03.0), and the following tools referred there in:

- "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2); /06/
- "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (version 03.1); /07/
- "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"(version 02.0); /08/
- "Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0); /09/
- "Estimation by modelling of tree growth and stand development",

- **Quantification of baseline emissions.**

As per the methodology AR-AM0014, the baseline net GHG removals by sinks comprises of following components:

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} \quad \text{Equation (1)}$$

Where:

$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks in year t; t CO ₂ -e
$\Delta C_{TREE_BSL,t}$	=	Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO ₂ -e (AR-TOOL14)
$\Delta C_{SHRUB_BSL,t}$	=	Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO ₂ -e (AR-TOOL14)
$\Delta C_{DW_BSL,t}$	=	Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO ₂ -e (AR-TOOL12)

However, section 5 of the above referred methodological tool AR-Tool 14 explains 3 conditions under which carbon stock and change in carbon stock may be estimated as zero. As per the tool the carbon stock in trees in the baseline can be accounted as zero if all of the underlying conditions therein the tool are met. Accordingly, RINA evaluated the baseline condition of all the four identified strata (viz, severely degraded mangrove areas, degraded mangrove areas, bareland, and shallow waterbody) that comes within the project boundary. PP has established 300 sample plots in Magyi area (100 each for planting years 2015, 2016 and 2017) for the monitoring and research purposes /86/. During on-site audit, RINA visited most of these sites (approx. 30 nos) and also those areas where the plantations are not yet established. Site visit reveals that pre-project trees are neither harvested, nor cleared, nor removed due to implementation of the project activity. Further, no pre-project tree mortality issue occurs because of leaving enough space for these trees to grow and lastly these trees are not inventoried along with the project trees in monitoring of carbon stocks and the monitoring plan takes care of monitoring its continued existence within the project boundary.

Hence, by following the conditions outlined in the methodological tool, RINA accept the argument on zero baseline.

- **Quantification of project emissions.**

As per section 3.2 of VCS PD, the ex-ante actual net GHG removals by sinks were estimated using the equation 2 described in section 5.5 of the methodology AR-AM0014: Afforestation and reforestation of degraded mangrove habitats Version 03.0. The following are the equations used for the purpose:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad \text{Equation (2)}$$

Where:

$\Delta C_{ACTUAL,t}$	=	Actual net GHG removals by sinks, in year t; t CO2-e
$\Delta C_{P,t}$	=	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e
$GHG_{E,t}$	=	Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO2-e

For calculating the change in the carbon stocks in project, occurring in the selected carbon pools in year t, PP has used the following equation as referred in the methodology:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta SOC_{PROJ,t} \quad \text{Equation (2)}$$

Where:

$\Delta C_{P,t}$	=	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e
$\Delta C_{TREE_PROJ,t}$	=	Change in carbon stock in tree biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e
$\Delta C_{SHRUB_PROJ,t}$	=	Change in carbon stock in shrub biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e

$\Delta C_{DW_PROJ,t}$ = Change in carbon stock in dead wood in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO2-e

$\Delta SOC_{PROJ,t}$ = Change in carbon stock in the soil organic carbon (SOC) pool within the project boundary, in year t; t CO2-e

As per the VCS PD section 3.2, estimation of the changes in carbon stocks in shrub biomass assumed as zero since no shrubs are planted as part of this project. Similarly changes in carbon stocks in dead wood are also not estimated following the conservative approach outlined in the methodology. Whereas change in carbon stock in tree biomass and change in carbon stock in the soil organic carbon (SOC) pool within the project boundary are estimated by using the equations given in the below paragraphs:

Estimation of the changes in carbon stocks in tree biomass: $\Delta C_{TREE_PROJ,t}$

The change in carbon stock in tree biomass was estimated by using the A/R methodological tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” (Version 04.2). As per the tool, the stock difference method was adopted and the ex-ante tree biomass was estimated using the method given in “Estimation by modelling of tree growth and stand development”, as presented in section 8 of the tool.

According to ‘Estimation by modelling of tree growth and stand development’ method, existing data (diameter etc) were used in combination with tree growth models to predict the growth of trees and the development of the tree stand over time. The annual growth rate of the mangrove is taken from the data provided by Mangrove Service Network (MSN) based on their experience in monitoring of mangrove growth for more than 15 years in the Myanmar region. / 33/. Apart from MSN data, PP has also used the research findings from ‘Carbon sequestration by mangrove plantations and a natural regeneration stand in the Ayeyarwady Delta, Myanmar by Ya Min Thant et al /32/ for evaluating the growth data for ex-ante estimation. RINA validated these assumptions and found that they are appropriate for the project context.

For ex-ante estimation of carbon stock in tree biomass, PP has utilized the tool “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (Version 01.0.0)”. The tool states “For ex ante estimation of aboveground tree biomass in project scenario any allometric equation can be used.” Accordingly, PP has used an allometric equation given in Sukardjo & Yamada (1992) /90/. The appropriateness of the equation for the present project circumstances is also validated by the audit team. To ascertain the values used in the ex-ante estimation, PP has provided a report by compiling the data from actual field measurements for different age groups of mangroves species used for plantation/86/. Further, the result obtained by using the equation and the results from field measurements were cross checked to ensure that there are no over estimations done while computing ex-ante project emission calculation.

However, for ex-post estimation, PP has adopted the method described in section II, paragraph 6 of the tool “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (Version 01.0.0)”, which specify to use a species-specific or group-of-species-specific allometric equation derived from trees growing in edapho-climatic conditions similar to those in the project area. Further, in Section 3.2 of VCS PD, PP states that such allometric equation will be developed using the continued research data and research personal and using the permanent sample plots that have been set up within the project (Refer FAR 01)

Estimation of the changes in carbon stocks in soil organic carbon

Changes in carbon stocks in the SOC pool is calculated by using equation (3) given in the Methodology AR-AM0014 (03.0):

$$\Delta SOC_{PROJ,t} = \frac{44}{12} \times \sum_{t=1}^t A_{PLANT,t} \times dSOC_t \times 1 \text{ year} \quad \text{Equation (3)}$$

Where:

$\Delta SOC_{PROJ,t}$ = Change in SOC stock within the project boundary, in year t; t CO2-e

$A_{PLANT,t}$ = Area planted in year t; ha

$dSOC_t$ = The rate of change in SOC stocks within the project boundary, in year t; t C ha⁻¹ yr⁻¹. The following default value is used, unless transparent and verifiable information can be provided to justify a different value:

(i) $dSOC_t = 0.50 \text{ t C ha}^{-1} \text{ yr}^{-1}$ for $t = t_{PLANT}$ to $t = t_{PLANT} + 20$ years, where t_{PLANT} is the year in which planting takes place;

(ii) $dSOC_t = 0 \text{ t C ha}^{-1} \text{ yr}^{-1}$ for $t > t_{PLANT} + 20$.

Section 3.2 of VCS PD refers a report entitled ‘Soil carbon measurement in Magyi,s mangrove forest’ prepared by University of Pathein /29/ showing the details of soil carbon estimation conducted in the project area based on the measurements taken from more than 64 nos of permanent sample plots. The samples were analysed in the Central research laboratory of Yangon University. The method followed for this estimation is based on the published paper entitled ‘Methods for assessing carbon stocks and emissions factors in mangroves, tidal salt marshes, and seagrasses’ by Howard, J. et al, , Coastal Blue Carbon:.Conservation International, Intergovernmental Oceanographic Commission of UNESCO, International Union for Conservation of Nature. Arlington, Virginia, USA. /88 /. Based on this report/29/ and the similar other reports/31/ /32/ /87/ /89/ /91/ PP has used a soil carbon accumulation rate of 7.32 tc/ha/yr for ex-ante estimation of changes in carbon stock in soil organic carbon. Further PP argues that the values and assumptions used in this report are conservative as far as the location of the project area is concerned and hence the value chosen is appropriate.

RINA audit team reviewed the above documentation and concluded that, since PP has provided transparent and verifiable information for the above value, RINA recommends to use it for ex-ante estimation. However, as per paragraph, 3.2.5 of Validation and Verification manual, ver 3.2, in order to ascertain the validity of the data or parameter provided by PP, it shall be sourced from relevant peer-reviewed journals/literature. (Refer FAR 02). Hence, in order to use it for ex-post estimation, the value shall be sourced from such published work that are relevant for the project area and appropriate to the project case.

Estimation of Project emission (GHGE,t)

As per paragraph 15 of the methodology, GHGE_t shall be estimated by using the A/R Methodological tool “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” (Version 04.0).

- a) The tool is applicable to all occurrence of fire within the project boundary.
- b) Non-CO₂ GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.

However, section 3.2 of VCS PD demonstrate that such biomass burning does not happen in the project case. Lands belonging to the project are covered with water and are subjected to low tide and high tide. These lands are degraded and below the forest definition. Burning is not practiced because of the wet condition and being not needed of such practice. Site visit reveals that fire is not a practice in these areas due to tidal conditions. Therefore this tool does not apply.

Hence, audit team confirms that non-Co₂ GHG emission resulting from burning of biomass can be considered as zero. ie, GHGE_t=0 tCO₂-e

- **Quantification of leakage.**

As per the methodology AR-AM0014, Version 3.0, “Afforestation and Reforestation of degraded mangrove forest” Leakage due to the displacement of agricultural activities in year t must be, estimated as per the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”; version 02.0. According to the same tool, leakage due to displacement of agricultural activities (i.e. refers to crop cultivation activities and grazing activities occurring on land) has to be accounted for.

However, the physical inspection of the site and interview with the stakeholders reveals that the project area is not used for any pre-project agricultural activities like crop cultivation or grazing activities. Most of the project area belongs to salt marshes, and grazing is not possible to occur in such lands. Hence there are no associated leakage emissions due to the implementation of project activity. Hence it is accounted as zero

- **Summary of net GHG emission reductions or removals.**

As per VCS PD section 3.4, the net anthropogenic GHG removals by sinks is calculated by using the equation below:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t \quad \text{Equation (4)}$$

Where:

$\Delta C_{AR-CDM,t}$	=	Net anthropogenic GHG removals by sinks, in year t; t CO ₂ -e
$\Delta C_{ACTUAL,t}$	=	Actual net GHG removals by sinks, in year t; t CO ₂ -e
$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks, in year t; t CO ₂ -e

LK_t = GHG emissions due to leakage, in year t; t CO₂-e

PP has provided a spread sheet 'VCU calculations MM mangrove_Final_ver03_1Feb 2018, /02/'. As per the estimation, the total GHG emission reductions and removals from the project for 20years crediting period (15/06/2015 to 14/06/2034) is 3,680,125 tCO₂e, resulting in annual emission reduction and removal of 184,006 tCO₂e. RINA's audit team has verified these calculations and confirms that the values given are conservative and are devoid of any material discrepancies.

In conclusion, RINA confirms that the input data used for calculating the Net anthropogenic GHG removals by sinks, procedures used for calculation and the results are complete and transparent. Further, audit team confirms that net anthropogenic GHG removals by sinks have been quantified correctly in accordance with the project description and applied methodology.

- ***Uncertainties associated with the calculation of emissions.***

According to the methodology, ex-ante estimations are not subjected to uncertainty control.

3.2.7 Methodology Deviations

No methodology deviations have been identified.

3.2.8 Monitoring Plan

As per the section 4.3 of VCS PD, monitoring will be organized according to Section 06 of AR-AM0014, and all the data that are mentioned in this section will be collected and archived electronically and kept for 2 years after the end of last crediting period.

RINA audited the adherence of the monitoring plan with the requirements of paragraph 6 of the methodology and conclude that the plan sufficiently covers the details about monitoring parameters, schedules and processes. The plan also includes the processes and the system employed for obtaining, recording, compiling and analyzing GHG data and information, project boundary monitoring, as well as descriptions of the roles and responsibilities of the monitoring personnel involved. PP has appointed a senior staff, Mr. Win Maung, as Project Director, former Director Forestry Department, having 30 years of working experience in mangrove conservation as government official; researcher and Project Manager of NGO/UN-LIFT projects, to take care of the project monitoring and training the field staff. He is assisted by a team of project staff having qualification in forestry science. Project Manager has trained all staff members regarding mangrove forest management, mangrove nursery techniques, natural resource management and community forestry activities. RINA team has conducted various interviews with the staff to evaluate their knowledge in project monitoring. .

Project proponent has established a QA/QC plan which covers procedure for collecting reliable field measurements, verifying methods used to collect field data, data maintenance and archiving. Audit team has checked these QA/QC plan and confirms that it adequately address the procedures for rectification of any errors found while doing the data transposition and final GHG estimation. Audit team has reviewed the roles and responsibilities related to these activities and confirm that they are well defined.

In order to monitor the project through time, PP proposes to establish permanent-sampling plots. RINA reviewed the sampling plan proposed in the VCS PD and confirm that it is appropriately documented and is in accordance with the guidelines established by the methodology. The number of samples and sample size was determined using “Calculation of the number of sample plots for measurements within A/R CDM project activities (Version 02.1.0)”, RINA team has checked the excel sheet /35/ and found no discrepancies in the values used for the calculation.

Thus RINA confirms that, the monitoring plan as proposed in the VCS PD sufficiently covers all the elements of monitoring methodology and ensures that the GHG emission reduction and removals generated by the project will be measurable and verifiable.

3.3 Non-Permanence Risk Analysis

The proposed project ‘Reforestation and Restoration of degraded mangrove lands, sustainable livelihoods and community development in Myanmar’ utilized the AFOLU Non-permanence risk tool: VCS Version 3.3 to assess the risk according to internal risk, external risk, natural risk, and mitigation measures for minimizing risk. At all levels, the audit team evaluated the rationale, appropriateness, and justifications of risk ratings chosen by project proponent. The findings and conclusion regarding the non-permanence risk analysis undertaken for the project are summarized below for each risk category and factor. Unless noted otherwise, the audit team agrees with the conclusion stated in the non-permanence risk report.

The findings of the audit team regarding the risk scores applied for each factor are as follows.

1. Internal Risk

Risk Factor	Validation Findings	Risk Rating
1. Project Management (PM)		
a)	The species identified for this reforestation project are <i>Rhizophora mucronata</i> , <i>Rhizophora apiculata</i> , <i>Bruguiera gymnorrhiza</i> , <i>Bruguiera cylindrical</i> , <i>Bruguiera sexangula</i> and <i>Ceriops tagal</i> and are naturally occurring mangrove species in Myanmar. The Audit team has checked the Species Distribution document. provided to confirm the same. Therefore, this risk is Not Applicable, hence zero.	0
b)	The agreement with the village tracts will ensure sufficient staff be able to take care the plants and in this manner the encroachment of outside players that could intentionally or unintentionally damage the planted areas is avoided. Agreements with the village tract chairmen of each village provided were checked during validation visit. .Therefore, the score of 0 is agreed by the audit term.	0
c)	This risk is assessed as unlikely as the management team includes individuals with significance experience in skills related to successfully undertake all activities in the project. This was evident during the site visit, when it was confirmed that project areas are managed by a very professional team from Worldview International Foundation (WIF) which includes senior staff with experience in the management and implementation of the project and able to done overall supervisory. The Audit team has checked the Project management structure to confirm the capacity and experience of the organization, hence agrees that this risk is not relevant.	0
d)	As confirmed during the site visit, PP has a permanent presence in the project areas and are located in the country and able to reach the project within a 4 hour drive from the Yangon. Country office is located in the Yangon and the branch office is within the project area. Hence, the audit team agrees that this risk is not relevant.	0
e)	Audit team has verified the capacity of the management team, i.e; project developer (Prime Carbon Co Ltd) and the project proponent (WIF) to develop this AFOLU project, account for carbon from trees and other GHG sources, report and participate in validation and verification under respective VCS methodologies and standard requirements. The Prime Carbon Co Ltd. is involved in the project design and development as well as the monitoring. The team includes AFOLU carbon project development specialists for CDM, VCS and ACR projects in Southeast Asia and involved in REDD+ project design and development in the region hence have the expertise. Therefore, the score of -2 is agreed to be accepted.	-2
f)	No specific adaptive management plan hence risk rating for this factor is 0.	0
	Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.	-2

Risk Factor	Validation Findings	Risk Rating
2. Financial Viability (FV)		
a)	As assessed in Section 2.4, The project implementer Worldview International Foundation (WIF) is an INGO and other partners involved are the University of Pathein and local communities from three village tracts. There is no financial return from mangrove reforestation other than the carbon credit benefits. Therefore the internal rate of return (IRR) is not applicable for this non-profit project activity hence the section 1.2 Financial Viability is not applicable for the project.	
b)		
c)		
d)		
e)		
f)		
g)	Further, the project viability is worked out based on the carbon credit benefit only and hence the value chosen is acceptable and conservative.	
h)		
i)		
	Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.	0

Risk Factor	Validation Findings	Risk Rating
3. Opportunity Cost (OC)		
a)	As assessed in the Section 2.4 (Baseline scenario-Additionality assessment) in VCS PD during validation the most plausible baseline scenario identified was continuation of the land-use prior to project start, i.e. Continuation of the pre-project land use which is the degraded and abandoned lands. Hence there is no alternative land use activity to the project. Since the baseline activities are subsistence-driven, net positive community impacts are demonstrated by the PP in the Risk Assessment and verified by the team.	0
b)		
c)		
d)		
e)		
f)		
g)	This has not been argued.	0
h)	This has not been argued.	0
i)	This has not been argued.	0
	Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] Total may be less than 0.	0

Risk Factor	Validation Findings	Risk Rating
4. Project Longevity (PL)		
a)	The WIF has in place legally binding contracts with the University of Pathein and Village tract committees for a period of 30 years which are checked by the Audit team and clearly state that they commit to conserve the carbon stocks for the crediting period and that they will respect the project activities for the whole project's length. The contract can be further extended for another 90 years; therefore the total project period is 120 years.	0
b)	This agreement is a legally binding commitment to continue management practices for the PP that protect the credited carbon stocks over the length of the project longevity period as required by Section 2.2.4 of the AFOLU Non-Permanence Risk Tool. Hence, it may be confirmed that the project longevity is 30 and there is a legal agreement to continue the management practices.	
	Total Project Longevity (PL) May not be less than zero.	0

2. External Risk

Risk Factor	Validation Findings	Risk Rating
1. Land Tenure and Resource Access/Impacts (LT)		
a)	The Audit team has checked the ownership and right of use documents (Agreements between Government and the University and the Village Tract Committees of Thabawkan and Thaegone and the MoU with WIF) and confirmed that the project is implemented in Government owned lands (University of Pathein and the Village Tract Committees of Thabawkan and Thaegone), who has made agreement with the WIF for the development of mangrove reforestation/restoration project. Therefore, both rights are held by the same entity. <i>Hence a risk of two is appropriate.</i>	2
b)		
c)	There are no disputes as the ownership is clear. Therefore, the likelihood of any dispute is very low. Moreover, the socio-economic survey conducted by WIF and University of Pathein, served as due process in order to identify any dispute as the whole villages were present in the meetings.	0
d)	As assessed above, there are no disputes over access/use rights in the project area.	0
e)	Not applicable.	0
f)	As explained in the project longevity risk this mitigation factor may be claimed by the project as the project area is protected by legally binding commitment to continue management practices that protect carbon stocks over the length of the project crediting period.	-2
g)	This has not been argued.	0
	Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)] Total may not be less than zero.	0

Risk Factor	Validation Findings	Risk Rating
2. Community engagement (CE)		
a)	The Audit team has validated the evidence of stakeholder consultation meetings and Village Sensitization Process were held in three village tracts by the Project proponent and confirmed that less than 20 % households living within the project area who are reliant on the project area, have been consulted. Hence, the risk would be zero in this case.	0
b)	As assessed above less than 20 % households of the people relying on the project area and whose livelihoods depend on it have been consulted. Therefore this risk is not applicable in this case.	5
c)	As assessed above through the evidence the Audit team confirmed that the project generates net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area. Hence the mitigation score of -5 is confirmed.	-5
	Total Community Engagement (CE) [where applicable, (a + b + c)] Total may be less than zero.	0

Risk Factor	Validation Findings	Risk Rating
3. Political Risk (PC)		
a)	The audit team confirmed that the 5 year mean governance score for Myanmar across the six governance indicators of World Bank Institute's Worldwide Governance Indicators (WGI, 2016 update) is -1.46. Therefore agrees that the political risk is 6.	6
b)		
c)		
d)		
e)		
f)	The audit team checked the website of UN-REDD and confirmed that Myanmar is a partner country since December 2011. Myanmar received UN-REDD targeted support in 2013 to develop a REDD+ Readiness Roadmap and used this Roadmap to develop a funding proposal in November 2013 based on a full UN-REDD National Programme (Annex 4). Also Myanmar has a DNA (Ministry of Environmental Conservation and Forestry). Therefore, the rating for this mitigation factors is -2.	-2
	Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.	4

2. Natural Risk

Risk Factor	Validation Findings	Risk Rating
F	As assessed by the Audit team during the site visit and the interviews conducted with the village committee leaders of the all the three village it is confirmed that mangroves in the Ayeyarwady Region have not been affected by any forest fire in the past. Since the ecosystems where mangroves are grown are not susceptible to forest fire, the risk of fire is not applicable to the project area. Therefore, the significance of this risk is considered 'No loss' and regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more. Since the risk rating is 0, no mitigation activities are discussed.	0
PD	The audit team checked various parcels during the site visit and confirmed that there are no reported pest attacks in the coastal mangrove area, which was confirmed by the farmers and other stakeholders interviewed during the site visit. However there have been few pest attacks in Sonneratiaceae family and Avicenniaceae family in the delta mangrove area. There is no reported insect 'tide watching mangrove moth' Auchavelans. There are reports of some propagules and seedlings in young stage being attacked by crabs. Therefore, the significance of this risk is considered insignificant (less than 5% loss of carbon stocks) and a likelihood of less than every 10 years is confirmed. The project proponent has argued a mitigation factor of 0.50 which is deemed appropriate. The reason is that the staff of WIF has experience in implementing mitigation activities in order to address this risk. a. Training –Conducted training regarding the identification of the principal species that affect the health of the planted trees by personnel with experience in the identification of pests and diseases that harm mangroves. b. Monitoring – WIF is responsible for monitoring the health of the planted trees to identify the presence of pests and diseases. In addition, annual monitoring activities have been implemented. c. Evaluation - The incidence and severity of pests and diseases identified in the field will be determined during annual monitoring. Due to the implementation of these activities, a mitigation factor of 0.50 is justified.	1

W	As confirmed during the site visit and assessment of the 'Hazard Profile of Myanmar, 2009' the most relevant risk is the existence of cyclones; the most destruction of natural disasters in Myanmar. During the period of 1947 to 2007, 34 cyclones crossed Myanmar coast, of which 7 cyclones claimed lives (Hazard Profile of Myanmar, 2009). Strong winds and storm surges (flooding) associated with the cyclones have caused the most damage. Of the cyclones that caused the greatest disaster, 11 of them made landfall in Rakhine State and 2 in the Ayeyarwady Delta Region. The most devastating cyclone by far was Cyclone Nargis of 2008. Cyclone risk is highest during the month of May; though, during the last 100 years cyclones also have occurred during April, October, November and December. The W risk significance is rated as 'Major' (25% to less than 50% loss of carbon stocks), which is correct according to the audit team. Referring to scientific data and publications, it is likely that the region may affect from cyclones and other extreme weather conditions. Consequently, a likelihood of every 10 to less than 25 years is confirmed for all extreme weather events. The audit team assessed the project itself has the main objective of to establish and maintain a sustainably managed mangrove ecosystem for carbon sequestration, natural disaster risk reduction, poverty reduction with sustainable livelihoods in the coastal communities. Also the Article published by Bahinipati & Sahu (2012) given by the project proponent confirm the same as the major mitigation activities in order to address this risk. Hence a mitigation factor of 0.50 is reasonable.	2.50
G	According to <u>Hazard Profile of Myanmar, 2009</u> the project area has not had any affects from earthquakes during the past hence this natural risk has not been considered. Therefore, Not relevant as confirmed by the audit team during the site visit. Hence, the significance of this risk is considered 'No loss' and regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more.	0
ON	The other natural risk susceptible to the project area identified by the Audit team is the Tsunami. It has tsunami induced by the 2004 Sumatra Earthquake (M9.1) caused around 60 missing and dead in the delta area of southern Myanmar. It also caused USD 500 million in losses, corresponding to 1.25% of the GDP at that time. There are other records of tsunamis induced by earthquakes in 1750 and in 1930. The tsunami in 1930 affected around 500 victims in Myanmar. The significance is considered 'Devastating' (50% to less than 70% loss of carbon stocks) but regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more. Since the risk rating is 0, no mitigation activities are discussed.	0
Total Natural Risk (as applicable, F + PD + W + G + ON)		3.50

The overall non-permanence risk rating that was determined for the project, using below Table is 7.50.

Risk Category	Rating
---------------	--------

a) Internal Risk	0.00
b) External Risk	4.00
c) Natural Risk	3.50
Overall Risk Rating (a + b + c)	7.50

However, in accordance with the VCS Non-Permanence Risk Tool, the overall score shall be rounded up to the nearest whole percentage, and the minimum risk rating shall be 10, regardless of the risk rating calculated. Therefore, 10% is the overall risk rating for this project.

In summary, the overall risk rating that was determined for the project, in accordance with the VCS Non-Permanence Risk Tool, is 10%. The audit team has concluded that the above risk rating is in conformance with the VCS rules.

Thus, RINA audit team confirmed that the non-permanence assessment has been carried out adequately by applying the conservative assumptions. Therefore, the total buffer credits foreseen in the proposed project activity are: Buffer credits = 3,680,125 x 10% = 368,012 tCO₂e for the whole duration of the crediting period.

4 SAFEGUARDS

4.1 No Net Harm

The proposed project is reforestation and restoration project and there are no negative environmental or socio-economic impacts due to the project activity. This was confirmed by interviewing the local stakeholders, the chairman and the village leaders of the respective village tracts, where the project is proposed to be implemented /36/. In fact, the project will lead to positive impacts like low income families in the area will get more opportunities to increase their income, new employment opportunities, knowledge in silviculture, infrastructure development and change in life style of local villagers.

4.2 Environmental Impact

As per the host country requirements EIA is not required for restoration and plantation of mangrove projects. This was confirmed with the interviews held with personnel from forest department and also by means of "Environmental Impact Assessment procedure", published by the Ministry of Environmental Conservation and Forestry, The Government of the Republic of the Union of Myanmar, dated 29/12/2015.

4.3 Local Stakeholder Consultation

RINA team confirms that PP has conducted many stakeholders prior to the implementation of plantation activities as well as prior to listing the VCS-PD in the VCS registry. The project is proposed to be implemented in three areas Shwethaungyan area, Thaegone village and Thabokkan village. It is checked and confirmed that PP has conducted individual consultations at

all the three areas. Relevant stakeholders were invited for the meeting, which was confirmed by means of minutes of meeting /81/, also confirmed by interviewing the stakeholders during the site visit /36/. It was also checked that apart from the local villagers, WIF team also had discussions with the forest dept. officials /81/. As discussed above RINA cross checked the attendance list of stakeholders' and also interviewed some of the local stakeholders during site visit to confirm the consistency of the information provided in the VCS-PD and the same was found to be appropriate.

A summary of comments has been provided by PP and it is found that no adverse comment was received for the project activity /81/. This has also been verified by RINA validation team during site visit by conducting a random stakeholder's meeting at the project site. Further, the interviewees confirmed that there was no adverse comment about the project and this project will lead to employment generation and better environmental conditions. RINA considers the local stakeholder consultation carried out adequately and can confirm that the process is credible.

4.4 Public Comments

This project was open for public comment from 12 June - 12 July 2017. The table below summarize the comments received during the public commenting period. Further, PP's responses to each comment and RINA's conclusion on the same is given at the end of the table.

Comments about eligibility

There is not support for the no forest criteria at the start date. They cited a study carried out by FAO before the project start date, but it is not clear how this study prove the no forest criteria in the project area. They include all the area as eligible, and it is not clear if they extract the water bodies (see Page 42, Fig. 10) and other lands (as villages, etc.) from the eligible area.

The separation between reforested and restored areas is not necessary if all area is classified as no forest.

Pag. 20. About conditions before project initiation: There is not support for the demonstration of no forest condition according to FAO criteria for 2015 and ten years before.

Pag. 33. There is not an analysis of define the project boundaries (degraded vs. no mangroves). According to the PO all the areas are no forest.

Comments about mortality rates

There is not scientific support for the mortality rates they used. According to Bayraktarov et al. (2016), the average survival rate in restoration projects in mangroves is 51%, and in the best case, developed countries could achieve 56,3%. Nevertheless, in this PD is mentioned a survival rate for the area of 80% (Pag. 78) and there is not documented support for this number. Likewise, there is not support for the distribution of mortality rates over the years. For this PD they assume mortality is zero for the first three years and only 5% for the year 4. Despite the range of survival rates for the first plantation years is wide (Primavera and Esteban, 2008), some studies such as Toledo (2001) reported survival of 77% until 1,5 years and 74% after year two.

Why for the case of restoration areas (Plantation density: 2000 trees) do they assume mortality zero?

Comments about estimation of carbon stock in above ground biomass

It is not consistent with the document about the project scale, size, and type of project. We think the estimations are overestimated, but in the hypothetical case those estimations are correct, the project must be classified as large scale. Additionally, throughout the document, there are inconsistencies with the classification of the type of project (in some cases they mention there is a grouped project, e.g. page 32, and in other sections they say it is not a grouped project).

Pag 49. They use the allometric equation for biomass estimation proposed by Sukardjo and Yamada (1992). We think this equation cannot be used because its diametric range is 3,9 cm to 7,80 cm (see

article). In this sense, according to the Table showed in page. 49, the equation only is applicable for years 5-7.

In case this equation is accepted for *ex-ante* estimations, it cannot be used for *ex-post* estimation due to the following reasons:

According to Tool 14, V.4.2 it is necessary to apply the Tool "*Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities*", which requires the accomplishment of the following conditions:

(a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party; (b) The equation has been used in commercial forestry sector of the host Party for 10 years or more; (c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R^2) was not less than 0.85.

In this sense, the equation is not applicable for *ex-post* estimations due to it was built with 10 data.

Pag. 49. What is the precedence of Table with Diameter per year? Was there enough data to adjust the curve? Was there a monitoring for plots for different ages? Additionally, considering the plantation density is like a natural mangrove, is difficult to achieve the same diameter per tree as in a plantation scenario, especially, because there are not management practices.

Pag. 50. The Equation used for the estimation of mean change in the biomass per hectare in trees is only applicable for *ex-post* estimation. This equation requires plot remeasures. For this *ex-ante* estimations, Equation 13 must be used. Furthermore, for the estimation presented in the PD, there was a mistake in the use of the Equation used because they did not include the number of plots in the estimations.

Pag. 59-60. Tables 19 and 20 show the change in C stock in reforestation and restoration strata. Final values are in tCO₂e/ha/year. We did the exercise to convert those values to tC /ha/year and the biomass with the aim to compare the results with values reported in the scientific literature. From Table 19, the average of tC /ha/year is 28,05. This value is higher than the average value reported by Alongi (2014), 11,1 t C /ha/year, and the range found in Thailand Mangroves 9,35 -12,9 tC/ha (Komiya 2014). This big difference could be a consequence of the diameter range used (Table in page 49) and due to the biomass estimation outside the range of the Equation, as well as they did not divided by the number of plots with the used equation. This last case leads to assume that old trees have the same biomass accumulation rate than the youngest trees, which is a wrong interpretation.

Comments about estimation of carbon stocks in soil

The soil carbon accumulation rate used in this PD is overestimated (13,23tC /ha/year). Why do they assume that the average C stock in those mangroves (640,92 t C /ha) were accumulated in 50 years? The value reported by this study are much higher than default

values allowed by the methodology (0,5tC/ha/year). Likewise, is almost eight times the average value reported by (Alongi 2014) for mangrove ecosystems (1,63tC/ha/year). Lovelock (2008) found for Australia, Caribbean and New Zealand mangroves a range from 1,51 to 6,34 tC /ha/year (mean 4,10 ± 45 tC /ha/year). Finally, for Pacific and the Indian Ocean, Chmura et al. (2003) reported soil carbon allocation rates between 0,26tC/ha/year to 3,36 tC/ha/year.

In comparison with estimations made with IPCC default value, the overestimation is 30%. Compared with the estimation made with methodology default value, the overestimation is 96%.

We consider the presented rate (13,23tC/ha/year) does not meet the methodology requirement: *"The default value of 0,5tC/ha/year is used, unless the transparent and verifiable information can be provided to justify a different value"*.

Comments about Baseline

Differentiating between old and new trees. The differentiation between the existing trees before project start date is necessary. They did not mention that activity in the project description. The inclusion of already existing trees leads to overestimation. The photos on page 15 and page 27 (Fig 7) show the existence of individuals already established in the baseline.

Pag. 13. The amount of carbon remove due to the preparation activities were not discounted (shrubs: *Acanthus ilicifolius*, *Dalbergiaspinosa*.).

Pag. 21. The photo shows a high presence of stumps in the planting area. In this kind of baseline, it is possible to plant more than 4000 plants/ha? There is enough space?

Pag. 44. How they classified the different land use types in the baseline? It is not clear.

Pag. 44. "These existing plants are not accounted for the carbon stocks but will be left to grow and are monitored throughout the crediting period of the project activity": In the monitoring plan, they must describe how they plan to carry out it.

Comments about other issues

Pag.4. "Mangrove restoration will further increase fish resources with up to 50%": Source

Pag. 4. "Establishment of the first mangrove gene bank with 64 species be followed with long-term research": First mangrove gene bank for Myanmar or the Indopacific? They only include in their project the planting of four species. How will they plan to get 64 species?

Pag. 20. The map shows three zones but without explanation.

Pag 30. In the WIF web page there is a strategy to adopt a tree. What kind of certification receive the buyer? It is important to clarify this point to avoid double count.

Pag 30. It is important to monitor the leakage management to include the discount of emission due to the charcoal production displacement. In this section, the PO establish they will monitor this variable, but in the monitoring plan, it was not included.

Pag. 45. Legend and tables in maps are inconsistent.

Pag 46-47. Maps show the project area includes other land uses, which demonstrates that a better delimitation of eligible areas is necessary.

Pag. 65. The final estimations do not reflect the results of the non-permanence risk tool. There is not a discount because of the buffer.

Pag 73- They propose the periodical update of some parameters related to disturbances. They did not describe how to monitor those parameters.

Pag. 76. Explain how the project is going to achieve the increase of family income in 100% during the next 5 five years.

Project Participants Response

Comments about eligibility

There is not support for the no forest criteria at the start date. They cited a study carried out by FAO before the project start date, but it is not clear how this study prove the no forest criteria in the project area. They include all the area as eligible, and it is not clear if they extract the water bodies (see Page 42, Fig. 10) and other lands (as villages, etc.) from the eligible area.

FAO has not done any study as mentioned in the comments. PP has only used the FAO forest definition of the minimum height of 5m since the Regional Ministry of Agriculture, Livestock, Natural Resources and Environment used that criterion when assessing the lands belonging to the project area. The Ministry issued letters dated 17 May 2017 confirming that the lands belong to the project are below the Myanmar forest definition. After the University of Patheingyi and two village tracts (Thaegone and Thabawkan) applied for land from the Government, the Ministry had to assess the land condition before giving the land. Based on their assessment these lands do not have any forests and are severely degraded.

In addition to the letter provided by the Ministry confirming the no-forest criteria, PP used satellite images to further to prove no forest criteria. Landsat images of 2003 were used to assess the land use condition 10 years prior the start date and Landsat images of 2013 were used to assess the land use condition at the start date. Since clear images of 2004 or 2014 were not available, PP had to use maps of 2003 and 2013 respectively.

About whether we extracted the water bodies and other lands (as villages, etc.) from the eligible area :

We have removed major rivers and water bodies. There is the tidal difference in these areas. Satellite images are being taken usually in the morning when there is probably the high tide. Therefore areas are inundated with water and may appear as water bodies. However when the tide is low these areas are exposed and mangroves can ~~will~~ be planted in those areas. We have not included any village tracts or settlement areas within the project boundary.

To delineate the project boundary, we have prepared a KML file showing the clear cut boundary demarcation of each parcel of land included in the project. These parcels are then uniquely numbered and the details regarding the latitude longitude, area, land class etc. are extracted in the excel format. These excel sheet and the KML files are available for verification

The Watershed Management & Mangrove Conservation Division of the Forest Department has issued a letter stating that the lands belonging to the project area have been subjected to deforestation for over 10 years. Discussions with the local people have found that these mangroves have been cleared for over 20-30 years and that these mangroves have been severely degraded. When the stems are being cleared for charcoal production and other uses, these mangroves are no longer able to produce propagules. Their capacity to natural regenerate stops. This has been the situation in these lands which has also been certified by the Forest Department.

The separation between reforested and restored areas is not necessary if all area is

classified as no forest.

Pag. 20. About conditions before project initiation: There is not support for the demonstration of no forest condition according to FAO criteria for 2015 and ten years before.

A satellite image interpretation was done using maps of 2003 and 2013. Also kindly refer the answer above

Pag. 33. There is not an analysis of define the project boundaries (degraded vs. no mangroves). According to the PO all the areas are no forest.

There is an analysis of the land areas. The maps have different land use categories which explain the land use types.

Comments about mortality rates

There is not scientific support for the mortality rates they used. According to Bayraktarov et al. (2016), the average survival rate in restoration projects in mangroves is 51%, and in the best case, developed countries could achieve 56,3%. Nevertheless, in this PD is mentioned a survival rate for the area of 80% (Pag. 78) and there is not documented support for this number. Likewise, there is not support for the distribution of mortality rates over the years. For this PD they assume mortality is zero for the first three years and only 5% for the year 4. Despite the range of survival rates for the first plantation years is wide (Primavera and Esteban, 2008), some studies such as Toledo (2001) reported survival of 77% until 1,5 years and 74% after year two.

Study team led by Mr. Win Maung (project manager) and his staff (graduates from the University of Forestry, Myanmar) have established 100 sample plots (10m x 10m) for each planting year (2015, 2016, 2017). These plots are monitored and measurements are taken to calculate the survival rate. As at present they have achieved a survival rate of more than 80%. The data is available for verification.

Another study on survival rates of *Avicennia officinalis*, *Avicennia marina*, *Bruguiera sexangula*, *Heritiera fomes*, *Rhizophora apiculata* and *Sonneratia apetala* in the Ayeyarwady Delta in Myanmar was conducted by Yokohama National University and Action for Mangrove Reforestation (ACTMANG) - [Link](#)

Avicennia marina - survival rate was 81% after four years and three months for trees in high ground and 54% after five years and 3 months for trees in low ground.

Avicennia officinalis – survival rate was 91% after 3 years and 2 months for trees in high ground and 78% after five years and 3 months for trees in low ground.

Heritiera fomes - survival rate was 69% after 2 years and 4 months for trees in high ground and 67% after 2 years and 4 months for trees in low ground.

Rhizophora apiculata - survival rate was 88% after 3 years and 9 months for trees in low ground

Sonneratia apetala - survival rate was 74% after 5 years and 3 months for trees in low ground

South Pole refer to a report by Bayraktarov et al. (2016) that the survival rate in restoration projects in mangroves is 51%, with the best case 56,3%. No geographical area is mentioned. If results from Myanmar had been included, the average survival rate would have been higher. It is a fact that local conditions and knowledge/methods are essential. We can therefore only refer to achievements in Myanmar, even if there are other areas with higher documented results than mentioned above.

Coastal Livelihood and Environmental Assets Rehabilitation in Rakhine (CLEARR) funded and monitored by UN LIFT has documented over 83% survival rate. Mangrove Service Network (MSN) project in KyaukPhyu Township, Rakhine State has documented over 74% (Certified document provided). Moreover, the survival rate of Forest Department in Ramree township (YannBywe), Rakhine State is over 85%. The survival rate of Forest Department in PyarPon Township, Ayeyarwady Region is 90.53%. (Certified letter provided).

It does not serve any constructive purpose to ignore information from the relevant country. We have only mentioned an estimated survival rate for ex-ante estimations based on results from the project and from other projects in Myanmar. Actual survival rates of the plants are monitored through permanent sample plots and shall be used for ex-post estimations.

Why for the case of restoration areas (Plantation density: 2000 trees) do they assume mortality zero?

We have made the same assumption of 80% survival rate and made the changes. Actual ex-post calculations will be done based on survival rates from the permanent sample plots.

Also refer the answer above

Comments about estimation of carbon stock in above ground biomass

It is not consistent with the document about the project scale, size, and type of project. We think the estimations are overestimated, but in the hypothetical case those estimations are correct, the project must be classified as large scale. Additionally, throughout the document, there are inconsistencies with the classification of the type of project (in some cases they mention there is a grouped project, e.g. page 32, and in other sections they say it is not a grouped project).

The project is not a grouped project. Corrections have been done and consistency is maintained throughout the document.

Pag 49. They use the allometric equation for biomass estimation proposed by Sukardjo and Yamada (1992). We think this equation cannot be used because its diametric range is 3,9 cm to 7,80 cm (see article). In this sense, according to the Table showed in page. 49, the equation only is applicable for years 5-7.

We did research with local trees in the area, and found out the equation from Komiyama was highly underestimating the stock at our site (Refer report by Joacim Kontny titled Measurements of biomass in Thor Heyerdahl Climate Park (THCP)). Comparing with different equations, we found this to be the most fitting for our results. As this is ex-ante estimation, no credits will be given. WIF together with Pathein University and AFOLU project development specialists will develop site-specific equations to calculate the ex-post estimations.

In case this equation is accepted for ex-ante estimations, it cannot be used for ex-post estimation due to the following reasons:

According to Tool 14, V.4.2 it is necessary to apply the Tool "Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities", which requires the accomplishment of the following conditions:

(a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party; (b) The equation has been used in commercial forestry sector of the host Party for 10 years or more; (c) The equation was derived from a data set of at least 30

sample trees, and the value of coefficient of determination (R^2) was not less than 0.85. In this sense, the equation is not applicable for *ex-post* estimations due to it was built with 10 data.

Indeed. Page 65 of the VCS PD states the following:

For *ex-ante*: Sukardjo & Yamada (1992)

For *ex-post*: more project and species specific equations will be used

Therefore for *ex-post* estimations, site specific equations will be developed and used for the calculations.

Pag. 49. What is the precedence of Table with Diameter per year? Was there enough data to adjust the curve? Was there a monitoring for plots for different ages? Additionally, considering the plantation density is like a natural mangrove, is difficult to achieve the same diameter per tree as in a plantation scenario, especially, because there are not management practices.

The table with diameter was obtained from the Mangrove Service Network (MSN). This is based on their research on mangrove growth. However this is only estimated figures used for *ex-ante* calculations. No credits are expected to trade using this diameter values. For *ex-post* calculations PP will monitor and record diameter of all species in the permanent sample plots that have been set up for the VCS project.

Pag. 50. The Equation used for the estimation of mean change in the biomass per hectare in trees is only applicable for *ex-post* estimation. This equation requires plot remeasures. For this *ex-ante* estimations, Equation 13 must be used. Furthermore, for the estimation presented in the PD, there was a mistake in the use of the Equation used because they did not include the number of plots in the estimations.

Thanks for the comment. Corrections are done in all relevant places

Pag. 59-60. Tables 19 and 20 show the change in C stock in reforestation and restoration strata. Final values are in tCO₂e/ha/year. We did the exercise to convert those values to tC/ha/year and the biomass with the aim to compare the results with values reported in the scientific literature. From Table 19, the average of tC/ha/year is 28,05. This value is higher than the average value reported by Alongi (2014), 11,1 tC/ha/year, and the range found in Thailand Mangroves 9,35 -12,9 tC/ha (Komiya 2014). This big difference could be a consequence of the diameter range used (Table in page 49) and due to the biomass estimation outside the range of the Equation, as well as they did not divided by the number of plots with the used equation. This last case leads to assume that old trees have the same biomass accumulation rate than the youngest trees, which is a wrong interpretation.

Alongi estimates AGB. Considering the high amount of BGB in mangroves, and the fact that it is a global estimate, while our area is in a high productive area for mangroves, this is not an unreasonable estimate. The trees are most productive from 15 years and forward. And this is only the *ex-ante* estimation and not *ex-post* estimation where actual credits are issued. Therefore the above argument is not valid. The calculations are supported by the carbon assessment conducted in the study area (Refer report by Joacim Kontny titled Measurements of biomass in Thor Heyerdahl Climate Park (THCP)).

Comments about estimation of carbon stocks in soil

The soil carbon accumulation rate used in this PD is overestimated (13,23tC /ha/year). Why do they assume that the average C stock in those mangroves (640,92 t C /ha) were accumulated in 50 years? The value reported by this study are much higher than default values allowed by the methodology (0,5tC/ha/year). Likewise, is almost eight times the average value reported by (Alongi 2014) for mangrove ecosystems (1,63tC/ha/year). Lovelock (2008) found for Australia, Caribbean and New Zealand mangroves a range from 1,51 to 6,34 tC /ha/year (mean 4,10 $\pm$ 45 tC /ha/year). Finally, for Pacific and the Indian Ocean, Chmura et al. (2003) reported soil carbon allocation rates between 0,26tC/ha/year to 3,36 tC/ha/year.

In comparison with estimations made with IPCC default value, the overestimation is 30%. Compared with the estimation made with methodology default value, the overestimation is 96%.

We consider the presented rate (13,23tC/ha/year) does not meet the methodology requirement: *"The default value of 0,5tC/ha/year is used, unless the transparent and verifiable information can be provided to justify a different value"*.

Soil assessment was conducted by a team from Pathein University led by Professor HtayAung (report titled: Soil Carbon Measures In Magyi's Mangrove Forest, April 2015). The team referred the following document for their study - Howard, J., Hoyt, S., Isensee, K., Telszewski, M., Pidgeon, E. (eds.) (2014). Coastal Blue Carbon: Methods for assessing carbon stocks and emissions factors in mangroves, tidal salt marshes, and seagrasses. Conservation International, Intergovernmental Oceanographic Commission of UNESCO, International Union for Conservation of Nature. Arlington, Virginia, USA.

Soil samples were collected using a soil core sampler along the Magyi channel and U-To channel where a forest carbon project is being developed to restore degraded mangrove lands. GPS coordinates were recorded and a soil depth probe was used to measure the soil depth. In each location, three (3) samples were collected in soil under *Bruguiera* spp., *Ceriops* spp. and *Rhizophora* spp which are the dominant mangrove species in the study area. Three (3) soil samples were collected at every 30 centimeter depth from each location thus giving 9 soil samples from each sample plot. The organic carbon content of the soil samples were measured using the Loss on Ignition (LOI) method. This method uses combustion and empirical relationships between organic carbon and organic matter. Laboratory tests were done at the Yangon University.

The soil organic carbon in the plots varied from 575.85 t/ha to 886.52 t/ha. The average soil organic carbon content in the studied soil was 732.26 t/ha. IPCC (2013) soil organic carbon stock for mangroves varies between 55 to 1376 t/ha. Dry bulk density of the soil was calculated as 0.64 g/cm³.

The rate of soil accretion in mangrove forests averages 5 mm year⁻¹, with 94 measurements out of a total of 139 ranging from 0.1 to 10.0 mm year⁻¹. The median value is 2.7 mm year⁻¹ with a few measurements showing net erosion (minimum value = -11.0 mm year⁻¹) or massive accretion (46.3 mm year⁻¹) in highly-impacted estuaries, such as those in southern China (Alongi, 2014).

According to studies done by the Pathein University, Sedimentation rate in mangrove for the Magyi area is about 10-20 mm per year. A conservative value of 10mm/year was applied.

Assuming a conservative period of 100 years, rate of change in SOC stocks within the

project boundary is 7.32 tC/ha/year. Therefore there is no need to use the default value of 0.5 tC/ha/year which is only going to under-estimate the actual soil carbon content in the project area.

Comments about Baseline

Differentiating between old and new trees. The differentiation between the existing trees before project start date is necessary. They did not mention that activity in the project description. The inclusion of already existing trees leads to overestimation. The photos on page 15 and page 27 (Fig 7) show the existence of individuals already established in the baseline.

PP has already established 300 sample plots in Magyi area (100 each for planting years 2015, 2016 and 2017). Only a % of this will be established as permanent sample plots for the VCS project but the rest will also be monitored for research purposes. Existing trees are all well documented in these sample plots and will NOT be included in the carbon calculations therefore there will be no over-estimation of carbon.

Section 5 of the methodological tool AR-Tool 14 (Version 04.2) explains 3 conditions under which carbon stock and change in carbon stock may be estimated as zero. According to the tool the carbon stock in trees in the baseline can be accounted as zero if all of the following conditions are met:

(a) The pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity;

(b) The pre-project trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, at any time during the crediting period of the project activity;

(c) The pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity.

LandSat images and Worldview 2 images from the year 2013 were used to conduct a satellite image analysis. Field verification was also conducted to identify the baseline landuse types of the area. According to the analysis the following categories were identified.

- a. Severely degraded mangrove areas
- b. Degraded mangrove areas
- c. Bare lands
- d. Shallow water areas

Severely degraded mangrove areas, bare lands and shallow water areas will be replanted with a density of 5000 plants per hectare. Degraded mangrove areas will be restored using approximately 2000 plants per hectare since there are mangrove plants which fall below the forest threshold but still remain as plants. There is no timber harvesting in this project and there will be monitoring to protect the existing and newly planted plants. Furthermore these existing mangrove plants are not removed or allowed to suffer mortality. The condition of these lands will be improved with the restoration program. These existing plants are not accounted for the carbon stocks but will be left to grow and are monitored throughout the crediting period of the project activity.

Hence all applicability conditions (a), (b) and (c) are met.

Pag. 13. The amount of carbon remove due to the preparation activities were not discounted

(shrubs: *Acanthus ilicifolius*, *Dalbergiaspinosa*).

Site preparations do not lead to any significant GHG emissions. There will not be any harmful site preparation techniques such as chemical or aerial site preparation in this reforestation project activity. The planting is done manually and will consist in preparing a small hole for the roots of the seedling, respecting the complete structure of the soil. There is no fertilization or burning of pre-existing vegetation, therefore, the project does not lead to GHG emissions by sources. In the applied methodology (AR Large-scale methodology (AR-AM0014) Afforestation and reforestation of degraded mangrove habitats Version 03.0) the only source of project emission is biomass burning but as is shown in the following table and mentioned in the VCS PD, this is not a source of emission in this project case.

Pag. 21. The photo shows a high presence of stumps in the planting area. In this kind of baseline, it is possible to plant more than 4000 plants/ha? There is enough space?

The stumps do not take up more than 20 % (or so) of the area, so there will be no problem to plant in between them. This situation has been studied by Mr. Win Maung (project manager) who is also the former Director of the Forest Department and has over 30 years of experience in mangrove plantations and confirmed that it is possible to plant mangroves with the said density.

Pag. 44. How they classified the different land use types in the baseline? It is not clear.

LandSat images of 2003 were used to assess the landuse condition 10 years prior the start date and LandSat images of 2013 were used to assess the landuse condition at the start date. Since clear images of 2004 or 2014 were not available, PP had to use maps of 2003 and 2013 respectively.

Pag. 44. "These existing plants are not accounted for the carbon stocks but will be left to grow and are monitored throughout the crediting period of the project activity": In the monitoring plan, they must describe how they plan to carry out it.

In the methodology AR-TOOL 14 it says:

Carbon stock in trees in the baseline can be accounted as zero if all of the following conditions are met:

- (a) The pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity;
- (b) The pre-project trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, at any time during the crediting period of the project activity;
- (c) The pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity.

During the baseline studies the area has been visited by the survey team. Existing plants are recorded. Therefore there are records of existing plants in each sample plot. These plants will not be removed and will be monitored throughout the project period.

Comments about other issues

Pag.4. "Mangrove restoration will further increase fish resources with up to 50%": Source Increase of sea food stock. It is commonly acknowledged an average increase of 50% after restoration of mangrove forests. (Ref. reports by CIFOR/ FAO/UN Environment and various scientific research documents). Specifically, 80% of all commercial or recreational species in Florida are mangrove dependent (Hamilton and Snedaker 1984). Mangroves are crucial for 72% of the commercial fish catch in the Philippines (Paw and Chua 1991). This ecosystem service that mangroves provide has considerable economic value, in excess of US \$18,000 per ha in the most productive locations (de Groot et al. 2012).

Pag. 4. "Establishment of the first mangrove gene bank with 64 species be followed with long-term research": First mangrove gene bank for Myanmar or the Indopacific? They only include in their project the planting of four species. How will they plan to get 64 species? This is the first gene bank in Myanmar. We have no knowledge of similar projects in other countries and can therefore only refer to Myanmar.

There are 29 existing species in the gene bank area (25 acres) and 22 species which is now being planted in the gene bank by transplant from near gene bank area. Besides, we have already collected and prepared for 13 species from other townships, Pyar Pone area. Therefore the total species number is 64. All of them are both true mangrove species and associate species. Please see the attach file of the name of the species.

Comment	Number	Species name	True Mangrove/ Associate mangrove
Existing Species in Gene Bank by 20 September 2017	1	<i>Avicennia alba</i>	TRUE
	2	<i>Avicennia marina</i>	TRUE
	3	<i>Avicennia officinalis</i>	TRUE
	4	<i>Bruguiera cylindrica</i>	TRUE
	5	<i>Bruguiera gymnorhiza</i>	TRUE
	6	<i>Bruguiera parviflora</i>	TRUE
	7	<i>Ceriops tagal</i>	TRUE
	8	<i>Ceriops decandra</i>	TRUE
	9	<i>Excoecaria agallocha</i>	TRUE
	10	<i>Lumnitzera littorea</i>	TRUE
	11	<i>Lumnitzera racemosa</i>	TRUE
	12	<i>Rhizophora apiculata</i>	TRUE
	13	<i>Rhizophora mucronata</i>	TRUE
	14	<i>Sonneratia alba</i>	TRUE
	15	<i>Scyphiphora hydrophilacae</i>	TRUE
	16	<i>Xylocarpus granatum</i>	TRUE
	17	<i>Xylocarpus moluccensis</i>	TRUE
	18	<i>Acanthus ilicifolius</i>	TRUE
	19	<i>Phoenix paludosa</i>	TRUE

		20	<i>Nypa fruticans</i>	TRUE
		21	<i>Finlaysonia obovata</i> (synonym: <i>Finlaysonia maritima</i>)	Associate
		22	<i>Dolichandrone spathacea</i>	Associate
		23	<i>Ipomoea tuba</i>	Associate
		24	<i>Pongamia pinnata</i>	Associate
		25	<i>Acrostichum speciosum</i>	TRUE
		26	<i>Acrostichum aureum</i>	TRUE
		27	<i>Clerodendrum inerme</i>	Associate
		28	<i>Heritiera litoralis</i>	TRUE
		29	<i>Premna obtusifolia</i>	Associate
		30	<i>Bruguiera sexangula.</i>	TRUE
	Transplanting near Gene Bank	31	<i>Acanthus volubilis</i> Wall.	TRUE
		32	<i>Sesuvium portulacastrum</i>	Associate
		33	<i>Crinum asiaticum</i> L.	Associate
		34	<i>Eclipta alba</i>	Associate
		35	<i>Pluchea indica</i> (L.) Less.	Associate
		36	<i>Terminalia catappa</i> L.	Associate
		37	<i>Ipomoea pes-caprae</i>	Associate
		38	<i>Derris scandens</i>	Associate
		39	<i>Derris trifoliata</i> Lour.	Associate
		40	<i>Scaevola taccada</i>	Associate
		41	<i>Cynometra ramiflora</i> L.	Associate
		42	<i>Aegiceras corniculatum</i>	TRUE
		43	<i>Pandanus odoratissimus</i>	Associate
		44	<i>Aegialitis rotundifolia</i>	TRUE
		45	<i>Bruguiera hainesii</i>	TRUE
		46	<i>Morinda citrifolia</i>	Associate
		47	<i>Sonneratia apetala</i>	TRUE
		48	<i>Heritiera fomes</i>	TRUE
		49	<i>Brownlowia tersa</i>	TRUE
		50	<i>Stachytarpheta jamaicensis</i>	Associate
		51	<i>Hygrophila obovata</i>	Associate
	Species from other township	52	<i>Cerbera odollam</i>	Associate
		53	<i>Intsia bijuga</i>	Associate
		54	<i>Calophyllum inophyllum</i> L.	Associate
		55	<i>Hibiscus tiliaceus</i> L.	Associate
		56	<i>Thespesia populnea</i>	Associate
		57	<i>Amoora cuculata</i>	Associate
		58	<i>Kandelia candel</i>	TRUE
		59	<i>Merope angulata</i>	Associate
		60	<i>Sonneratia griffithii</i>	TRUE

	61	<i>Sonneratia caseolaris</i>	TRUE
	62	<i>Barringtonia racemosa</i>	Associate
	63	<i>Acanthus ebracteatus</i>	TRUE
	64	<i>Brownlowia argentata</i>	TRUE

Pag. 20. The map shows three zones but without explanation.
Explanation has been inserted

Pag 30. In the WIF web page there is a strategy to adopt a tree. What kind of certification receive the buyer? It is important to clarify this point to avoid double count.
The strategy to adopt a tree was introduced only for those who are interested in making a difference by supporting mangrove restoration. The ownership of the tree or land or carbon rights are NOT transferred to any person who wish to adopt a tree. The cost of adopting is 88 Kr (about 10 USD) and is only charged 1 time over the life of tree and is NOT related to any carbon rights. Therefore this process is not double counting.

Pag 30. It is important to monitor the leakage management to include the discount of emission due to the charcoal production displacement. In this section, the PO establish they will monitor this variable, but in the monitoring plan, it was not included.
We are involving all the local people to make sure there will be no illegal logging in the area.

Also we are in the process of establishing a mangrove protection and monitoring committees with the intention of monitoring any illegal activities within the project. These committees are responsible for routine check-up and report on future occurrence of any such leakage related issues. Monitoring plan is updated with the above information

Pag. 45. Legend and tables in maps are inconsistent.
This has been corrected

Pag 46-47. Maps show the project area includes other land uses, which demonstrates that a better delimitation of eligible areas is necessary.
This has been corrected. Parcel boundaries are now clearly demarcated. Each plot is uniquely identified and labelled. An excel sheet showing latitude, longitude, plot area, type of land, etc. are prepared to avoid any ambiguity in the area included in the project activity.

Pag. 65. The final estimations do not reflect the results of the non-permanence risk tool. There is not a discount because of the buffer.
This has been done and the Non-permanence risk assessment is available.

Pag 73- They propose the periodical update of some parameters related to disturbances. They did not describe how to monitor those parameters.
This will be monitored in different ways,

- **Unpredicted disturbance occurring during the crediting period**
This will be measured in the counting of the sample-plots
- **Unpredicted disturbances occurring during the crediting period (changes in hydrology, sedimentation, disease, and/or human factors), affecting differently different parts of an originally homogeneous stratum or stand;**
This will also be done during the recounting, and with the help of national and international data.
- **Mangrove forest establishment (planting, re-planting) may be implemented**

at different intensities, dates and spatial locations than mentioned in the PD;
This will have to be done as we see the survival-rate.

Pag. 76. Explain how the project is going to achieve the increase of family income in 100% during the next 5 five years.

Baseline survey of all communities was done from the start. This and consultation with the communities is the basis for planning livelihood creation and sustainable community development. WIF has 35 years experience in this field and started participatory planning with the communities at an early stage. Several livelihood projects have already been implemented providing alternative jobs to the charcoal burners and other low income groups (majority of the population is landless laborer earning average 60-70 USD per month. To increase this with 100% within 5 years is a doable by utilizing renewable local resources on land and sea. A comprehensive plan is completed and in implementation stage. After one year, more than 100 family earners people (70% women) have been provided sustainable income which is over 100% of average pre project period. This also includes infrastructure like community solar grids, wind mills, energy forest etc. and support to the fishermen with ice plant, cool rooms etc. (40% of catches are lost due to lack of proper pre-harvest facilities). The same goes for agricultural production like processing of cashew nuts etc. and for value addition of coconut harvests by establishing a processing plant for virgin coconut oil and other coconut products providing over 50 additional jobs. More on this comprehensive plan on request.

VVB's Conclusion

RINA's audit team has evaluated the public comments posted by Southpole Group on 14 Jul 2017 at 18:58:22 GMT, and the responses provided by PP. The following are the conclusion:

As per RINA's assessment, PP has provided reasonable justification for each comment and the answers were substantiated with evidences wherever necessary. Many of the above comments were also included as part of the Resolution table (attached as Appendix 1 of this report) and hence were closed by following RINA's standard audit procedure.

Therefore, RINA conclude that the responses are satisfactory and comments are reasonably justified.

5 VALIDATION CONCLUSION

RINA Services Spa (RINA) has performed a validation of the project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar". The validation was performed on the basis of VCS Version 3 requirements as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfilment of stated criteria.

The project correctly applied the baseline and monitoring methodology AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats", dated 04/10/2013.

The proposed project involves restoration of 2146.48 Ha of degraded mangrove habitat of the Magyi, Thabawkan and Thaegone village tracts, located in Northern part of Ayeyarwady Division of Myanmar. From the total 2146.48 Ha, 737.04 Ha covers Magyi region, 887.87 Ha from Thabawkan region and 521.57 from Thaegone village tract. As a result, the project results in net anthropogenic

GHG removal of CO₂ that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. GHG removals are attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total net anthropogenic GHG removals from the project are estimated as 3,680,125 tCO₂e for the selected 20 year renewable crediting period, with an average value of 184,006 tCO₂e per year. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change. The risk rating that was determined for the project, in accordance with the VCS Non-Permanence Risk Tool, is 10%. The audit team has concluded that the above risk rating is in conformance with the VCS rules and the buffer credits foreseen in the proposed project activity are $3,680,125 \times 10\% = 368,012$ tCO₂e for the whole duration of the crediting period. The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA's opinion that the project participants are able to implement the monitoring plan.

In summary, it is RINA's opinion that the project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar" as described in the PD version 03 dated 01/02/2018 meets all relevant VCS version 3 requirements and correctly applies the baseline and monitoring methodology AR-AM0014 Version 3.0.

APPENDIX 1: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Table 1. CL from this validation

CL ID	01	Section no.	3.1	Date: 18/09/2017
Description of CL 1				
1. PP is requested to provide copies of the latest NASA report stating the extent of degradation of mangroves forest, sit bio (1992) report and evidences for the other references provided in section 1.10 of the VCS-PD. 2. The PD is not transparent on whether the ARR project complies with the WRC (Wetland Restoration and Conservation) required as set out in section 3.1.11 of AFOLU requirements.				
Project participant response				Date: 16/11/2017

1. Copy of NASA report (2014) provided. Reference of findings of Sit Bo (1992) referred from Than, M.M., Mochida, Y., Kogo, M. (2006) Survival and growth performances of some mangrove species replanted in the ex-agricultural land of the Ayeyarwady Delta in Myanmar. TROPICS Vol. 15 (1). The relevant document provided as evidence.

National Biodiversity Strategy and Action Plan (2011) – Page 52 (*According to National Biodiversity Strategy and Action Plan (2011), mangroves in Ayeyawaddy delta in 1924 was 253,018 hectares but as of 2001, it only remained 111,939 hectares.*)

NASA report (2014) - Page 11 (*According to the latest NASA (2014) report only 16% of mangrove forests are left in the Ayeyarwaddy Region by 2013. The study documents that the total mangrove extent in Ayeyarwaddy had been reduced from 81,800 hectares in the year 2000 to 46,200 hectares by 2013 losing over 36,500 hectares in just 13 years.*)

NASA report (2014) - Page 12 (*These losses seen since 2000 were largely due to agricultural expansion, charcoal production with large scale deforestation*)

Sit Bo (1992) – Page 1 (*reported a rapid deforestation rate of 7,775 ha per year in the Ayeyarwaddy delta (between 1984 – 1991) which was 3 times faster than any other forest lost in Myanmar*)

Ya Min Thant et al. 2012 - Page 2 (*main reason was due to production of charcoal for local consumption and supply for Yangon city. Other threats include increased population, conversion to paddy fields, fish and shrimp ponds and salt production areas.*)

Ya Min Thant et al. 2012 - Page 2 (*Other threats include increased population, conversion to paddy fields, fish and shrimp ponds and salt production areas. The practice of paddy cultivation in this area is of a shifting cultivation due to salt and acid sulphate intrusion. This intrusion results in lands unsuitable for paddy and the farmers have to move to a new area*)

NASA report (2014) - Page 11 (*Projections of the extent by 2030 by NASA indicate only 13,000 hectares of mangroves will be left in Ayeyarwaddy while 68,000 hectares will be left in Rakhine*)

Reference for all climatic data provided (Source - Department of Meteorology and Hydrology, Myanmar). Documents are certified by Mr. Soe Soe Lwin, Deputy Director, Department of Meteorology and Hydrology, Ayeyarwady Resion, Pathein.

Folder name - **Meteorological data**

Reference for Key environmental parameters (Table 7 of VCS PD) – There have not been any other studies done on the environmental parameters in this area. The Marine Science Department of University of Pathein was the 1st to do such a analysis hence those results are included in the PD.

2. Clarification is done in the revised PD section 1.2. The following section is added for the explanation -*As per the section 3.1.11 of VCS AFOLU Requirements (Version 3.6), all ARR projects shall comply also WRC requirements (Wetlands Restoration and Conservation) when soil organic carbon pool in the project scenario is not deemed below de minimis. For this project soil organic carbon is an important part of the total amount of the carbon sequestered, hence the project will comply both ARR requirements and WRC requirements. However the project do not consider any GHG emissions reductions and therefore does not fall under the description of WRC project in the section 4.2.19 of the AFOLU Requirements (Version 3.6)*

Documentation provided by project participant	
1. Weber S.J., Keddell L., Kemal M. (2014) Myanmar Ecological Forecasting: Utilizing NASA Earth Observations to Monitor, Map, and Analyze Mangrove Forests in Myanmar for Enhanced Conservation. National Aeronautics and Space Administration - LINK 2. Than, M.M., Mochida, Y., Kogo, M. (2006) Survival and growth performances of some mangrove species replanted in the ex-agricultural land of the Ayeyarwady Delta in Myanmar. TROPICS Vol. 15 (1)LINK 3. National Biodiversity Strategy and Action Plan (2011) 4. Ya Min Thant et al. 2012 5. Reference for all climatic data. Folder name - <i>Meteorological data</i>	
VVB assessment	Date: 12/01/2018
1. PP has provided copies of the latest NASA report indicating the page nos, which mentions the extent of degradation of mangroves forest, sit bio (1992) report . Also and evidences for the other references provided in section 1.10 of the VCS-PD is provided to RINA, which is checked and accepted . 2. The revised PD is now transparent on the WRC (Wetland Restoration and Conservation) requirements. Based on the above justification CL 01 is closed.	

CL ID	02	Section no.	3.1	Date: 18/09/2017
Description of CL 2				
1. Please provide evidence for the start date. 2. The start date of the crediting period is taken as the same of the start date of the project activity. However, land clearing date cannot be the start date of the crediting period, since there are no real GHG reductions happening during the land clearance. Thus, PP is requested to revise the date to a more reliable one. 3. PP is further requested to provide the evidences for robust plan for managing and implementing the project over the project crediting period.				
Project participant response				Date: 16/11/2017

1. Evidence for start date provided. 2. Start date of the crediting period is the start date of planting, which is 15th June 2015. This has been corrected in the VCS PD 3. Several guidebooks are referred by the project team for their management practices. The list of documents is provided below. In addition, the project has the following key persons for the management and implementation – • Win Maung, Project Director, former Director Forestry Department. 30 year working experience in mangrove conservation as government official; researcher and Project Manager of NGO/UN-LIFT projects. • Maung Maung Pyone. Assistant manager. 25 years experience in forestry and mangrove restoration with speciality in mapping, GPS locations and social mobilization. • Dr. Htay Aung, science advisor and field controller in charge of liaison with Patheingyi University and local communities. Over 20 years experience in marine science research in the project area. • Dr. Ranil Senanayake, Senior Science Director WIF, Founder of Analog Forestry and Chairman Raniforest Rescue International. • Suraj Anuradha Vanniarachchy, Senior Scientific Carbon Associate from Prime Carbon. Overall coordinator for the VCS project development with experience in carbon project development in the Asian region. • Joacim Kontny, Biogeochemist from Norwegian University of Life Sciences • Win Sandar Htay, Lawyer and accountant in charge of administration and financial management, public relation, database, procurement and sub-contracts. • NawHtoo Say WahKhaing, communication specialist in charge of social mobilisation. • Myint Sein, Field Manager, served as Field administrator with over 20 year experience of mangrove conservation and community development activities at Forest Department.	
Documentation provided by project participant	
1. Document titled “039.Evidence for Start Date - Daily Labour Wages” 2. Mangrove Nursery and Planting Techniques for some important Mangrove Species (January 2012) By Win Maung (English) 3. Mangrove Nursery and Planting Techniques for some important Mangrove Species (January 2012) By Win Maung (Myanmar Language) 4. Melana, D.M., J. Atchue III, C.E. Yao, R. Edwards, E.E. Melana and H.I. Gonzales. 2000. Mangrove Management Handbook. Department of Environment and Natural Resources, Manila, Philippines through the Coastal Resource Management Project, Cebu City, Philippines. 96 p. 5. FAO. 1994. Mangrove forest management guidelines. FAO Forestry Paper No. 117. Rome. 6. MAP-Indonesia. 2006. 5 Steps to Successful Ecological Restoration of Mangroves. Mangrove Action Project-Indonesia. Yogyakarta, Indonesia.	
VVB assessment	Date: 12/01/2018

1. The start date of the project activity is 15/05/2015, which is the date of the land preparation, and is in accordance with section 3.2.1 of the AFOLU requirements, v 3.6. This date was cross checked against the "debit voucher for PO-315-016 (payment done for land clearing)".
2. Start date of the crediting period is now revised to the start date of planting, which is 15th June 2015. Checked the revised PDD and accepted.
3. RINA checked the content of the above documents and also had discussion with the above listed project team regarding the continuance of the project for 20years. Information provided was satisfactory hence Point 3 is closed

Based on the above mentioned justifications CL02 is closed.

CL ID	03	Section no.	3.1	Date: 18/09/2017
Description of CL 3				
During the site visit, it was found that the proposed area of Magyi belongs to Patheingyi University and Patheingyi university has signed an MoU with WIF dated 15/07/2016 /21/ for validation and sale of CO₂ offsets to international buyers, and an amended agreement on 21/05/2017 for the extension of contract and increased land area /22/. Further to this, WIF has also signed MoU with Thabawkan village tract, signed by village committee leader dated 21/05/2017 and Thaeagon village /22/, dated 21/05/2017 /23/. However, the land ownership documents for the three regions are not available and the PP is requested to provide the same. It was further noted that the area covered under Thaeagon village tract as per the PD is 543 ha. However, the MoU between WIF and Thaeagon village committee refers to 540 ha. PP is requested to clarify the same.				
Project participant response				Date: 14/11/2017
Regarding Thaeagon village tract, the revised GIS maps provide the total area as 534.29 ha. Therefore the error of 543 ha has been corrected. The Regional Government of the Ayeyarwaddy Division has given approval to the Patheingyi University on 12th May 2014 for a 1815.4 acre (734.66 ha) area for establishing the mangrove park and gene bank. This is in-line with the MoU signed between WIF and Patheingyi University on July 15, 2016 (Follow up with the initial MoU signed on 15 November 2013). On 21 May 2017 an Amendment to the MoU was done by increasing the area to 1940 acres (785 ha). The Regional Government of the Ayeyarwaddy Division has issued a letter dated 10 April 2017 regarding the application submitted by Prof. Htay Aung on behalf of the Thaeagon Village Tract and Thabawkan Village Tract to obtain 1849 acres (748.26 ha) and 2700 acres (1092.65 ha) of degraded mangrove lands respectively. The letter states that the Minister of Agriculture, Livestock, Natural Resources and Environment has agreed on the request and acknowledged the need to protect these areas. The Regional Ministry for Agriculture, Livestock, Natural Resources & Environment issued 2 letters dated 2nd October 2017 confirming the approval of the above applications by the 2 village tracts.				

Documentation provided by project participant	
- Letter issued by the Regional Government of the Ayeyarwaddy Division dated 12th May 2014 and English Translation - Letter issued by the Regional Government of the Ayeyarwaddy Division dated 10th April 2017 and English Translation - Letter issued by the Regional Ministry for Agriculture, Livestock, Natural Resources & Environment dated 2nd October 2017 for Thabawkan Village Tract - Letter issued by the Regional Ministry for Agriculture, Livestock, Natural Resources & Environment dated 2nd October 2017 for Thaegone Village Tract	
VVB assessment	Date: 12/01/2018
The land ownership documents of the three regions were further checked with letters from the Regional Ministry of Agriculture, Livestock, Natural Resource & Environment /25/ /26/ and /27/. As per the letters the lands has been allocated to pathein university, Thaegon village tract and Thabawkan village tract mangrove conservation committee for 30 years and possibility of extension to 120 years /25/ /26/ and /27/. It is further checked that the areas covered under Thegone village is revised based on the area of plantation, which is also as per the MoU between WIF and Thaekon village committee. Based on the above justification, CL03 is closed. FAR 04 is raised. The area under the Pathein University considered for the VCS project is 737.04 ha. However the document from the Regional Ministry of Agriculture, Livestock , Natural Resource & Environment, confirms that 728 ha of land handed over to Pathein University that doesn't have forest, dated 18/05/2017 /27/. During the site visit, PP confirmed that the MoU signed between WIF and Pathein university was for 785 Ha /22/, and they have applied for an extension of areas with the Regional Ministry of Agriculture, Livestock, Natural Resource & Environment . The same was also confirmed by the representatives from Pathein Univesrity. RINA closed the CL based on the ammended MoU ad site visit inteviews. However, PP is requested to provide the ammended document from the Regional Ministry of Agriculture, Livestock , Natural Resource & Environment: to confirm that 785 ha or at least 737.04 ha land was handed over to Pathein University that doesn't have forest, The same needs to be checked during the first verification.	

CL ID	04	Section no.	3.1	Date: 18/09/2017
Description of CL 4				
PP is requested to provide the contract agreements of the permanent employed labours and receipts of payments done for the daily wage labours. Also provide evidences to confirm that the salary provided to the labours are above the minimum average wage of the host country. Also provide evidences on the skill enhancement trainings provided to the stakeholders.				

Project participant response	Date: 15/11/2017
PP is requested to provide the receipts of payments done for the daily wage labours. – Scanned copy titled “Daily Labour Wages” provided in folder CL 04. The document has evidence of the payments that were done for ground work. Project started on 1st May and after 10 working days 50,000 kyats were paid to each worker (5000 kyats per day, which is higher than that time minimum wage of 3600 kyats per day) Also provide evidences to confirm that the salary provided to the labours are above the minimum average wage of the host country – Project paid 5000 kyats per day when the minimum wage was 3600 kyats. Documents titled ‘Minimum wage proof -TRADING ECONOMICS’ (web link - https://tradingeconomics.com/myanmar/minimum-wages) and article from Asia Times dated 21.07.2017 provided as evidence “....the government legalized trade unions in 2011-12 and passed the Minimum Wage Law in 2013. The law paved the way for negotiations over the first wage threshold to begin, but two years and little progress later, workers began to strike, demanding better pay and more humane working conditions. The eventually agreed 3,600 kyat (US\$2.64) daily wage, a compromise between the trade unions’ proposal of 4,000 kyat (US\$3) and factory owners’ counter of 2,500 kyat (US\$1.88), drew fire from both sides. But analysts at the time suggested that the mutual backlash was testament to a well-negotiated deal.....” (web link - http://www.atimes.com/article/minimum-wage-war-myanmar/) PP is requested to provide the contract agreements of the permanent employed labours - Scanned copies of the contracts provided. Also provide evidences on the skill enhancement trainings provided to the stakeholders. - The project manager/director is assisted with a team of well experienced foresters including 12 graduates (Mg Aung WannaTun, Mg Nyi Lin Htut, Mg ZawMyoTun, Mg ThwinHtiooKyaw, Mg San Tun Aung, Mg Aung MyoHtay, Mg KyawHtooNaing, Mg Nyi Sit Aung, Mg Moe Min Aung, Ma Zin Wai Htike, Ma Kyawt Kay Paing and Naw Sweet Peace Thaw Mu Khu) from the National University of Forestry. The staff who are recruited for several activities including nursery establishment and management, mangrove replanting, maintenance are given training on each activity. Win Maung has written a manual on the planting techniques and mangroves in 2012 (Myanmar and English language books provided). In addition a report titled “Training programs on mangrove planting” provided with photographic evidence that skill enhancement training were provided for both nursery workers and site workers who were involved in the project.	
Documentation provided by project participant	

1. Contract agreements of the staff provided in Folder "CL 04". It consist contracts of Field Assistant, Technical Assistant, Boat man, Security person and Nursery permanent labourer.
2. List of staff working for the project is provided in the same folder.
3. Scanned copy titled "Daily Labour Wages"
4. Documents titled 'Minimum wage proof -TRADING ECONOMICS' (web link - <https://tradingeconomics.com/myanmar/minimum-wages>)
5. Both English and Myanmar language of the report "MANGROVE NURSERY AND PLANTING TECHNIQUES FOR SOME IMPORTANT MANGROVE SPECIES" written by Win Maung in 2012
6. Report title "Training programs on mangrove planting" as evidence that skill enhancement was done from the beginning.

VVB assessment**Date:** 12/01/2018

RINA checked the contract agreements of the permanent employed labours with the evidences of the payments done /54/ /59/ /60/. It is confirmed that the daily wages provided were 5000 kyats per day, which is higher than that of minimum wage of 3600 kyats per day /61/. It is also checked that the stakeholders were also provided with skill enhancement trainings /64/.

CL04 is closed.

CL ID	05	Section no.	3.2.2	Date:	18/09/2017
Description of CL 5					
PP is requested to provide justification on species selection for reforestation activity. A brief botanical description of these species including correct nomenclature, local name, any economic use of these species, photograph etc. also need to be included in the VCS PD. Section 1.1 of VCS PD mentions of restoration activity. PP is requested elaborate all the activities undertaken as part of the restoration, and provide evidence that such activity does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area The justification provided in the PD is not consistent with the applicability condition. It is not clear on whether the project involves burning as part of site visit preparation and how this is checked throughout the crediting period. Burning of woody biomass : PP to clarify on how the emissions from forest fires as required by the tool for the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0), has been accounted in the project activity.					
Project participant response					Date: 15/11/2017

Justification on species selection done. Brief description of species is included in Section 1.8 Description of project activity.

Section 1.1 of VCS PD mentions of restoration activity. PP is requested elaborate all the activities undertaken as part of the restoration, and provide evidence that such activity does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area –

The terms reforestation and restoration were used to differentiate two types of planting done based on planting density. Areas where there is more space planting is done 1 x 2 meter that allows 5000 plants per hectare. Areas where there is less space, the planting activity is called 'Restoration' and on those lands PP expects to replant 2000 plants per hectare. That is the only difference. There is no any other special silvicultural activities done that will lead to any alteration of hydrology.

The "**Mangrove Management Handbook (2000)**" produced by the Department of Environment and Natural Resources, Manila, Philippines state "spacing can range from 16 individuals per square meter to one individual per 1 square meter. The closer the spacing, the greater the ability of the propagules to withstand wave impact..." This gives a value between 10,000 plants per hectare. (Page 31)

The **Mangrove Guidebook for South East Asia (2007)** published by FAO and Wetlands International states "as a general rule, mangrove seedlings should be planted with 1 metre spacing, i.e. at a density of 10 000 per hectare...." (page 54).

Technical Guidelines and Standards in Sea Dike Design (2011) by the Ministry of Agriculture and Rural Development, Vietnam also mention several planting spaces that vary from 1600 – 5000 plants per hectare. – Refer Appendix G

There is no universally accepted one spacing rule for mangroves but the planting space can be decided on site specific conditions and experience. Therefore the spacing of 1x2 meter was selected by field experience of the management team.

The justification provided in the PD is not consistent with the applicability condition - Applicability condition revised. Fire is not used as a management practice. *Section 2.3 states "As mentioned before, there will not be any kind of site preparation during this project, not even fertilization or burning of pre-existing vegetation, therefore, the project does not lead to GHG emissions by sources". During the site visits the validation team was taken to different locations of the project. These areas are covered with water and are subjected to low tide and high tide. There is no need of any burning as any remaining debris is left on the ground.*

PP to clarify on how the emissions from forest fires as required by the tool for the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0), has been accounted in the project activity. – Fire is not a practice in the project area (not even in the pre-project condition).

Documentation provided by project participant

- Mangrove Management Handbook (2000), Department of Environment and Natural Resources, Manila, Philippines
- Mangrove Guidebook for South East Asia (2007), FAO and Wetlands International
- Technical Guidelines and Standards in Sea Dike Design (2011), Ministry of Agriculture and Rural Development, Vietnam

VVB assessment				Date: 12/01/2018
Revised PD provides justification on species selection for reforestation activity. Further PP has provided botanical description of these species including correct nomenclature, local name, any economic use of these species, photograph. Further, the revised Section VCS PD mentions of clearly describes the difference between reforestation and restoration activity. It is further confirmed that the restoration activities does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area Burning of woody biomass is considered as one of the parameter for risk analysis. The same was checked and accepted. CL05 is closed.				
CL ID	06	Section no.	3.2.6	Date: 18/09/2017
Description of CL 6				
As per section 3.1 of the VCS-PD, the plant density at severely degraded, bare lands and shallow water is taken as 5000 and degraded land is taken as 3000. Please provide the basis for the same. During the site visit, it was checked that plot no. 67, 3 was a new plot, which was not classified and plot 107 is not shallow water but severely degraded. Plot 95, which is classified as degraded, on site visit looked like severely degraded/bare land. Further clarify the abandoned shrimp pond is classified in which land use. PP is requested to clarify and confirm the same with evidences.				
Project participant response				Date: 15/11/2017

Areas where there is more space planting is done 1 x 2 meter that allows 5000 plants per hectare. Areas where there is less space, the planting activity is called 'Restoration' and on those lands PP expects to replant 2000 plants per hectare (not 3000).

During the site visit, it was checked that plot no. 67, 3 was a new plot, which was not classified and plot 107 is not shallow water but severely degraded. Plot 95, which is classified as degraded, on site visit looked like severely degraded/bare land. Further clarify the abandoned shrimp pond is classified in which land use. PP is requested to clarify and confirm the same with evidences. - In the excel file "WIF Project boundary_ver01" plot no 67 is already there classified as severely degraded. This classification was done based on several factors such as satellite image interpretation, visual assessment by mangrove experts and forest officers. These lands have been subjected to heavy deforestation by local communities and the existing plants are no longer able to neither produce propagules nor reach the minimum tree height. With time they will die and the lands will be converted to bareland.

Plot No 107 is in fact classified as 'bareland' after doing the assessment by the GIS expert.

Plot No 3 which is the abandoned shrimp ponds were in fact used as shrimp ponds in the past and are now abandoned. Therefore mangrove replanting will be done on these lands.



Documentation provided by project participant	
All revised GIS files uploaded in a folder titled - GIS maps_18082017	
Link - https://drive.google.com/open?id=0BzEZ4Bft-RHbWINIUjl1eVRrdFU	
VVB assessment	Date: 12/01/2018
Planting density proposed is acceptable and it conforms to the practice undertaken in the field. Hence the issue is closed. The revised GIS file were checked for the plots numbers mentioned above and are found in line with the justification provided. Hence the issue is closed Hence CL 06 is closed.	

CL ID	07	Section no.	3.2.6	Date: 18/09/2017
Description of CL 7				
VCS PD section 3.3 has no reference of the equation used for quantifying the leakage emission as per the latest version of the methodology AR-AM0014, "Afforestation and Reforestation of degraded mangrove forest" Version 3.0.				
Project participant response				Date: 18/10/2017

According to the methodology AR-AM0014 (Version 03.0), the leakage emission has to be assessed with the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" (Version 02). This tool evaluates the displacement of crop cultivation and grazing activities. Section 6 of this tool indicates that leakage emissions can be considered insignificant if they meet the following requirements:

1. Leakage emission attributable to the displacement of agricultural activities due to implementation of an A/R CDM project activity is estimated as the decrease in carbon stocks in the affected carbon pools of the land receiving the displaced activity.

2. Leakage emission attributable to the displacement of grazing activities under the following conditions is considered insignificant and hence accounted as zero:

- (a) Animals are displaced to existing grazing land and the total number of animals in the receiving grazing land (displaced and existing) does not exceed the carrying capacity of the grazing land;
- (b) Animals are displaced to existing non-grazing grassland and the total number of animals displaced does not exceed the carrying capacity of the receiving grassland;
- (c) Animals are displaced to cropland that has been abandoned within the last five years;
- (d) Animals are displaced to forested lands, and no clearance of trees, or decrease in crown cover of trees and shrubs, occurs due to the displaced animals;
- (e) Animals are displaced to zero-grazing system.

Most of the project areas are emerged salty mudflats either bare lands or with a few mangrove plants. Grazing is not a common practice in the area. The protection from any future illegal grazing on mangrove sites is part of the project activities. Therefore, leakage in the whole project area can be assumed as zero for the duration of the project.

Therefore there was no need of using the equation mentioned since leakage is considered zero for the project.

Documentation provided by project participant

N/A

VVB assessment

Date: 12/01/2018

During the site visit, it was confirmed that the project areas are either bare lands or with a few mangrove plants, thus there is no displacement of agricultural or grazing activities. Thus the leakage emissions considered is zero. Thus, RINA accepts the justification provided by PP.

CL07 is closed.

Table 2. CAR from this validation

CAR ID	01	Section no.	3.1	Date:	18/09/2017
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Description of CAR	
RINA team has verified project boundary shape files provided by PP, and have noticed many discrepancies on the reported land use/land cover information for some of the land parcels. The details of those land parcels are given in the attached excel sheet "WiFi_Project boundary_ver01" PP is requested justify the inclusion of such land parcels within the project boundary	
Project participant response	Date: 15/11/2017
The project boundary shape files were revised and all the files are provided with this Appendix 1 document. One important point to note is that Satellite images are taken only at a specific time of the day. Tides are the rise and fall of sea levels caused by a combined effect of gravitational forces exerted by the moon and sun and the rotation of Earth. Tidal change significantly affects these mangrove lands so even during the same day an area may be submerged with water and then appears dry. Therefore identification of the landuse type cannot be only done by satellite image interpretation and field verification is very important. The assessment was done using a combination of satellite image analysis and field verification. This should be noted not to confuse a particular area as a dryland when its actually a water body during a certain time period of the day.	
Documentation provided by project participant	
All revised GIS files uploaded in a folder titled - GIS maps_18082017 Link - https://drive.google.com/open?id=0BzEZ4Bft-RHbWlNIUjl1eVRrdFU	
VVB assessment	Date: 12/01/2018
Revisions are noted. However it is found that, the area proposed in the VCS PD and the excel sheet are not matching. Also PP is requested to use the same excel sheet "WIF Project boundary_ver01" submitted along with the DVR and provide all the corrections/additions/deletions if any in the same sheet. Also please address all the comments given in the excel sheet . If any new areas added, please identify and mark separately. Also restoration areas should be shown with different colour codes/place mark etc. PP is requested to submit the revised project boundary files. Hence the issue is kept open	
Project participant response	Date: 15/01/2018
All the correction as per the above instruction are done. The revised KML file and excel sheet are provided	
Documentation provided by project participant	

WIF Project Boundary Version 03_01.02.2018

WIF Shape files Version 03_01.02.2018

VVB assessment

Date: 28/01/2018

Revised project boundary files are checked and found correct

Hence the issue raised in CAR 01 is closed.

CAR ID	02	Section no.	3.1	Date: 18/09/2017
Description of CAR				
During the site visit, it was observed that there were many abandoned charcoal kilns present within the project boundary. Also section 1.13 of VCS PD mentions that cutting of mangroves for charcoal production has been a practice under the pre-project scenario. Villagers who were involved in charcoal production are employed in the project thus they have agreed to stop the charcoal production (which will be monitored). PP is requested to provide a leakage management and monitoring plan covering the activities related to cutting of mangroves for charcoal production for the total duration of the project crediting period The Leakage management demonstrated in the VCS-PD is not as per the section 3.6 and 4.6 of AFOLU requirements, v 3.6 /37/.				
Project participant response				Date: 15/11/2017

During the field visit there were 3 abandoned small scale charcoal kilns. Charcoal production in the project area has been very limited during the last years due to non-availability of trees. When WIF began the research activities in 2012, only a few families were engaged in charcoal production during the season.

During the interview with former charcoal burners, they mentioned that they stopped charcoal production not only because lack of trees but also it only resulted in very low income. To prevent those in the community living nearby mangrove forest depending on cutting mangrove to make charcoal and get income for their livelihood, Worldview International Foundation (WIF) employ them, paying daily wages of Kyats 5000/-, in planting mangrove in the belief that their participation in planting process would create a feeling of ownership and that they would not readily cut mangrove as they had done so before. The project has established mangrove protection and monitoring committees with the intention of monitoring any illegal activities within the project. These committees are responsible for routine check up for such deforestation and will report them as explained in the monitoring plan. In addition WIF have 4 forest guards and 2 project staff responsible for patrolling the project area.

WIF, in consultation with the local people are developing alternative income generation activities that might interest them to take care of their livelihood.

The use of charcoal has been reduced due to increased use of gas among the upper and middle class, increasingly changing to use gas which is regarded as a better and cleaner way to cook food. There is no available statistics but energy consumption is not static and shifting over to gas.

Leakage management section has mentioned about recruiting former charcoal burners into the project thus in line with the Section 3.6 of AFOLU requirements, v 3.6 “ Leakage mitigation activities may be supplemented by providing economic opportunities for local communities that encourage forest or wetland protection, such as employment as protected-area guards....”

There is no market leakage because the project does not reduce production of any commodity that causes a change in the supply and market demand. There is no activity shift leakage either since these charcoal burners have not moved their activity outside the project boundary. They have stopped their practice and joined the project as staff. There is no ecological leakage in the project since none of the project activity causes changes in GHG emissions or fluxes of GHG emissions from ecosystems that are hydrologically connected to the project area (As per section 4.6 of AFOLU requirements, v 3.6)

Documentation provided by project participant

Document No 035. Interview with former Charcoal burner and its English translation

VVB assessment

Date: 12/01/2018

The justification provided by PP is accepted. The same was also confirmed during the site visit by interviewing the charcoal burners, who are now working in the mangrove plantation and quite happy the wages provided by WIF. The daily wages of Kyats 5000/-, provided by WIF was further cross checked with WIF records. It is also confirmed that the project will have proper monitoring in place in protect the mangroves, which is also supported by forest officials.

The revised PD demonstrates leakage management as per the section 3.6 and 4.6 of AFOLU requirements, v 3.6.

Based on the above justifications CAR 02 is closed.

CAR ID	03	Section no.	3.2.2	Date: 18/09/2017
Description of CAR				
Reference to the applicability conditions of the tool: "Estimation of non-CO ₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" (Version 04.0)				
a) The tool is applicable to all occurrence of fire within the project boundary.				
b) Non-CO ₂ GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.				
VCS PD mentions that burning biomass will be avoided, all the areas are degraded lands as per the FAO forest definition and no fire occurs. Therefore this tool does not apply.				
PP is requested to substantiate the claim that no fire occur within the project area.				
Project participant response				Date: 15/11/2017

During the site visits the validation team was taken to different locations of the project. These areas are covered with water and are subjected to low tide and high tide. Since most of the time the lands are submerged in water there is no need of any burning and also impossible to burn. Burning has not been any kind of management practice for mangrove replanting because of the tidal changes.



Documentation provided by project participant

n/a

VVB assessment

Date: 12/01/2018

Burning of woody biomass is considered as one of the parameter for risk analysis. The same was checked and accepted

CR03 is closed.

CAR ID

04

Section no.

3.2.4

Date: 18/09/2017

Description of CAR

1.The section 2.4 of the VCS-PD states that “Procedures to demonstrate the eligibility of lands for afforestation and reforestation CDM project activities2” (Version 01) of the Annex 18, EB 35 was used in demonstrating the eligibility of lands for the AR-CDM project activity”. However, section 2.4 of the VCS-PD refers to selection and justification of baseline scenario and not the land eligibility. PP is requested to correct the same.

2.Provide evidence that the incentive from the planned sale of VERs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of the project activity

3.As per the step-1 ,the identified alternatives are i) Continuation of the pre-project land use which is the degraded and abandoned lands; ii) Mangrove reforestation & restoration of the land within the project boundary performed without being registered as a VCS ARR project. Not clear on why the natural mangrove regeneration is not considered as one of the alternative. It is not transparent if the all land uses within the boundary of the proposed A/R VCS project activity that are currently existing or that existed at some time since 31 December 1989 but no longer exist, are identified or not.

4. Sub step 1b discussed in the VCS-PD is not clear on the mandatory applicable laws and regulations. Also provide copy of all the laws and policies referred in the VCS-PD.

5. Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios is demonstrated by means of Investment barriers, other than insufficient financial returns; Technological barriers; Barriers due to local ecological conditions and Barriers due to social conditions. However, noted that the same is not demonstrated as per the points provided in sub step 2 a of the tool. Further PP is requested to demonstrate and justify the same with valid evidences. It is further not clear on why barriers due to prevailing practice is not considered and justified. PP is further requested to refer to “guideline for objective demonstration and assessment of barriers, version 01 EB-50 to demonstrate barriers.

6. Common practice analysis: PP is requested to provide, the document “National Sustainable Development Strategy for Myanmar (2009)”, National Biodiversity Strategy and Action Plan, 2011, evidences of NASA studies identified only 46,200 ha of mangroves were left in 2013”. Further PP is requested demonstrated common practice analysis as per points 33 and 34 of step 4 of common practice analysis and provide evidences for the same.

Project participant response

Date: 15/11/2017

Corrected as - Latest version of “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities” version 01 was used to identify the baseline scenario and demonstrate additionality in the project. Steps followed are presented in following paragraphs.

Incentive from the planned sale of VERs was seriously considered in the decision to proceed with the project activity.

March 20th 2012, the Board of WIF decided to implement a mangrove restoration and research project in Myanmar with funding of Letten Foundation. After exploring options, they started working with the Government of Myanmar (Regional Govt of Ayeyarwady) and Patheingyi University in Magyi area. This was a 3 year project.

April 21st 2014, the Board of WIF decided to explore carbon funding in order to continue the initial project idea and develop a long-term sustainable model.

During 2014-2015 WIF explored several carbon investors including *Bio8, Brødrene Michaelsen, Starboard, Ice World, Sundt Air, Pegasus Helicopters, Lykke Exchange*.

January 15th 2015, Letten Foundation inform WIF that they will not continue funding after June 2015. (Email from Ernst Alsaker, Chairman of Letten Foundation to General Secretary of WIF)

January 15th 2015, Starboard Co Ltd willing to fund the project provided carbon credits are generated.

September 15th 2015 an agreement was signed between WIF and Bio8 for carbon financing based on the initial agreement in January 2015

December 21st 2015, the Board decided to include degraded lands from Thaegone and Thabawkan into the project and instructed the team to explore suitable land for this.

The Board only approved the project since it was assured by the carbon investors about potential financial support through carbon revenue. Unless carbon financing is available, this kind of a project is not sustainable in the long run. This is further sustained by the fact that Co-Operative Bank Ltd of Myanmar rejected another loan application by PP for the continuation of the project. Reasons include the risk of the nature of the project and not availability of any assets for the particular project.

As per the investment barrier, PP only agreed to continue the 3 year research project as a reforestation project, considering the carbon financing. This was assured by Bio8 as indicated in the above timeline and by the agreement dated 15.09.2015 and with Starboard Co Ltd willing to fund provided the project being developed as a forest carbon project.

Why the natural mangrove regeneration is not considered as one of the alternative - Because lands belonging to the project are either degraded or severely degraded. The Regional Ministry of Agriculture, Livestock, Natural Resources and Environment also have confirmed that these lands did not have any forests and are degraded.

It is not transparent if the all land uses within the boundary of the proposed A/R VCS project activity that are currently existing or that existed at some time since 31 December 1989 but no longer exist, are identified or not – The date 31 December 1989 is applicable for AR CDM (afforestation/ reforestation) projects only and not applicable for VCS ARR projects. Since the project is a VCS project, as per the Section 3.1.6 of the AFOLU Requirements (V 3.6) land assessment was limited to 10 years prior to project start date. Satellite images of year 2013 and 2003 were used for the analysis.

Section revised to make it clear. Copies of all laws and policies referred are in folder CAR 04. None of these laws and regulations prohibit mangrove reforestation.

PP have used the “guideline for objective demonstration and assessment of barriers, version 01 EB-50 to demonstrate barriers. One notable point is that Myanmar is a Least developed country (LDC). Being an LDC there are constraints such as data availability (Guideline 7 of the tool). Following proof is presented for each barrier:

Investment barriers, other than insufficient financial returns

WIF is an INGO and other partners involved are the University of Patheingyi and local communities from three village tracts. WIF has demonstrated capacity in environmental conservation, awareness and in mobilizing local communities. The University has also the capacity to involve in above activities but lack the necessary funding for this kind of projects. Local communities also lack the capacity to initiate this project without WIF or the University. – Copy of WIF’s NGO registration. After Letten Foundation rejected further funding this project was implemented through funds that were granted for the agreement being implemented as a forest carbon project. WIF also applied for a loan to continue the operations of the proposed project in 2017 for upcoming planting but the bank rejected on the condition that WIF does not have any property as a guarantee. This further strengthens the argument that a non-profit organization such as WIF cannot implement this kind of a project unless a grant is available. (point 13 of Sub-step 2a)

This is further sustained with the following paragraphs from the Common Practice Analysis –

Analysing past or ongoing restoration activities, most efforts by the Government (Forest Department) are concentrated mainly in Bogalay, Laputta and Pyarpon townships. Between the period of 2008-2016 an area of 1,943 ha have been planted in Bogalay (242 ha/year) while an area of 1,781 ha have been planted in Laputta (222 ha/year). An area of 951 ha have been planted in Pyarpon between the period 2009-2016 (136 ha/year). However the percentage of survival is not documented and the destruction due to natural and anthropogenic activities is not followed up.

The local NGO, Mangrove Service Network (MSN) has established around 575 ha of mangroves over the period of 2013-2017 with the funding from POSCO DAEWOO in Rakhine State (115 ha planting per year). Another local NGO, Forest Resource Environment Development and Conservation Association (FREDA) has planted 2,940 ha of mangroves in Pyarpon Township (Ayeyarwaddy Region) over a period of 20 years (147 ha planting per year) funded by different agencies. In the past the planting of mangroves have been less than 150 ha per year by any NGO due to different constraints.

Technological barriers

Distance between Gwa township and project area is approximately 90-100 km by sea which takes around 7-8 hours one way trip. Travel by land is more difficult since there are not proper road system to link these two points.

Barriers due to local ecological conditions

During stakeholder meetings it was identified that they lack the knowledge or capacity to reforest these degraded mangrove lands. Minutes of stakeholder meetings provided as evidence.

Guideline 7: For projects in Least Developed Countries³ it is sufficient to transparently describe the relevant barriers, as less stringency is needed with regards to data availability in the actual demonstration of barrier, as compared to the projects in other countries. Projects in Least Developed Countries are ~~80~~ bound by the provisions in this guideline and may use other approaches that are more adapted to the local circumstances.

1. Documents provided with relevant page numbers that the information was referred.
Requested demonstrated common practice analysis as per points 33 and 34 of step 4 of common practice analysis and provide evidences for the same –

Other forestation activities	Proposed ARR VCS project activity	Proof
Forestation activities are conducted on all categories of land which results in conversion of already forested lands	Forestation carried out on degraded and abandoned lands	Over 300,000 ha of demarcated forestlands were given to over 800 companies by the Government which may have resulted in large-scale conversions. (Forest Trends report, 2015)
Forestation and/or plantation activities conducted on all types of land (State, private, lands belonging to local communities) under large-scale land concessions provided by the Government.	Forestation conducted with local participation on lands belonging to Government that has been given to local village tract committees	From 2004 to 2005 alone, 1.77 million acres of forests (protected forest reserves, unclassified forests, and "other" forests) were de-gazetted to make way for resource extraction, energy infrastructure development, agricultural expansion, and military compounds, according to government data (Forest Trends report, 2015)
Large areas of land belonging to the forestation activity overlaps with public and private lands (forest, production land etc) because there is not any assessment prior approving the land concession.	Only lands without forest vegetation as of 1 st May 2005 are being forested thus not causing any removal of existing vegetation	The number and intensity of local land and livelihood conflicts have increased in parallel with the increase in the government allocations of agribusiness concessions to the private sector, with local communities unable to claim statutory or customary land use rights. (Forest Trends report, 2015)
Benefits include forest wood and non-wood products, ecosystem services (water, recreation, air). Situations where new plantations are established on forested lands, the benefits will diminish due to the transformation.	Benefits include non-destructive ecosystem services (water, recreation, air) plus additional benefits obtained via sale of carbon emission reductions. Due to transformation of degraded land the ecosystem benefits are more credible.	
Lack of participation from Government and associations to monitor how the contract is compiled between local communities and project developers and lack of monitoring the forestation activities or control over the activities	Project developers are committed to ensure quality assurance and quality maintenance in all silvicultural activities and periodic monitoring exists in the interest of achieving the best possible results.	While agricultural concessions allocated within forests between 2010 and 2013 largely resulted in forest conversion and timber production, less than one-fourth of total agricultural concession areas were actually planted with agricultural crops by the end of 2013 ((Forest Trends, 2015)

Documentation provided by project participant

1. Board decision dated 20.03.2012 – initiate a research project
2. Board decision dated 21.04.2014 – continue the project as a carbon project and seek for carbon funding
3. Email from Ernst Alsaker, Chairman of the Letten Foundation (15.01.2015) rejecting further funding after June 2015
4. Letter from Svein Rasmussen of Starboard Co Ltd (15.01.2015) agreeing to fund the project provided the project will be developed as a forest carbon project.
5. Agreement between WIF and Bio8 on carbon financing
6. Board decision dated 21.12.2015 – include degraded lands belonging to Thaegone and Thabawkan
7. Email conversation between WIF and EAM/ Bio8 discussing about carbon financing and potential investors from Switzerland and Germany – Dated February 2015
8. Forest Inventory and Survey Report magyi Magyi (April 2015)
9. Forest inventory Report Thabokkan n Thaegone (May 2016)
10. Socioeconomic Survey Report on Magyi (March 2015)
11. Socioeconomic Survey Report on Thabokkan village track (February 2017)
12. Socioeconomic Survey Report on Thaegone village track (December 2016)
13. Authorize to market carbon by U Nyunt Phay of Patheingyi University

Following documents provided for point 5 –

1. Copy of WIF's NGO registration
2. Bank rejection letter of the loan applied
3. Mangrove plantation in Rakhine and Ayeyarwady Delta
4. Mangrove plantations by Forest Department
5. (15.1.2016) Meeting with WIF &Thaegone (E)
5. (15.1.2016) Meeting with WIF &Thaegone (M)
6. (8.7.2016) Meeting with WIF &Thabokkan (E)
6. (8.7.2016) Meeting with WIF _Thabokkan (M)

Following documents provided for point 6 –

1. National Sustainable Development Strategy for Myanmar (2009) – **Page 11**
2. National Biodiversity Strategy and Action Plan, 2011 – **Page 5** gives the graph of mangrove % (Figure 2. Forest Area by Forest Types of Myanmar (Percentage of total forest area))
Page 53 - Figure 11. Trend of Mangrove Conversion in Ayeyarwady Delta.
3. Weber S.J., Keddell L., Kemal M. (2014) Myanmar Ecological Forecasting: Utilizing NASA Earth Observations to Monitor, Map, and Analyze Mangrove Forests in Myanmar for Enhanced Conservation. National Aeronautics and Space Administration – **Page 11** where its mentioned that only 46,200 ha of mangroves were left in 2013.
4. Mangrove plantation in Rakhine and Ayeyarwady Delta
5. Mangrove plantations by Forest Department
6. Kevin Woods (2015) Commercial Agriculture Expansion in Myanmar: Links to Deforestation, Conversion Timber, and Land Conflicts. Forest Trends – Pls refer **Executive Summary of the report**

VVB assessment

Date: 12/01/2018

1. The section 2.4 of the revised VCS-PD updated with Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities.
2. The starting date of the A/R VCS project is 15/05/2015, which is after 31/12/1999. It is checked that the incentives from the sale of carbon credits was seriously considered in the decision to proceed with the project activity, which was cross checked with the board minutes , dated 21/03/2012 /39/ and subsequent board minutes, dated 21/04/2014 and 21/12/2015. It was further confirmed that the before the start date of the project, PP has consulted many investors for funding of the project , which was confirmed by email communication and letters dated 20/01/2015, 15/09/2015 and 22/12/2014 /42/ /43/ /63/. Thus, only after the positive response from the investors, PP has initiated the implementation of the project.
3. The letter from the Regional Ministry of Agriculture, Livestock, Natural Resources and Environment also have confirmed that these lands did not have any forests and are degraded /25/ /26/ /27/. Thus, the option of natural mangrove regeneration has not been considered as one of the alternative, which is accepted by RINA team.
4. All the applicable laws and regulations provided by PP were checked and accepted.
5. The barriers considered are Investment Barrier, other than insufficient financial returns and Technological barriers. The same is demonstrated as per sub step 2 a of the tool with evidences and “guideline for objective demonstration and assessment of barriers, version 01 EB-50 to demonstrate barriers, which is accepted by RINA.
- 6., The document “National Sustainable Development Strategy for Myanmar (2009)”, National Biodiversity Strategy and Action Plan, 2011, evidences of NASA studies provided by PP checked and accepted. It is also checked that common practice analysis is demonstrated as per points 33 and 34 of step 4 of common practice analysis in the revised PD. The same was checked with evidences and accepted.

Based on the above mentioned justifications CR04 is closed.

CAR ID	05	Section no.	3.2.6	Date: 18/09/2017
Description of CAR				

1. The equation given in the VCS PD section 3.1 is not the same as given in the methodology. PP is requested to justify the use of a different equation for quantification of baseline net GHG removal by sink.
2. Further PP is requested to demonstrate the compliance of the conditions (a), (b), and (c) as set out in paragraph 11 of the tool for the period covering the entire crediting period.
3. According to Tool 14, V.4.2 it is necessary to apply the Tool "Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities", which requires the accomplishment of the following conditions:
 - (a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party;
 - (b) The equation has been used in commercial forestry sector of the host Party for 10 years or more;
 - (c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R^2) was not less than 0.85.
4. VCS PD section 3.2 is not transparent on the use of the above tool and the condition therein. PP is requested to provide the same in the VCS PD
5. PP is requested demonstrate the appropriateness of the equation referred from Sukardjo & Yamada (1992) for total biomass calculation
6. *Evidences for the equation referred from Sukardjo & Yamada (1992) on the total biomass calculation for areas similar to the proposed project*
7. *Evidences for DBH values, sourced from Patheir University,*
8. *Reduction in plant density from the 4th year onwards.*
9. *For the restoration, the plants selected is 2000 as per VCU calculation spread sheets. However, the VCS-PD states 3000 and also there is no gradual decrease throughout the crediting period. Pls clarify*

Project participant response	Date: 15/11/2017
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1. The equation given in the VCS PD section 3.1 is not the same as given in the methodology. PP is requested to justify the use of a different equation for quantification of baseline net GHG removal by sink.
PP Response – *Correct equation used.*

2. Further PP is requested to demonstrate the compliance of the conditions (a), (b), and (c) as set out in paragraph 11 of the tool for the period covering the entire crediting period.

Explanation is provided in the revised VCS PD section 3.1

3. According to Tool 14, V.4.2 it is necessary to apply the Tool “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities”, which requires the accomplishment of the following conditions:

- (a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party;
- (b) The equation has been used in commercial forestry sector of the host Party for 10 years or more;
- (c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R^2) was not less than 0.85.

PP Response – *Above (a), (b), (c) are applicable for ex-post estimation of tree biomass. The same tool states “For ex ante estimation of aboveground tree biomass in project scenario any allometric equation can be used.” Therefore the equation used for ex-ante estimation is valid. The VCS PD states “For ex-post estimation allometric equations will be developed using the continued research data and research personal.”*

4. VCS PD section 3.2 is not transparent on the use of the above tool and the condition therein. PP is requested to provide the same in the VCS PD

PP Response – *Explanation provided stating that as per the tool, any equation can be used for ex ante estimation. VCS PD has also mentioned that for ex post estimations, site specific equations will be developed and used as per the tool.*

5. PP is requested demonstrate the appropriateness of the equation referred from Sukardjo & Yamada (1992) for total biomass calculation

PP Response – As per the above tool, there is no specific requirement when selecting an equation for ex ante estimations. However thorough literature review was conducted to identify most suitable allometric equation for ex-ante estimations since there are no equations developed in the project area. A research done by Sukardjo & Yamada (1992) on mangroves species in Indonesia seems to be most plausible equation. Results on this equation and results from field measurements gave similar results thus proving that this equation is the most plausible for ex-ante estimations.

6. *Evidences for the equation referred from Sukardjo & Yamada (1992) on the total biomass calculation for areas similar to the proposed project*

PP Response – *A research published by Ya min Tant, et al, 2012 provides total above and below ground biomass for six years old mangrove plantations of *Avicenia marina* (Am), *Avicenia officinalis* (Ao) and *Sonneratia apetala* (Sa) and a naturally regenerated stand (NR: consists of *Ceriops decandra*, *Bruguiera sexangula*, and *Aegiceras corniculatum*) protected for seven years. The above and below ground biomass in NR is 174 t/ha followed by Sa (101 t/ha), Am (52 t/ha) and Ao (48 t/ha). The total carbon stock in biomass was 73 tC/ha in NR, 43 tC/ha in Sa, 21 tC/ha in Am and 18 tC/ha in Ao respectively.*

The project ex ante estimates above ground and below ground biomass of 126 t/ha for 6 year plantation and 190 t/ha for 7 year plantations. Since the project also have a mixed plantation this value is similar to the value of the NR stand in the Ya min Tant et al (2012) assessment.

6 ALONGI, D.M. (2014) CARBON SEQUESTRATION IN MANGROVE FORESTS CARBON MANAGEMENT 3(3):313-322 HAVE THE FOLLOWING VALUES FOR MANGROVES (*R. APICULATA*) IN SE ASIA:

5 years - 579 tC/ha (Southern Thailand)
 6 years - 1179 tC/ha (Southern Vietnam)
 18 years - 1117 tC/ha (Malaysia)
 20 year - 979 tC/ha (Southern Vietnam)
 25 years - 808 tC/ha (Southern Thailand)
 35 years - 1904 tC/ha (Southern Vietnam)

Above and below ground carbon estimated for *Kandeliacandelin* Vietnam (Nguyen et al, 2004):

4 years - 29 tC/ha
 6 years - 73.8 tC/a
 8 years - 85.5 tC/ha
 9 years - 121 tC/ha

According to our estimates:

5 years - 21 tC/ha
 6 years - 60 tC/ha
 9 years - 205 tC/ha
 18 years - 593 tC/ha
 20 years - 627 tC/ha

Therefore we have not over-estimated the calculations by using the above Sukardjo & Yamada (1992) equation for the ex-ante calculations.

7. Evidences for DBH values, sourced from Patheir University

PP Response - The original source of the data provided by Patheir University is from Mangrove Services Network (MSN) a NGO working in the field of mangroves since 2001. One of their areas of work is research on mangroves. Since there were no site related growth data available, PP has used the growth data information on DBH that were provided by Mangrove Services Network (MSN). Certified document provided as reference.

8. Reduction in plant density from the 4th year on wards.

PP Response - This is only an assumption for ex-ante calculations based on that during the 1st three years dead plants are replaced by new plants and there after a gradual decrease is expected annually. For ex post calculations, actual mortality rates are used from the permanent sample plots.

9. For the restoration, the plants selected is 2000 as per VCU calculation spread sheets. However, the VCS-PD states 3000 and also there is no gradual decrease throughout the crediting period. Pls clarify - For lands that will be reforested 5000 plants per hectare will be planted. By the end of 20 years, it is estimated that 3000 healthy plants will be per hectare. Similarly in lands that are restored, 2000 plants are planted per hectare and by the end of 20 years, 1200 healthy trees are expected to be in one hectare. The actual standing density will be monitored and accurately used for ex-post calculations based on the permanent sample plots

Documentation provided by project participant	
- Alongi, D.M. (2014) Carbon sequestration in mangrove forests <i>Carbon Management</i> 3(3):313-322 - Ya Min Thant, Mamoru Kanzaki, Seiichi Ohta and MaungMaung Than (2012) Carbon sequestration by mangrove plantations and a natural regeneration stand in the Ayeyarwady Delta, Myanmar. <i>TROPICS</i> Vol. 21 (1) - Nguyen HT, Yoneda R, Ninomiya I et al. (2004) The effects of stand-age and inundation on carbon accumulation in mangrove plantation soil in Namdinh, Northern Vietnam. <i>TROPICS</i> Vol. 14 (1) - Annual Growth Rate of Mangrove Species by Mangrove Service Network	
VVB assessment	Date: 12/01/2018
1. Correction noted and hence issue closed 2. Checked the revised VCS PD, compliance of condition (a), (b) and (c) are demonstrated. Hence the issue closed 3. The response provided above is accepted. However VCS PD section 3.2 further states that for ex- post estimations, site specific equations will be developed and used as per the tool. Since this can be checked also at the time of first verification, audit team has decided to raise this issue as a FAR 4. Noted. Refer point no.3 above 5. Explanation provided is accepted. References were checked and hence the issue is closed 6. All the references provided were further cross checked. The response is found appropriate. Hence the issue is closed 7. The original data from Mangrove Service Network (MSN) is submitted as a proof. Hence the issue is closed. 8. Explanation provided is appropriate. Hence the issue is closed 9. Assumption used on number of plants per hectare at different time period is found reasonable. Hence the issue is closed. CAR 05 is closed FAR 1 is raised with reference to point 3.	

CAR ID	06	Section no.	3.2.6	Date: 18/09/2017
Description of CAR				

1. Methodology AR-AM0014: Afforestation and reforestation of degraded mangrove habitats Version 03.0, specifies to use a value 0.50tC/ha/yr for $dSOC_t$, ie the rate of change in SOC stocks within the project boundary, in year t; tC/ha1/yr1. However it is noticed that PP has used a higher value ie 13.23tC/ha/yr for estimation of SOC. PP is requested to provide transparent and verifiable information to justify the use of the value 13.23tC/ha/yr for $dSOC_t$.

PP is requested to demonstrate the conservativeness of the value chosen for $dSOC_t$.

2. Section 3.2 of the VCS PD is not transparent on the calculation followed for $GHG_{E,t}$, ie increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t,

Project participant response

Date: 15/11/2017

1. Soil assessment was conducted by a team from Patheingyi University led by Professor Htay Aung (report titled: Soil Carbon Measures In Magyi's Mangrove Forest, April 2015). The team referred the following document for their study - Howard, J., Hoyt, S., Isensee, K., Telszewski, M., Pidgeon, E. (eds.) (2014). Coastal Blue Carbon: Methods for assessing carbon stocks and emissions factors in mangroves, tidal salt marshes, and seagrasses. Conservation International, Intergovernmental Oceanographic Commission of UNESCO, International Union for Conservation of Nature. Arlington, Virginia, USA.

Soil samples were collected using a soil core sampler along the Magyi channel and U-To channel where a forest carbon project is being developed to restore degraded mangrove lands. GPS coordinates were recorded and a soil depth probe was used to measure the soil depth. In each location, three (3) samples were collected in soil under *Bruguiera* spp., *Ceriops* spp. and *Rhizophora* spp. which are the dominant mangrove species in the study area. Three (3) soil samples were collected at every 30 centimeter depth from each location thus giving 9 soil samples from each sample plot. The organic carbon content of the soil samples were measured using the Loss on Ignition (LOI) method. This method uses combustion and empirical relationships between organic carbon and organic matter. Laboratory tests were done at the Yangon University.

The soil organic carbon in the plots varied from 575.85 t/ha to 886.52 t/ha. The average soil organic carbon content in the studied soil was 732.26 t/ha. IPCC (2013) soil organic carbon stock for mangroves varies between 55 to 1376 t/ha. Dry bulk density of the soil was calculated as 0.64 g/cm³.

The rate of soil accretion in mangrove forests averages 5 mm year⁻¹, with 94 measurements out of a total of 139 ranging from 0.1 to 10.0 mm year⁻¹. The median value is 2.7 mm year⁻¹ with a few measurements showing net erosion (minimum value = -11.0 mm year⁻¹) or massive accretion (46.3 mm year⁻¹) in highly-impacted estuaries, such as those in southern China (Alongi, 2014).

According to studies done by the Patheingyi University, Sedimentation rate in mangrove for the Magyi area is about 10-20 mm per year. As per Alongi (2014), rate of soil accretion in mangrove forests can vary from -11 mm/year to 46.3 mm/year. A conservative value of 10mm/year was applied.

Assuming a conservative period of 100 years, rate of change in SOC stocks within the project boundary is 7.32 tC/ha/year. Therefore there is no need to use the default value of 0.5 tC/ha/year which is only going to under-estimate the actual soil carbon content in the project area.

The IPCC published in its '2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands', a default value of 1.62 tC/ha/year for mangrove ecosystems with a range of 0.10 – 10.2 tC/ha/year. The value calculated for the project, 7.32 tC/ha/year lies between this IPCC range.

Ya Min Thant et al (2012) calculated the rate of carbon sequestration to the soil was 13.7 tC/ha/year (at 1 meter depth) in their assessment of carbon sequestration by mangrove plantations and a natural regeneration stand in the Ayeyarwady Delta, Myanmar.

Alongi (2002) reported that soil carbon was 162.8 tC ha⁻¹, 189.4 tC ha⁻¹, 337.1 tC ha⁻¹ in 25, 5 and 3 years old *Rhizophora apiculata* forest in Thailand.

2. The methodology specifies to use the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" (Version 04.0) for estimation of GHG_{E,t}, i.e. increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t. The tool is applicable to all occurrence of fire within the project boundary.

Section 2.2 of the revised VCS PD includes the justification for non-applicability of this tool for estimating the project emission. Further, section 3.2 of the revised VCS PD is made transparent on the estimation of GHG_{E,t}, i.e. increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t.

Documentation provided by project participant	
1. <i>Soil Carbon Measures In Magyi's Mangrove Forest</i> 2. <i>Ya Min Thant, Mamoru Kanzaki, Seiichi Ohta and MaungMaung Than (2012) Carbon sequestration by mangrove plantations and a natural regeneration stand in the Ayeyarwady Delta, Myanmar. TROPICS Vol. 21 (1)</i>	
VVB assessment	Date: 12/01/2018
1. Justification provided in the report entitled: Soil Carbon Measures In Magyi's Mangrove Forest, April 2015 and the reference quoted therein were evaluated. RINA accept the value 7.32 tC/ha/year for ex ante estimation of the changes in carbon stocks in soil organic carbon, since it falls within the IPCC range of 0.10 – 10.2 tC/ha/year for mangrove ecosystem. 2. Section 2.2 of the revised VCS PD demonstrate the non-applicability of this tool for estimating the project emission. Section 3.2 of the revised VCS PD is made transparent on the estimation of GHG_{E,t}, i.e. increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t. Hence CAR 06 is closed and FAR 2 is raised	

CAR ID	07	Section no.	3.2.6	Date:	18/09/2017
Description of CAR					
RINA team reviewed the excel sheets submitted by PP 'VCU calculation MM –Final' and noticed that uncertainties associated with the calculation of emissions are not addressed appropriately. PP shall refer the methods for applying uncertainty in Appendix 2 of the methodological tool, 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' Version 04.1, PP is requested to apply the provisions given in the appendix 2 of the tool, and include the justification in the VCS PD and the emission reduction spread sheet.					
Project participant response					Date:
					15/11/2017

The change in carbon stock in tree biomass in this project within the project boundary was estimated using the A/R methodological tool “estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” (Version 04.2). Under the “Estimation by modelling of tree growth and stand development” method, existing data (diameter etc) were used in combination with tree growth models to predict the growth of trees and the development of the tree stand over time.

According to the methodology, ex-ante estimation of carbon stock in tree biomass is not subjected to uncertainty control, although the project participants should use the best available data and models that apply to the project site and the tree species.

Documentation provided by project participant

n/a

VVB assessment

Date: 12/01/2018

Audit team accept the above argument on uncertainty.

Hence CAR 07 is closed

CAR ID	08	Section no.	3.2.8	Date:	18/09/2017
Description of CAR					
As per Para 6.1 of the methodology, the monitoring plan shall provide for collection of all relevant data necessary for: a) Verification that the applicability conditions listed under paragraphs 3 and 4 have been met; b) Verification of changes in carbon stocks in the pools selected; c) Verification of project emissions and leakage emissions. PP is requested to explicitly explain the inclusion of all the above components in the proposed monitoring plan. As per para 6.2 of the methodology, information shall be provided, and recorded in the project design document, to establish that the commonly accepted principles and practices of forest inventory and forest management in the host country are implemented. If such principles and practices are not known or available, standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for inventory operations, including field data collection and data management, shall be identified, recorded and applied. Use or adaptation of SOPs available from published handbooks, or from the “IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry 2003”, is recommended. PP is requested to provide justification on use of commonly accepted principles and practices of forest inventory and forest management in the host country for monitoring the project activity.					

Project participant response	Date: 15/11/2017
Section 4.2 Data and Parameters Monitored have listed all the parameters that shall be monitored during the project period with a description of measurement methods, frequency, equipments used and QA/QC procedures. The main reference document used for the project related to SOPs and for monitoring is the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (2003).	
Documentation provided by project participant	
Good Practice Guidance for Land Use, Land-Use Change and Forestry (2003) IPCC	
VVB assessment	Date: 12/01/2018
The revised VCS PD is updated with the information required for compliance of the monitoring plan requirements. The reference document are also incorporated.	
Hence CAR 08 is closed	

CAR ID	09	Section no.	3.3	Date: 18/09/2017
Description of CAR				
For each risk factor PP is requested to provide the following information: Project Management Risk : provide agreements with the village tract chairmen of each village and ensure sufficient staff be able to take care the plants and in this manner the encroachment of outside players that could intentionally or unintentionally damage the planted areas is avoided. Project longevity risk : Provide documentary evidence to prove that project proponent has a legal agreement to continue the management practice for the entire duration of the project activity. Provide all ownership documents: Land lease agreement between WIF and Pathein University, Thabawkan and Village Tract Mangrove Conservation Committee and Thaekone and Village Tract Mangrove Conservation Committee to ensure the entire project longevity of 30 years. Financial viability: why the non- applicability of no financial return from mangrove reforestation other than the carbon credit benefits. Provide stakeholder consultation report for assessing the net positive impacts & opportunity cost for the project activity. The total of internal risk score need to be re-checked whether it is 0 or -2. Also re-check the total Project longevity score.				

Project participant response	Date: 15/11/2017
1. Project Management Risk : provide agreements with the village tract chairmen of each village and ensure sufficient staff be able to take care the plants and in this manner the encroachment of outside players that could intentionally or unintentionally damage the planted areas is avoided. – MoU for Magyi is signed between WIF and University of Pathein. For this area WIF is responsible to take care the plants and to avoid encroachment of outside players. Therefore the staff themselves makes sure this will be properly implemented. For lands in Thabawkan and Thaegone, there are already MoUs for the proposed activities. The agreements with the village tract chairmen on taking care of plants are yet to sign. However the main responsibility of maintaining the plantations lies with WIF therefore WIF also will ensure adequate staff is recruited to avoid outside encroachments. 2. Project longevity risk : Provide documentary evidence to prove that project proponent has a legal agreement to continue the management practice for the entire duration of the project activity. Provide all ownership documents: Land lease agreement between WIF and Pathein University, Thabawkan and Village Tract Mangrove Conservation Committee and Thaekone and Village Tract Mangrove Conservation Committee to ensure the entire project longevity of 30 years. Section 3.4 of the MoU between WIF and the Forest Department (Government of Myanmar) dated 11.08.2017 mention that the forest carbon projects implemented are for a period of minimum 100 years (Document No 6 in Folder titled CAR 09) The MoUs signed between WIF and Pathein University, Thabawkan and Village Tract Mangrove Conservation Committee and Thaekone and Village Tract Mangrove Conservation Committee have been provided as evidence which mention a minimum period of 30 years which can be extended further. (Document Numbers 3,4,5 in Folder titled CAR 09) 3.Financial viability: why the non- applicability of no financial return from mangrove reforestation other than the carbon credit benefits. The proposed project is implemented by Worldview International Foundation (WIF). WIF is an INGO and other partners involved are the University of Pathein and local communities from three village tracts. None of the species used for the project are commercially valuable for this proposed project. The sole purpose of the replanting is to restore the degraded lands, to provide livelihood opportunities for the local communities, to conduct research activities etc. Therefore any financial return other than carbon credits is not applicable. 4. Provide stakeholder consultation report for assessing the net positive impacts & opportunity cost for the project activity. Three main meetings were held to discuss/ assess net positive impacts of the project. Date: 15.01.2016 Village - Thaegone Date: 08.07.2016 Village – Thabawkan Date: 18.12.2016 Participants – Forest Department officers, WIF staff Documents are provided for references 5.The total of internal risk score need to be re-checked whether it is 0 or -2. Also re-check the total Project longevity score. – Checked and found alright	

Documentation provided by project participant	
1. MOU between WIF and Patheingyi University 15_Nov_2013 2. MOU between WIF and Patheingyi University 15_July_2016 3. MoU between WIF and PU Amended 4. Agreement between Thagayon Village tract and WIF 5. Agreement between Thabawkan and WIF 6. MOU between WIF and Forest Department (FD) 11_Aug_2017 7. Meeting with WIF & Thagayon (English and Myanmar versions) 8. Meeting with WIF & Thabawkan (English and Myanmar versions) 9. Meeting with WIF & Forest Department Officer (English and Myanmar versions)	
VVB assessment	Date: 28/01/2018
RINA checked the responses given above by referring the documents provided. Found that the risk estimated are reasonable and are in line with the requirements of Non-permanence risk tool: VCS Version 3.3. hence the issues given above (Point no. 2, 3, 4,5) are closed For Point no. 1, PP has provided MoU signed between WIF and University of Patheingyi for Magyi area. This MoU specifies WIF's role in managing the project management risk. However for Thabawkan and Thagayon area, there are no such agreements in place, though there are MoUs with village tract chairman for using the area for reforestation project. Since it is a post implementation requirement and plantation in these villages are not yet initiated, the audit team decided to raise this issue as a FAR3.	

CAR ID	10	Section no.	4.1	Date: 18/09/2017
Description of CAR				
In section 5.1 of the VCS-PD, PP is requested to identify and discuss any potential negative environmental and socio-economic impacts identified by the project proponent and discuss whether reasonable steps have been taken to mitigate such impacts.				
Project participant response				Date: 15/11/2017

There are no negative impacts identified during the stakeholder meetings and/or during baseline surveys. The project will be reforesting degraded lands using mangrove species, therefore it will overall increase the forest cover and restore the degraded lands.

Lands belong to the Government and PP is not buying or obtaining the ownership of the lands in anyway. Land will be leased to the University and to two village tract committees. Therefore there is no land grabbing or any kind of forced eviction since lands are degraded and no one is living in these lands.

Positive environmental impacts are explained in Section 5.2

Documentation provided by project participant

1. Meeting with WIF & Thaegone (English and Myanmar versions)
2. Meeting with WIF & Thabawkan (English and Myanmar versions)
3. Meeting with WIF & Forest Department Officer (English and Myanmar versions)

VVB assessment

Date: 12/01/2018

Section 5.1 of the VCS-PD now discuss the potential negative environmental and socio-economic impacts identified by the project proponent. Noted that there were no negative comments. Also confirmed with stakeholders during the site visit.

CAR 10 is closed.

CAR ID	11	Section no.	4.3	Date:	18/09/2017
Description of CAR					
As per the VCS-PD, it is understood that the PP has carried out several stakeholders consultations. However, PP is requested to refer only the stakeholder's consultations, which is part of the VCS project activity. Further, provide the minutes of the meeting and list of participants who attended the meeting. Further it is not clear, if there were any negative comments and how these comments were addressed.					
Project participant response					Date:
					15/11/2017

PP has conducted several types of stakeholder consultations. Main one was with the communities of the village tracts. Most of these meetings were to discuss about the status of the project but 2 main meetings with the committees were to introduce the carbon credit concept and to identify any positive and negative impacts of the project.

Second type is with the Forest Department officers to discuss about the project and positive/negative impacts of such projects. According to the meeting minutes there were no negative impacts of the project.

Third type is by way of organizing an awareness program for the school children and involving them in an art competition. Benefits of mangroves were explained to the school children supported by field visits to the mangrove areas. Then they were asked to draw on topics related to mangroves and the importance of their protection. Even though this may look irrelevant this competition helped to disseminate information among young and adult communities.

Documentation provided by project participant

1. Meeting with WIF & Forest Department Officer (English and Myanmar versions)
2. Folder "2. Thaegone meetings" in CAR 10 folder
3. Folder "3. Thabawkan meetings" in CAR 10 folder

VVB assessment

Date: 12/01/2018

PP has conducted many stakeholders prior to the implementation of planation activities as well as prior to listing the VCS-PD in the VCS registry. The project is proposed to be implemented in three areas Shwethaungyan area, Thaegone village and Thabokkan village. It is checked and confirmed that PP has conducted individual consultations at all the three areas. Relevant stakeholders were invited for the meeting, which was confirmed by means of minutes of meeting /81/, also confirmed by interviewing the stakeholders during the site visit /36/. It was also checked that apart from the local villagers, WIF team also had discussions with the forest dept. officials /81/. As discussed above RINA cross checked the attendance list of stakeholders' and also interviewed some of the local stakeholders during site visit to confirm the consistency of the information provided in the VCS-PD and the same was found to be appropriate.

CAR 11 is closed.

Table 3. FAR from this validation

FAR ID	01	Section no.	3.2.6	Date:	04/02/2018
Description of FAR 1					

As per the methodology, (Equation no.2) change in carbon stock in tree biomass in project in year t , shall be estimated by using the tool, “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e. and “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (Version 01.0.0). The tool states that, for ex ante estimation of aboveground tree biomass in project scenario, any allometric equation can be used. Accordingly, PP has used an allometric equation given in Sukardjo & Yamada (1992).

However, for ex-post estimation, PP has adopted the method described in section II, paragraph 6 of the same tool, which specify to use a species-specific or group-of-species-specific allometric equation derived from trees growing in edapho-climatic conditions similar to those in the project area. Further, in Section 3.2 of VCS PD, PP states that for ex-post estimation of project emission, such allometric equation will be developed using the continued research data and research personal and using the permanent sample plots that have been set up within the project.

In view of the above, PP is requested to publish these research findings in peer-reviewed journals in order to ascertain that, the data or parameters used are correct and appropriate for the project circumstances. Audit team hence decided to raise this issue as FAR.

Project participant response

Date: DD/MM/YYYY

Documentation provided by project participant

VVB assessment

Date:DD/MM/YYYY

FAR ID	02	Section no.	3.2.6	Date: 04/02/2018
Description of FAR 2				

For the ex-ante estimation of SOC pool, PP has used site specific value for $dSOC_t$ derived from field based data. RINA audit team has evaluated all the research work related to soil carbon estimation and found that the value chosen for the project is relevant. PP has provided transparent and verifiable information to justify that the value used is appropriate to the project context. Hence RINA accepted the chosen value for ex-ante estimation of the changes in carbon stocks in soil organic carbon.

However, as per paragraph, 3.2.5 of Validation and Verification manual, ver 3.2, in order to ascertain the validity of the data or parameter provided by PP, it shall be sourced from relevant peer-reviewed journals/literature. Hence PP is requested to use data from such published sources and the same shall be made available during the time of project monitoring and verification. Since the issue can be dealt even post validation, RINA team has decided to raise this issue as a FAR.

Project participant response	Date: DD/MM/YYYY
Documentation provided by project participant	
VVB assessment	Date: DD/MM/YYYY

FAR ID	03	Section no.	3.3	Date: 04/02/2018
Description of FAR 3				
To address the project management risk, PP has provided MoU signed between WIF and University of Pathein for Magyi area. This MoU specifies WIF's role in managing the project management risk. However for Thabawkan and Thaegone area, there are no such agreements in place, though there are MoUs with village tract chairman for using the area for reforestation project. Since it is a post implementation requirement and plantation in these villages are not yet initiated, the audit team decided to raise this issue as a FAR.				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				Date: DD/MM/YYYY

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FAR ID	04	Section no.	3.1	Date: 04/02/2018
Description of FAR 4				
The area under the Pathein University considered for the VCS project is 737.04 ha. However the document from the Regional Ministry of Agriculture, Livestock , Natural Resource & Environment, confirms that 728 ha of land handed over to Pathein University that doesn't have forest, dated 18/05/2017 /27/. During the site visit, PP confirmed that the MoU signed between WIF and Pathein university was for 785 Ha /22/, and they have applied for an extension of areas with the Regional Ministry of Agriculture, Livestock, Natural Resource & Environment . The same was also confirmed by the representatives from Pathein Univesrity. RINA closed the CL based on the ammended MoU ad site visit interviews. However, PP is requested to provide the ammended document from the Regional Ministry of Agriculture, Livestock , Natural Resource & Environment: to confirm that 785 ha or at least 737.04 ha land was handed over to Pathein University that doesn't have forest, The same needs to be checked during the first verification.				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				Date: DD/MM/YYYY



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
 We declare that Mr/Mrs/Ms:

Rekha Menon

è qualificato come:
 is qualified as:

TEC, VAL, VER, TL, ITRP

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13
13.2	Manure	13
14.1	Afforestation and reforestation	14

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
 Scheme Leader
 Rita Valoroso

Rita Valoroso

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

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UNFCCC	quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects
VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
 We declare that Mr/Mrs/Ms:

Danhya Nambiar

è qualificato come:
 is qualified as:

TEC

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13
13.2	Manure	13
14.1	Afforestation and reforestation	14

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template

Responsabile di schema
 Scheme Leader
 Rita Valoroso

Rita Valoroso

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

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UNFCCC	quali Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects
VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
 We declare that Mr/Mrs/Ms:

Geisa Maria Principe Branco Sabettoni

è qualificato come:
 is qualified as:

TEC, VAL, VER, TL, ITRP

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
13.1	Solid waste and wastewater	13

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	18/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
 Scheme Leader
 Rita Valoroso

Rita Valoroso

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CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
 We declare that Mr/Mrs/Ms:

Talita Carvalho Beck

è qualificato come:
 is qualified as:

TEC, VAL, VER, TL
LOCAL EXPERT

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
13.1	Solid waste and wastewater	13
14.1	Forestry	14

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)
1	14/08/2017	Update qualification in TA 14.1 and Local expert

Responsabile di schema
 Scheme Leader
 Laura Severino

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VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
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The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects