INITIAL ENVIRONMENTAL EXAMINATION (IEE) FOR MAUNG-MA-GAN HOTEL ZONE BEING INVESTED BY DAWEI DEVELOPMENT PUBLIC CO., LTD. (DDPC)






Reported by

Ever Green Tech Environmental Services and Training Co., Ltd.

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Table of Content

List of Figures

List of Table

List of Abbreviations

ACI	Activated Carbon Injection
BOD	Biochemical Oxygen Demand
BTU	British Thermal Units
CAP	Corrective Action Plan
CDC	City Development Council
COD	Chemical Oxygen Demand
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSR	Corporate Social Responsibility
dB	Decibel
DDPC	Dawei Development Public Company Limited
D.G	Diesel Generator
ECD	Environmental Conservation Department
EO	Environmental Officer
CPA	Corrective Action Plan
EHS	Environmental Health and Safety
EMM	Environmental Management and Monitoring
EMP	Environmental Management Plan
EPA (Australia)	Environmental Protection Authorities (Australia)
ESIA	Environmental and Social Impact Assessment
GPS	Global Positioning System
IEE	Initial Environmental Examination
IFC	International Finance Cooperation
IUCN	International Union for Conservation of Nature
LED	Light Emitting Diode
NEQG	National Environmental Quality (Emission) Guidelines
NGO	Non-Government Organization
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
OHS	Occupational Health and Safety
PM	Particulate Matter
PPE	Personal Protective Equipments
RP	Representative Persons
SMP	Social Management Plan
SO_2	Sulphur Dioxide
TDS	Total Dissolved Solid
USEPA	Environmental Protection Agency (American)
WB	World Bank
WHO	World Health Organization

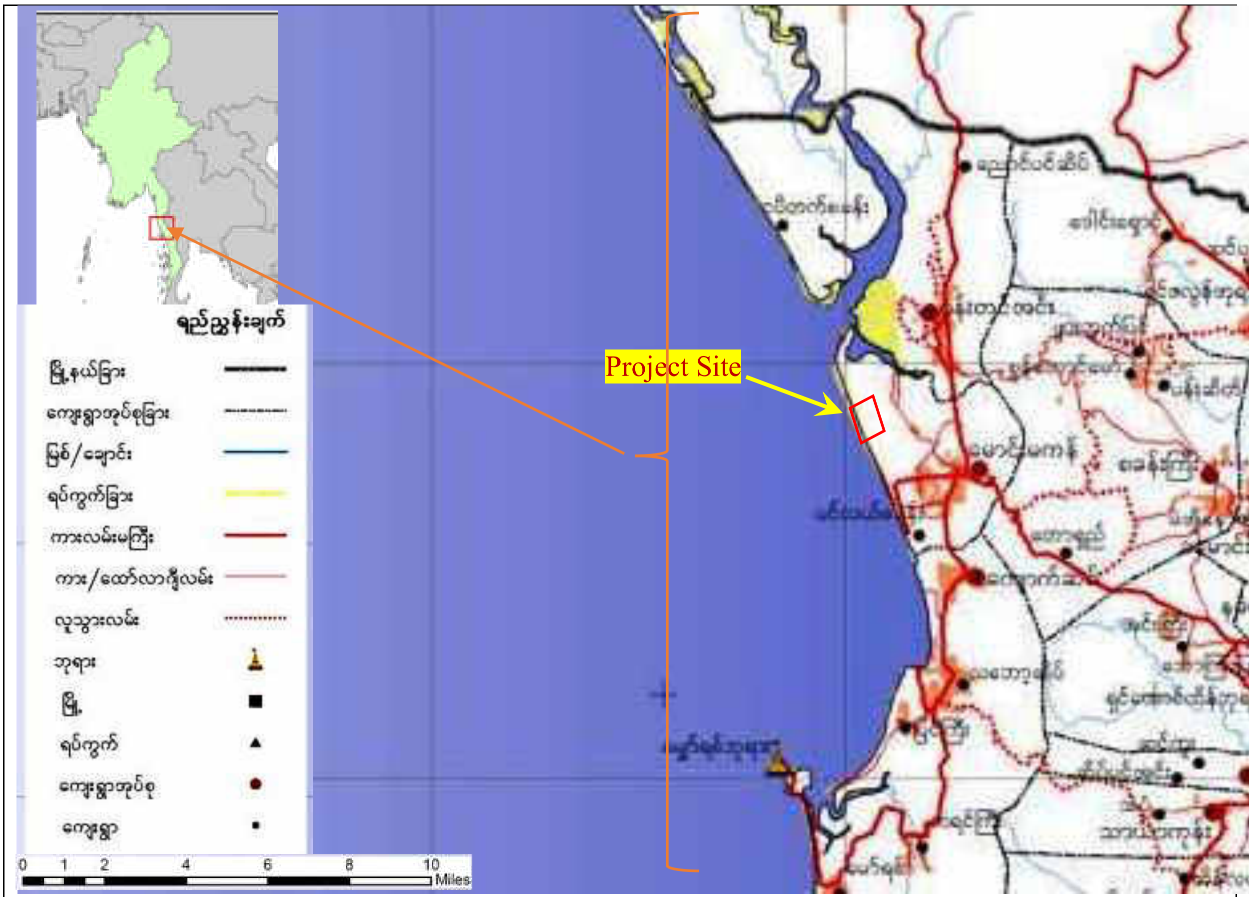
၁။ အနှစ်ချုပ်အစီရင်ခံစာ (မြန်မာဘာသာ)

၁-၁။ နိဒါန်း

Dawaei Development Public Company Limited (DDPC) မှ တနင်္သာရီတိုင်းဒေသကြီး ၊ လောင်းလုံမြို့နယ်၊မောင်းမကန်ကျေးရွာအုပ်စုအနီးတွင် Orchid Garden Resort ဟိုတယ်စက်မှုဇုံအား တည်ဆောက်လည်ပတ်မည်ဖြစ်ပါသည်။ မြန်မာနိုင်ငံတွင်ပြဌာန်းထားရှိပြီးသောပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ထုံးလုပ်နည်း (၂၀၁၅) တို့အရ အဆိုပြုဟိုတယ်စီမံကိန်းသည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (Initial Environmental Examination – IEE)အားလုပ်ဆောင်ရမည်ဖြစ်ပါသည်။ ထိုကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းများအား လုပ်ဆောင်လျက်ရှိသည့်တတိယအဖွဲ့အစည်း (Third Party) တစ်ခုဖြစ်သည့် Ever Green Tech Environmental Services and Training Co., Ltd. ဖြင့်လုပ်ဆောင်ခဲ့ခြင်းဖြစ်ပါသည်။

၁-၂။စီမံကိန်းတည်နေရာ

အဆိုပြုစီမံကိန်းသည် တနင်္သာရီတိုင်းဒေသကြီး၊ လောင်းလုံမြို့နယ်၊ မောင်းမကန်ကျေးရွာအုပ်စု၊ မောင်းမကန်ကမ်းခြေတွင် မြောက်လတ္တီကျူ (19°9′23.54″) နှင့် အရှေ့လောင်ဂျီကျူ (98°5′25.76″) တွင် တည်ရှိပါသည်။ ထိုစီမံကိန်းတည်နေရာပုံကို အောက်ပါပုံတွင် ဖော်ပြထားပါသည်။



ပုံ ၁.၁ စီမံကိန်းတည်နေရာပြမြေပုံ

၁-၃။ စီမံကိန်းအဆိုပြုသူ အကျဉ်းဖော်ပြချက်အကျဉ်း

စီမံကိန်းအဆိုပြုသူ အကျဉ်းအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

စီမံကိန်းအဆိုပြုသူ	ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှုအများပိုင် ကုမ္ပဏီလီမိတက် (DDPC)
စီမံကိန်းအမျိုးအစား	ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်း
ပါဝင်မည့်အဆောက်အဦးများ	နှစ်ခန်းတွဲ အဆောက်အအုံ ၄၄ လုံး (အခန်းစုစုပေါင်း ၈၈ ခန်း)၊ ဆယ်ခန်းတွဲ အဆောက်အဦး ၁ လုံး (အခန်း ၁၀ ခန်း)၊ ဘန်ဂလိုအလုံး ၅၀ (စုစုပေါင်း အခန်း ၅၀)
ကုမ္ပဏီ လိပ်စာ	ကajr‰ကင်းလမ်းနှင့် ဆိမ်ကမ်းသာလမ်းထောင့်၊ ထိeန်းသစ်ရပ်ကွက်၊ ထားဝယ်မြို့။

	ဖုန်းနံပါတ် - 059 – 2023955 , 2023956 , 2023958 **အီးမေး** - secretary@ddpcmyanmar.com, cg@ddpcmyanmar.com

၁-၄။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်မည့်တတိယအဖွဲ့အစည်းအကျဉ်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်မည့် Ever Green Tech Environmental Services and Training Co., Ltd. နှင့် သက်ဆိုင်သော အချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

Ever Green Tech Environmental Services & Training Co., Ltd.	
Company မှတ်ပုံတင်အမှတ်	3344/2015-2016 (Ygn)
Transitional Third Party Registration Number	0047
လိပ်စာ	တိုက်အမှတ် (၁၄)၊ သီရိမြို့ (၈)လမ်း၊ ၁၃ ရပ်ကွက်၊ လှိုင်မြို့နယ်၊
ဖုန်းနံပါတ်	09-5099230
အီးမေး	green.evergreentech@gmail.com,
ဆက်သွယ်ရန် ပုဂ္ဂိုလ်	Dr. Kyaw Swar Tint အဓိကအကြံပေး 09-5099232

၁-၅။ ပါဝင်သောပညာရှင်များနှင့်၎င်းတို့၏ လုပ်ငန်းတာဝန်များ

အစီရင်ခံစာရေးဆွဲရာတွင်ပါဝင်သောပညာရှင်များနှင့် သက်ဆိုင်ရာ လုပ်ငန်းတာဝန်အသီးသီးမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

Name	Degree	Responsibility	Experiences
1. Dr. Kyaw Swar Tint	Ph.D. (Mining)	Noise and Environmental Management	At least 7 yrs experiences in environmental related field
2. Dr. Thein Tun	Ph.D. (Metallurgy)	Soil Quality	At least 4 yrs experiences in environmental related field
3. Dr. Myo Min Tun	Ph.D. (Metallurgy)	Air Quality	At least 4 yrs experiences in environmental related field

4. Dr. Ei Mon Aung	Ph.D. (Chemical)	Process, Utilities and Wastewater Treatment	At least 3 yrs experiences in environmental related field
5. Dr. Kyaw Zay Moe	Ph.D. (Botany)	Flora Diversity	At least 3 yrs experiences in environmental related field
6. Dr. Ko Myint	Ph.D. (Zoology)	Fauna Diversity	At least 3 yrs experiences in environmental related field
7. Dr. Khon Aung	M.B.B.S (Ygn)	Occupational Safety and Health	At least 5 yrs experiences in environmental related field
8. U Min Aung	M.Sc. (Chemistry)	Water Quality	At least 6 yrs experiences in environmental related field
9. Ms. Thazin Htwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Public Consultation and Participation	At least 4 yrs experiences in environmental related field
10. Ma Nandar Nwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Risk Assessment and Management	At least 4 yrs experiences in environmental related field
11. Mg Yaw Ma Nar	B.Sc. (Forestry), Dip. In EIA/EMS	Environmental Baseline Study	At least 3 yrs experiences in environmental related field
12. Ma May Thet Zaw	M.E. (Civil)	Water Resources Management and Hydrology	At least 3 yrs experiences in environmental related field
13. Ma Nay Chi Win Mg	M.E. (Civil)	Traffic	At least 2 yrs experiences in environmental related field
14. Dr. Win Swe	Ph.D (Geology)	Oceanography and Hydrology	At least 2 yrs experiences in environmental related field
15. U Aung Naing Tun	L.L.B, M.B.A, M.A (B.L), M.A (TEFL)	Laws and Regulations	At least 4 yrs experiences in environmental related field

၁-၆။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း၏ရည်ရွယ်ချက်များ

ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှု အများပိုင်ကုမ္ပဏီလီမိတက် (DDPC)မှ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာတင်ပြခြင်း၏ ရည်ရွယ်ချက်မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

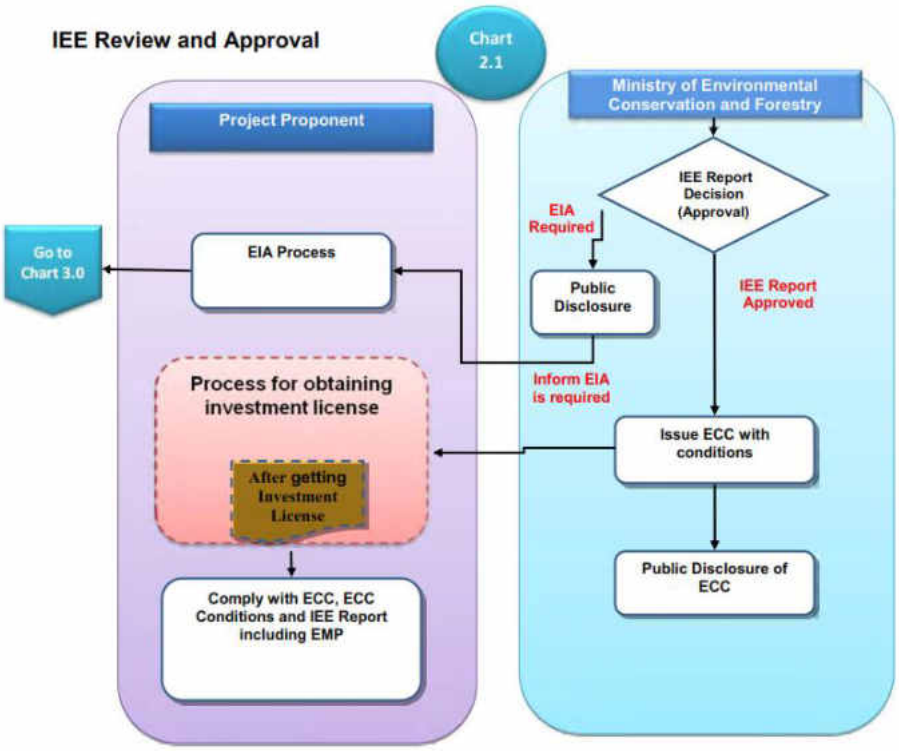
- စီမံကိန်းအနီးပတ်ဝန်းကျင်ကို စီမံကိန်းလုပ်ငန်များကြောင့် ရုပ်ပိုင်းဆိုင်ရာ၊ ဇီဝပိုင်းဆိုင်ရာ၊ လူမှုစီးပွားရေးဆိုင်ရာနှင့် ယဉ်ကျေးမှုအမွေအနှစ်များအား ထိခိုက်နိုင်မှုများကိုဆန်းစစ်ရန်၊
- စီမံကိန်းအကောင်အထည်ဖော်ခြင်းကြောင့်ထိခိုက်နိုင်မည့် ဒေသခံလူထု၏ စီမံကိန်းအပေါ် သဘောထားကို သိရှိနိုင်ရန် လူထုတွေ့ဆုံပွဲများလုပ်ဆောင်သတ်မှတ်ရန်၊
- စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ဆိုးကျိုးများကိုလျော့ချရန်နိုင်သည့် အစီအစဉ်များကို ဆောင်ရွက်ရန်၊
- စီမံကိန်းလုပ်ငန်းစဉ်များသည် ဆိုးကျိုးများလျော့ချပေးနိုင်သည့် နည်းများနှင့် စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များအတိုင်း လုပ်ဆောင်နေကြောင်း အစီရင်ခံစာများ ရေးသားဖော်ပြ နိုင်ရန်
- ဆိုးကျိုးများလျော့ချပေးနိုင်မည့် နည်းလမ်းများနှင့် စောင့်ကြည့်လေ့လာမည့် အစီအစဉ်များကို တာဝန်ယူမည့်လူ (သို့) အဖွဲ့ ကိုသတ်မှတ်ပေးရန်

၁-၇။ မူဝါဒ၊ ဥပဒေဆိုင်ရာနှင့် အဖွဲ့အစည်းဆိုင်ရာလိုက်နာဆောင်ရွက်ချက် အမျိုးသားအဆင့်သတ်မှတ်ချက်များ

ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၁၄) နှင့် မြန်မာနိုင်ငံ၏ အမျိုးသားပတ်ဝန်းကျင်မူဝါဒ(၁၉၉၄) အရ၊ ပတ်ဝန်းကျင်နှင့် လူမှုစီမံခန့်ခွဲရေးအတွက် ဥပဒေဆိုင်ရာများကို ထောက်ပံ့ပေးသော(၂၀၁၅)ခုနှစ်၊ ဒီဇင်ဘာလ(၂၉)ရက်နေ့ တွင်ထွက်ရှိလာသည့် မြန်မာပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်းနှင့်အညီ ပြုလုပ် ဆောင်ရွက်ခဲ့ပါသည်။

ထို့အပြင် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE)ကို ဆောင်ရွက်ရာတွင်(၂၀၁၅)ခုနှစ်၊ ဒီဇင်ဘာလ (၂၉) ရက်နေ့တွင် ထွက်ရှိလာသည့် မြန်မာ့အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွှတ်မှု(NEQ) လမ်းညွှန်ချက်များနှင့်အညီပြုလုပ်ခဲ့ပါသည်။လမ်းညွှန်ချက်များသည် အပြည်ပြည်ဆိုင်ရာဘဏ္ဍာရေးပူးပေါင်း ဆောင်ရွက်ရေးအဖွဲ့(IFC)၊ပတ်ဝန်းကျင်ကျန်းမာရေးနှင့်ဘေးအန္တရယ်ကင်းရှင်းရေး(EHS)လမ်းညွှန်ချက်များ အပေါ် များစွာအခြေပြုထားပြီး၊ ဆူညံမှုနှင့်တုန်ခါမှု၊ လေထုတ်လွှတ်မှုနှင့် စွန့်ထုတ်အရည်စွန့်ထုတ်မှုများ အပါအဝင် အမျိုးမျိုးသောပတ်ဝန်းကျင်ဆိုင်ရာသတ်မှတ်ချက်များ၏ ကွပ်ကဲရေးနှင့်ထိန်းချုပ်ရေး တို့အတွက် အခြေခံစနစ်ကို အထောက်အကူပြုပါသည်။

လုပ်ငန်းစဉ်၏အကျဉ်း(ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်းမှထုတ်ယူထားပါသည်)ကို ပုံ ၁.၁ တွင်ဖော်ပြထားပါသည်။



မြန်မာနိုင်ငံတွင် ပြဌာန်းထားရှိပြီးသော အဆိုပြုစီမံကိန်းနှင့်သက်ဆိုင်သည့်မူဝါဒ၊ ဥပဒေဆိုင်ရာနှင့်အဖွဲ့အစည်း ဆိုင်ရာ လိုက်နာဆောင်ရွက်ရမည့် ဥပဒေများအကျဉ်းချုပ်မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

Laws and Regulations	Year
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008
Environmental Conservation Law (Law No.7(o), 14,15,24,25,29)	2012
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014
EIA Procedures (Article 102 to 110, 113, 115, 117)	2015
National Environmental Quality (Emission) Guidelines	2015
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016
Labour Organization Law, (Law No. 1,7 to 11)	2011
The Settlement of Labour Dispute Law, (Law No. 38, 39, 40, 51)	2012
Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013
The Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014
Minimum Wages Law (Law No. 12, 13 (a to g)	2013
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016

The Myanmar Insurance Law (Law No. 15, 16)	1993
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012
Workman Compensation Act	1951
Law Amending the Factories Act 1951 (Pyidaungsu Hluttaw Law No. 12/2016)	2016
Public Health Law (Law No. 3, 5)	1972
Pesticide Law (Pyidaungsu Hluttaw Law No. 14/2016)	2016
Private Industrial Enterprise Law	1990
Forest Law	1992
Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994
Protection and Preservation of Cultural Heritage Regions Laws (Law No. 15, 16)	1998
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006
Environmental Conservation Law	2012
Agricultural Land Law	2012
The Protection and Preservation of Antique Objects Law (Law No. 12,15 20)	2015
The Protection and Preservation of Ancient Monuments Law (Law No. 12,15 20)	2015
The Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013
The Freshwater Fisheries Law (Law No. 36,40,41)	1991
Myanmar Petroleum and Petroleum Products Law (Article 32, 33)	2017
Automobile Law (Pyidaungsu Hluttaw Law No. 55/2015)	2015
The Myanmar Engineering Council Law (Law No. 20,24,25, 31(a), 37)	2013
Myanmar Mining Law	2018
Myanmar Mining Rule	2018
Tanintharyi Region Environmental Conservation and Cleaning Law	2018

၁-၈။ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်

(က) စီမံကိန်းလုပ်ဆောင်သွားမည့် လုပ်ငန်းစဉ်

အဆိုပြုစီမံကိန်းသည် တနင်္သာရီတိုင်း၊ လောင်းလုံးမြို့၊ မောင်းမကန်ကျေးရွာ အနီးရှိ မောင်းမကန်ကမ်းခြေတွင် ကမ်းခြေသို့လာရောက်လည်ပတ်ကြသည့် တစ်နှစ်ထက်တစ်နှစ်ပိုမိုများပြားလာသည့် ခရီးသွားများအဆင်ပြေစွာတည်းခိုနားနေနိုင်ရေးအတွက် ဒေသခံလုပ်ငန်းရှင်များ၏အစုရှယ်ယာများဖြင့်ဖွဲ့စည်းထားသည့် DDPC မှ မြေဧက (၆၀.၄၈) ပေါ်တွင် ဟိုတယ်အဆောက်အဦး (၃)လုံး တည်ဆောက် သွားပါမည်။ ထိုဟိုတယ်အဆောက်အဦးတွင် မိသားစုအိပ်ခန်း(၈၈)ခန်း၊ တစ်ယောက် အိပ်ခန်း (၁၀) ခန်း၊ ဘန်ကလို (၁) လုံးတွင် အခန်း (၁) ခန်းပါဝင်ပြီး၊ ဘန်ကလို အလုံး (၅၀) တည်ဆောက် ထားပြီး အခန်းပေါင်း (၁၄၈) ခန်းဖြင့် ဖွဲ့စည်းထားပါသည်။

(ခ) အခြားဆက်စပ်အဆောက်အဦးများ

ထိုဟိုတယ်စီမံကိန်းတွင် ဝန်ထမ်းအိမ်ရာ၊ရုံးခန်း၊ ရေကူးကန်၊ အဝတ်လျော်ခန်း၊ မီးအားပေးစက်ခန်းတို့ကို ဟိုတယ်၏တောင်ဘက်ပိုင်းတွင် တည်ဆောက်ထားပြီး ရေဆိုးသန့်စင်စက်များကိုလည်း တည်ဆောက်တပ်ဆင်သွားမည် ဖြစ်ပါသည်။

(ဂ) စီမံကိန်းအကြောင်းအရာအကျဉ်းဖော်ပြချက်

စီမံကိန်းအကျဉ်းအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

အကြောင်းအရာ	ဖော်ပြချက်
ရည်ရွယ်ချက်	မောင်းမကန်ကမ်းခြေသို့ လာရောက်လည်ပတ်သည့် ခရီးသွားများအား အကောင်းဆုံးဝန်ဆောင်မှုပေးနိုင်ရန်။
စွန့်ပစ် ပစ္စည်းများ စီမံခန့်ခွဲမှု	
အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	ပြန်လည်အသုံးပြုနိုင်သော လုပ်ငန်းသုံးအမှိုက်များ နှင့် အိမ်သုံးအမှိုက်များ ပြန်လည် အသုံးပြုသွားမည်ဖြစ်ပါသည်။ ၄င်း အမှိုက်များအား အမျိုးအစားခွဲခြားပြီး စည်ပင်သာယာရေးကော်မတီ၏ လမ်းညွှန်ချက်နှင့်အညီ စွန့်ပစ်သွားမည် ဖြစ်ပါသည်။
စွန့်ပစ်ရေ	ထွက်ရှိလာသောရေဆိုးများကို သန့်စင်ပြီး ပြန်လည်အသုံးပြု ပါမည်။

အခြေခံအဆောက်အဦးများ	
ရုံး နှင့်လုပ်ငန်းဆိုင်ရာများ	ရုံးခန်းကို စီမံခန့်ခွဲမှုအပိုင်းလုပ်ဆောင်နိုင်ရန် ဆောက်လုပ်ထားပါသည်။
ဆက်သွယ်မှုလမ်း အမျိုးအစား	ထား၀ယ် - မောင်းမကန် လမ်းမကြီးဘေး ကပ်လျက်တွင် ဟိုတယ်ကို တည်ဆောက်ထားပါသည်။
အလုပ်သမား ခန့်ထားနိုင်မှု	
အလုပ်သမား ခန့်ထားနိုင်မှု	**၁။ လုပ်ငန်းခွင်အကြို တည်ဆောက်ခြင်း ကာလ** လုပ်ငန်းခွင် အကြိုတည်ဆောက်ခြင်းကာလတွင် အလုပ်သမားဦးရေ (၁၀) ဦးခန့်သာ ထားရှိမည်ဖြစ်ပြီး၊ အနီးဆုံးကျေးရွာမှ လူများကိုသာ အများဆုံး ခန့်အပ်သွားမည်ဖြစ်သည်။
	၂။ လုပ်ငန်းခွင် တည်ဆောက်ခြင်းကာလ လုပ်ငန်းခွင်တည်ဆောက်ခြင်းကာလတွင် အလုပ်သမားဦးရေ (၃၀) ခန့်ထားရှိမည်ဖြစ်ပြီး၊ ထိုဒေသမှ ဒေသခံပြည်သူအယောက် (၂၀) ခန့် ခန့်အပ်ထားနိုင်မည်ဖြစ်ပါသည်။
	၃။ စီမံကိန်း လည်ပတ်ခြင်း ဟိုတယ်၏သက်တမ်းမှာအနည်းဆုံး နှစ် (၆၀)ခန့် ဖြစ်ပြီး၊ ဝန်ထမ်းဦးရေ (၉၀)ခန့်ခန့်အပ်ထားမည်ဖြစ်ပြီး သက်ဆိုင်ရာတာဝန်အသီးသီးခွဲဝေပေးခြင်းဖြင့် လုပ်ငန်းလည်ပတ်မည်ဖြစ်သည်။
	၄။ လုပ်ငန်းပိတ်သိမ်းခြင်း ဟိုတယ်၏ သက်တမ်းကုန်ဆုံးချိန်တွင် လုပ်ငန်းအားပိတ်သိမ်းမည်ဖြစ်သည်။ ထိုပိတ်သိမ်းခြင်းလုပ်ငန်းဆောင်ရွက်ချိန်တွင် ပတ်ဝန်းကျင်တွင် စီမံကိန်းမစခင် မူလအခြေအနေအတိုင်းဖြစ်အောင် အပင်များပြန်လည်စိုက်ပျိုးခြင်းလုပ်ငန်းများ ဆောင်ရွက်မည်ဖြစ်ပါသည်။
ထင်ရှားသော သွင်ပြင် လက္ခဏာ	
လုပ်ငန်းနယ်နိမိတ်	ပျမ်းမျှအားဖြင့် (၆၀.၄၈)ဧက
ရေသုံးစွဲမှု ပမာဏ	တစ်နေ့လျှင် ဂါလံ (၁၆၀၀၀) ခန့်
ရေအရင်းအမြစ်	အဆိုပြုစီမံကိန်းတည်ဆောက်ခြင်းနှင့်လည်ပတ်ခြင်းလုပ်ငန်းစဉ်များအတွက်ရေအရင်းအမြစ်မှာ သပြေရွာရှိ သဘာဝရေကန်(၅ မိုင်ကွာဝေး) မှဖြစ်ပြီး ရေသယ်ကားများဖြင့် သယ်ဆောင်ကာ သိုလှောင်သုံးစွဲရပါသည်။ စီမံကိန်းအတွက် တစ်နှစ်စာ ရေအရင်းအမြစ်လိုအပ်ချက်မှာဂါလံ(၅၀၀၀၀၀)ဖြစ်ပါသည်။သောက်ရေ အတွက်ကိုမူ သောက်ရေသန့် မှာယူသုံးစွဲမည်ဖြစ်ပါသည်။ ဧည့်သည်များသီးသန့်အသုံးပြုရန်ရေများအတွက်မြေအောက်တွင်ရေလှောင်ကန်တည်ဆောက်ထားရှိမည်ဖြစ်ပါသည်။ရေဆိုးများ၊ စွန့်ပစ်ရေများအား ပြန်လည်သန့်စင်မှုစနစ်တပ်ဆင်ကာ ပြန်လည်သန့်စင်ပြီးရေများအား ပန်းပင်များရေလောင်းခြင်း ၊စက်ပစ္စည်း များဆေးကြောခြင်းနှင့် ဖုန်ထသောလမ်းများအား ရေလောင်းခြင်းလုပ်ငန်းများကို ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

လျှပ်စစ်ပမာဏ အရင်းအမြစ်	ထရန်စဖော်မာ (500) KVA ဒီဇယ်မီးစက် (200) KVA
လိုအပ်သော လျှပ်စစ်ပမာဏ	260 KVA
ယာဉ်ပမာဏ	ထရက်ကား - ၂စီး ရေသယ်ကား - ၂စီး ဗင် - ၃စီး
ရင်းနှီးမြှုပ်နှံငွေ	(ကျပ်သန်း) ငွေပမာဏ - ၁၀၀ အဆောက်အဦးများ - ၃၇၁၄ စက်ပစ္စည်းကိရိယာများ - ၄၅၉ လုပ်ငန်းသုံးပစ္စည်းများတန်ဖိုး - ၁၃၉၈ စုစုပေါင်း - ၅၆၇၁

(ဂ) မြေအသုံးချမှု

ဟိုတယ်တည်ဆောက်ရေးစီမံကိန်းသည် မြေဧက (၆၀.၄၈) ဧကကိုအသုံးပြုထားပြီး ထိုမြေပေါ်တွင် သီဟိုဠ် စိုက်ခင်းများနှင့် လူနေအိမ်များမရှိသော ကြိုးဝိုင်းတောများရှိပါသည်။

၁-၉။ စီမံကိန်းလုပ်ငန်းစဉ်အဆင့်ဆင့်

စီမံကိန်းလုပ်ငန်းစဉ်အဆင့်ဆင့်အနေဖြင့် တည်ဆောက်ရေးလုပ်ငန်းစဉ်၊ လည်ပတ်ခြင်းလုပ်ငန်းစဉ် နှင့် စီမံကိန်းပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ် ဟူ၍ အောက်ပါအတိုင်းအဆင့်ဆင့် ပါဝင်မည်ဖြစ်ပါသည်။

(ဃ) တည်ဆောက်ရေးအဆင့်

အဆိုပြုစီမံကိန်းသည် ပင်လယ်ကမ်းခြေတွင်တည်ဆောက်ခြင်းဖြစ်သည့်အပြင် တစ်ထပ်အဆောက်အဦးများသာ များပြားခြင်းကြောင့် မြေတူးခြင်း၊ မြေညှိခြင်း၊ မြေဖို့ခြင်းလုပ် ငန်းများစွာ လုပ်ဆောင်ရန်မလိုအပ်ပါ။ ပင်လယ်ကမ်းခြေတစ်လျှောက်ရှိ သစ်ပင်များအားထိန်းသိမ်းကာကွယ်သွားမည်ဖြစ်ပြီး အဆောက်အဦးများဆောက်လုပ်ရန် မဖြစ်မနေဖယ်ရှားရမည် သစ်ပင်များအားဖယ်ရှားခြင်းများကြောင့် သစ်ပင်(၁ ဧက)ခန့်ဆုံးရှုံးနိုင်ပါသည်။

(ခ) လုပ်ငန်းလည်ပတ်မှုအဆင့်

လုပ်ငန်းလည်ပတ်မှုအဆင့်၏ အဓိကရည်ရွယ်ချက်သည် မောင်းမကန်ကမ်းခြေသို့ လာရောက်လည်ပတ်သော ခရီးသွားများအတွက် ဟိုတယ်ဝန်ဆောင်မှုများ ပေးနိုင်ရန်ဖြစ်ပါသည်။

အဓိကဝန်ဆောင်မှု အဆောက်အဦးများတွင် အခန်း(၁၀)ခန်းပါ အဆင့်မြင့်ဟိုတယ်(၁)လုံး၊ အခန်း(၂)ခန်းပါ အဆင့်မြင့်ဟိုတယ်(၄၄)လုံးနှင့် ကျေးလက်ပုံစံ Bungalow (၅၀) လုံးတို့၏ စီမံကိန်းလည်ပတ်ခြင်း လုပ်ငန်းစဉ်များ ပါဝင်မည်ဖြစ်ပါသည်။

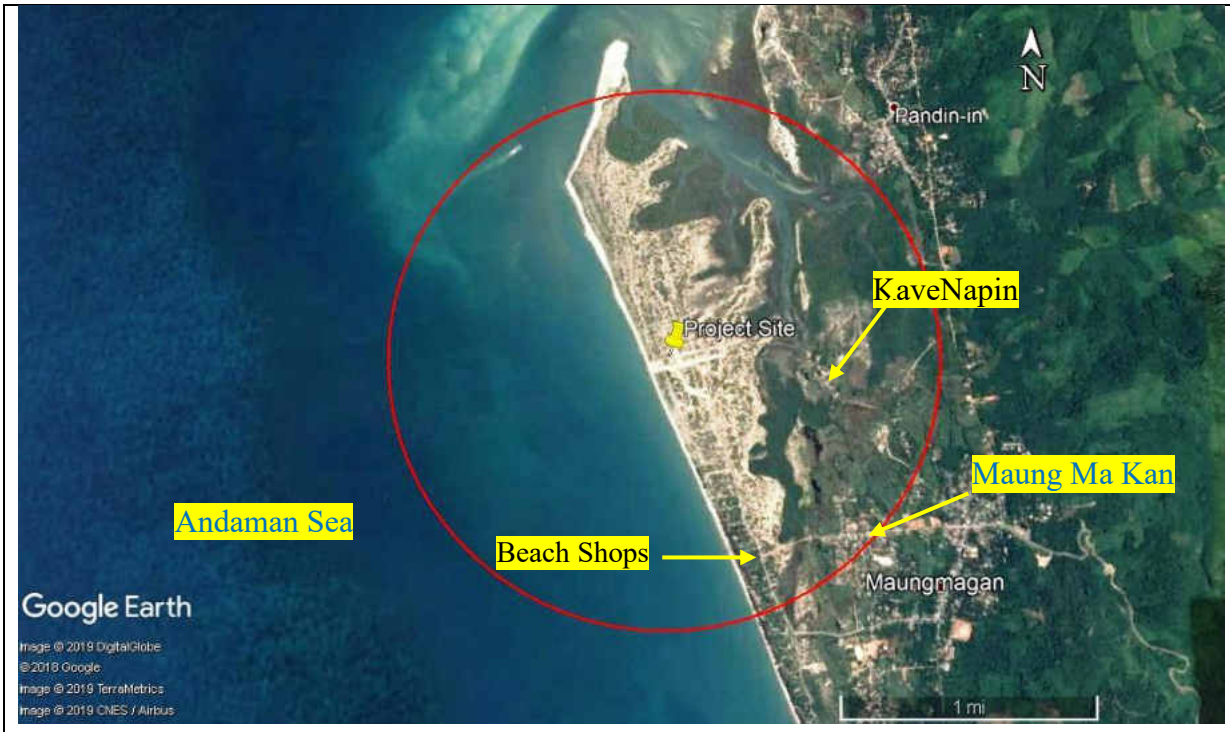
ဝန်ဆောင်မှုအထောက်အကူပြု အဆောက်အဦးများတွင် ရေကူးကန်၊ ဧည့်ခန်း၊ လုံခြုံရေးအခန်း၊ ဆေးခန်း၊ ရေလှောင်ကန်၊ စွန့်ပစ်ရေသန့်စင်ခြင်း၊ ကစားကွင်း၊ ကားရပ်နားရာကွင်း၊ မီးစက်ထားရန်အဆောက်အဦး၊ လမ်း၊ ရေမြောင်းနှင့် ရှုခင်း စသည်တို့ ပါဝင်ပါသည်။

(ဂ) စီမံကိန်းပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်

ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်တွင် အဆိုပြုစီမံကိန်းမတည်ဆောက်မီက မူလအခြေအနေများနှင့် အနီးစပ်ဆုံး တူညီစေရန် အဆောက်အအုံများအား ပြန်လည်ဖြိုချသည့် လုပ်ငန်းစဉ်များပါဝင်မည်ဖြစ်ပါသည်။ မြို့နယ်စည်ပင်သာယာရေးကော်မတီ(လောင်းလုံ)၏ လမ်းညွှန်ချက်နှင့်အညီ အဆောက်အဦးများနှင့် ဆက်စပ်ပစ္စည်းများအား စနစ်တကျ ပြန်လည်ဖယ်ရှားပိတ်သိမ်းသွားပါမည်။

၁.၁၀။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆိုင်ရာနယ်နမိတ်သတ်မှတ်ချက်

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအား (၃) ကီလိုမီတာအချင်းဝက်ပတ်လည်ရှိ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်သက်ရောက်မှုများအား ဆန်းစစ်လေ့လာသွားမည်ဖြစ်ပါသည်။ အဆိုပြုစီမံကိန်း တည်ဆောက်လည်ပတ်ခြင်းသည် ယေဘူယျအားဖြင့် ထိခိုက်မှုနည်းသော်လည်း မတော်တဆ အရေးပေါ်အခြေအနေများ(မီးလောင်ခြင်း)ဖြစ်ပေါ်ပါသော်လည်းကောင်း၊ စီမံကိန်းတည်ဆောက်လည်ပတ်စဉ် မော်တော်ယာဉ်များ၊ သွားလာမှုကြောင့်လည်းကောင်း၊လူဦးရေများတိုးပွားလာခြင်းကြောင့်လည်းကောင်း ထိခိုက်မှုခံစားရနိုင်သည့် လူနေရပ်ကွက်များအားလုံးပါဝင်ရန် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်သွားမည့် နယ်နမိတ် (၃) ကီလိုမီတာသတ်မှတ်ရခြင်းဖြစ်ပါသည်။



၃ကီလိုမီတာ အဝန်းဝိုင်းအတွင်းကျရောက်သည့် လူနေရပ်ကွက်များ

(၃)ကီလိုမီတာ အဝန်းအဝိုင်းအတွင်း အဓိကအားဖြင့် အောက်ဖော်ပြပါလူနေရပ်ကွက်များ ပါဝင်မည် ဖြစ်ပါသည်။

(က) ကဗျိုးနှစ်ပင် ကျေးရွာ

(ခ) မောင်းမကန် ကျေးရွာအုပ်စု

၁-၁၁။ စိမ်ကိန်းအနီးပတ်ဝန်းကျင်

စိမ်ကိန်းအနီးအနားတွင် ထိခိုက်မှုရှိနိုင်သည့် အရာများအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

စဉ်	အကြောင်းအရာ	ဖော်ပြချက်	အကွာအဝေး (ကီလိုမီတာ)
၁။	အနီးဆုံးလူနေရပ်ကွက်	ကဗျိုးနှစ်ပင်	၁
၂။	အနီးဆုံး မျက်နှာပြင်ရေထု	ပန်းဒက်အင်း ချောင်း ကပ္ပလီပင်လယ်	၀.၈၄ ၀.၂၈
၃။	အနီးဆုံးလူနေအထူထပ်ဆုံးနေရာ	မောင်းမကန် ကျေးရွာ	၁.၆၄
၄။	အနီးဆုံးလမ်း	မောင်းမကန်လမ်း	၁.၄

စီမံကိန်းအနီးပတ်ဝန်းကျင်ပြပုံ

၁.၁၂။ ဇီဝမျိုးစုံမျိုးကွဲ

အဆိုပြုစီမံကိန်း အနီးပတ်ဝန်းကျင်စစ်တမ်းကောက် တိုင်းတာချက်များအရ ကုန်းပေါ်အပင်နှင့် တိရိစ္ဆာန်အရေအတွက်မှာ နည်းပါးကြောင်းတွေ့ရှိရပါသည်။ စစ်တမ်းကောက်ယူချက်များအရအပင် မျိုးရင်း(၃၄)ခုမှ မျိုးစိတ်ပေါင်း(၇၆)မျိုးကိုတွေ့ရှိရပါသည်။ ၄င်းမျိုးစိတ်များထဲမှ သစ်ပင်မျိုးစိတ် (၄၀.၈၀%) ၊ ခြုံပင်မျိုးစိတ် (၁၉.၇၀%)၊ အပင်ပျော့ (၁၄.၅၀%) ၊ အပင်ငယ်မျိုးစိတ် (၁၁.၈၀%)၊ နွယ်တက်ပင် (၇.၉၀%)နှင့် မြက်မျိုးစိတ် (၅.၃၀%) တို့ပါဝင်ပါသည်။ မျိုးတုန်းပျောက်ကွယ်ရန် အန္တရယ်ရှိသော အပင်မျိုးစိတ်အနေဖြင့် ဒီရေတောအပင်မျိုးစိတ်တစ်ခုဖြစ်သော *Aegialitis rotundifolia* (Pinlesa)အားတွေ့ရှိပါသည်။ အကောင်မျိုးစိတ်များအနေဖြင့် ကုန်းနေရေနေသတ္တဝါ နှင့် တွားသွားသတ္တဝါ (၁၃) မျိုး၊ ငှက်မျိုးစိတ် (၁၂) မျိုး၊ ငါးမျိုးစိတ် (၁၅ မျိုး)၊ နို့တိုက်သတ္တဝါ မျိုးစိတ် (၁)မျိုးနှင့် zooplankton မျိုးစိတ် (၃)မျိုးအားတွေ့ရှိရပါသည်။ မျိုးတုန်ပျောက်ကွယ်ရန် အန္တရယ်ရှိသော မျိုးစိတ်များအားစီမံကိန်း အနီးပတ်ဝန်းကျင်တွင် မတွေ့ရှိရပါ။

၁-၁၃။ အဓိကထိခိုက်နိုင်မှုများနှင့်လျော့နည်းသက်သာစေရန်လုပ်ဆောင်ရမည့်နည်းလမ်းများ

အဆိုပြုစီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် အဓိကသက်ရောက်နိုင်မှုများအနေဖြင့် တည်ဆောက်ရေးလုပ်ဆောင်သည့်ကာလအတွင်း ရေမြောင်းများ ပိတ်ဆို့ခြင်း၊ အမြင်မတင့်တယ်မှု နှင့် ယာဉ်ကြောရှုပ်ထွေးမှု၊ လည်ပတ်ခြင်းကာလအတွင်း ရေထု၊ မြေထု ညစ်ညမ်းမှု၊ မီးဘေးနှင့် ယာဉ်ကြောပိတ်ဆို့ခြင်း၊ အစရှိသည့် ထိခိုက်မှုများရှိနိုင်ပါသည်။ အထက်ပါထိခိုက်မှုများနှင့် လျော့နည်းသက်သာစေရန် လုပ်ဆောင်ရမည့်နည်းလမ်းများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

ထိခိုက်မှုအနှစ်ချုပ်နှင့်လျော့နည်းသက်သာစေရန်လုပ်ဆောင်ရမည့်နည်းလမ်းများအကျဉ်းချုပ်

စဉ်	လုပ်ငန်းစဉ်	အဓိကထိခိုက်နိုင်မှုများ	လျော့နည်းသက်သာစေရန်လုပ်ဆောင်ရ မည့်နည်းလမ်းများ
၁။	တည်ဆောက်ခြင်းလုပ်ငန်းစဉ်	- ရေမြောင်းများပိတ်ဆို့ခြင်း	- ပိတ်ဆို့သွားသောရေမြောင်းများအား အစားပြန်လည်တူးဖော်ပေးပါမည်။
		- လမ်းပိတ်ဆို့ခြင်းနှင့် ယာဉ်အွန်အရယ်	- ဆောက်လုပ်ရေးပစ္စည်းများအား ညဖက်တွင်သာ သယ်ယူပါမည်။
		- အမြင်မတင့်တယ်မှု	- တည်ဆောက်ရေးလုပ်ဆောင်နေစဉ်အတွင်း အဆောက်အဦး အပြင်ဘက်တွင်ကာရံထားရှိပါမည်။
၂။	လည်ပတ်ခြင်းလုပ်ငန်းစဉ်	- ရေထု/မြေထုညစ်ညမ်းမှု	- စွန့်ပစ်အမှိုက်စီမံခန့်ခွဲမှုစနစ်ထားရှိရန် -ပြန်လည်အသုံးပြုနိုင်သော လုပ်ငန်းသုံးအမှိုက်များ နှင့် အိမ်သုံးအမှိုက်များ ပြန် လည် အသုံးပြုသွားမည် ဖြစ်ပါသည်။ ၄င်း အမှိုက်များအား အမျိုးအစားခွဲခြားပြီး စည်ပင်သာယာရေးကော်မတီ၏ လမ်းညွှန်ချက်နှင့်အညီ စွန့်ပစ်သွားမည် ဖြစ် ပါသည်။
		- မီးဘေးအွန်အရယ်	- မီးသတ်ဦးစီးဌာန၏ လမ်းညွှန်ချက်နှင့်အညီ မီးဘေးအွန်အရယ်ကာကွယ်ရေးစနစ် ထားရှိပါမည်။ ဝန်ထမ်းများအား မီးငြိမ်းသတ်မှုစနစ်များကို လေ့ကျင့်သင်ကြားပေးခြင်းများကိုပြုလုပ်ထားရမည်ဖြစ်ပါသည်။
		- ယာဉ်ကြော ပိတ်ဆို့ခြင်း	- ယာဉ်ကြော စီမံခန့်ခွဲမှုအစီအမံများနှင့် လက်ရှိလမ်းအားအဆင့်မြှင့်တင်ပြုပြင်ပေးပါမည်။

၃။	ဘဘာဝဘေး အန္တရာယ်များ	- ရေဘေး	-ရေလွှမ်းမိုးခြင်းကြုံတင်ပြင်ဆင်မှုအစီအမံထားရှိပြီး ဖြစ်ပေါ်လာပါက အရေးပေါ်လုပ်ဆောင်ချက်များ ရေးဆွဲထားရှိပါမည်။
		- မီးဘေး	- မီးသတ်ဦးစီးဌာန၏ လမ်းညွှန်ချက်နှင့်အညီ နိုင်ငံတကာအဆင့်မီ (NFPA) စံချိန်စံညွှန်း အတိုင်း အတိအကျ တည်ဆောက်သွားပါမည်။ ဟိုတယ်၏ အခန်းတိုင်းတွင် အလိုအလျောက်မီးဘေးအချက်ပြစနစ်နှင့် မီးငြိမ်းသတ်ရေးပစ္စည်းများ တပ်ဆင်ထားရှိမည်။

၁-၁၄။ လူထုပူးပေါင်းပါဝင်မှုရှိရေး လုပ်ဆောင်ထားရှိချက်များ

လူထုပူးပေါင်းပါဝင်ခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းများ လုပ်ဆောင်ရေးအတွက် အဓိကအရေးကြီးသော လုပ်ငန်းစဉ်ဖြစ်သဖြင့် ထိရောက်မှုရှိသော လူထုပူးပေါင်းပါဝင်ခြင်း လုပ်ငန်းစဉ်များ ဖြစ်စေရန် အောက်ဖော်ပြပါအတိုင်း လုပ်ဆောင်သွားရှိပါမည်။

(က) အဓိကသက်ဆိုင်သူများ သတ်မှတ်လုပ်ဆောင်ခြင်း (Stakeholder Engagement and Identification) ၊

(ခ) လူနေရပ်ကွက်များအတွင်းသို့ကွင်းဆင်းဆောင်ရွက်ခြင်း (Household survey)၊

(ဂ) အဓိကသက်ဆိုင်သူများ တွေ့ဆုံပွဲပြုလုပ်ခြင်း (Key stakeholders meetings)

(ဃ) လူထုတွေ့ဆုံပွဲများပြုလုပ်ခြင်း (Public meetings)၊

(င) အစီရင်ခံစာ အားချပြဆွေးနွေး အကြံညဏ်ရယူခြင်း (Public disclosure process)၊

(က) အဓိကသက်ဆိုင်သူများ သတ်မှတ်လုပ်ဆောင်ခြင်း

စီမံကိန်းနှင့်ပက်သက်ပြီး အဓိကသက်ဆိုင်သူများအနေဖြင့် အောက်ဖော်ပြပါ သက်ရောက်သူများအား သတ်မှတ်ထားရှိပါသည်။

(က) ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှုအများပိုင် ကုမ္ပဏီလီမိတက် (DDPC) အုပ်ချုပ်မှုဒါရိုက်တာအဖွဲ့များ

(ခ) အနီးအနားရှိကျေးရွာများ မှာကျေးရွာသူ၊သားများ နှင့် အုပ်ချုပ်ရေး အဖွဲ့ဝင်များ

(ဂ) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန(ထာဝယ်)

(ဃ) မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန (ထာဝယ်၊ လောင်းလုံ)

(င) စည်ပင်သာယာရေးကော်မတီ (ထာဝယ်၊ လောင်းလုံ)

(စ) ကျန်းမာရေးဦးစီးဌာန (ထာဝယ်၊ လောင်းလုံ)

(ဆ) စီမံကိန်းနှင့် စာရင်းအင်းဦးစီးဌာန (ထားဝယ်)

(ဇ) လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့် စာရင်းအင်းဦးစီးဌာန (ထာဝယ်၊ လောင်းလုံ)

(ဈ) ရေအရင်းအမြစ်နှင့်အသုံးချရေးဦးစီးဌာန (ထာဝယ်)

(ည) အလုပ်သမားညွှန်ကြားမှုဦးစီးဌာန (ထာဝယ်)

(ဋ) မြန်မာနိုင်ငံရဲတပ်ဖွဲ့ (မောင်းမကန်၊ လောင်းလုံ)

(၄) သစ်တောဦးစီးဌာန (ထားဝယ်၊လောင်းလုံ)

(၀) ဒေသအခြေစိုက်မီဒီယာများ၊အစိုးရမဟုတ်သောအဖွဲ့အစည်းများအစရှိသည်တို့ပါဝင်မည်ဖြစ်ပါသည်။

(ခ) လူနေရပ်ကွက်များအတွင်းသို့ကွင်းဆင်းဆောင်ရွက်ခြင်း

လူနေရပ်ကွက်များအတွင်းသို့ ကွင်းဆင်းဆောင်ရွက်ခြင်းအနေဖြင့် ကဗီးနှစ်ပင်ကျေးရွာနှင့် မောင်းမကန်ကျေးရွာ အုပ်စုများအတွင်းသို့ ကွင်းဆင်းဆောင်ရွက်ခဲ့ပါသည်။

(ဂ) လူထုတွေ့ဆုံပွဲများပြုလုပ်ခြင်း

လူထုတွေ့ဆုံပွဲကို (၂)ကြိမ် ကျင်းပပြုလုပ်မည်ဖြစ်ပါသည်။

(၁) ပထမအကြိမ်လူထုတွေ့ဆုံပွဲ

ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်အတွင်း ပထမအကြိမ်လူထုတွေ့ဆုံပွဲကို (၇.၄.၂၀၁၈)တွင် မောင်းမကန်ကျေးရွာ၌ကျင်းပပြုလုပ်ခဲ့ပါသည်။ လူထုတွေ့ဆုံပွဲအတွင်း စီမံကိန်းကြောင့် တိုက်ရိုက်(သို့) သွယ်ဝိုက်ထိခိုက်သည့် ဒေသခံလူထု (၁၈၀) ကျော် တက်ရောက်ခဲ့ပါသည်။

(၂) ဒုတိယအကြိမ်လူထုတွေ့ဆုံပွဲ

ဒုတိယအကြိမ်လူထုတွေ့ဆုံပွဲကို ထားဝယ်မြို့၌ (၁၉.၅.၂၀၁၈)တွင် ကျင်းပပြုလုပ်ခဲ့ပါသည်။

(ဃ) အများပြည်သူသို့ထုတ်ဖော်တင်ပြခြင်း

ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း၏ အစီရင်ခံစာအကျဉ်းချုပ်ကို မြန်မာဘာသာဖြင့် သက်ဆိုင်ရာဌာနများ၊ လူထုများထံသို့ ထုတ်ပြန်ထားရှိမည်ဖြစ်ပါသည်။ အစီရင်ခံစာ အပြည့်အစုံအား DDPC Website တွင်တင်ပြထားရှိမည်ဖြစ်ပါသည်။

၁-၁၅။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည် လုပ်ငန်းရှင်၊ တစ်ဆင့်ခံကံထရိုက်များ အားလုံးအပါအဝင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးလုပ်ငန်းများအား စတင်တည်ဆောက်သည့်အချိန်မှစတင်ပြီး ပိတ်သိမ်းသည့်အချိန်သည့်တိုင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးလုပ်ငန်းများအား လုပ်ဆောင်နိုင်ရန်အတွက် တာဝန်ဝတ္တရားများ

သတ်မှတ်ခွဲဝေပေးခြင်း၊လိုအပ်သောစီမံခန့်ခွဲမှုများလမ်းညွှန်ပေးခြင်း၊စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များ (စောင့်ကြည့်ရမည့်အရာများ ၊ စောင့်ကြည့်ရမည့်အကြိမ်အရေအတွက်၊ စောင့်ကြည့်ရ မည့်သူ) အစ ရှိသည်များ သတ်မှတ်ပေးခြင်းတို့ ပါဝင်မည်ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ကျဉ်းချုပ်အား နယ်နိမိတ်သတ်မှတ်ခြင်း အစီရင်ခံစာအခန်း(၈)တွင် ဖော်ပြထားပါသည်။

(က) အရေးပေါ်အခြေအနေစီမံခန့်ခွဲမှုအစီအစဉ် (Emergency Response Plan)

အဆိုပြုစီမံကိန်းမှ ဖြစ်ပေါ်နိုင်သည့် အရေးပေါ်အခြေအနေများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

(က) မီးဘေးအန္တရာယ်၊

(ခ) ဇည့်သည်နှင့် အလုပ်သမားများ ကျန်းမားရေး စသည်တို့ဖြစ်ပါသည်။

အစီရင်ခံစာထဲတွင် အဆိုပါဖြစ်ပေါ်လာနိုင်သည့် အရေးပေါ်အခြေအနေများနှင့် ကာကွယ်လုပ်ဆောင်သွား ရမည့်နည်းလမ်းများအား နယ်နိမိတ်သတ်မှတ်ခြင်းဆိုင်ရာအစီရင်ခံစာအခန်း(၈)တွင် ဖော်ပြထားရှိပါသည်။

(ခ) သဘာဝဘေးအန္တရာယ်စီမံခန့်ခွဲမှုအစီအစဉ် (Diasaster Management Plan)

အဆိုပြုစီမံကိန်းတွင် သဘာဝဘေးအန္တရာယ်များအနေဖြင့် အောက်ဖော်ပြပါတို့ပါဝင်မည်ဖြစ်ပါသည်။

(က) မီးဘေးအန္တရာယ်၊

(ခ) ငလျင်ဘေးအန္တရာယ်၊

(ခ) ရေကြီးခြင်း စသည်တို့ဖြစ်ပါသည်။

အစီရင်ခံစာထဲတွင် အဆိုပါဖြစ်ပေါ်လာနိုင်သည့် ဘေးအန္တရာယ်များနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့် နည်းလမ်းများအား နယ်နိမိတ်သတ်မှတ်ခြင်းဆိုင်ရာအစီရင်ခံစာအခန်း(၈)တွင် ဖော်ပြထားရှိ ပါသည်။

(ဂ) စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များနှင့်ခန့်မှန်းကုန်ကျစရိတ်အကျဉ်းချုပ်

အဆိုပြုစီမံကိန်းအတွက် ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေး အစီအစဉ်များအား ခန့်မှန်းကုန်ကျ စရိတ် များ နှင့်အတူ အောက်ပါဇယားများတွင် ဖော်ပြထားပါသည်။

ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များ

Item	Environmental Concerns	Parameters	Frequency	Estimated Cost (USD)	Responsible Party
A	**Pre-Construction & Construction Phase**				
1	Ambient air quality	PM 10, PM2.5, CO, CO2, NO2, SO2	Twice a Year	1000	DDPC Monitoring Team
2	Noise level	Integrating Noise Level Meter dB(A)	Twice a Year	500	DDPC Monitoring Team
3	Water Quality	Colour, Turbidity, Total Hardness, Biological Oxygen Demand (BOD), Suspended Solid, Oil and Grease	Twice a year	50	DDPC Monitoring Team
B	**Operation Phase**				
1	Ambient air quality	PM 10, PM2.5, CO, CO2, NO2, SO2, O3	Once a Year	1000	DDPC Monitoring Team
2	Noise level	Equivalent noise level dB(A)	Once a Year	500	DDPC Monitoring Team
3	Water Quality	pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids, Total Coliform Bacteria, and Total Nitrogen, Total phosphorus	Twice a Year	50	DDPC Monitoring Team

အဆိုပါဇယားအရ တည်ဆောက်ရေးကာလ ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေးအစီအစဉ် ခန့်မှန်းကုန်ကျစရိတ်မှာ တစ်နှစ်လျှင် 3100 US$ ခန့်ရှိမည်ဖြစ်ပြီး လည်ပတ်ရေးကာလတွင် တစ်နှစ်လျှင် 1600 US$ ခန့်ရှိမည် ဖြစ်ပါသည်။

အဆိုပြုစီမံကိန်းဖော်ဆောင်သူအနေဖြင့် ပပတ်ဝန်းကျင် စောင့်ကြည့်လေ့လာရေး အစီအစဉ်များအတွက် ရန်ပုံငွေလျာထားချက်မှာ တစ်နှစ်လျှင် 5000 US$ ဖြစ်ပြီး လိုအပ်ပါကထပ်မံဖြည့်သွင်းဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

၁-၁၆။ ဒေသခံလူထုဖွံ့ဖြိုးတိုးတက်ရေးအစီအမံများ

DDPC သည်ဒေသခံလုပ်ငန်းရှင်များဖြင့် ဖွဲ့စည်းထားရှိသည့် ဒေသခံကုမ္ပဏီဖြစ်သည်နှင့်အညီ ဒေသခံ များထိခိုက်နစ်နာမှုမရှိစေယုံသာမက စဉ်ဆက်မပြတ်ဖွံ့ဖြိုးတိုးတက်ရန် အတွက်လည်း စီမံကိန်းများလျာထားဆောင်ရွက်လျက်ရှိပါသည်။ ၎င်းတို့မှာ တာဝန်သိလူမှုဖွံ့ဖြိုးမှုရံပုံငွေအား အသားတင်အမြတ်ငွေ၏ ၂% အနည်းဆုံးထားရှိကာ စွမ်းရည်ဖွံ့ဖြိုးတိုးတက်စေရန် သင်တန်းများပေးခြင်း၊ ဒေသအခြေစိုက် လူမှုရေးကူညီမှုအသင်းများသို့ ရံပုံငွေ ထောက်ပံ့ပေးခြင်း၊ ဒေသခံပြည်သူများ အလုပ်အကိုင်အခွင့်အလမ်းများ ရရှိစေရန် စဉ်ဆက်မပြတ်ကူညီဆောင်ရွက်ပေးခြင်း အစရှိသည်တို့ဖြစ်ပါသည်။

၁.၁၇။ အချက်အလက်များကောက်ယူခြင်း

စီမံကိန်းနှင့်သက်ဆိုင်သည့် နေရာပြမြေပုံကားချပ်များအပါအဝင် စီမံကိန်းဆိုင်ရာ အချက်အလက် များအား DDPC မှ ရရှိပါသည်။ တဆင့်ခံအချက်အလက်များ (secondary data) ကို မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန(လောင်းလုံ)နှင့် ပြည်သူ့ကျန်းမာရေးဆိုင်ရာ အချက်အလက် များအား ကျန်းမာရေးဦးစီးဌာန (လောင်းလုံ)မှ ရယူထာပြီး မူလအချက်အလက်များ (primary data) ကောက်ယူရာတွင် စီမံကိန်းလေ့လာမှုဧရိယာအတွင်း ကွင်းဆင်းကောက်ယူ ရရှိပါသည်။

၁-၁၈။ အနှစ်ချုပ်သုံးသပ်ချက်

အဆိုပြုစီမံကိန်းနှင့်စပ်လျဉ်း၍ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားအပေါ်သက်ရောက်မှုများအား ဤကနဦး ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် တင်ပြထားပါသည်။ ထို့အပြင် ဟိုတယ်လုပ်ငန်းများကို မထိခိုက်

နိုင်သော သင့်လျော်သည့် ဆိုးကျိုးလျော့ချရေးလုပ်ငန်းများနှင့် ကောင်မွန်သောပတ်ဝန်ကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များအားလည်း ထည့်သွင်းဖော်ပြထားပါသည်။

စီမံကိန်း၏ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းသည် စီမံကိန်းမှ သိသာထင်ရှားသော ပတ်ဝန်းကျင်နှင့်လူမှုထိခိုက်မှုများ ဖြစ်ပေါ်မည်မဟုတ်ကြောင်း သေချာစေပါသည်။ ထိခိုက်မှုများသည် သဘာဝအရ စီမံကိန်းနေရာတွင်သာကွက်၍ ဖြစ်ပေါ်ပြီး၊ ယာယီ(သို့)ရည်တိုတာဖြစ်ပေါ်မည်ဖြစ်ပြီး ထိခိုက်မှုများကို ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် အကြံပြုထားသည့် လျော့ချရေးအစီအမံများကို အသုံးပြုလျက် အသင့်ကိုင်တွယ်ဖြေရှင်းသွားနိုင်မည်ဖြစ်ပါသည်။

အနှစ်ချုပ်အားဖြင့်ဆိုသော်ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှုအများပိုင် ကုမ္ပဏီလီမိတက်အနေဖြင့် အစီရင်ခံစာတွင် အကြံပြုထားသော ထိခိုက်မှုလျော့ချနိုင်သည့် လုပ်ငန်းစဉ်များနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအတိုင်း စနစ်တကျအကောင်အထည်ဖော်ဆောင်ခြင်းဖြင့် အဆိုပြုစီမံကန်းအား ပတ်ဝန်းကျင်ထိခိုက်မှု ပတ်ဝန်းကျင်ထိခိုက်မှုအနည်းဆုံးဖြစ်အောင် အကောင်အထည်ဖော်ဆောင်ရွက်နိုင်မည် ဖြစ်ပါသည်။ ၄င်းအပြင် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ထိခိုက်မှုများအားလုံး နှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့် နည်းစဉ်များ အားလုံးအား ဖော်ပြထားရှိပြီးဖြစ်၍ ထပ်မံပြီး ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်သွားရန် လိုအပ်တော့မည်မဟုတ်ကြောင်း သုံးသပ်တင်ပြအပ်ပါသည်။

1. EXECUTIVE SUMMARY

1.1 Introduction

The Dawei Development Public Company Limited (DDPC) intends to build a hotel resort, named Orchid Garden Resort, in Maung Ma Kan Village, Laung Lone Township, Tanintharyi Region. According to the Environmental Conservation Law (2012) and Environmental Impact Assessment Procedure (2015), the proposed hotel project has to prepare Initial Environmental Examination (IEE) to be least environmental and social impacts to the surroundings.

1.2. Location of the Project

Maung Ma Kan hotel resort is located at the coordinates of 19° 9′ 23.54″ N Latitude and 98° 5′ 25.76″ E Longitude, near the Maung Ma Kan beach, Maung Ma Kan Village, Laung Lone Township, Dawei District. The project will cover a total land area of 60.48 Acres. The location map of project area is shown in the following figure.

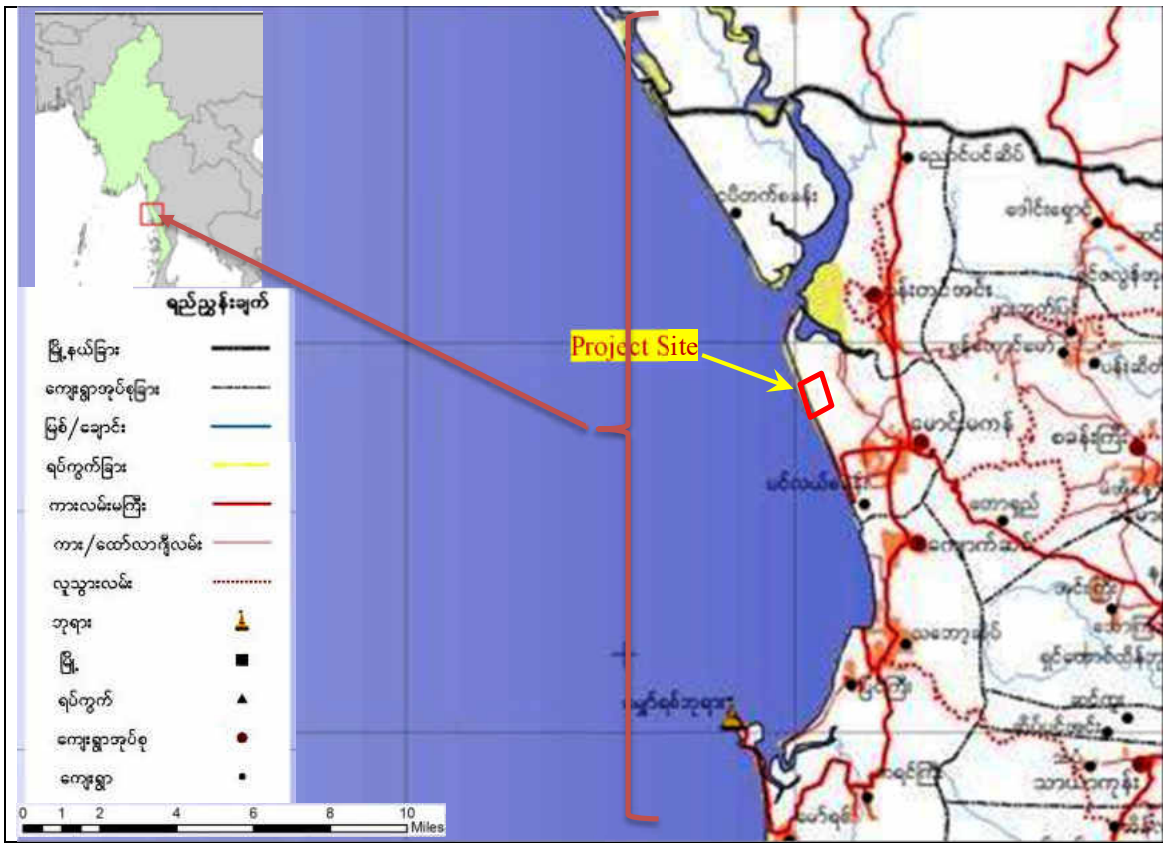


Figure 1.1. The Location Map of Proposed Hotel Zone Project

1.3. Brief of the Project Proponent

The project proponent will be DDPC and the followings are the brief description of DDPC.

Company Name	Dawei Development Public Company Limited (DDPC)
Company Type	Public Company Limited
Project Name	Orchid Garden Resort (Maung Ma Kan)
Building Included	Two unit one storeyed 44 buildings with a total of 88 guest rooms, ten unit one storey 1 hotel building with 10 rooms and country style bungalow 50 buildings with 50 rooms. There are total numbers of 148 rooms in construction activities.
Area	The hotel resort, Maung Ma Kan will occupy 60.48 acres of the land in phase I.
Company Address (1)	Corner of Kamaukin road and Siekanthar road, Hteintit Ward, Dawei Phone number- 059 – 2023955 , 2023956 , 2023958 Email - secretary@ddpcmyanmar.com, cg@ddpcmyanmar.com
Company Address (2)	No. 282, Maha Bandula Road (9x10) street, Lanmadaw Township, Yangon. Phone number- 09 – 421142111 , 09 – 253663166 Email - acc.ddpcmyanmar@gmail.com
Facebook Page	http://daweidevelopmrntpublic.blogspot.com/
Contact Person	U Than Htut Oo Senior Executive Director Phone number :09-5151693 Email: ed1@ddpcmyanmar.com

1.4. Objectives of IEE Report

This IEE report is prepared to assess the potential impacts of the proposed project and to formulate, implement and monitor the environmental protection measures in the phases of its construction, operation and decommissioning in order to reduce the environmental impacts or have to minimum impacts to the environment and to increase its operating efficiency. The study area for IEE covers all hotel project operational areas, including where supporting activities take place. This IEE report identifies the potential environmental and social impacts

that could be associated with the proposed hotel project activities including those of an indirect and cumulative nature. The followings are the main objectives of the IEE report.

(i) assess the project's potential positive and negative, direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the vicinity of the project area,

(ii) identify the stakeholders, hold consultation meeting with project affected people and consider their concerns in the implementation of the project,

(iii) present mitigation measures to help reduce and/or mitigate, and/or compensate for the negative environmental impacts from the proposed project,

(iv) describe the monitoring measures and reporting procedures to ensure the operations of the project meet with proposed mitigation measures, and

(v) identify the responsible person or team to proceed the proposed mitigation and monitoring measures.

1.5. Study Team and Their Role and Responsibilities

Below is the information of EMP study team and their responsibilities.

Name	Degree	Responsibility	Experiences
1. Dr. Kyaw Swar Tint	Ph.D. (Mining)	Noise and Environmental Management	At least 7 yrs experiences in environmental related field
2. Dr. Thein Tun	Ph.D. (Metallurgy)	Soil Quality	At least 4 yrs experiences in environmental related field
3. Dr. Myo Min Tun	Ph.D. (Metallurgy)	Air Quality	At least 4 yrs experiences in environmental related field
4. Dr. Ei Mon Aung	Ph.D. (Chemical)	Process, Utilities and Wastewater Treatment	At least 3 yrs experiences in environmental related field
5. Dr. Kyaw Zay Moe	Ph.D. (Botany)	Flora Diversity	At least 3 yrs experiences in environmental related field
6. Dr. Ko Myint	Ph.D. (Zoology)	Fauna Diversity	At least 3 yrs experiences in environmental related field
7. Dr. Khon Aung	M.B.B.S (Ygn)	Occupational Safety and Health	At least 5 yrs experiences in environmental related field
8. U Min Aung	M.Sc.	Water Quality	At least 6 yrs experiences

	(Chemistry)		in environmental related field
9. Ms. Thazin Htwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Public Consultation and Participation	At least 4 yrs experiences in environmental related field
10. Ma Nandar Nwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Risk Assessment and Management	At least 4 yrs experiences in environmental related field
11. Mg Yaw Ma Nar	B.Sc. (Forestry), Dip. In EIA/EMS	Environmental Baseline Study	At least 3 yrs experiences in environmental related field
12. Ma May Thet Zaw	M.E. (Civil)	Water Resources Management and Hydrology	At least 3 yrs experiences in environmental related field
13. Ma Nay Chi Win Mg	M.E. (Civil)	Traffic	At least 2 yrs experiences in environmental related field
14. Dr. Win Swe	Ph.D (Geology)	Oceanography and Hydrology	At least 2 yrs experiences in environmental related field
15. U Aung Naing Tun	L.L.B, M.B.A, M.A (B.L), M.A (TEFL)	Laws and Regulations	At least 4 yrs experiences in environmental related field

1.6. Policy, Legal and Other Requirements

National Requirements

The IEE has been undertaken in accordance with the Myanmar Environmental Impact Assessment Procedure which was promulgated on December 29th, 2015, and provides legislation for environmental and social governance of economic development in Myanmar, under the Environmental Conservation Law 2012 and Environmental Conservation Rules 2014 of the National Environmental Policy for Myanmar 1994.

In addition, the IEE assessment was undertaken in accordance with Myanmar's National Environmental Quality (Emission) (NEQ) Guidelines which were promulgated on December 29th, 2015. The Guidelines are largely based on International Finance Corporation (IFC) Environmental Health and Safety (EHS) Guidelines, and provide the basis for regulation and

control of various environmental parameters, including noise and vibration, air emissions, and effluent discharges.

An overview of the process (from the IEE Procedure) is shown in Figure 1.1.

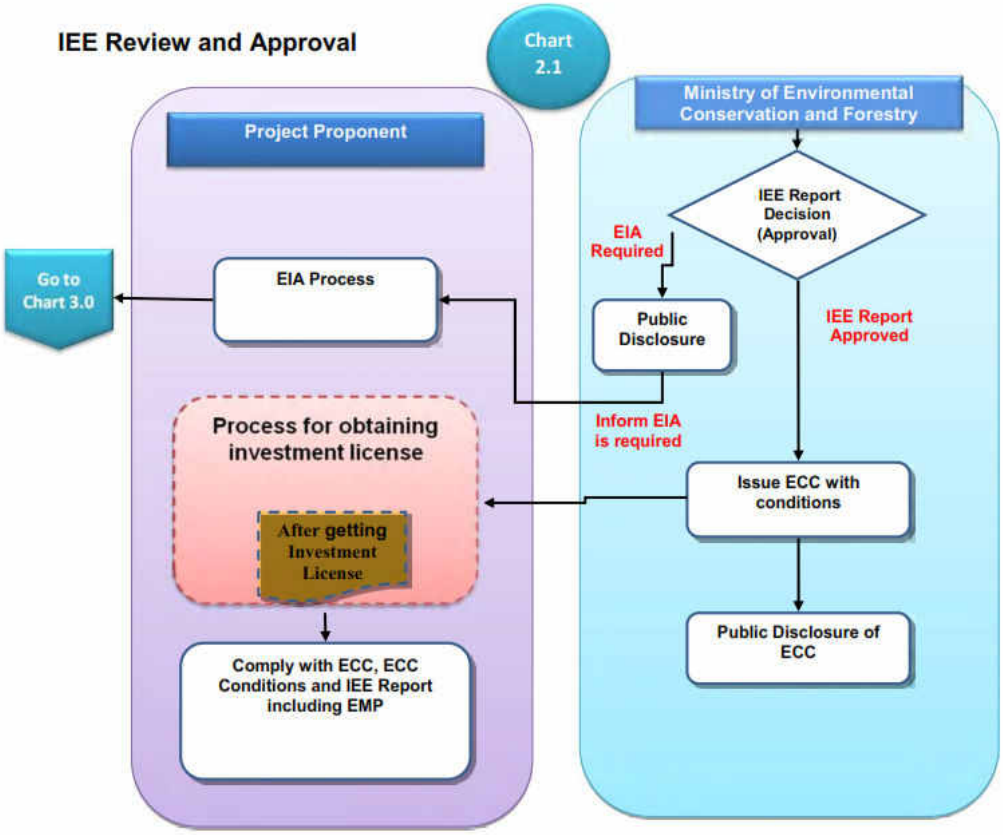


Figure 1.2. IEE Review and Approval Process

(*Source EIA Procedure, 2015)*

1.7. Laws and Regulations Related to the Proposed Project

Myanmar has promulgated several laws and regulations concerning protection of the Environment. The following table describes laws and regulations directly or indirectly associated with the proposed project.

Table 1.1. Relevant Environmental Laws and Regulations in Myanmar

Laws and Regulations	Year
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008
Environmental Conservation Law	2012

(Law No.7(o), 14,15,24,25,29)	
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014
IEE Procedures (Article 102 to 110, 113, 115, 117)	2015
National Environmental Quality (Emission) Guidelines (Section 2.1.9)	2015
The Protection of rights of National Race Law, (Law No. 5)	2015
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016
Labour Organization Law, (Law No. 1,7 to 11)	2011
The Settlement of Labour Dispute Law, (Law No. 38, 39, 40, 51)	2012
Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013
The Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014
Minimum Wages Law (Law No. 12, 13 (a to g)	2013
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016
The Myanmar Insurance Law (Law No. 15, 16)	1993
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012
Workman Compensation Act	1951
Myanmar Fire Force Law, (Law No. 25)	2015
National Food Law,	1997
Public Health Law (Law No. 3, 5)	1972
The Myanmar Tourism Law, (Section 6 ,7 ,8,9 and 10)	1990
Myanmar Hotel and Tourism Law, (Section 6 ,7 and 8)	1993
Private Industrial Enterprise Law	1990
Forest Law	1992
Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994
Protection and Preservation of Cultural Heritage Regions Laws (Law No. 15, 16)	1998
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006

Myanmar Port Authority Law	2015
Agricultural Land Law	2012
The Protection and Preservation of Antique Objects Law (Law No. 12,15 20)	2015
The Protection and Preservation of Ancient Monuments Law (Law No. 12,15 20)	2015
the Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013
The Freshwater Fisheries Law (Law No. 36,40,41)	1991
Automobile Law Pyidaungsu Hluttaw Law No. 55/2015	2015
The Myanmar Engineering Council Law (Law No. 20,24,25,31(a), 37)	2013

1.8. Brief of Buildings Included

The project will include the (10 rooms), (2 rooms) star level hotel and country style bungalow. The supporting services infrastructure (staff house, site office, swimming pool, laundry, stand-by generator, etc.) will be centralized and located at a site on the property south of the site, as will be the waste water treatment plant, the transformer, and the temporary construction camp. The purpose projects phase one construction activities including total numbers of 148 rooms. These are two unit one storeyed 44 buildings with a total of 88 guest rooms, 10 unit one storeyed hotel building with 10 rooms and country style bungalow 50 buildings with 50 rooms.

1.9. Brief of the Project

The following table shows the brief descriptions of the proposed project.

Aspects	Descriptions
Project Purposes	
Objective	To give hotel service for visitors who will visit to the Maung Ma Kan Beach
Waste Management	

Solid Wastes	Recyclable domestic waste will be recycled. Other domestic waste will be disposed of in a domestic waste disposal site as directed by Laung Lone City Development Committee.
Liquid Wastes	Waste water generated from domestic usage and cleaning activities will be treated and reused.
Other Infrastructures	
Office and other facilities	The office will be provided for administration purpose.
Access and haul roads	Main access to the proposed project is mainly from Dawai-Maung Ma Kan road.
Employment	
Employment	**1. Pre-construction Phase** The project will be used a total of 20 people at pre-construction phase and most of people will be local workers from nearest villages. **2. Construction Phase** The project will employ a total of 40 people at construction of which approximately 30 people will be sourced from the local area. **3. Operation Phase** Once the site is complete and operational it is expected that the facility will have a lifespan of approximately 40 years or more. The operation of the facility will create employment opportunities for more than 90 staff members in total. **4. Decommissioning** Once the facility reaches the end of its lifespan, the facility will be decommissioned. After this time, the site will be rehabilitated in accordance with best practice at the time of decommissioning. The project will employ a total of 40 people at decommissioning phase.
Salient Features	
Total Project Area	Approximately 60.48 acres

Domestic Water Demand	Approx.: 16,000 gallons/day
Source of Process and Domestic Water	The main source of water for process and domestic usage is carrying from natural spring pool with water-browsers and stored in the ground storage tank. This natural water pool is located in Tha Pay Village nearly 5 miles away from the proposed resort.
Sewage and Stormwater Disposal	Although the soil type is sandy and high permeability, a pump sump on site will be prepare to remove sewage, and a stormwater drainage system will be designed to remove stormwater.
Source of Electrical Power	500 KVA transformer and 200 KVA diesel backup generator
Need of Electrical Power	260 KVA for full load
Vehicles used during operation phase	Backhole - 1no. Truck - 2 nos. Pick up - 1no. Water Browser - 2 no. Van - 3 no.
Investment	(Kyats) Money invested - 100 million Infrastructure (main) - 3714 million Machinery and Equipment - 459 million Operational Equipment - 1398 million Total 5671 million Kyats

1.10. Land Use

The project will use 60.48 acres. The use area will be cashew plantation land and reserved forest area without residential area.

1.11. Boundary of the IEE Study

All of the environmental impact assessment will be conducted within the 3 kilometer (km) radius around the proposed project. The reasons for conduction 3km around the proposed project are to cover (1) the impacts zone during emergency case (fire), (2) the impact zone due to increase in traffic and road accident, (3) the impact zone due to population influx especially for scarcity of drinking water, and (4) the impact zone due to visual.

1.12. Local Residents within 3km Boundary

Local residents within 3km boundary are

(a) Kave Napin Village, and

(b) Maung Ma Kan Villages Group.

Local Residents within 3km Radius around the Proposed Project

Local residents can also consider as beach shops along the seashore and sprinkled seafood sellers near the hotel zone.

1.13. Environmental Sensitive Areas around the Proposed Project

The nearest environmentally sensitive areas of the proposed project are shown in the following table.

No.	Vicinity	Description	Distance (km)
1.	Nearest Public Residents	Kave Napin Village	1.0 km
2.	Nearest Water Body	Pan Det Inn Chaung Andaman Sea	0.84 km, 0.28 km
3.	Nearest Densely Populated Area	Maung Ma Kan Village	1.64 km
4.	Nearest Road	Maung Ma Kan Road	1.4 km

Vicinity around the Proposed Project

1.14. Biodiversity Environment

Survey on biodiversity environment resulted that the terrestrial plants and animals are very low in and around the project area as the project site is located in hotel zone. Direct observation method and systematic sample collection of flora and fauna were conducted in the field. The survey recorded that a total of (76) plant species from (34) families was recorded in which tree species were (40.80%), followed by shrub (19.70%), herb (14.50%), small tree (11.80%), climber (7.90%), and grasses (5.30%) were included. According to IUCN red list (2017), all plant species are common species but only one species from mangrove community which ***Aegialitis rotundifolia*** **(Pinle-sa) was recorded as a near threatened species status (NT).** In fauna (44) species comprises of (13) amphibian and reptile, (12) species of birds, (15) species of fish, (1) species of mammal and (3) species of zooplankton are recorded during the scoping survey. No red list species of animal are found during the survey period. Abundance status of zooplanktons are investigated which showed as low diversity and small population. Impact analysis investigated that the proposed project will be affected indirectly with small impact (no significant) on terrestrial and aquatic environment. The extent of the impact on fauna and flora is investigated as only in the site specific and duration of the impact is assumed as temporal or permanent.

1.15. Key Anticipated Environmental Impacts and Mitigation Measures

The following table shows summary of key environmental impacts and mitigation measures for proposed hotel zone project.

Summary of Key Anticipated Impacts and Mitigation Measures

No.	Phase	Anticipated Impacts	Mitigation Measures
1.	Construction Phase	Blockage of drainage system	- Alternative water ways to reduce the blockage of drainage system will prepare as part of compensation program. The alternative water ways will have the capacity to control water volume at least equal volume of natural drainage system.
		Traffic congestion and accidents	- Movement of heavy machinery during the construction phase will be limited to off-peak hours and construction materials carry to nighttime
		Visual Impacts	- Enclose the construction camp sites with non-transparent fencing to minimize the visual impacts on nearby areas especially for travelers along the Maung Ma Kan road
2.	Operation Phase	Soil and surface water pollution (solid and liquid wastes)	- Waste water will be treated and recycled - Enough drainage system with proper treatment system will be constructed - Recyclable waste will be sent to recycler and reusable waste will be reused - Not to dispose any solid and liquid waste during hotel operation into sandy soil
		Traffic congestion and accidents	- Traffic management measures and additional road infrastructure will be planned by the developers with the consent of the concerned authorities to meet the increased traffic loads. - Upgrade existing road to the proposed project if necessary
		Fire hazard	- The Fire Prevention Plan and Emergency Preparedness and Response Plan (EPRP) will assist - Project staff in effectively responding to fire hazard

1.16. Public Consultation and Participation Process

In this study, effective public consultation and participation approaches in the form of stakeholder identification, focus group discussions, public meetings and public disclosure will be conducted. Public participation will be conducted by the following procedures:

(a) Stakeholder Engagement and Identification;
(b) Focus group discussion;
(c) Household survey;
(d) Public meetings; and
(e) Public disclosure.

(a) Stakeholder Engagement and Identification

The following communities, authorities and NGOs will be considered as key stakeholders who are directly or indirectly related to the proposed project.

(a) Local People (Maung Ma Kan Villages Group, Kavee Napin)
(b) Village Administrative Offices (Maung Ma Kan Villages Group, Kavee Napin)
(c) Environmental Conservation Department (Tanintharyi)
(d) Local Administration Offices (Dawei, Longlone);
(e) City Development Committees (Dawei, Longlone);
(f) Departments of Public Health (Dawei, Longlone);
(g) Planning and Statistics Department (Dawei);
(h) Department of Settlement and Land Record (Dawei);
(i) Department of Water Resources Utilization Department (Dawei);
(j) Department of Labour (Dawei, Longlone);
(k) Myanmar Police Forces (Maung Ma Kan);
(l) Forest Department (Dawei, Longlone); and
(m) Local Media, NGOs and CBOs (Tanintharyi Journel, Dawei Watch, D.R.A, TKP etc.)

(b) Household Survey

Household survey was conducted in Maung Ma Kan Village and Kavee Napin Village about 4 days.

(c) Public Meetings

Public meetings were held two times as follow:

(i) First Public Meeting

The first public meeting was completed in (7.4.2018) Maung Ma Kan village, during the IEE study. There were about 180 people from local communities who are directly or indirectly affected by the proposed project are attended in this meeting. The aims of this first public meeting are -

(i) To announce the process and procedure of IEE;
(ii) To discuss about the possible environmental and social impacts;
(iii) To discuss the scope of anticipated impacts zone; and
(iv) To discuss about the alternative ways to avoid the possible impacts.
(i) To discuss about the identification and evaluation of possible environmental impacts and mitigation measures; and
(ii) To discuss about the alternative ways to avoid the possible impacts.

The most public concerns during first public meeting are nearly the same as the public meeting for scoping report.

(ii) Second Public Meeting

Second public meeting was completed in (19.5.2018) Dawei, according to the following purposes.

(i) To discuss the alternative ways to avoid environmental impacts;
(ii) To announce-the anticipated impacts of proposed projects;
(iii) To discuss about mitigation measures for these impacts; and
(iv) To discuss about the management and monitoring plan.

Most Public Needs and Concerns during Household Survey and Public Meeting

During household survey and public meetings, the most important positive outcomes from the project expected by the local people and most of their concerns about proposed project are as follow:

Village Name	Most Public Needs	Most Pubic Concerns
Ka Vee Napin	• Upgrading of village road • Want to create job opportunity	• Wind speed will be increased from the sea side because cutting of trees between the sea and Kavee Napin Village • Blockage of village road to the sea • Land use and compensation

Maung Ma Kan	• Upgrading of educational purpose through upgrading of multimedia and other education facilities • Supporting for health care facilities by upgrading existing health care facilities • Getting of Electricity • Upgrading of Maung Ma Kan Road to the proposed hotel zone • Creating of job opportunities to local people • Supporting to get land permit for local people in nearest villages	• Land use • Traffic and road accidents • Ground water depletion

(d) Public Disclosure Process

Summary of IEE report in Myanmar Language was also distributed to all key stakeholders and final IEE report will be made publicity in DDPC's website.

1.17. Community Development Program and CSR Fund

Being local public company, DDPC will conduct community development throughout the whole life of the project. DDPC promises to set up at least 2% of annual profit as CSR fund. Environmental mitigation and monitoring costs will not take account as CSR fund.

1.18. Conclusion

This IEE report reviews the key anticipated environmental and social impacts of proposed project. Moreover, proper mitigation measures for these anticipated impacts and good environmental management practices, which do not reduce hotel process were described in this report. According to the IEE study, all of the major and minor environmental and social impacts can be reduced by proper mitigation measures described in this report. To summarize, it can be concluded that the proposed project need not to conduct comprehensive EIA and all of the anticipated adverse impacts of the project can be minimized by the proper mitigation measures described in this report. So, it can be concluded that the proposed hotel zone project can be allowed to operate if the DDPC will conduct all of the mitigation and enhancement measures described in this report.

2. INTRODUCTION

2.1 Purpose and Background

As the tourism sector in Tanintharyi region increasing year after year and continuously increasing the number of visitors to Dawei. Moreover, there was not have enough accommodation facilities during Thingyin festival and long public holiday like Thadinkyut and Tasaungdye in Maung Ma Kan Beach. So, DDPC (local public company establishing most of Dawei people) intends to build a hotel resort in in Maungmagan Village, Long- lone Township, Dawei District, Thanitharyi Region, Republic of the Union of Myanmar. According to the Environmental Conservation Law, 2012 of the Ministry of Natural Resources and Environmental Conservation (MONREC), the proponents of every development projects in the country have to prepare an Environmental Management Plan (EMP) or Initial Environmental Examination (IEE) or Environmental Impact Assessment (IEE) so as to know impacts on environment and surrounding communities and to find ways to mitigate or minimize these impacts.

2.2 Aim and Objectives of the Report

This is an Initial Environmental Examination (IEE) report to assess the potential impacts of the proposed project and to formulate, implement and monitor the environmental protection measures in the phases of its construction, operation and decommissioning in order to reduce the environmental impacts or have to minimum impacts to the environment and to increase its operating efficiency. The objectives of the IEE report for Dawai Development Public Company Limited are to;

(i) assess the project's potential positive and negative, direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the vicinity of the project area,

(ii) identify the stakeholders, hold consultation meeting with project affected people and consider their concerns in the implementation of the project,

(iii) present mitigation measures to help reduce and/or mitigate, and/or compensate for the negative environmental impacts from the proposed project,

(iv) describe the monitoring measures and reporting procedures to ensure the operations of the project meet with proposed mitigation measures, and

(v) identify the responsible person or team to proceed the proposed mitigation and monitoring measures.

2.3 Detail Information of the Project Proponent

The following are the detailed information about the project proponent.

Company Name	Dawei Development Public Company Limited (DDPC)
Company Type	Public Company Limited
Project Name	Orchid Garden Resort (Maung Ma Kan)
Building Included	(10 Room Star Level Hotel (1.Nos), 2 Room Star Level Hotel (44.Nos) and Country Style Bungalow (50 .Nos)
Area	The hotel resort, Maung Ma Kan will occupy 60.48 acres of the land in phase I.
Company Address (1)	Corner of Kamaukin road and Siekanthar road, Hteintit Ward, Dawei Phone number- 059 – 2023955 , 2023956 , 2023958 Email - secretary@ddpcmyanmar.com, cg@ddpcmyanmar.com
Company Address (2)	No. 282, Maha Bandula Road (9x10) street, Lanmadaw Township, Yangon. Phone number- 09 – 421142111 , 09 – 253663166 Email - acc.ddpcmyanmar@gmail.com
Facebook Page	http://daweidevelopmrntpublic.blogspot.com/
Contact Person	U Than Htut Oo Senior Executive Director Phone number :09-5151693 Email: ed1@ddpcmyanmar.com

2.4 Study Team

Below is the background information on Ever Green Tech Environmental Services and Training Co., Ltd., (Third party) who was conducted the IEE.

Ever Green Tech Environmental Services & Training Co., Ltd.	
Company Name	Ever Green Tech Environmental Services and Training Co., Ltd.
Company Registration Number	3344/2015-2016 (Ygn)
Third Party	0047

Registration Number	
Contact Address	No.14, Thiri Mying (8th) Street, 13th Quarter, Hlaing Township, Yangon
Telephone Number	09-5099230
E-mail	green.evergreentech@gmail.com
Contact person	Dr. Kyaw Swar Tint Key Consultant 09-5099232

2.5. Study Team and Their Resposibilities

The followings are the specialist list and their responsible sectors for conduction IEE.

Name	Degree	Responsibility	Experiences
1. Dr. Kyaw Swar Tint	Ph.D. (Mining)	Noise and Environmental Management	At least 7 yrs experiences in environmental related field
2. Dr. Thein Tun	Ph.D. (Metallurgy)	Soil Quality	At least 4 yrs experiences in environmental related field
3. Dr. Myo Min Tun	Ph.D. (Metallurgy)	Air Quality	At least 4 yrs experiences in environmental related field
4. Dr. Ei Mon Aung	Ph.D. (Chemical)	Process, Utilities and Wastewater Treatment	At least 3 yrs experiences in environmental related field
5. Dr. Kyaw Zay Moe	Ph.D. (Botany)	Flora Diversity	At least 3 yrs experiences in environmental related field
6. Dr. Ko Myint	Ph.D. (Zoology)	Fauna Diversity	At least 3 yrs experiences in environmental related field
7. Dr. Khon Aung	M.B.B.S (Ygn)	Occupational Safety and Health	At least 5 yrs experiences in environmental related field
8. U Min Aung	M.Sc. (Chemistry)	Water Quality	At least 6 yrs experiences in environmental related field
9. Ms. Thazin Htwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Public Consultation and Participation	At least 4 yrs experiences in environmental related field

10. Ma Nandar Nwe	M.S. (Environmental Assessment and Management); Dip in Applied Psychology	Risk Assessment and Management	At least 4 yrs experiences in environmental related field
11. Mg Yaw Ma Nar	B.Sc. (Forestry), Dip. In EIA/EMS	Environmental Baseline Study	At least 3 yrs experiences in environmental related field
12. Ma May Thet Zaw	M.E. (Civil)	Water Resources Management and Hydrology	At least 3 yrs experiences in environmental related field
13. Ma Nay Chi Win Mg	M.E. (Civil)	Traffic	At least 2 yrs experiences in environmental related field
14. Dr. Win Swe	Ph.D (Geology)	Oceanography and Hydrology	At least 2 yrs experiences in environmental related field
15. U Aung Naing Tun	L.L.B, M.B.A, M.A (B.L), M.A (TEFL)	Laws and Regulations	At least 4 yrs experiences in environmental related field

2.6. Brief of Project Activities

(a) Construction Activities

The following activities will be conducted during construction phase.

Construction camp: This site will allow use of the existing underpass to access the site and minimize highway traffic disruptions caused by movement of construction works equipment. The establishment of the camp (access roads, temporary office buildings, earth materials stockpiles, equipment and material stores, maintenance yard, etc.) will entail loss of trees occurring at that site (approx. 1 acre).

Water supply: The plant nursery, construction camp and site works will require a supply of water. The water requirement for the all construction activities and workers except drinking water will be supported from the existing tube wells; two installed 4-inch diameter (Ø) pipe. There is one overhead tank existing near the staff quarter. This tank is meant for temporary storage of water during primary stage of construction.

Building Construction Infrastructure: The construction phase has planned into four phases according to investor plan. Phase I will include construction of three hotel buildings, each will be two unit one Storeyed 44 buildings with a total of 88 guest rooms, ten unit one Storey 1 hotel building with 10 rooms and country style bungalow 50 buildings with 50 rooms. There are total numbers of 148 rooms in construction activities.

All building materials include wood and brick with reinforce concrete (RC) type. Hotel buildings are planned to be equipped with up-to-date electrical and communication system and air conditioning system with environmentally friendly refrigerants.

(b) Operations Activities

The main purpose of operation phase is hotel services for visitors to Maung Ma Kan Beach. During operation phase of the hotel services will include as follow:

Main Services Infrastructure

Main services infrastructure will include operation of (a) 10 Rooms Star Level Hotel (1 Nos), (b) 2 Rooms Star Level Hotel (44 Nos), and (c) Country Style Bungalow (50 Nos).

Supporting Services Infrastructure

Supporting Services Infrastructure includes; Swimming Pool, Lobby, Security House, Dispensary, Water Store Tank, Wastewater Treatment, Playground, Car Parking, Transformer House, Road & Drain and Landscape.

Employment

It is estimated that 90 persons (skilled and unskilled) will be employed during operation of the resort.

Water Supply and Demand

There are the same water supply sources for operation phase as the construction phase. The water requirement will be planning of additional water supply from a natural spring pool in Tha Pay village (5 miles away from the project area) transport by water-box cars to water storage tank at the hotel resort. The total estimated demand for water by the resort during full operation is approximately about (5,000,000 gallons) of water a year. These are meant for use in washing, bathing, cooking, gardening, toilets water and other cleaning activities. Drinking

water as purified water will be outsourced in local market. There is a plan to construct a big ground level tank. This ground level tank is meant for guest only. It is planned to install wastewater treatment system for wastewater and grey water. The treated water will be used in gardening, vehicles washing and watering to the roads not to be dusty. The chemical used for treating pond water is liquid chlorine so as to clean up the water.

(c) Decommissioning Activities

Although the proposed project is long-term project, decommissioning of the project would occur at the end of its lifespan. The goal of project decommissioning will be to remove the concrete and steel structures or as a whole and return the site to a condition as close to a pre-construction state as feasible. The physical removal of the structures and equipment will be the reversal of the construction process. All areas disturbed by the proposed project would be restored to pre-project conditions and/or to conditions acceptable to the CDC (Loung Lone) rule and regulations. During decommissioning phase, all concrete and steel structures and equipment would be dismantled and removed.

2.7. Data Collections

The project related data, site layout plans and design parameter are provided by Dawai Development Company Limited. Secondary data on demographic distribution in the area are sourced from Head of Local Administration Office (Lounglone) and data on public health are sourced from Public Health Department (Lounglon). Primary data for public concerns, socio-economic and health profiles are conducted by household survey.

3.0. POLICY, LEGAL AND OTHER REQUIREMENTS

This chapter sets out the relevant legal and policy context in Myanmar and documents the environmental and social standards with which the project has to comply with, as well as the international standards that the project will follow.

3.1. Proponent's Environmental, Social and Health Policies

The main policy and commitment of DDPC will be identified in the following points:

- the protection of public safety, the health and safety of the workforce and the local communities;
- the protection and promotion of human rights, the economic and social development of local communities;
- the protection of the environment and the conservation of biodiversity and ecosystems;
- the compliance with Myanmar laws, regulations and industrial standards regarding the environment, health, safety and hygiene at work in all of our operations;
- visible and active leadership that promotes HSE excellence, which engages and motivates employees and contractors alike to succeed;
- setting objectives and targets for measuring and improving HSE performance in line with company activities and strategic objectives;
- implementing sustainable development principles in our activities;
- seek and achieve continuous improvement in our processes, consistent with our strategic objectives and priorities, by adopting the most advanced systems for environmental protection and energy efficiency; and
- creating a culture in which DDPC employees, Contractors and Visitors share these commitments and understand that working safely is a condition of employment.

3.2. Sustainability Policy

DDPC's sustainability model is "To operate in a sustainable manner means to create value for stakeholders, and to use resources so that the needs of future generations will not be compromised, respecting people, the environment and the society as a whole." DDPC adheres to a sustainability policy, which is composed of the following principles:

- *Stakeholder relations* – "Engaging stakeholders and involving them in company's business are both prerequisites for sustainability and for the construction of reciprocal value."
- *Human Rights* – "The respect of Human Rights represents the basis for an inclusive growth of societies, of the territories and, consequently, of the companies that work there."
- *Relations with communities and contribution to local development* – "Dialogue, the respect of local communities, the evaluation of impacts are all preconditions for an effective cooperation, targeted at creating territorial value."
- *Climate strategy* – "To satisfy the world's energy demand, by containing, at the same time, emissions of gases that have an impact on climatic change, is one of the greatest challenges of modern society."

3.3. Developer's Policies for Socio-economic Development of Local People

The company's policies for local socio-economic development are shown in the following table.

No.	Description	Company's Policy
1.	Local Community Development Policy	Appoint local people with relevant skills as much as possible (At least 50% of Local People)
2.	Corporate Social Responsibility (CSR) Policy	Contribute at least 2 percent of the annual net profit after tax as CSR fund or at least 500 Lakhs per year.

3.4. Laws and Regulations Related to the Proposed Project

Myanmar has promulgated several laws and regulations concerning protection of the Environment. The following table describes laws and regulations directly or indirectly associated with the proposed project.

Table 3.1. Relevant Environmental Laws and Regulations in Myanmar

Laws and Regulations	Year	Purposes
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008	- To conserve the natural environment, - To prevent and upgrade the rights and lives of the workers
Environmental Conservation Law (Law No.7(o), 14,15,24,25,29)	2012	- To enable to implement the Myanmar National Environmental Policy; - To enable to lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process;
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014	- To implement correctly according to the environmental management plan
IEE Procedures (Article 102 to 110, 113, 115, 117)	2015	- To develop the environmental impacts and to draw the environmental management plan;
National Environmental Quality (Emission) Guidelines	2015	These national Environmental Quality (Emission) Guidelines (hereafter referred to as Guidelines) provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.
The Protection of rights of National Race Law, (Law No. 5)	2015	Consists of four bills, as submitted to the legislature; Buddhist Women's Special Marriage Bill, Religious Conversion Bill, Monogamy Bill and Population Control Bill.
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016	To develop responsible investment businesses which do not cause harm to the natural environment and the society for the benefit of the Union and its citizens
Labour Organization Law, (Law No. 1,7 to 11)	2011	This Law was enacted, to protect the rights of the workers, to have good relations among the workers or between the employer and the worker, and to enable to form and carry out the labour organizations systematically and independently
The Settlement of Labour Dispute Law, (Law No. 38, 39, 40, 51)	2012	The Pyidaungsu Hluttaw hereby had enacted this Law for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace.

Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013	- To facilitate employment which is appropriate to the age and ability of the job seeker - To help workers obtain employment and to provide stability of employment and skills development for employees - To help employers obtain appropriate employees
The Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014	- To allow worker for leave and holiday allowances, religious or social activities with earn allowance, and benefits for Health allowances. - Concerned workers: Daily wage workers/ temporary workers/permanent workers.
Minimum Wages Law (Law No. 12, 13 (a to g)	2013	This Law was enacted to meet with the essential needs of the workers, and their families, who are working at the commercial, production and service, agricultural and livestock breeding businesses and with the purpose of increasing the capacity of the workers and for the development of competitiveness,
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016	(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee. (b) Moreover, pay can be in the means of… (1) Totally in cash OR half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors. (2) Totally in cash OR half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But, this must be for the sake of the employees and their families. And, it also must be reasonable/fair. (3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012	The employers and workers shall co-ordinate with the Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational work of the workers and accident at the establishment.
Workman Compensation Act	1951	To protect personal injury caused to a workman by accident arising out of and in the course of his employment and to compensate in accordance with the provisions of Workman Compensation Act
Myanmar Fire Force Law, (Law No. 25)	2015	-To take precautionary and preventive measure and loss of state own property, private property, cultural heritage and the lives and property of public due to fire and other natural disasters -To organize fire brigade systemically and to train the fire brigade

		-To prevent from fire and to conduct release work when fire disaster, natural disaster, epidemic disease or any kind of certain danger occurs -To educate, organize an inside extensively so as to achieve public corporation -To participate if in need for national security, peace for the citizens and law and order
National Food Law,	1997	a) Recommendation on imported and exported food b) Post market surveillance (risk assessment) c) HACCO along with general practice for food inspectors and manufactures d) Food safety training for restaurants, street, vendors, etc.
Public Health Law (Law No. 3, 5)	1972	To promote and safeguard public health and to take necessary measures in respect of environmental health.
The Myanmar Tourism Law, (Section 6 ,7 ,8,9 and 10)	1990	A person desirous of operating any of the following businesses of tourism industry for international tourists or foreign visitors shall apply for a license to the Directorate in the prescribed form:- a) Tourist Enterprise; b) Hotel Business; c) Lodging-House Business; d) Tourist Transport Business; e) Tour Guide Business; f) Businesses, prescribed from time to time as a Tourism Industry by the commission The Directorate may prescribe the types of business to be operated under a license for domestic tourists among the businesses contained in Section 6.
Myanmar Hotel and Tourism Law, (Section 6 ,7 and 8)	1993	A Government Department, Government Organization, an organization in joint-venture with the Government, Municipality, Co-operative Society, other organization or person desirous of operating a hotel business or lodging-house business shall, before commencing implementation of the project proposal apply for prior permission to the Ministry in the manner prescribed.
Private Industrial Enterprise Law	1990	To narrow down the gap between rural development and urban development by the development and improvement of industrial enterprises; to avoid or reduce the use of technical know-how which cause environmental pollution; to cause the use of energy in the most economical manner.
Forest Law	1992	To implement forest policy and environmental conservation policy, to promote public cooperation in implementing these policies, to develop the economy of the State, to prevent destruction of forest and biodiversity, to carry out conservation of natural forests and establishment of forest plantations and to contribute towards the fuel requirement of the country.

Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994	To protect wildlife, wild plants and conserve natural areas, to contribute towards works of natural scientific research, and to establish zoological gardens and botanical gardens.
Protection and Preservation of Cultural Heritage Regions Laws (Law No. 15, 16)	1998	To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years; to protect and preserve the cultural heritage regions and the cultural heritage.
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995	To prevent the outbreak of Communicable Diseases, by implementing following project activities:- (a) immunization of children by injection or orally; (b) immunization of those who have attained majority, by injection or orally, when necessary; (c) carrying out health educative activities relating to Communicable Disease.
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006	-To convince the public that health can be adversely affected due to smoking and consumption of tobacco product and to cause refraining from the use of the same; -To protect from the danger which affects public health adversely by creating tobacco smoke-free environment; -To obtain a healthy living style of the public including child and youth by preventing the habit of smoking and consumption of tobacco product;
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006	To conserve and protect the water resources and rivers system for beneficial utilization by the public; to prevent environmental impact.
Myanmar Port Authority Law	2015	"Any person who by himself or another so casts or throws any ballast or rubbish or any such other thing or so discharges any oil or water mixed with oil, or the master of any vessel from which the same is so cast, thrown or discharged, shall be punishable with fine not exceeding fifty thousand kyats, and shall pay any reasonable expenses which may be incurred in removing the same".
Agricultural Land Law	2012	To protect the rights of the people who are working on the farm.
The Protection and	2015	-To implement the policy of protection and preservation for the perpetuation of antique objects; -To protect and preserve antique objects so as not to

Preservation of Antique Objects Law (Law No. 12,15 20)		deteriorate due to natural disaster or man-made destruction; -To uplift hereditary pride and to cause dynamism of patriotic spirit by protection and preservation of antique objectives; -To have public awareness of the high value of antique objectives; -To carry out in respect of protection and preservation of antique monuments in conformity with the International Convention and Regional Agreement ratified by the State.
The Protection and Preservation of Ancient Monuments Law (Law No. 12,15 20)	2015	- To implement the policy of protection and preservation for the perpetuation of ancient monuments; - To protect and preserve ancient monuments so as not to deteriorate due to natural disaster or man-made destruction; - To uplift hereditary pride and to cause dynamism of patriotic spirit by protecting and preserving ancient monuments; - To have public awareness of the high value of ancient monuments; - To protect and preserve ancient monuments from destruction; - To search and maintain ancient monuments; - To carry out in respect of protection and preservation of ancient monuments in conformity with the International Convention and Regional Agreement ratified by the State.
the Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013	- Performing the sticking pictogram for being least the health impacts and accident injuries in the occupational area according to the prescribed standards and norms of the Globally Harmonized System GHS); - Making the necessary arrangements to be safety of the occupational area and issuing orders and directives for preventing and decreasing the accident; - Laying down the proliferation plans on knowledge, and safety of chemical and related substances to administrators, license holders, public and workers; - Cooperating with local and foreign governmental departments, organizations and non-governmental organizations in respect of safety management for chemicals hazard.
The Freshwater Fisheries Law (Law No. 36,40,41)	1991	- To further develop the fisheries; - To prevent the extinction of fish; - To safeguard and prevent the destruction of freshwater fisheries waters; - To obtain duties and fees payable to the State; - To manage the fisheries and to take action in accordance with the Law.

Automobile Law Pyidaungsu Hluttaw Law No. 55/2015	2015	- For the safe driving of motor vehicles in public areas through registration according to official rules and regulations. - To provide driving licenses for driving particular types of motorized vehicles after qualification checks. - For the easy flow of road users and for the protection against road risks and vehicle perils. - To avoid traffic congestion and to use high technology transportation systems efficiently in order to implement protection against road risks and vehicle perils. - To reduce environmental pollution caused by motor vehicles.

3.5. National and International Guidelines for Proposed Project

National Guidelines and Internal standard guidelines are referred for Environmental Management Plan of the proposed resort project.

1. Environmental Impact Assessment Procedure (2015)
2. National Environmental Quality (Emission) Guidelines (2015) for Poultry Production
3. World Health Organization Guidelines (WHO)
4. IFC Guidelines for Waste Management Facilities, 2007
5. IFC Guidelines for Water and Sanitation, 2007
6. IFC Guidelines for Community Health and Safety
7. IFC, Environmental Health and Safety Guideline for Tourism and Hospitality Development
8. World Bank Safeguard Policies

3.6. Statement of Commitments

3.6.1 Commitments of Project Developer

We, Dawei Development Public Co., Ltd (DDPC) commit to comply with the followings:

a) Comply with the commitments of the environmental and socio-economic development revealed in the IEE report.

b) Acknowledge and comply the laws, regulations and guidelines associated with the project, included in the report.

c) Comply and proceed the alternative methods, mitigation measures and monitoring plans included in the report for the reduction of the negative environmental impacts; and take responsibility for the environmental impacts due to non-compliance of the commitment.

d) Give priorities for the occupational health and safety of the workers.

e) Utilize the exact amount of fund as stated in proposed expenditure for cooperate social responsibility funds.

f) Take responsibility for all of the works and absence of the contractors, sub-contractors, officers and representatives of the company in operating the processes.

g) Take responsibility to support after discussion for the impacted people to ensure for their stable livelihood not lower than before the project; and resettlement and rehabilitate the impacted local people, government organizations and other related people and organizations.

h) We, Dawei Development Public Co., Ltd. commit to follow the environmental commitments, mitigation measures, management plans illustrated in the IEE report. We also commit to follow the Environmental Conservation Laws 2012, and other related laws that stated in IEE.

(Signature)

Name -

Position -

Date -

3.6.2 Commitments of the Environmental Assessment Practitioner

The IEE report was written by Ever Green Tech Environmental Services and Training Co., and IEEs in this report were designed by the following criteria;

(a) The designed IEE complied with the National Constitution, Environmental Conservation Law, EIA Procedures, and National Environmental Quality Guideline.

(b) This IEE also complied with the existing or future Labor laws, Occupational Health and Safety Laws, Rules and Procedures.

(c) These environmental impact protection procedures are designed of incident avoiding, mitigation and replacing for the project proponent who commits to follow the environmental impact protection procedure.

(d) This environmental management report is systematically designed not only for environmental impact protection procedures and occupational safety and health but also emergency management planning and social welfare programs.

(e) All facts including in this report are systematically surveyed without bias. As a third party, we commit and take full responsibility for all facts in this report.

3.7. Penalties and other Administrative Punishment

The developer must have to know the penalties and other administrative punishment granted in IEE Procedures in Myanmar.

No	Non-Compliance	Penalties	Specific Administrative Punishment of the Ministry
1.	Failure or delay in timely submission of reports within Period prescribed by Ministry	100 to 500 US$ or equivalent Myanmar Kyat + 10-25 US$/ day unit cured or equivalent Myanmar Kyat	-Issue Enforcement Notice
2.	Obstruction or interference with an official in the course of their duties	250 to 5,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice -Criminal prosecution
3.	Failure to provide information to the Ministry or any representative	1,000 to 5,000 US$ or equivalent Myanmar Kyat	-Suspension of Approval of EMP, EMP-CP, EMP-OP in whole or in part
4.	Failure to provide information to the Ministry Inspector or any representative when requested in regard to inspection and monitoring	250 to 5,000 US$ or equivalent Myanmar Kyat	- Issue Enforcement Notice
5.	Undertaking or allowing any preparatory or other construction works without the prior approval by the Ministry of a reserved EMP or EMP-CP	1,000 to 5,000 US$ or equivalent Myanmar Kyat +50 to 500 US$/ day until cured or equivalent Myanmar Kyat	-Criminal prosecution
6.	Operating/implementing without a permit, or approval by the Ministry of an EMP or EMP-Op	1,000 to 5,000 US$ or equivalent Myanmar Kyat +50 to 500 US$/ day unit cured or equivalent Myanmar Kyat	- Criminal prosecution
7.	Non-compliance with an Enforcement Notice or Suspension Notice issued by the Ministry	2,000 to 10,000 US$ or equivalent Myanmar Kyat +100-500 US$/day unit cured or equivalent Myanmar Kyat	-Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part

8.	Failure to notify to the Ministry of any knowledge of any event of an imminent of Environmental damage	1,000 to 5,000 US$ or equivalent Myanmar Kyat	- Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
9.	Failure to take reasonable steps to prevent an imminent thread of damage to the Environment, social, human health, livelihoods, or property, where application based on the EMP, EMP-CP or EMP-OP	2,500 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
10.	Non-compliance with conditions in 'the ECC and allowable Emission Limit Values	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
11.	Failure to take pay compensation amounts required in respected in respect of social impacts	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
12.	Failure to fully restore social conditions upon resettlement	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part

Notes:

1. All penalty amounts set forth in this Annex are denominated in United states Dollars (US$) and are subject to annual inflation adjustment
2. Abbreviations are as follows;
   EMP =Environmental Management Plan,
   EMP-CP = Environmental Management Plan – Construction Phase,
   EMP-OP = Environmental Management Plan –Operational Phase

4. DESCRIPTION OF PROJECT AND ALTERNATIVES

4.1. Project Background

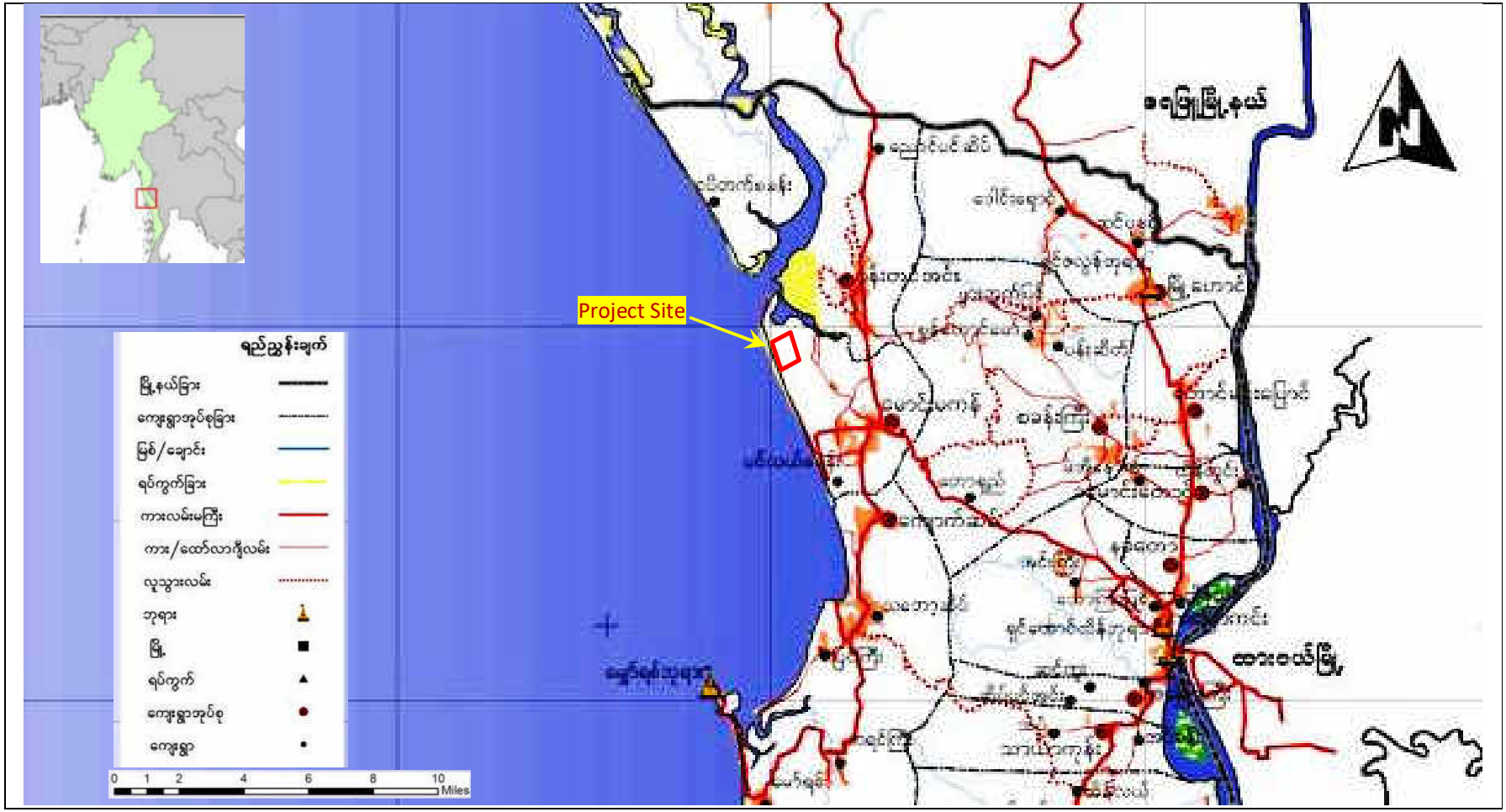
The Maungmagan hotel resort project is a modification of the original concept for the development of the beachfront at Maung Ma Kan beach. It intends to create a high-end local and tourism resort that is environmentally friendly and which will directly contribute to the economic development of the area.

4.2. History of Land Use

The use area will contain cashew plants land and reserved forest area without residential area. So, vacant / coast land (148.40), received permission to operate (30 years) on November 16, 2015 from Department of Land Records. The forest land (254.80 acres) are apply to announce the order dated (February 4, 2014) No. (12/2014) in order to cancel the Reserved Forest area and the activities prior to the service received. Next, in accordance with the procedures and application to the Management Committee received permission to operate (30 years) on March 28, 2016.

4.3. Location of the Project

Maungmagan hotel resort is located near the Maung Ma Kan beach, Maung Ma Kan Village, Launglon Township, Dawei District, at the coordinates of 19° 9′ 23.54″ N Latitude and 98° 5′ 25.76″ E Longitude and covering a total land area of 60.48 Acres. The location map of project area is shown in Figure 4.1. and 4.2.



Source: Township Profiles (MIMU)

Figure 4.1. The Location Map of Proposed Hotel Zone Project

Figure 4.2. The Satellite Map of Project Area

4.4. Land Use

This area is only found cashew plantation land and reserved forest area without residential area. When they do have access to the information required by the Department of Land Records, vacant land / coast caused a valid type of land (148.40 acres) and in the forest land (254.80 acres) are reported. Therefore vacant / coast land (148.40), including what application submitted in accordance with the procedures, the Management Committee received permission to operate (30 years) on November 16, 2015. The forest lands (254.80 acres) are apply to announce the order dated (February 4, 2014) No. (12/2014) in order to cancel the reserved forest area and the activities prior to the service received. Next, in accordance with the procedures and application to the Management Committee received permission to operate This area included only cashew plantation land and reserved forest area without residential area. When they do have access to the information required by the Department of Land Records, vacant land / coast caused a valid type of land (148.40 acres) and in the forest land (254.80 acres) are reported. Therefore vacant / coast land (148.40), including what application submitted in accordance with the procedures, the Management Committee received permission to operate (30 years) on November 16, 2015. The forest lands (254.80 acres) are apply to announce the order dated (February 4, 2014) No. (12/2014) in order to cancel the reserved forest area and the activities prior to the service received. Next, in accordance with the procedures and application to the Management Committee received permission to operate (30 years) on March 28, 2016. All of the recorded documentation of the land use are shown in Appendix B.

4.5. Site Layout

DDPC intend to build phase one construction activities on the 60.48 acres site. The layout of the building footprints of the site is shown at Figure 4.4. Also indicated are the proposed phase one for the construction works. It can easily be noted that the (10 rooms), (2 rooms) star level hotel and country style bungalow will occupy flat and gently sloping land that has either been previously cleared or is covered by disturbed coconut plants. The supporting services infrastructure (staff house, site office, swimming pool, laundry, stand-by generator, etc.) will be centralized and located at a site on the property south of the site, as will be the waste water treatment plant, the transformer, and the temporary construction camp. It is to be noted that the resort footprint does not encroach on the small wetland area to the east of the site. The purpose projects phase one construction activities including total numbers of 148 rooms. Which is bungalow 50 Nos., (2 rooms) star level hotel 44 Nos. and (10 rooms) star level hotel 1 No.

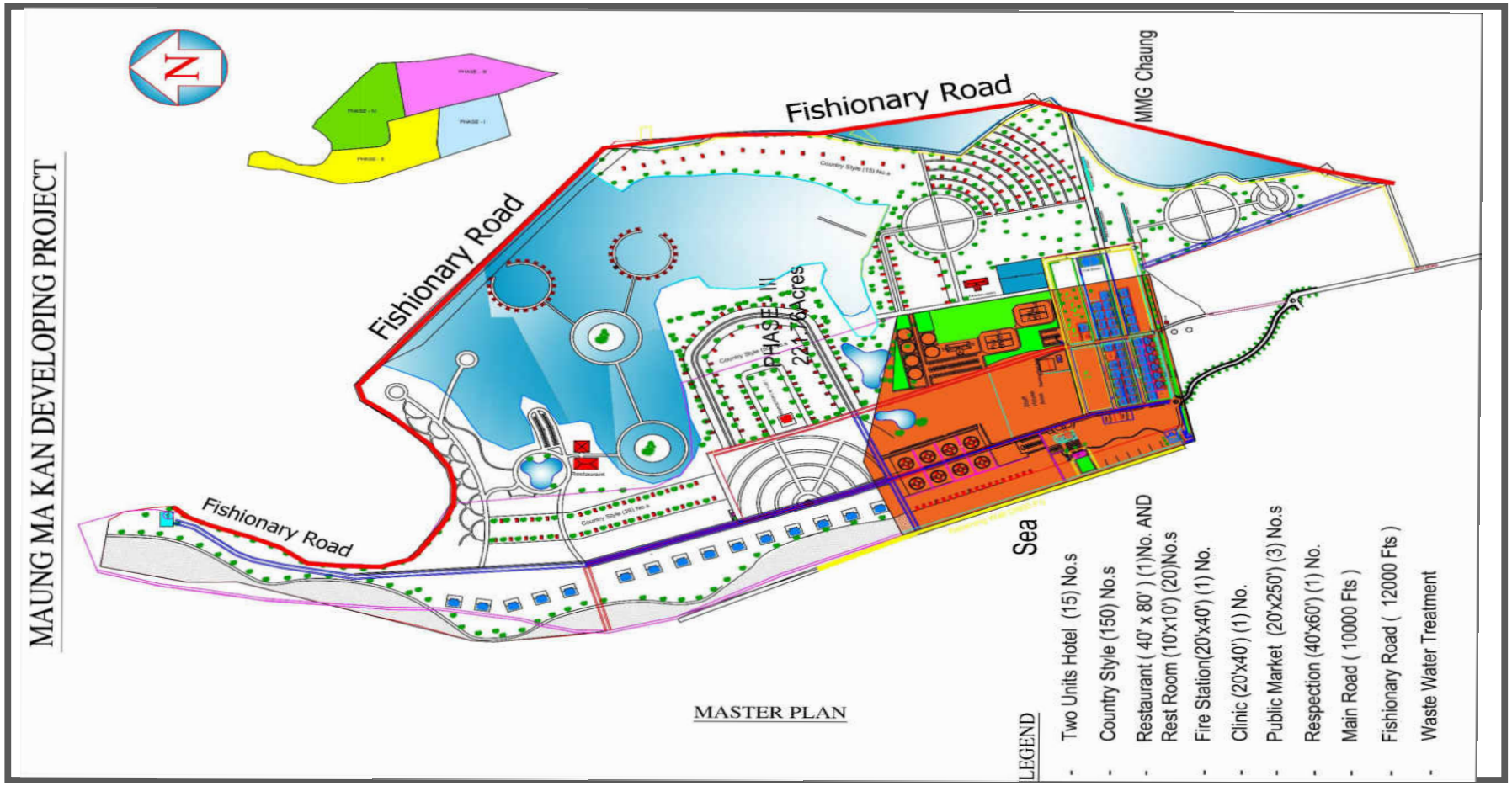


Figure 4.3 Building Footprints of Project Layouts

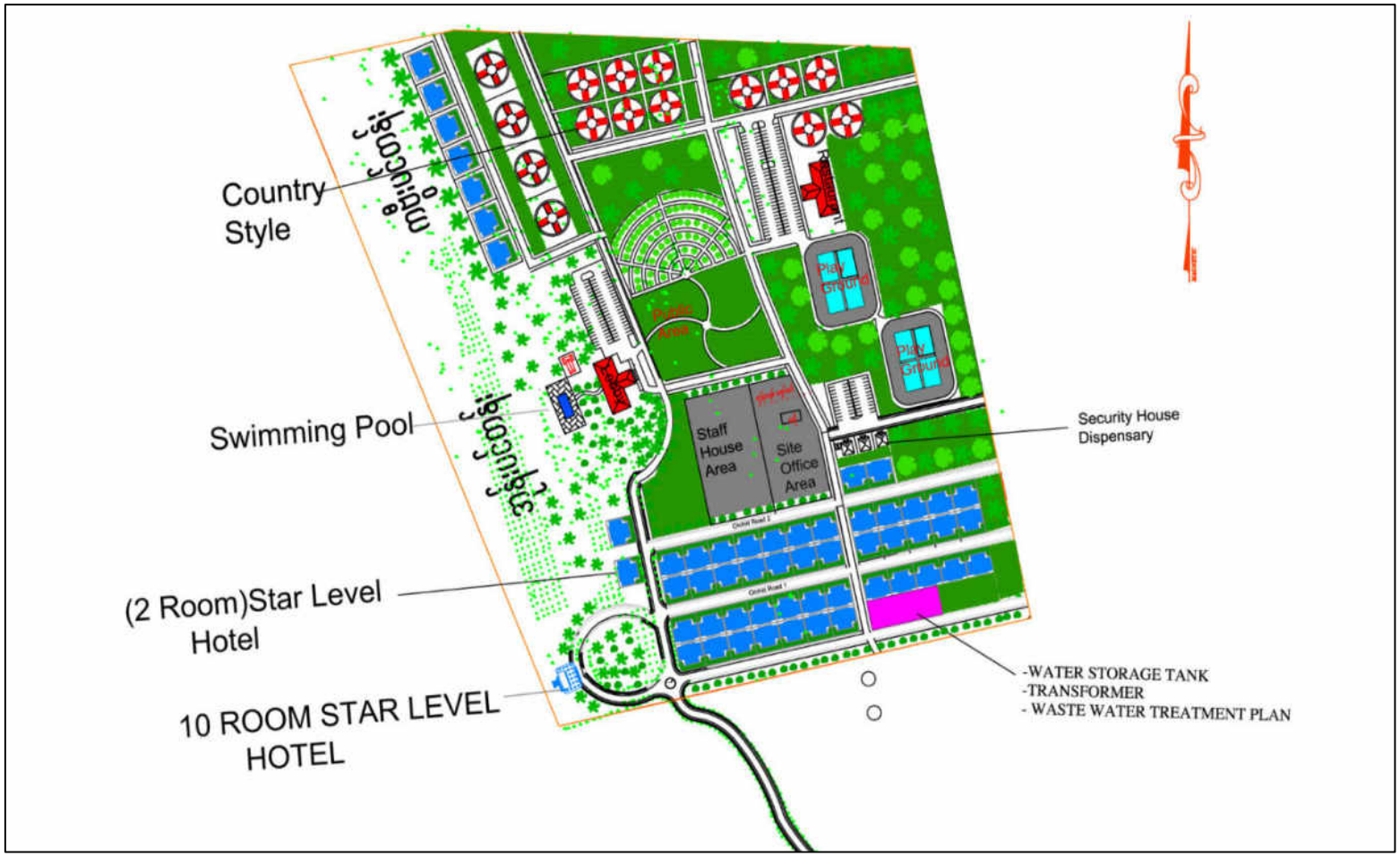


Figure 4.4 Building Footprints for Phase 1 Project Layout

Figure 4.5. Current Situation of the Project in Aerial Photo

4.6. Construction Schedule

4.6.1. Site Preparation Activities

Plant rescue and nursery: Initial activities on the site will entail identifying and establishing the plant nursery to which will be removed selected plants and seedlings taken from the areas

to be covered by buildings. This will be done by a landscape contractor in charge of a team engaged in the selection and removal of desirable plant material. This will be done more or less simultaneously with the general clearance of the underbrush on the building areas such that all large trees are left and the buildings and adjacent access areas can be pegged out. To the greatest extent possible, building footprints will be laid out and oriented so as to minimize the removal and loss of trees. The area of removal will also take into account the need for clear space around each building for the passage of construction equipment.

Construction camp: This site will allow use of the existing underpass to access the site and minimize highway traffic disruptions caused by movement of construction works equipment. The establishment of the camp (access roads, temporary office buildings, earth materials stockpiles, equipment and material stores, maintenance yard, etc.) will entail loss of trees occurring at that site (approx. 1 acre).

Water supply: The plant nursery, construction camp and site works will require a supply of water. The water requirement for the all construction activities and workers except drinking water will be supported from the existing tube wells; two installed 4-inch diameter (Ø) pipe. There is one overhead tank existing near the staff quarter. This tank is meant for temporary storage of water during primary stage of construction.

4.6.2 Building Construction Infrastructure

The construction phase has planned into four phases according to investor plan. Phase I will include construction of three hotel buildings, each will be two unit one Storeyed 44 buildings with a total of 88 guest rooms, ten unit one Storey 1 hotel building with 10 rooms and country style bungalow 50 buildings with 50 rooms. There are total numbers of 148 rooms in construction activities. All building materials include wood and brick with reinforce concrete (RC) type. Hotel buildings are planned to be equipped with up-todate electrical and communication system and air conditioning system with environmental friendly refrigerants.

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4.6.3 Site Waste Management

A considerable amount of soil (excavation) wastes will be generated during site preparation and excavation activities especially for the foundation work of buildings, construction of the

pond and construction of the ground level tank. These wastes will be used in cut and fill for required area of the proposed project. of organic refuse (vegetation) would be generated during site clearance activities. To the greatest extent possible the soft material (leaves, shoots, etc.) would be separated and composted on site for later reuse during the landscaping phase. Harder and woody material (tree trunks, branches) would be stockpiled and removed from the site by a waste contractor.

4.6.4 Materials Transportation

Site clearance and construction of the hotel will require transportation of materials to and from the site and this will generate a significant amount of traffic, especially trucks, on the beach main road. This will exacerbate traffic congestion in Maung Ma Kan village along the transport routes and potentially cause a deterioration of air quality due to dust and exhaust fumes.

4.7. Operations Phase

The main purpose of operation phase is hotel services for visitors to Maung Ma Kan Beach. During operation phase of the hotel services will include as follow:

(a) Main Services Infrastructure

Main services infrastructure will include operation of (a) 10 Rooms Star Level Hotel (1 Nos), (b) 2 Rooms Star Level Hotel (44 Nos), and (c)Country Style Bungalow (50 Nos).

Figure 4.6 -Perspective (10 Rooms) Star Level Hotel

Figure 4.7- Perspective (2 Rooms) Star Level Hotel

Figure 4.8- Perspective Country Style Bungalow

(b) Supporting Services Infrastructure

Supporting Services Infrastructure includes; Swimming Pool, Lobby, Security House, Dispensary, Water Store Tank, Wastewater Treatment, Playground, Car Parking, Transformer House, Road & Drain and Landscape.

Figure 4.9 Perspective Swimming Pool

Table- Infrastructure List of Proposed Project

No.	Items	Qty	Qtys
1	**(10) Rooms Star Level Hotel (7622 Sq Ft)**		
	(a) Building (7622 Sqft)	1	No
	(b) M&E Work (Electrical,Air Con, Fire Alram & Fifting, CCTV and Water Supply)	1	Lot
	(c) Interior	1	Lot
2	**(2) Rooms Star Level Hotel (2700 Sq Ft)**		
	(a) Building (2700 Sqft)	44	No.s
	(b) M&E Work (Electrical,Air Con, Fire Alram & Fifting, CCTV and Water Supply)	44	Lots
3	Country Style Bangalow (50 x 5000000)	50	No.s
4	External Power Supply	1	Lot
5	Street Light (For 60No.s Street light)	1	Lot
6	External Water Supply	1	Lot
7	Road (7016 Fts) & Drain	610	Sud
8	Landscape	1	Lot
9	Swimming Pool	1	No
10	Lobby House (120'x 60')	1	No
	(a)Restaurant	1	Set
	(b)Family KTV and SPA	1	Set
	(c)Gym Instrument	1	lot
14	Security Station (1000 Sqft)	1	No
15	Dispensary (1000 Sqft)	1	No
16	Water Storage Tank (30000 gls)	1	No
17	500KVA Transformer	1	Set
18	Wastewater Treatment Plan	1	Lot

(c) Employment

It is estimated that 90 persons (skilled and unskilled) will be employed during construction of the resort. Employee statement of hotel resort is shown in Table 4.1.

Table 4.1 Employee Statement of Hotel Resort

Sr. No.	Designation	No of Employee
1	Manager	1
2	Accountant	1
3	Marketing Officer	1
4	Admin / HR Officer	1
5	Technician (Engineering)(M&E)	1
6	Cashier	4
7	Office Staff	5
8	Technician (Assistant)(M&E)	12
9	Housekeeping Supervisor	3
10	Security Head	1
11	Receptionist	6
12	Landscaping Expert	1
13	Housekeeping Staff	12
14	Bell Man	15
15	Security	15
16	Landscaping Wages	5
17	Driving Range Attendants	6
	Total	90

(c) Water Supply and Demand

There are the same water supply sources for operation phase as the construction phase. The water requirement will be planning of additional water supply from a natural spring pool in Tha Pay village (5 miles away from the project area) transport by water-box cars to water

storage tank at the hotel resort. The total estimated demand for water by the resort during full operation is approximately about (300,000 gallons) of water a year. These are meant for use in washing, bathing, cooking, gardening, toilets water and other cleaning activities. Drinking water as purified water will be outsourced. There is a plan to construct a big ground level tank. This ground level tank is meant for guest only. It is planned to install wastewater treatment system for wastewater and grey water. The treated water will be used in gardening, vehicles washing and watering to the roads not to be dusty. The chemical used for treating pond water is liquid chlorine so as to clean up the water.

(d) Transportation

Operation of the resort will require the transport of guests to and from the airport, primarily in relation to Dawei. This will involve scores of bus movements in addition to the traffic caused by hotel staff, suppliers, and local visitors. The entrance to the resort will be designed to facilitate the easy exit to and from the Maungmagan-Dawei road and to prevent traffic congestion at the entrance.

(e) Electricity Demand

The total estimated demand for electricity will be 260 KVA and will be equipped with 500 KVA transformer and 200 KVA, 100 KVA diesel backup generator.

4.8. Alternatives Analysis

An analysis of reasonable alternatives for meeting the project objectives may lead to designs that are more environmentally, socio-culturally or economically sound.

4.8.1. "NO-GO" Alternative

The proposed project does not proceed (the "no-go" alternative), the adverse impacts identified in this report would be avoided. The main adverse impacts are If the proposed project does not proceed, According to the IEE study, all of the impacts can be mitigated proper mitigation measures as proposed in this report. Moreover, the project proponent said he will close the project at any time if there will have any impact on the natural environment and local people. So, no-go alternative is not acceptable for current conditions of the nearest villages, local economy and local GDP.

Not so much an alternative to the proposed land use but rather as an adjunct to the resort development is the designation and development of the Maung Ma Kan Sea Beach. This area has a designated fishing beach but with the cooperation of the local fishermen and the provision of alternative means of livelihood as reserve keepers and tour guides the few fisherfolk will be induced to adopt a more sustainable mode of living.

5.0. DESCRIPTION OF SURROUNDING ENVIRONMENT

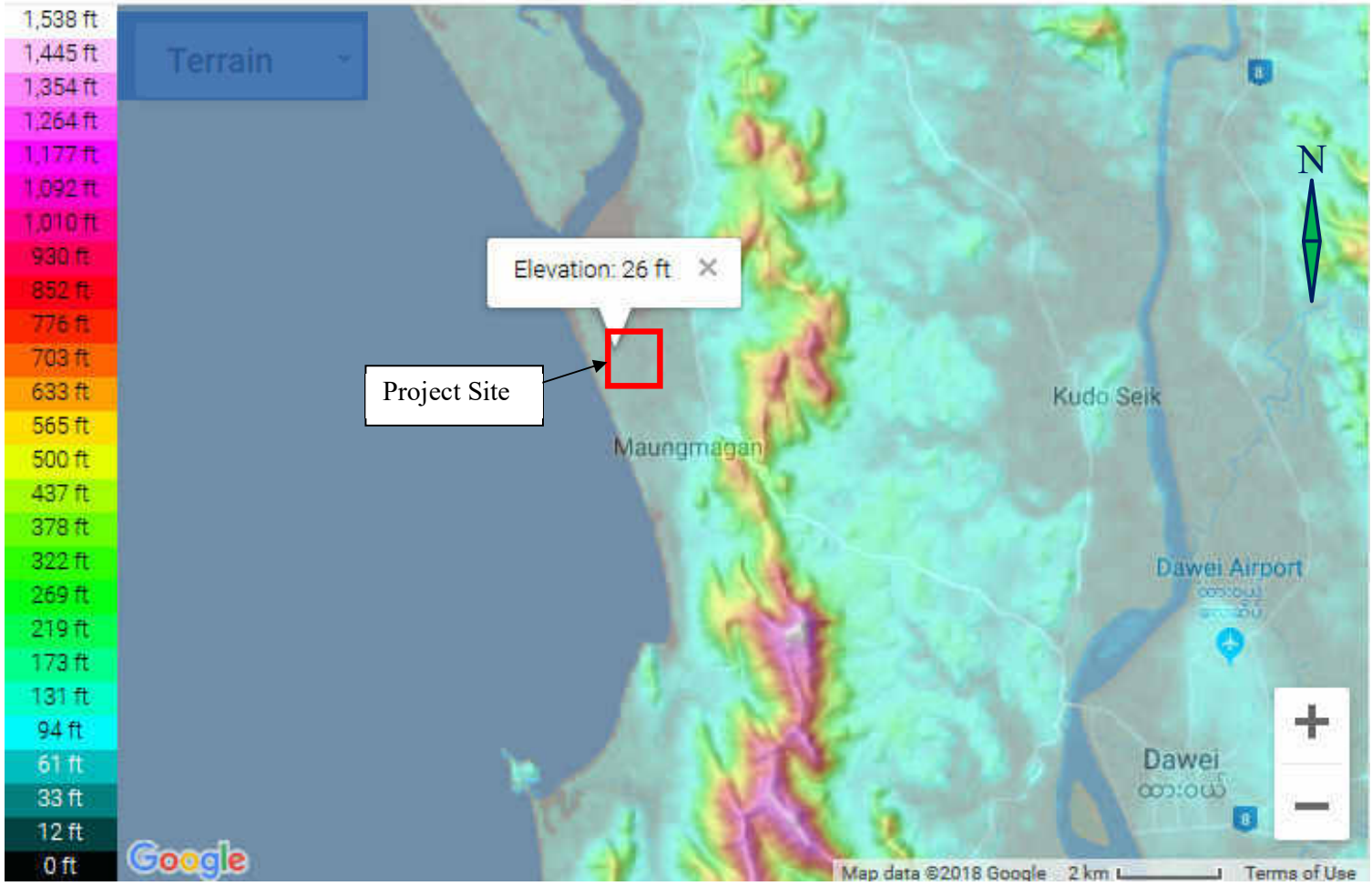
5.1. Topography and Drainage

The project site is located on a wide coastal strip at the base of the western extension of the Myinmoletkat Mountain range (Figure 5.1). Here the limestone hills to the north, slope westwards from an altitude of 30 m (100 ft) in the vicinity of the plateau at Maung Ma Kan in the east.

The project site north of the main road is relatively flat with a low-lying flat area close to sea level in east and rising to a height of 8 m (26 ft) in the central section of the site on the southern side. From the northeast the land rises gently towards the east. Here the elevation at the coastline is in the order of 1.5 m (5 ft) (Figure 5.2).

Surface drainage on the hills just north of the project site is poorly developed with most rainfall percolating downwards through fissures and cracks in the rock. However, the Nabule Chaung that begins just west of Pandin In village flows westwards and enters the sea just to the north of the project site.

The project site itself is relatively flat and has no distinct drainage features on the slopes. Storm runoff from the slopes is intercepted by the east-west running main road and therefore should prevent any significant storm runoff from flowing onto the site.



Source: http://en-us.topographic-map.com

Figure 5.1. Topographic Setting of Project Area

Figure 5.2 Site Topography

5.2. General Geology

The investigated area lies on the southern part of Shan-Taninthayi massif and northern continuation of Taninthayi ranges, It is covered with Late Paleozoic rocks. The western part of the study area, which is in Taungnyo Range, are Carboniferous rock units (Taungnyo Series) arranged and systematically described (Leicester, 1930). Further up to the northwestern part, also in Mottama Range, Late Permian rocks (Martaban Beds, Pascoe, 1959) and Mesozoic granitic rocks are exposed.Along the Tanintharyi area, quaternary deposit of gray and gray swampy soil and red brown forest soil types are present. Soil Map of Tanintharyi region is shown in Figure 5.3.

The project site is underlain by limestones belonging to the coastal formation, which are found at depths below ground level. The soil at the surface of the project site consists of a layer of reddish-brown silty clay and coarse to fine calcareous sand that is up to 6 meters deep.

This soil type covers the entire site and overlays four different other soil types, the areal distribution of which is shown in Figure 5.3. These consist of dense calcareous sand, sand gravels, compact to dense medium to fine sands, soft peaty clays and compact sands.

The Coastal Group of limestones consists of a variety of limestones deposited in shallow coastal environments comprised of reef deposits, limestone muds, and gravels, colluvium and rubbly reworked materials. Further to the south the Coastal Group limestones are overlain by limestones belonging to the Montpelier Formation.

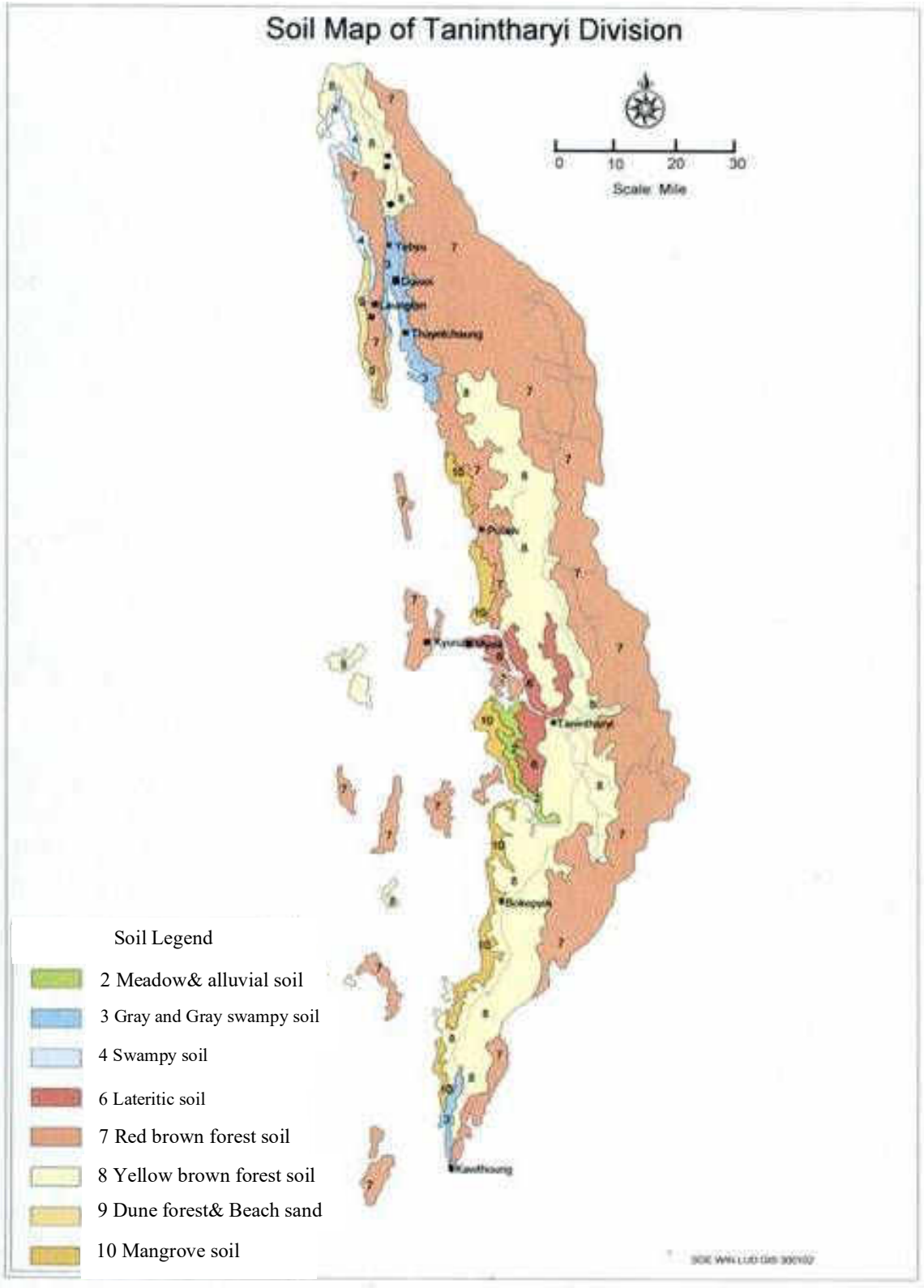


Figure 5.3. Soil Map of Tanintharyi Region

5.3. Climate and Meteorology

Tanintharyi region has a tropical climate. The region has only slight changes in temperature. Maung Ma Kan has temperate weather, as it is located in the low latitude zone and near the sea. The dry season of the area in which the project lies starts in February and ends in May. The rainy season starts in June and ends in September and the cold season follow with the cooler, drier months of October to January. Some important meteorological data which are collected from Meteorological Station (Dawei) are as follow:

5.3.1 Rainfall

The project area is warm and wet season with the highest temperature (36.6˚C) and lowest temperature (21.2˚C). Yearly rainfall and temperature are as follow:

No.	Year	Rainfall		Temperature	
		Raining Days	Total Rainfall	Summer	Winter
				Maximum	Minimum
1	2011	164	223.57	36.0	15.0
2	2012	170	262.16	36.1	14.0
3	2013	156	219.94	35.1	15.8
4	2014	143	229.25	35.5	11.0
5	2015	148	193.25	35.8	21.5
6	2016	145	189.15	39.0	10.5

Unusual Rainfall - 2016, March (9.13 inches)

Unusual Temperature – 2016, March (39.5 ˚C)

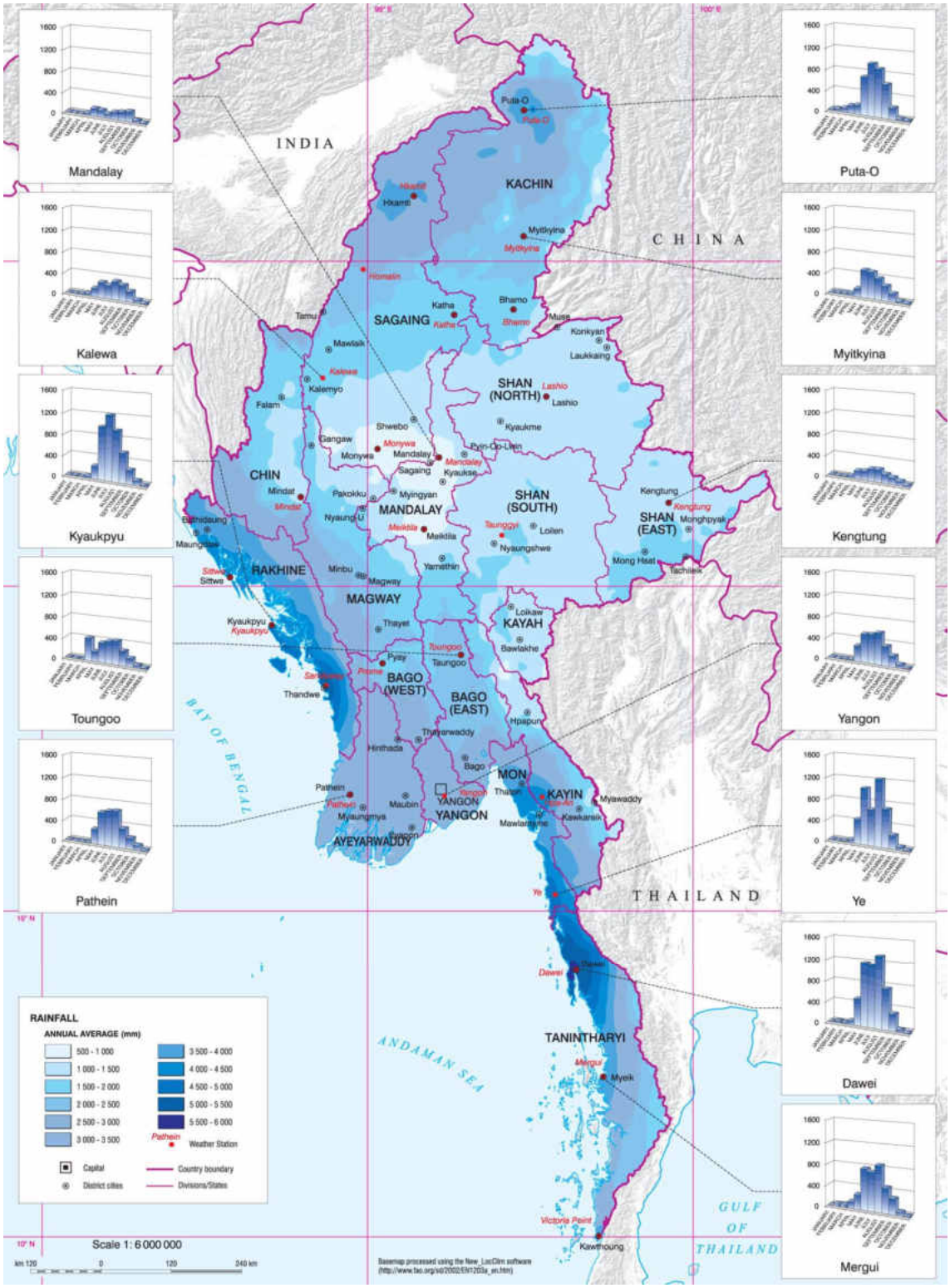


Figure 5.4: Rainfall Map of Myanmar with Monthly Distribution Patterns

[Source: http://dwms.fao.org/atlases/myanmar/atlas_en.htm]

5.3.2 Wind Speed and Direction

Winds approach the project area primarily from the east and northeast. Long-term wind data obtained from the station of Dawei (Department of Meteorology and Hydrology Myanmar) located 8 miles east of the site.

During the pre-monsoon months of onset date to June, the wind blew Southeast, South and Southwest direction over the country. In the Southwest monsoon months of July and August, the wind blew South and Southwest direction and in the post monsoon months of September to withdrawal date, the wind blew from North and Northeast direction over the country. For the wind speed, the coastal areas have stronger wind than the inland areas and also stronger wind prevailed monsoon season than the pre and post monsoon. Figures 5.5 to 5.7 show the results for the wind direction and speed representing the regions of Dawei during the study period 2001-2010 (10yrs). The data indicates that greater than 4 mph of the wind speed are more frequently from the southwest in pre-monsoon season and monsoon season. In post monsoon season southwest, southeast and northeast sectors are greater than 4 mph of wind speed.

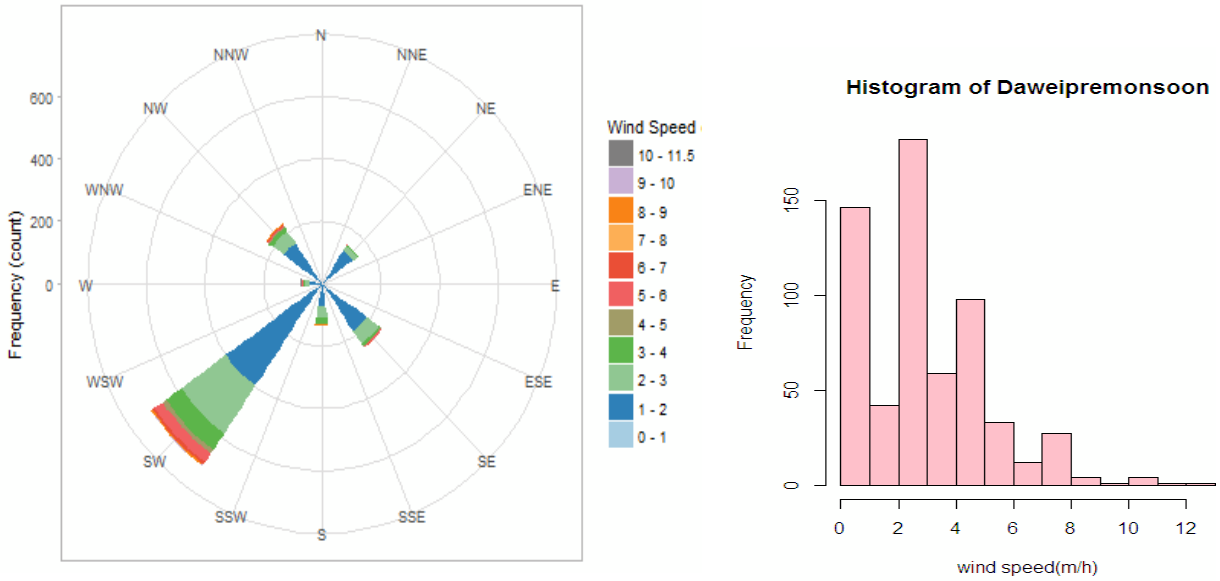


Figure 5.5. Wind Rose and Frequency of Wind Speed for Pre-monsoon Season

(Source: Myanmar Climate Report, No. 9/2017)

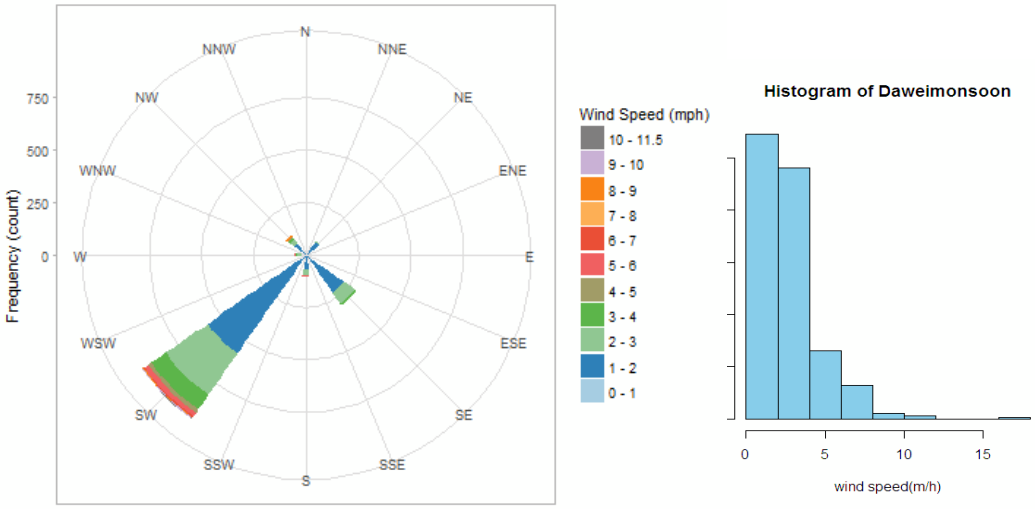


Figure 5.6. Wind Rose and Frequency of Wind Speed for Monsoon Season

(Source: Myanmar Climate Report, No. 9/2017)

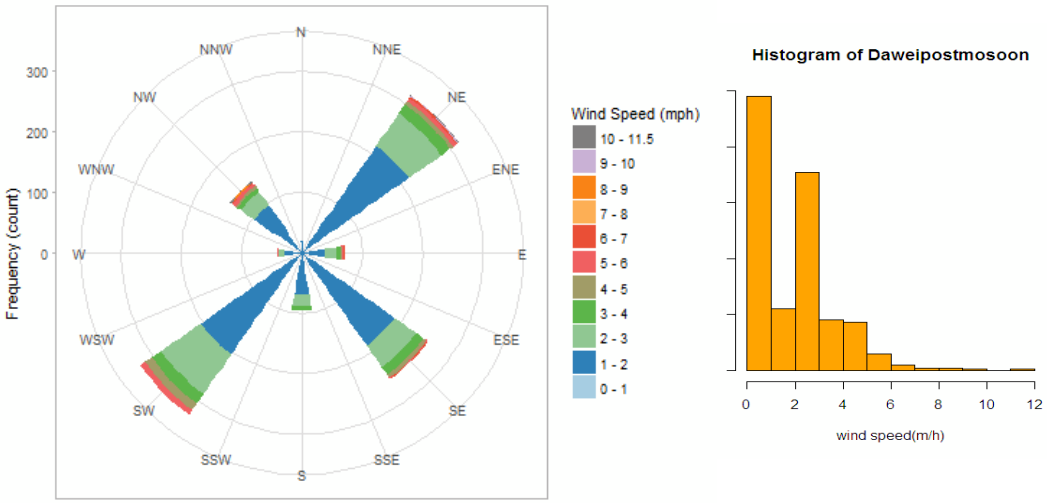


Figure 5.7. Wind Rose and Frequency of Wind Speed for Post Monsoon Season

(Source: Myanmar Climate Report, No. 9/2017)

5.3.3 Temperature Trends

It was very clear from temperature trend analysis that the maximum temperature showed increasing trends and decreasing trend for minimum temperature over all parts of the years in the project site.

The deviation for T_{max} was calculated following the formula: $T_{maxn} - T_{max}$, and the deviation for T_{min} was calculated by $T_{minn} - T_{min}$, where "n" represents each year and "normal" is the T_{max} or T_{min} normals calculated for the period 1981-2010

Table 5.1. Number of Minimum Temperature Days at Dawei, Duration: 1981-2010 (20 yrs)

Minimum temp (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Less than 6°	-	-	-	-	-	-	-	-	-	-	-	1	1
6° - 8°	-	-	-	-	-	-	-	-	-	-	-	2	2
8° - 10°	1	-	-	-	-	-	-	-	-	-	-	2	3
10° - 15°	141	57	9	-	1	-	-	-	-	2	28	153	391
15° - 20°	579	450	253	15	2	8	18	21	29	49	272	549	2245
20° - 25°	209	339	664	855	878	878	911	905	847	872	595	221	8174
Greater than 25°	-	1	4	30	49	14	1	4	4	7	5	2	121

Source: Myanmar Climate Report, No. 9/2017

Table 5.2. Number of Maximum Temperature Days at Dawei, Duration: 1981-2010 (20 yrs)

Maximum temp (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
40° and greater	-	-	-	-	-	-	-	-	-	-	-	-	0
38° - 40°	-	-	4	7	6	-	-	-	-	-	-	-	17
36° - 38°	5	31	125	207	53	-	-	-	1	1	13	3	439
30° - 36°	891	804	793	662	586	307	224	169	360	743	816	815	7170
25° - 30°	34	12	8	23	277	557	669	704	505	182	70	112	3153
20° - 25°	-	-	-	1	8	36	37	57	14	4	1	-	158
Less than 20°	-	-	-	-	-	-	-	-	-	-	-	-	0

Source: Myanmar Climate Report, No. 9/2017

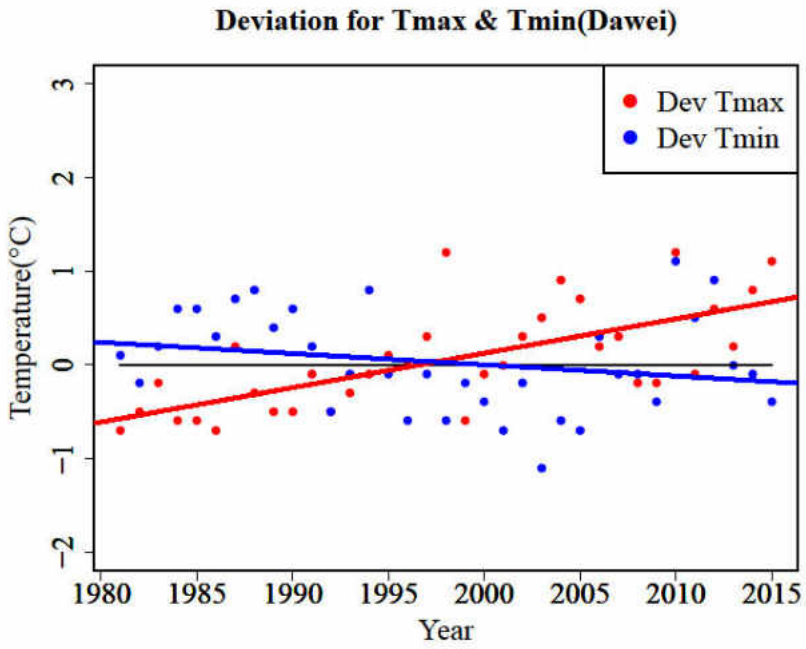


Figure 5.8. Maximum and Minimum Temperature Deviation Trend over Dawei

5.4. Oceanography and Hydrology

The project area is lie in the northern Tanintharyi Coast is generally flat and sandy popular resort area, beside by the Andaman Sea. PanDanInn River is located northward and northeast of the project site. Other small lattice stream are sounding east part can be seen in Figure (5.9).

5.4.1 Waves

Wave climates at the project site are consistent with the local wind conditions. Predominant waves are from the easterly and wastely directions, occurring about 40% of the time. The average wave height is 2.4ft. The project seashore has a smooth beach slope and is very little potential to wave impacts.

5.4.2 Tides

Tidal variation at Maung Ma Kan is relatively low. The tide at the project site will only depend on the situation of the moon (especially in full moon day).

Source:https://www.arcgis.com/home/webmap/viewer.html

Figure 5.5 Surface Water near the Project Site

5.5 Seismicity

Myanmar is an earthquake-prone country because it lies in a one of the world major earthquake belt, Alpide Belt, which extends from northern Mediterranean through Iran, Himalaya region and Myanmar. Most of the earthquake in central and delta region of Myanmar have resulted from movement of Sagaing Fault which extends from the northwest of Katha, through Sagaing, along the eastern flank of Pegu Yoma and finally into the western Gulf of Martaban for a distance of about 600 miles. Structurally, Hpa-pon fault and Three - pagoda fault are situated at the northern and southern part of the area and their trend in nealy NW - SE direction. Earthquake intensity in the area can be seen in Figure 5.10.

The approach is mainly empirical and historical in the sense that it makes use of past seismic events and history to make educated guesses about region wide intensities in the future. Recent earthquakes include one in April 2016 near Mawtaik on the India and Sunda (Eurasia) plates at 6.9 magnitudes on the Richter scale, as well as a magnitude 6.8 earthquake that occurred on the Sagaing fault in Myanmar on November 11, 2012. The Sagaing fault is a major fault in Southeast Asia between the India and Sunda (Eurasia) plates. This strike-slip fault (side-to side motion) is part of a broad zone of deformation that includes the India Asia collision zone to the north and extension of the Andaman Sea to the south. The November 11 earthquake and its four aftershocks (with magnitudes ranging from M-5 to M-5.8) occurred north of the city of Mandalay, along a stretch of the Sagaing fault. A map of earthquakes in the SE Asian region is shown in Figure 5.7 and a historical earthquake map of Myanmar is shown in Figure 5.11.

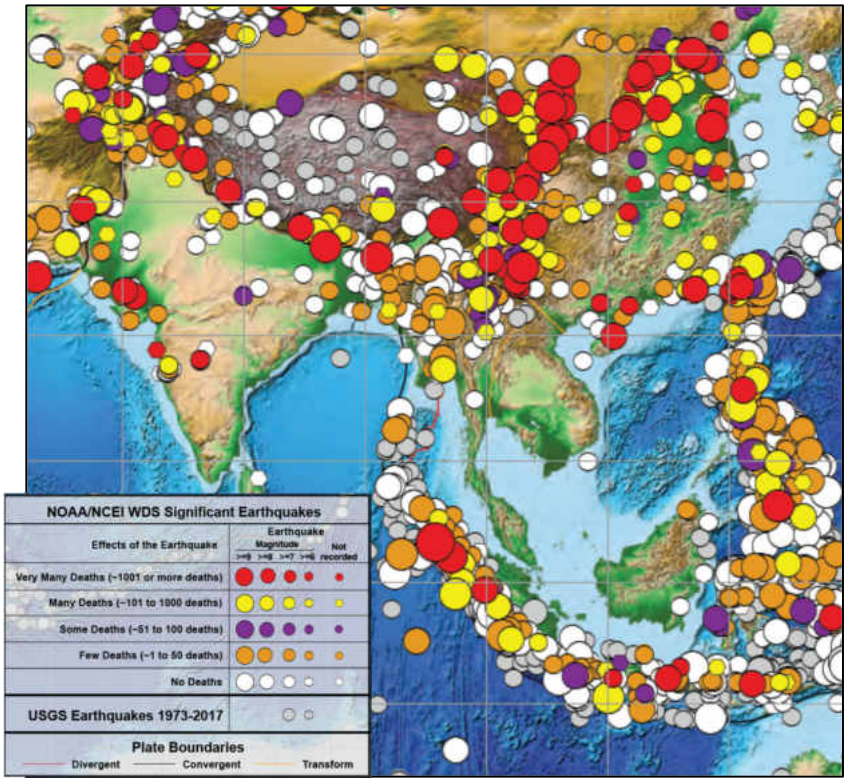


Figure 5.10. Map of Significant Earthquakes 2150 B.C. to A.D. 2017
[Source: USGS]

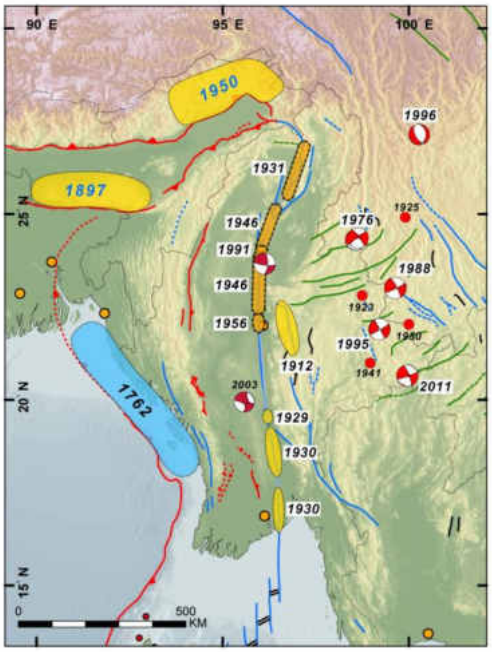
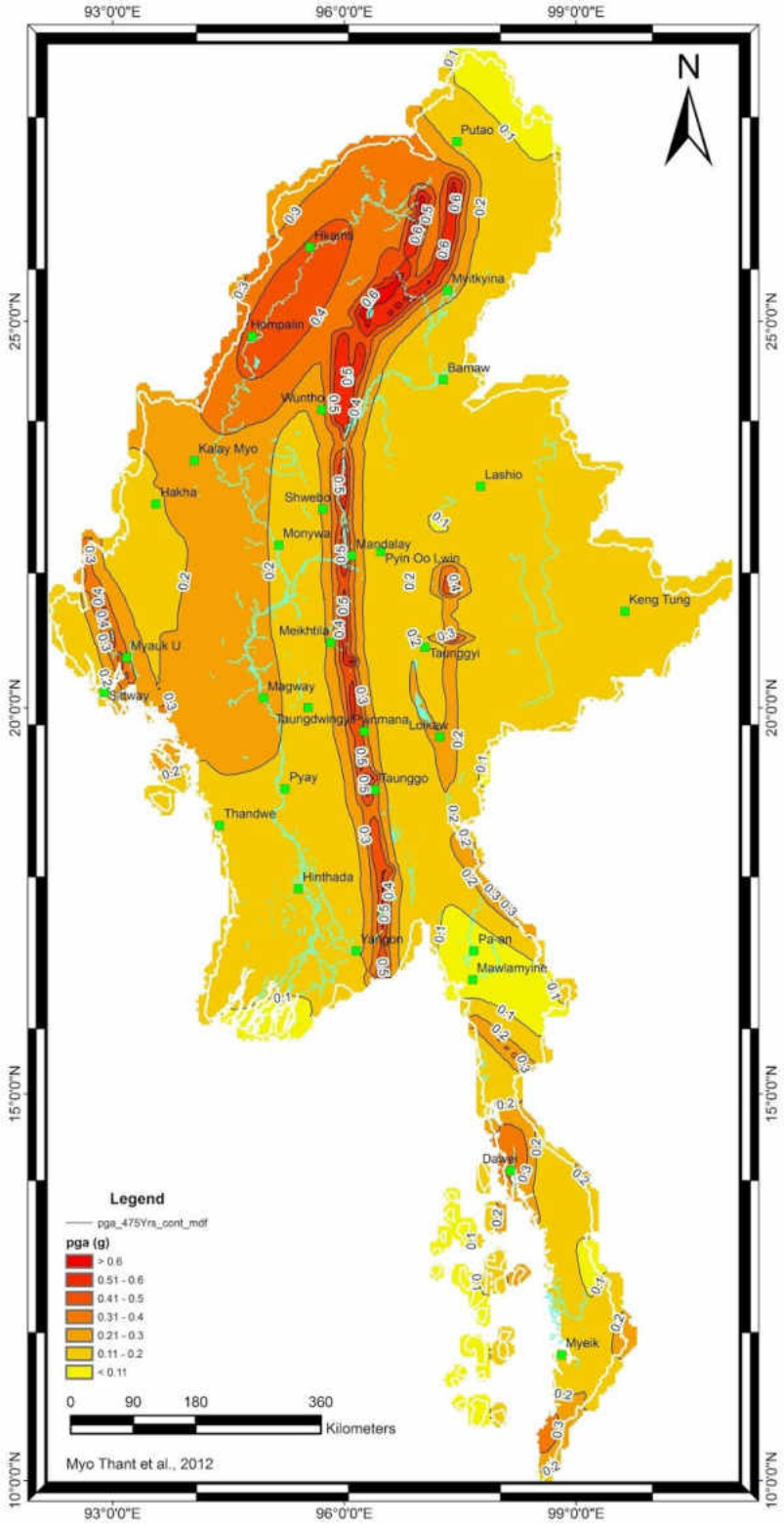


Figure 5.11. Neotectonic Map of Myanmar

[Source: http://www.earthobservatory.sg/news/strong-quake-myanmar#.U4wB1ncxXmQ , Accessed 2016]



Seismic Zone Map of Myanmar (PSHA Map, 2012)

Source: Myo Thant et al.,2012

As per map the proposed project is located within the Zone II (Moderate zone) of earthquake hazard, as shown in prbabilistic seismic hazard Assessment Map (PSHA Map) of Myanmar showing expected peak ground acceleration (PGA) values with 100% probability in 500 years.

5.6 Tsunamis

In Myanmar there were records of moderate tsunamis, generated by two large magnitude earthquakes, which originated in the Andaman-Nicobar Islands [these are the 31 December 1881 Car Nicobar Earthquake (7.9 Richter scale [RS]) and the 26 June 1941 Andaman Island Earthquake (7.7 RS)]. The tsunami generated by the giant 2004 Sumatra Earthquake also caused moderate damage in some parts of the Myanmar Coast. It is evident that Myanmar is vulnerable to hazards from moderate and large tsunami along its long coastline.

Previous Indian Ocean tsunamis have not been properly documented. The southern Tanintharyi Coast, consists of some large offshore islands, and the near-shore areas between these and the coastline are marshy and partly covered with mangrove forests. This setting therefore provides partial protection from tsunami waves. However, the northern Tanintharyi Coast is generally flat and sandy areas. Thus, this area is comparatively more vulnerable to the tsunami hazard. The probable earthquake and tsunami hazards along the Myanmar coastal areas are summarised in Table 5.3.

Table 5.3. Probable Earthquake and Tsunami Hazards along the Myanmar Coastal Areas

Coastal Region	**Area**	**Earthquake Hazard** (Modified Mercalli Intensity Scale)	**Tsunami Hazard**
Rakhine Coast	Northern Part	Strong Zone with MMI 8	Moderate
	Southern Part	Moderate Zone with MMI 7	Moderate
Delta Area	Ayeyarwady Delta	Moderate Zone with MMI 7	Moderate
	Sittaung Estuary	Severe Zone with MMI 8 - 9	Moderate
Tanintharyi Coast	Northern Part	Moderate Zone with MMI 7	Moderate
	Southern Part	Moderate Zone with MMI 7	Light

Source: Hazard Profile of Myanmar (2009)

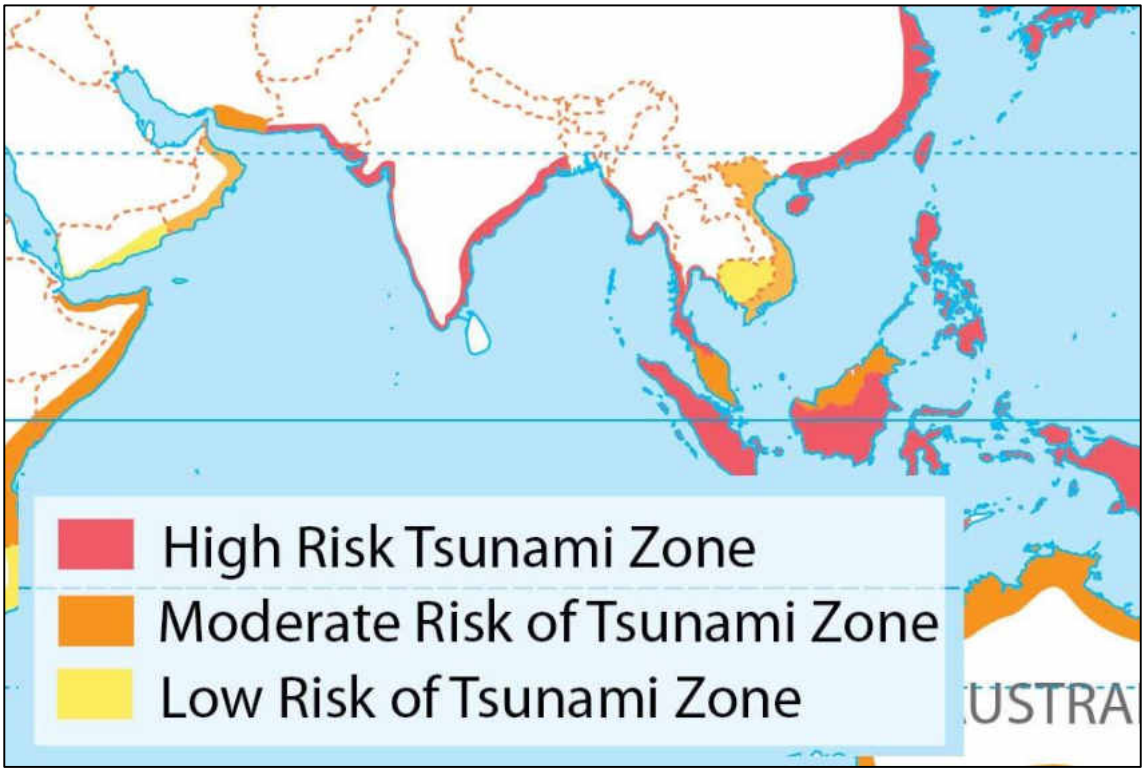


Figure 5.12. Tsunami Risk in the Bay of Bengal

Source: World Tsunami Zones (www.mapsofworld.com)

By studying the above facts and figures, there will be moderate impact of Tsunami on the proposed project.

5.7. Traffic Study

Since the project is located in the relatively populated municipal area (Maung Ma Kan Village) and the nature of the project is highly interrelated with the traffic conditions, IEE team took a traffic study and prepared vehicle movements summaries at the vicinity of the project. The purpose of the traffic study is to summarize the counts of vehicle movements through Maung Ma Kan road and to know the peak period hours. This type of volume summary is used in making decisions regarding the geometric design of the roadway, sign and movement making, traffic circulation patterns, capacity analysis, parking and loading zones, and vehicle classification.

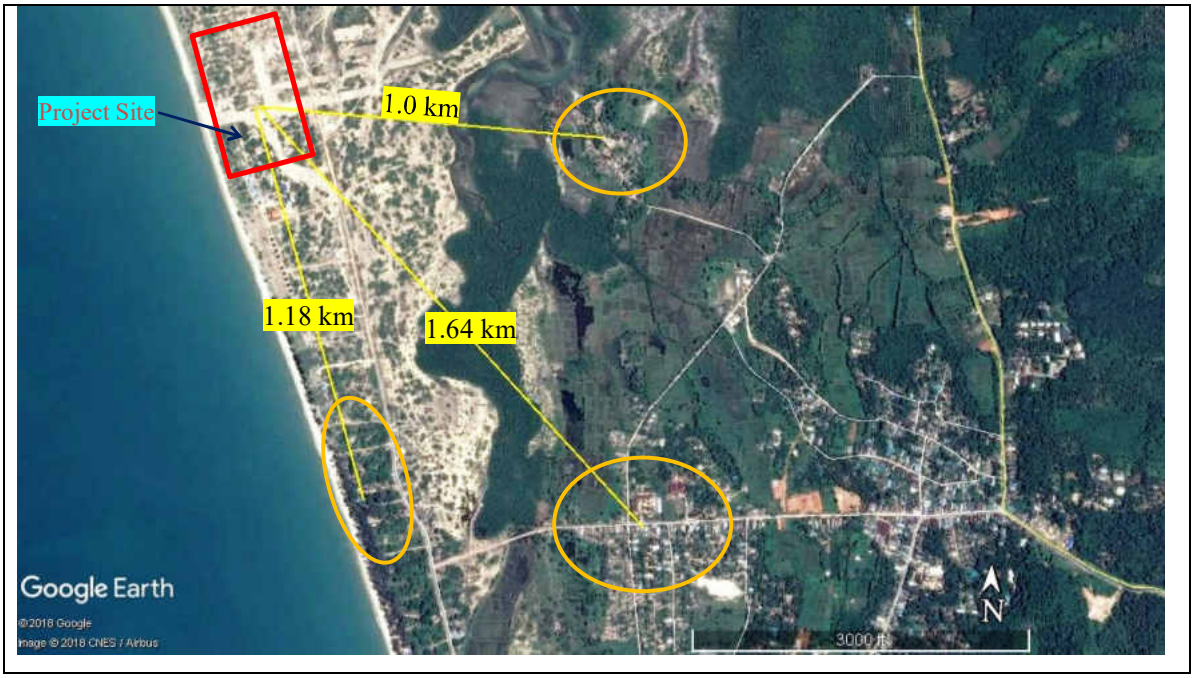


Figure 5.13. Accounting Point of Vehicle Movement in Google Map

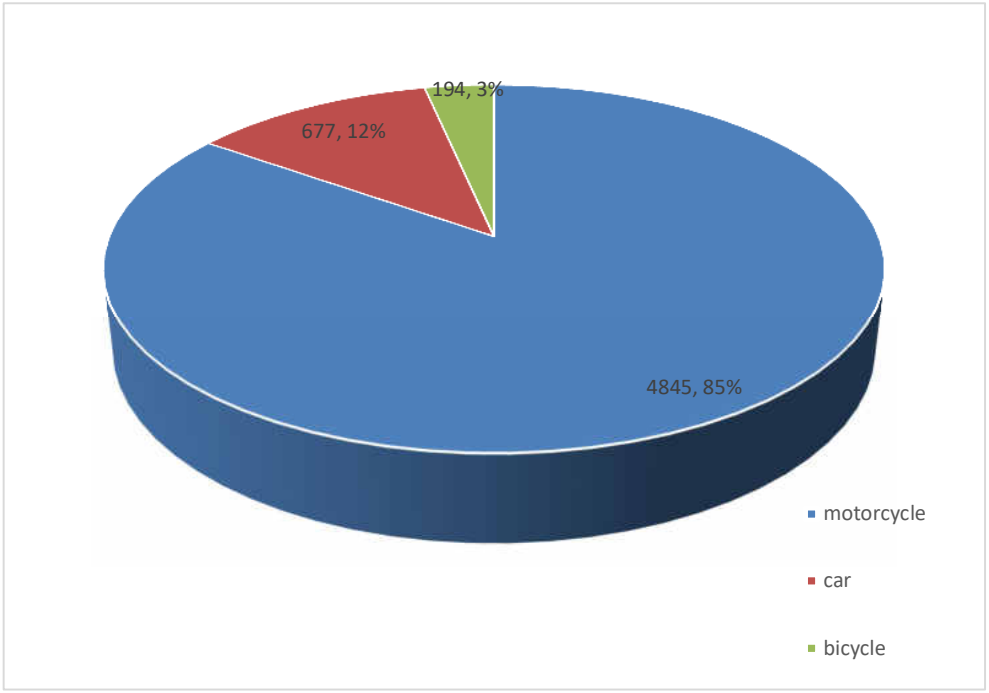


Figure 5.14.Types of Vehicles used percentage in Weekend Day at Maung Ma Kan Road

Table -Summary of Vehicle Movements

SUMMARY OF VEHICLE MOVEMENTS				
LOCATION: MaungMaKan Rd				
TOWNSHIP: Launglon	CITY: MaungMaKan Village			
OBSERVER: IEE Team	DATE: 17.3.2018 (Sat)			
WEATHER: Clear	Weekend Day			
REMARK:				
VEHICLE MOVEMENTS				
TIME	**Types of Vehicles**			**Total**
BEGIN	Motorcycle	Car	Bicycle	
7:00(Am) -10:00 (Am)	1547	210	61	1818
11:00(Am) -2:00 (Pm)	1068	185	48	1301
4:00(Pm) -7:00 (Pm)	1250	197	57	1504
7:30(Pm) -9:30 (Pm)	880	85	28	993
Traffic Volume				**5616**
7:00(Am) -10:00 (Am)	**1818**	Peak Period Hours		
Peak Period Traffic Volume				
7:00(Am) -10:00 (Am)	1547	210	61	

According to the traffic count result in weekend day, morning peak hour occurs at 7:00 am to 10:00 am. There will also traffic at evening time 4:00 pm to 7:00 pm.

At morning peak hour, peak volume is 1818 vehicles. In this period, vehicles coming from Maung Ma Kan road as the time is inbound hours at the beginning of weekend day. At midday peak hour, peak volume is 1301 vehicles. In this period, vehicles moving in all inbound and outbound directions were about the same amount. At evening peak hour, peak volume is 1504 vehicles. Comparing to morning peak volume, the peak volume recorded between 7:00-10:00 am is significantly high. And Weekend day peak volume is 5716 vehicles.

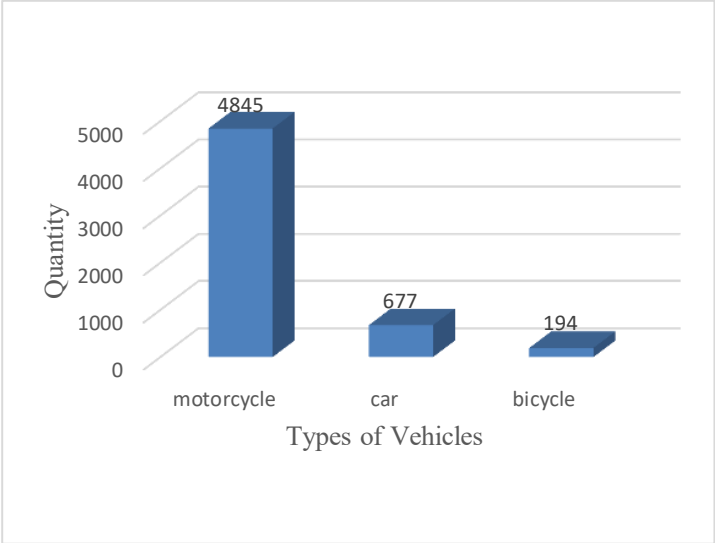


Figure 5.15. Average Vehicles Passed in Weekend Day at Maung Ma Kan Road

SUMMARY OF VEHICLE MOVEMENTS				
LOCATION: Maung Ma Kan Rd				
TOWNSHIP: Launglon	CITY: Maung Ma Kan Village			
OBSERVER: IEE Team	DATE: 19.3.2018 (Mon)			
WEATHER: Clear	Work Day			
REMARK:				
VEHICLE MOVEMENTS				
TIME	**Types of Vehicles**			**Total**
BEGIN	Motorcycle	Car	Bicycle	
7:00(Am) -10:00 (Am)	970	86	61	1117
11:00(Am) -2:00 (Pm)	780	98	39	917
4:00(Pm) -7:00 (Pm)	850	117	54	1021
7:30(Pm) -9:30 (Pm)	476	57	27	560
Traffic Volume				**3615**
7:00(Am) -10:00 (Am)	**1117**	Peak Period Hours		
Peak Period Traffic Volume				
7:00(Am) -10:00 (Am)	970	86	61	

According to the traffic count result in work day, morning peak hour occurs at 7:00-10:00 am, midday peak at 11:00 am-2:00 pm, evening peak at 4:00-7:00 pm and night peak at 7:30-9:30 pm. At morning peak hour, peak volume is 1117 vehicles. In this period, vehicles coming from Maung Ma Kan road as the time is inbound hours at the beginning of work day. At midday peak hour, peak volume is 917 vehicles. In this period, vehicles moving in all inbound and outbound directions were about the same amount. At evening peak hour, peak volume is 1021 vehicles. Comparing to morning peak volume, the peak volume recorded between 7:00-10:00 am is significantly high. So, the Vehicle Movements in Weekend day is greater 1.5% generation rate of in Work day vehicles volume.

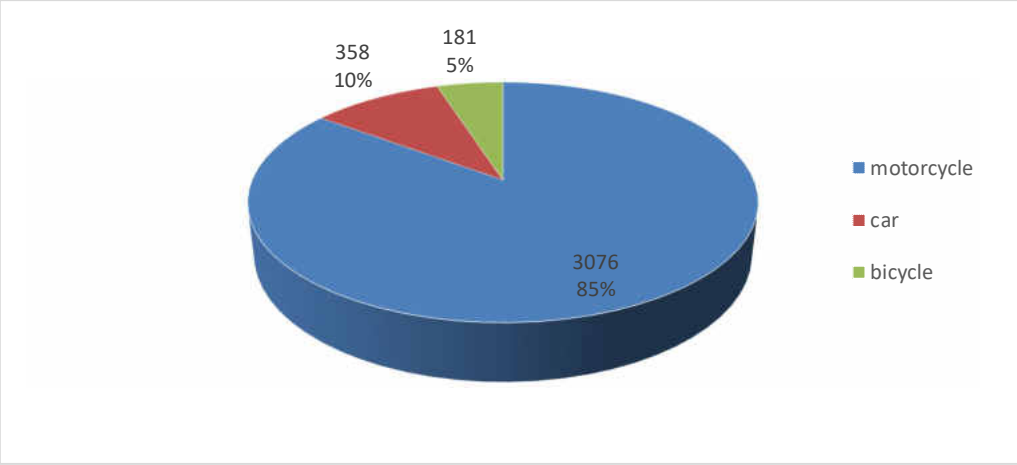


Figure 5.16. Types of Vehicles used Percentage in Working Day at Maung Ma Kan Road

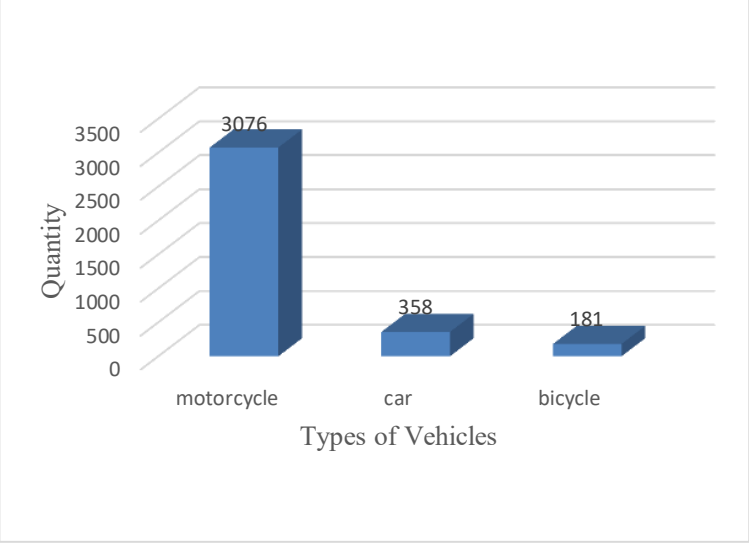


Figure 5.17. Average Vehicles Passed in Working Day at Maung Ma Kan Road

5.8. Social Environment

5.8.1. Socio-economic Profile by Secondary Data Collection

The following are the secondary data of Lounglon Township. Some data are collected from Lounglon Administration Office and some data are sourced from the Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Taninthayi Region- Lounglon Township Report" October 2017.

(a) Population

In 2017, there are about 106,000 people in Lounglon Township as shown in the following Table. The percentage of urban population is about 4.5% in township.

Township	Total (Male/Female)				Total (Urban/Rural)			Households
	Male	Female	Total	Sex Ratio	Urban	Rural	Urban Population	
Lounglon	49723	56264	105,987	96.3	1115	21000	4.5	22115

Source: Lounglon Township Administrative Offices (2018)

According to the above table, the female percentage is a little higher than the male percentage and so the job opportunities for female and gender equality is important in this region. The proposed project will create job opportunities for local people especially for female due to the nature of hotel project. So, the proposed hotel project will be great benefit for local people.

(b) Ethnicity

Most of the people who live in Lounglon are Bamar, followed by Kayin, China, and Mon people. A small number of Kayar and Shan live in Lounglon Township. The races residing in Lounglon township are shown in the following table.

No.	Race	Number	%
1	Kachin	-	-
2	Kayar	2	0.002
3	Kayin	19	0.018

4	Chin	-	-
5	Mon	8	0.008
6	Bamar	105917	99.931
7	Rakhine	6	0.006
8	Shan	4	0.004
9	China	24	0.022
10	Indian	7	0.006
11	Pakistan	-	-
12	Bangladeshi	-	-
Total		105,987	100

Source: Lounglon Township Administrative Offices, 2018

(c) Religion

All of 100% of the people living in the township are Buddhists. There are many religious places in the region including four historic and well-known pagodas, 272 pagodas and 153 monasteries for Buddhists. The different kinds of religion present in Lounglon Township are shown in in the following Table.

Township	Religion	Buddhist	Christian	Hindu	Muslim	Total
Lounglon	Number	105987	-	-	-	105987
	(%)	100.0	-	-	-	100.0

Source: Lounglon Township Administrative Offices, 2018

So, the proposed hotel project will have a plan for sustaining of Buddhist Cultural in proposed hotel project (architecture design for cultural heritage and donation of Baddish Image or pagoda inside the project campus).

(d) Land Use

Lounglon Township mainly use its land for agriculture followed by grazing land. Detailed acres for land uses in Lounglon Township are shown in in the following table.

Land Category	Lounglon	
	ha	%
Agricultural Land	79272	34.8
Forest and Natural Area	66180	29.0
Grazing land	3097	1.36
Industrial Land	101	0.044
Settlement Land	2258	0.1
Wastelands	7124	3.13
Forest wild	29967	13.2
wild land	29351	12.9
Other	10438	4.58
Total Area	227788	100.00

Source: Lounglon Township Administrative Offices, 2018

(e) Living Profile

Type of housing unit

The majority of the households in Lounglon Township are living in wooden houses (49.8%) followed by households in bamboo houses (16.7%). About 48.1 per cent of urban households and 52.5 per cent of rural households live in wooden houses.

Table - Conventional households by type of housing unit by urban/rural

Residence	Total	Apartment/ Condominium	Bungalow/ Brick house	Semi-pacca house	Wooden house	Bamboo house	Hut 2 - 3 years	Hut 1 year	Other
Total	25735	0..3	13.6	13.4	53.9	16.1	1.7	0.7	0.3
Urban	1240	0.5	15.9	19.4	53.1	8.7	0.8	1.1	0.6
Rural	24495	0.3	13.4	13.1	53.9	16.5	1.8	0.7	0.3

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Taninthayi Region- Lounglon Township Report" October 2017

(f) Water Usage

In Lounglon Township, 61.3 per cent of households use improved sources of drinking water (tapwater/piped, tube well, borehole, protected well/spring and bottled water/water purifier). In Tanintharyi Region, 63.6 per cent of households use improved sources of drinking water

while it is 69.5 per cent for the Union. Some 53.2 per cent of the households use water from protected well/spring and 24.1 per cent use water from unprotected well/spring. Some 38.7 per cent of the households use water from unimproved sources. In rural areas, 39.4 per cent of the households use water from unimproved sources for drinking water.

Table - Source of Drinking Water in Lounglon Township

Source of drinking water		Total	Urban	Rural
Tap water/ Piped		5.5	6.5	5.4
Tube well, borehole		1.5	1.0	1.5
Protected well/ Spring		53.2	62.1	52.8
Bottled water/ Water purifier		1.1	5.2	0.9
Total improved drinking water		*61.3*	*74.8*	*60.6*
Unprotected well/Spring		24.1	22.3	24.2
Pool/Pond/ Lake		1.4	0.1	1.4
River/stream/ canal		0.1	0.1	0.1
Waterfall/ Rain water		5.4	-	5.7
Other		7.7	2.7	8.0
Total unimproved drinking water		*38.7*	*25.2*	*39.4*
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**25,735**	**1,240**	**24,495**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Tanintharyi Region- Lounglon Township Report" October 2017

(g) Lighting

In Lounglon Township, 7.7 per cent of the households use electricity for lighting. This proportion is low compared to other townships in Tanintharyi Region. The percentage of households that use electricity in Tanintharyi Region is 8.0 per cent. The use of generator (private) for lighting is the highest in the township with 54.9 per cent. In rural areas, 54.5 per cent of the households use generator (private) for lighting.

Table - Conventional households by source of lighting by urban/rural

Source of lighting		Total	Urban	Rural
Electricity		7.7	16.1	7.3
Kerosene		15.2	2.9	15.8
Candle		19.4	15.3	19.6
Battery		0.6	0.7	0.6
Generator (private)		54.9	63.5	54.5
Water mill (private)		1.0	1.3	1.0
Solar system/energy		1.0	0.2	1.1
Other		0.1	-	0.2
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**25,735**	**1,240**	**24,495**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Tanintharyi Region- Dawei Township Report" October 2017

(h) Cooking Fuel

In Lounglon Township, households mainly use wood-related fuels for cooking with 81.6 per cent using firewood and 16.5 per cent using charcoal. Only 0.5 per cent of households use electricity for cooking. Some 82.2 per cent of households in rural areas use firewood and 16.2 per cent use charcoal.

Table - Conventional households by type of cooking fuel by urban/rural

Type of cooking fuel	Total	Urban	Rural
Electricity	0.5	3.5	0.3
LPG	0.2	0.2	0.2
Kerosene	0.1	0.2	0.1
Bio-Gas	0.6	1.5	0.6
Firewood	40.8	19.9	74.3

Charcoal		81.6	71.0	82.2
Coal		0.3	0.2	0.3
Other		0.2	1.0	0.1
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**25,735**	**1,240**	**24,495**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–Tanintharyi Region- Lounglon Township Report" October 2017

(i) Occupational Patterns

Data shows that trade is the common livelihood means of households in Lounglon Township. The other main economic activities in the area are agriculture, arbitrary, trade, and public services. According to official statistics, Lounglon has a total of 78,053 people as the township workforce and 69,853are employed with an unemployment rate of 10.51%. Per capita income in the township is estimated to be 1442,110 Kyats in 2014-2015.

Table - Occupational Patterns

Government Employee	Services	Agriculture	Livestock	Trade	Industry	Arbitrary	Others
1643	-	32555	10	15000	500	16000	2970

Table - Employment

Workforce	Employed	Unemployed	Unemployment rate
78053	69853	8200	10.51%

Table - Per Capita Income

Year	Income
2014-15	1442,110 Ks.
2015-16	-.
2016-17	-

(j) Education

Over sixteen percent of the total township population is students. For education sector, although primary school education is compulsory and fee-free, school enrollment rate of 5-year-olds is relatively half over of (65.8%) in the overall township. Percentage of students passing the matriculation is 36.54%. The teacher-student ratios are 1:19 in BEPS, 1:30 in BEMS, and 1:25 in BEHS. Data on education and literacy report that literacy rate in Lounglon Township was 100%. Detailed for educational facilities in Lounglon region are as below:

Educational Facilities

School	No. of Schools	No. of Teachers	No. of Students	Teacher/ Student Ratio
Higher Education	2	227	7871	1:35
BEHS	5	213	5223	1:25
BEHS (Extan)	8	222	5655	1:25
BEMS	2	30	914	1:30
BEMS (Extan)	3	57	1633	1:28
Post (BEPS)	28	280	8039	1:29
BEPS	71	342	6394	1:19
Monastery school	4	21	401	1:19
Preschool	16	29	721	1:25

Scholl Enrollment

No. of 5 yrs-old children			Enrollment			Enrollment Rate
Male	Female	Total	Male	Female	Total	
1442	1427	2869	1008	880	1888	65.8%

Literacy Rate

Population	Above 15 Years of Age	Literate	Literacy Rate
105,987	90405	90405	100%

According to the above tables, educational facilities, enrollment rate, literacy rate are in good conditions. Nevertheless, the DDPC should have a plan to encourage local education facilities, especially scholarship program for

(k) Healthcare Profile

As described in the following tables, there are 16-bed township hospital, and two 16-bed hospital in the village tract. There are also 38 rural healthcare centers and sub- centers. Infrastructures for health care services are also seemed to be insufficient especially for rural people.

Hospitals

Sr. No.	Hospital	Govt./Private	Bed
1.	Township hospital (Lounglon)	Govt.	25
2.	Maung Ma Kan	Govt.	16
3.	Tha Kyet Taw	Govt.	16

Healthcare Centers

Sr. No.	Type of Healthcare Center	No. of Healthcare Center
1.	Rural Healthcare Center	7
2.	Rural Healthcare Sub-Center	31

Healthcare Facilities

Population	No. of Doctors	Ratio	No. of Nurses	Ratio	No. of Healthcare Assistant	Ratio
105987	6	1:17664	18	1:5888	6	1:17664

Common Diseases

According to secondary data available, the most common diseases include Diarrhoea, Hepatitis, malaria, stomach ailment, and tuberculosis. It was also found out that there was substantial amount of incidence of Diarrhoea, and stomach ailment in the township.

Sr. No.	Disease	Incidence
1.	Malaria	42
2.	Diarrhoea	3791
3.	TB	226
4.	Stomach Ailment	1584
5.	Hepatitis	13

HIV/AIDS

2015-16		2016-17	
Infected	Dead	Infected	Dead
2	-	-	-

Health Indices

No. of Maternal	No. of Infant	Per 1000			
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
2620	2180	17.47	1.83	2.7	2.5

In public health sector, the ratios of medical service personnel and local population indicate the existing conditions of the insufficient health care facilities, especially for rural people. As described in the above tables, the health care facilities of Lounglon Region is in good conditions.

5.9. Living Environment

The living environment will include the overall conditions of air quality, water quality and noise levels. The locations of the baseline environmental monitoring for living environment are shown in Figure 5.18.

Figure 5.18. Locations of Environmental Baseline Study

Table 5.4. Coordinate of Environmental Baseline Study

Location	GPS Coordinate	
SW	N14°09′10.46″	E98°05′08.54″
DW	N14°09′07.34″	E98°05′18.36″
AQ	N14°09′19.19″	E98°05′16.30″
N1	N14°09′13.75″	E98°05′48.08″
N2	N14°08′34.30″	E98°05′28.91″
N3	N14°08′37.21″	E98°05′55.41″

5.9.1 Air Quality

The project site is located in a rural environment that is largely characterized by scattered households, beach restaurants and fish framing. No industry has been identified within the area. The primary sources of air pollution are therefore anticipated to include dust arising from unpaved roads and vehicle movements, and domestic fuel burning from rural households (fuel wood and charcoal for cooking and space heating during winter).

Air Quality Monitoring

ESIA Team used Haz Scanner EPAS air quality monitoring station to detect ambient air quality inside the project. The methodology used by ESIA Team are as follow:

(a) Monitoring Parameters

The parameters for ambient air quality monitoring were SO_2, NO_2, CO_2, CO, H_2S, O_3, $PM_{2.5}$ and PM_{10}.

(b) Methodology

Determination and analysis of ambient air qualities were conducted by using Haz-Scanner Environmental Perimeter Air Station (EPAS).

Haz-Scanner EPAS Air Quality Monitoring Station

Sampling rate of air quality were recorded automatically every one minute for important gases (Sulfur dioxide, Nitrogen dioxide, Carbon dioxide, Carbon monoxide, Hydrogen sulfide, Particulate matter, Hydrogen sulfide and Ozone) to describe ambient air quality. Sampling pump was adjusted to 2 liter/min. Different analysis methods are integrated in the instrument, such as particulates 90° Infrared Light Scattering for particulate matters (PM_{10}, $PM_{2.5}$), electrochemical sensors for toxic gases (SO_2, NO_2, CO, H_2S), NDIR (optional sensor) for (CO_2) and Gas Sensing Semiconductor- GSS technology (optional sensor) for O_3.

Monitored Gases for Ambient Air Quality

No.	Parameters	Analysis Methods
1.	Sulfur dioxide (SO_2)	Electrochemical sensors
2.	Nitrogen dioxide (NO_2)	Electrochemical sensors
3.	Carbon Dioxide (CO_2)	NDIR (optional sensor)
4.	Carbon monoxide (CO)	Electrochemical sensors

5.	Hydrogen Sulfide (H_2S)	Electrochemical sensors
6.	Particulate matter 2.5 ($PM_{2.5}$)	Infrared Light Scattering
7.	Particulate matter 10 (PM_{10})	Infrared Light Scattering
8.	Ozone (O_3)	Gas Sensing Semiconductor- GSS technology (optional sensor)

(c) Location of Air Quality Monitoring Points

The air quality monitoring was conducted near the Kavee Nabin Village.

Air quality monitoring at Day Time (7:00 am to 7:00 pm)

Air quality monitoring at Night Time (7:00 pm to 7:00 am)

(d) Monitored Period

Air quality was monitored by 12 hours for day time and 12 hours for night time. Detailed for measured periods are shown in following table.

Monitoring Points	Duration
Night Time	(07:00 pm to 07:00 am)
Day Time	(07:00 am to 07:00 pm)

(e) Air Quality Monitoring Results

The air quality monitoring results obtained by every minute were combined to make average values for day time (12 hours) and nigh time (12 hours) for evaluation and comparison with standard values.

Air Quality Monitoring Results of Day Time

Parameters	Unit	Measured Values
Barometric Pressure	mBar	1021
CO	µg/m^3	4.3
CO_2	µg/m^3	1164
H_2S	µg/m^3	0.00
NO_2	µg/m^3	4.72
O_3	µg/m^3	29.5
PM $_{10}$	µg/m^3	84.13
PM $_{2.5}$	µg/m^3	41.48
SO_2	µg/m^3	70.4

Air Quality Monitoring Results for Night Time

Parameters	Unit	Measured Values
Barometric Pressure	mBar	1049
CO	µg/m^3	3.0
CO_2	µg/m^3	807
H_2S	µg/m^3	0.00
NO_2	µg/m^3	6.4
O_3	µg/m^3	22.62
PM $_{10}$	µg/m^3	42.72
PM $_{2.5}$	µg/m^3	27.46
SO_2	µg/m^3	41.5

(f) Comparison with Guidelines Values

Monitoring results are compared with Myanmar Emission Guideline (2015); World Health Organization Guideline Value (Global Update 2005); National Ambient Air Quality Standard Central Pollution Control Board (Ministry of Environment and Forests, 2003) as shown in following table.

Pollutants	Day Time (12 hours)	Night Time (12 hours)	MEG Value	WHO Guideline Value	NAAQS
CO_2 ($\mu g/m^3$)	1164	807	-	-	-
CO ($\mu g/m^3$)	4.3	3.0	5(mg/Nm^3)	-	10,000 for Industrial, 4,000 for residential, (1 hour)
H_2S ($\mu g/m^3$)	0.00	0.00	2 (30 min) for Agriculture, Livestock and Forestry	-	-
NO_2 ($\mu g/m^3$)	4.72	6.4	200 (1 hour)	200 (1 hour)	120 for Industrial, 80 for residential, rural and other areas (24 hour)
O_3 ($\mu g/m^3$)	29.5	22.62	100 (8 hour)	100 (8 hour)	-
PM_{10} ($\mu g/m^3$)	84.13	42.72	50 (µg/m3) (24 hour)	50 (µg/m3) (24 hour)	150 for Industrial, 100 for residential, rural and other areas
$PM_{2.5}$ ($\mu g/m^3$)	41.48	27.46	25(µg/m3) (24 hour)	25(µg/m3) (24 hour)	-
SO_2 ($\mu g/m^3$)	70.4	41.5	500 (10 min)	500 (10 min)	120 µg/m3 (24 hour) for Industrial, 80 for residential, rural and other areas

Note:

MEG = Myanmar Emission Guideline 2015)

WHO Guideline = World Health Organization Guideline Value, Global Update 2005

NAAQS = National Ambient Air Quality Standard, 2003 (Central Pollution Control Board, Ministry of Environment and Forests)

According to the monitoring results, the concentrations of $PM_{2.5}$ and PM_{10} in daytime is a little higher than the ambient air quality standard. The most possible source of particulate matter (PM) will be the travelling of moto cycle and along the Maung Ma Kan road. Monitoring results of CO_2 are also higher and the most possible source will be open space burning of domestic wastes within the village.

However, no guideline values were provided for carbon dioxide. Other measured gases are below the Myanmar Emission Guideline (MEG) value, WHO guideline value and NAAQS.

5.9.2 Water Quality

As the proposed project can impact on water environment (depletion of natural water source and impact on water quality), water samples are collected and some parameters of water quality are measured on site and some parameters are sent to respective laboratories. Water samples are tested for drinking water purpose in National Health Laboratory (one of the national approved laboratory).

Table 5.4. Surface Water Quality Testing Results inside the Project Site

Analyses	Ref: Value	Drinking water quality	Unit	Results	Method
Color	15		TCU	1	Platinum Cobalt Method
Turbidity	5		NTU	0.05	Absorption Method
Arsenic	0.05		mg/L	5	Arsenator
Chloride	250		mg/L	140	Argentometric Method
Hardness	500		mg/L as $CaCO_3$	0.92	Unit Dose Vials Method
Iron	1		mg/L	0.2	Bipyridyl Method
pH	6.5-8.5			6.2	Ion selected Electrode Method
Total Dissolved Solid	1000		mg/L	60	Ion selected Electrode Method
Sulphate	250		mg/L	7	Barium Chloride Method
Magnesium	150		ppm	1.0	Magnecol Method
Zinc	3		mg/L	0.04	Zincon Method
Electro conductivity	1500		µmhos/cm	60	Ion selected Electrode Method

The following Table shows results of sea water quality (location point SW_2) at near the proposed project.

Table 5.5. Sea Water Quality at near the Proposed Project

Analyses	Ref: Value	Drinking water quality	Unit	Results	Method
Color	15		TCU	1	Platinum Cobalt Method
Turbidity	5		NTU	0.05	Absorption Method
Arsenic	0.05		mg/L	0	Arsenator
Chloride	250		mg/L	370	Argentometric Method
Hardness	500		mg/L as $CaCO_3$	240	Unit Dose Vials Method
Iron	1		mg/L	0.16	Bipyridyl Method
pH	6.5-8.5			6.2	Ion selected Electrode Method
Total Dissolved Solid	1000		mg/L	>4000	Ion selected Electrode Method
Sulphate	250		mg/L	98	Barium Chloride Method
Magnesium	150		ppm	56.0	Magnecol Method
Zinc	3		mg/L	0.03	Zincon Method
Electro conductivity	1500		µmhos/cm	>6000	Ion selected Electrode Method

According to the testing results for surface water qualities, all of the water is not suitable as drinking water.

5.9.3. Noise

To monitor the existing noise level, the (IEE) team used TES-1353H Integrating Sound Level Meter which is applicable with IEC61672-1: 2003, IEC60651: 1979, ANSI S1.4: 1983 and IEC60804: 1985 standards. Existing noise level are monitoring in both day time (07:00 to 22:00) and night time (22:00 to 07:00).

The results of noise levels (Leq) in April 2018 are shown in the following Table. The noise levels at AN1 located eastward 1 km away of the project site was at 52.7 dB(A) during daytime and at 42.4 dB(A) during nighttime. On the other hand, the noise levels at AN2

located southward 1.18 km away of the project site was at 52.2 dB(A) during daytime, and at 42.2 dB(A) during nighttime. AN3 located east-south 1.64 km away of the project site was at 53.6 dB(A) during daytime, and at 43.9 dB(A) during nighttime.

Table - Noise Levels Monitoring Results

Receptors and distances from project		Existing noise levels monitored by integrated noise level meter (dBA)	
		Daytime	Nighttime
AN1	Kave Nepin (1km)	52.7	42.4
AN2	Beach Shops(1.18km)	52.2	42.2
AN3	MaungMaKan(1.64km)	57.6	43.9
MEG Target Value*	Residential, institutional, educational	55	45
	Industrial, commercial	70	70

According to the existing noise level monitoring, AN3 (Near Maung Ma Kan Village) is a little higher than the allowable limit (MEG Target Value) due to the travelling of motocycle and vehicles along the Dawei-Maung Ma Kan Public Road.

5.10. Biodiversity Environment

Survey resulted that the terrestrial plants and animals are very low in and around the project area as the project site is located in hotel zone. Direct observation method and systematic sample collection of flora and fauna were conducted in the field. The survey recorded that a total of (76) plant species from (34) families was recorded in which tree species were (40.80%), followed by shrub (19.70%), herb (14.50%), small tree (11.80%), climber (7.90%), and grasses (5.30%) were included. According to IUCN red list (2017), all plant species are common species but only one species from mangrove community which ***Aegialitis rotundifolia*** **(Pinle-sa) was recorded as a near threatened species status (NT)**. In fauna (44) species comprises of (13) amphibian and reptile, (12) species of birds, (15) species of fish, (1) species of mammal and (3) species of zooplankton are recorded during the scoping

survey. No red list species of animal are found during the survey period. Abundance status of zooplanktons are investigated which showed as low diversity and small population. Impact analysis investigated that the proposed project will be affected indirectly with small impact (no significant) on terrestrial and aquatic environment. The extent of the impact on fauna and flora is investigated as only in the site specific and duration of the impact is assumed as temporal or permanent.

5.10.1. Introduction

In Myanmar, the construction industry is growing exponentially. It focuses on civil construction buildings, mainly in commercial, services, hotels, offices and luxury apartment complexes, under the Government's urbanization strategy as infrastructure developments are immediately required in many sectors for country's economy development. With those developments, environmental concerns are increasing among the people who are living around the project area. However, the infrastructure development and environmental sustainability are important enable to be growing for ecological balance and economy development. Biodiversity is the part of the nature and plays in important role in natural environment and human benefits. Thus with those reasons, biodiversity sustainability and conservation plans are more important for balance of nature and future perspectives.

The Initial Environmental Examination (IEE) on Biodiversity will be conducted systematically and scientifically in all possible environmental impacts of the proposed hotel project and identified the monitoring and mitigation measures on impacts which could be happened in the project activities

The purposes of IEE are to identify:

- the important issues to be considered in all developmental processes;
- the information necessary for decision-making; and
- the facts to support the mitigation measures and management plan.

5.10.2. National Law for Protection of Biodiversity

Regards on biodiversity conservation, Myanmar's Environmental laws relating to biological conservation and management issued by the Ministry of Natural Resources and Environment Conservation (MONREC) are listed below:

Table - Environmental Law Related to Biodiversity Conservation

1. The Territorial Sea and Maritime Zones Law, 1977	Measures for the protection of marine and coastal zone environments and for the conservation of marine biological diversity
2. The Forest Law, 1992	Provisions to conserve water, soil, biological diversity and the environment; sustain forest produce yields; protect forest cover; establish forest and village firewood plantations; sustainably extract and transport forest products
3. Forest Rule, 1994	Provision of the sustainability of ecosystems and biodiversity
4.Forest Policy 1995	Provision of the sustainability of ecosystems, habitats and biodiversity
5.Protection of Wildlife and Protected Areas Law, 1994	Provision of wildlife protection, natural areas conservation, carrying out the protection and conservation of wildlife, ecosystems and migratory birds in accordance with International Conventions acceded by the State, protecting the endangered species of wildlife and their natural habitats and contribution for the development of research on natural science.
6. Protection of Wildlife and Protected Areas Rule 2002	Provision of the sustainability of ecosystems, habitats and biodiversity
7. Biodiversity and Protected Area Law 2018	Provision of biodiversity and wildlife protection, natural areas conservation, carrying out the protection and conservation of biodiversity, ecosystems and protected areas as well as protection of migratory birds in accordance with International Conventions acceded by the State, protecting the endangered species of wildlife and their natural habitats and contribution for the development of research on natural science.

5.10.3. Biological Environment of the Project Area

The project site is located at N 14º 09′ 20.757” and E 98º 05′ 14.226” on the Maung Ma Kan beach in Dawei Township, Tanintharyi Region. The project site is also situated in Dawei hotel zone in Maung Ma Kan beach of Adman sea which has about 66 acres. Core area of the

project site is mostly the grasses mixed with shrubs, scattered small trees and trees while the front line on the beach to the sea are planted trees (pile trees). But the margin and surrounding area of the project sites are observed the scattered and patch of mangrove trees especially along the creek with the saline water at the back of the project site. According to the survey, there is small population of terrestrial fauna inside the project area while some birds and reptiles are slightly abundant in the margin of the project area. Some shore birds are found along the beach nearby the project area. Small population of bird, local name is Zewasoe, English name as Edible-nest swiftlet and scientific name is *Collocalia fuciphaga* is reported inhabited around the area by local people. But no information of their nests is confirmed nearby the area. This bird is highly economic important species distributed in Southeast Asia and Southern part of Myanmar. Small fishes are observed in fishing along the coastal sea water. No commercial fishing is found in this area. No red list species of fauna in both terrestrial and aquatic environments are recognized during the survey. There is also no wildlife protected area, wetland and reserved forests nearby the project area. However, the Adman sea in front line of the Hotel Zone and project area is considerable for marine ecosystem. No sea turtle and dolphin information are available. Common species of small size sharks and rays' information are available through the interview in nearby shallow water of the project area during the survey period.

Marine and Mangrove Ecosystem

Marine ecosystems make up the largest aquatic system in the world covering more then 70 percent of the planet. Marine ecosystems are considered to be the habitats that complete the larges system from the shores to the dark sea floor. The marine ecosystem includes: marshes, tidal zones, estuaries, the mangrove forest, lagoons, sea grass beds, the sea floor, and the coral reefs. Just like every other ecosystem in the world, the aquatic ecosystems rely on each other for maintaining a balanced marine ecosystem. Marine ecosystems are an important part of the world, because the marine ecosystems give marine life such as: tiny plankton, fish, crustaceans, invertebrates, reptiles, marine mammals, sharks, and rays a place to live and survive. Mangroves may be considered part of shoreline ecosystems or estuary ecosystems. Mangrove swamps are characterized by trees that tolerate a saline environment, whose roots systems extend above the water line to obtain oxygen, presenting a mazelike web. Mangroves host a wide diversity of life, including sponges, shrimp, crabs, jellyfish, fish, birds and even crocodiles (*https://sciencing.com › Nature)*.

5.10.4. Methodology

Field Work

Field survey was conducted to collect the data on targeted flora and fauna species. Based on the characterizations of the biological environment, the faunal and floral groups that might be impacted by the proposed project activities are investigated under field work. The groups of study species are as follow:

- Flora (vegetation, mangroves and plants)
- Herpetofauna (Reptiles and Amphibia)
- Avifauna/birds
- Fish
- Mammals
- Zooplankton

Data Collection of Plant Species

Flora survey was taken for 2 days to the northern part nearby Maung Ma Kan Beach Area in March, 2018. Plant specimen collection, taking photographs for some floral parts to identify, interviewing with local people and habitat identification in the field were conducted. Plant species are also observed and listed by walk-through-surveys in and around the proposed project area. Flora observation was carried out for 2 km radius from the central point of the project area (Figure 5.19). The central GPS coordinate point of the proposed project area is 14°09′ 20.7576″ N and 98°05′ 14.226″ E (Figure 5.20).

Data Analysis of Plant Species

After field trip, plant identification was carried out based on available literatures such as key to the families of the flowering plants, issued by Department of Botany, Yangon University (1994), Backer *et. al.*(1963), Kress *et. al.* (2003), Gardner *et al.* (2000) etc., and verification was conducted by recorded field photographs and some useful internet websites.A Google map from iTouchMap.com (https://itouchmap.com/latlong.html) was used to show the sampling points of flora and different zones of the project area where plant species were observed. Different lines and dot colors are created by Adobe Photoshop (7.0) to prominent and understand on the flora sampling points and the different zones of project area. And also, the threatened levels of plant species of the project area were checked and described their present conservation status in accordance with "The IUCN Red List of Threatened Species, 2017" (http://www.iucnredlist.org/ details/199856/0).

Figure 5.19. A Map Showing Project Area and Its Surroundings

Figure 5.20. Field Activities: (A) Plant Collection (B) List of Species (C-D) Walk-through Survey in and around the Project Area (E) Taking Photographs for Some Floral Parts to Identify

Data Collection of Animal Species

Field observation was taken to collect the primary data and information. Secondary data and interview survey were also taken for manipulation of data for the past and present and also for the reference. Five groups such as amphibians and reptiles, birds/avifauna, fishes, mammals and zooplanktons were targeted to collect the samples. Appropriate biological survey methods for each kind of animals were used to collect the data and information. Specimen collection was taken around 1km radius of the project area. For the secondary data, the information of animal presence was obtained in past and present in and around the project area. Identification and list of animal species encountered in and surrounding area were made. Observed frequency and abundance of individual species of animals were also recorded. Interview survey was taken with fisherman to investigate fish species richness and abundance (Figure 5.21). Zooplanktons were collected by using plankton net (mesh size 190µm) in three sampling points. Collected specimens of animals were recorded by photograph.

Collection and Preservation of Zooplankton Samples

In collecting of the zooplanktons, a total of 75 liters of water was being filtered with plankton net (mesh size 190µm) carried out in each sampling site (Figure 5.22). The hauling distance was 60cm long near the surface water. At each study sites triplicate samples were carefully transferred to a small vial. The inside of the net was washed so as to collect any sticking plankton. A few drops of formalin were put to narcotize the animals and when they became motionless and settled down, the supernatant water was discarded slowly and concentrated samples were collected. All samples were preserved in 5% formaldehyde solution. The taxonomical identification and numbers of population abundance of water sample were done by drop count method under the microscope. Taxonomic identification was carried out following Battish (1992), Roy (1999), Sharma(1999a), Khan (2003) and website www.zooplankton.org.

Data Analysis

Data analysis is made by descriptive statistical analysis through Microsoft excel. Impact analysis is conducted followed by the standard guideline. Identification and determination of the potential impacts such as magnitude, extent and duration on flora and fauna caused by the

proposed project is made. Based on the type of the project, impact levels are identified into four categories such as low, moderate, high and very high for the proposed project. Significant points are determined based on collected data (observed frequency, abundance, density, diversity and distribution of the particular species etc.). The factors are used in determining impact significance and magnitude, these factors are 1. area of influence, 2. percentage of resource affected, 3. persistence of impacts, 4. sensitivity of resources, 5. status of resources, 6. regulatory status, and 7. social values.

Impact Analysis

Impact Classification: Impacts were classified into four categories as shown in the following table. Small, Moderate, Large and Very large followed by the Bureau of Land Management by the US (2016).

Table - Classification of Impact Levels and Caused Event on Biodiversity

No.	Impact level	Caused events
1	Low (L)	This is an impact that is limited to the immediate project area, affects a relatively small proportion of the local population (less than 10%), and does not result in a measurable change in carrying capacity or population size in the affected area.
2	Moderate (M)	This is an impact that extends beyond the immediate project area, affects an intermediate proportion of the local population (10 to 30%), and results in a measurable but moderate (not destabilizing) change in carrying capacity or population size in the affected area.
3	High (H)	This is an impact that extends beyond the immediate project area, could affect more than 30% of a local population, and could result in a large, measurable, and destabilizing change in carrying capacity or population size in the affected area.
4	Very High (VH)	This is an impact that extends beyond the immediate project area, could affect more than 50% of a local population, and could result in a very large, measurable, and destabilizing change in carrying capacity or population size in the affected area.

Fish Sample Collection by use of Surrounding Net

Collected Fish Sample

Zooplankton Sample Collection by use of Plankton Net

Figure 5.21. Field Activities: Sample Collection of Fauna

Results (Flora)

Plant survey was carried out for 1 km range from the core area of the proposed project area. In the proposed project area, a few shrub land vegetation, scattered small tree and tree species were observed. The surroundings of project area were mainly composed by shrub land vegetation and mangrove communities and creeks (Figure 5.22 and 5.23).

In this flora survey, a total of (76) plant species from (34) families was recorded in which tree species were (40.80%), followed by shrub (19.70%), herb (14.50%), small tree (11.80%), climber (7.90%), and grasses (5.30%) were included.

According to IUCN red list (2017), all plant species are common and not included in the three main threatened categories of red list but only one species from mangrove community which *Aegialitis rotundifolia* (Pinle-sa) was recorded as a near threatened species status (NT).

Table 5.6. Recorded Plant Species of the Proposed Project Area

No.	Scientific Name	Family	Myanmar Name	Habit	IUCN Status
1	*Acacia auriculiformis* A.Cunn.ex Ben	Fabaceae	Aurishaa	Tree=31	NL
2*	*Acanthus ilicifolius* L.	Acanthaceae=2	Khayar	Shrub	NL
3	*Achyranthes aspera* L.	Amaranthaceae=2	Kyet-mauk-pyan	Herb=11	NL
4*	*Aegialitis rotundifolia Roxb.*	Plumbaginaceae	Pinle-sa	Shrub	NT
5	*Albizia saman* F. Muell.	Mimosaceae=3	Thinbaw-kokko	Tree	NL
6	*Alternanthera sessilis* (L.) R. Br.	Amaranthaceae=4	Pazun-sar	Herb	NL
7	*Anacardium occidentale* L.	Anacardiaceae	Thiho-thayet	Tree	NL
8	*Areca catechu* L.	Arecaceae=5	Kunthi-pin	Small tree=9	NL
9	*Artocarpus heterophyllus* Roxb.	Moraceae=4	Peinne	Tree	NL
10	*Arundo donax* L.	Poaceae	Kyu	Grass	NL
11*	*Avicennia officinalis* L.	Avicenniaceae=1	Thame-net	Tree	NL
12	*Bauhinia monandra* Kurz.	Caesalpiniaceae=2	Swe-daw	Tree	NL
13	*Borassus flabellifer* L.	Arecaceae	Htan	Tree	NL
14*	*Bruguiera malabarica* Arnold	Rhizophoraceae=1	Byu	Small tree	NL
15	*Carica papaya* L.	Caricaceae=1	Nget-pyaw	Small tree	NL
16	*Cassia alata* L.	Fabaceae	Pwesay-mezali	Shrub=15	NL
17	*Cassia fistula* L.	Fabaceae	Ngu-gyi	Tree	NL
18	*Casuarina equisetifolia* Forst.	Casuarinaceae=1	Pinle-kabwe	Tree	NL
19	*Ceiba pentandra* (L.) Gaertn.	Bombacaceae=1	Le-moh-pin	Tree	NL
20	*Chloris barbata* Sw.	Poaceae	Sin-ngo-myet	Grass=4	NL
21	*Cinnamomum pachyphyllum* Kosterm.	Lauraceae=2	Kayaway	Tree	NL
22	*Cocos nucifera* L.	Arecaceae	Ohn	Tree	NL
23	*Cuscuta reflexa* Roxb.	Convolvulaceae=2	Shwe- nw e	Herb	NL
24	*Cynodon dactylon* (L.) Pers.	Poaceae	Mye-sa	Grass	NL
25	*Delonix regia* (Boj. Ex Hook.) Raf.	Fabaceae	Seinban-gyi	Tree	NL
26	*Duabanga grandiflora* Walp.	Lythraceae=3	Myauk-ngo	Tree	NL
27	*Eclipta alba* (L.) Hassk.	Asteraceae=3	Kyeik-hman	Herb	NL
28	*Emblica officinalis* Gaertn.	Phyllanthaceae	Zibyu	Tree	NL
29	*Eucalpytus albens* Benth.	Myrtaceae=1	Eu-ca-lit	Tree	NL
30	*Eupatorium odoratum* L.	Asteraceae	Bizat	Shrub	NL
31	*Euphorbia heterophylla* L.	Asteraceae	Kywe-kyaung-myin-si	Shrub	NL
32*	*Excoecaria agallocha* L.	Euphorbiaceae=3	Tayaw	Small tree	NL
33	*Ficus glomerata* Roxb.	Moraceae	Ye-thahpan	Tree	NL
34	*Ficus rumphii* Bl.	Moraceae	Nyaung-phyu	Tree	NL
35	*Getonia floribunda* Roxb.	Combretaceae=2	Gyut-nwe	shrub	NL
36	*Gisekia phanaceoides* L.	Gisekiaceae=1	Gangala	Herb	NL
37	*Heliotropium indicum* L.	Boraginaceae=1	Sin-hna-maung	Herb	NL
38	*Homonoia riparia* Lour.	Euphorbiaceae	Ye-chanya	Shrub	NL
39	*Hygrophila phlomoides* Nees.	Acanthaceae	Migyaung-kunbat	Herb	NL
40	*Hyptis suaveolens* (L.) Poit.	Lamiaceae=2	Taw-pin-sein	Herb	NL

Table 5.6. Contd. (a)

No.	Scientific Name	Family	Myanmar Name	Habit	IUCN Status
41	*Ipomoea pes-caprae* (L.) R.Br.	Convolvulaceae	Pinle-kazun	Climber=6	NL
42	*Jasminum multiflorum* (Burm.f.) Andrews	Oleaceae	Tawsabe	Climber	NL
43	*Lagerstroemia speciosa* (L.) Pers.	Lythraceae	Pyin-ma	Tree	NL
44	*Lannea coromandelica* (Houtt.) Merr.	Anacardiaceae	Nabe	Tree	NL
45	*Leucaena glauca* (L.) Benth.	Mimosaceae	Bawsagaing	Small tree	NL
46	*Litsea laurifolia* (Jacq.) Kurz.	Lauraceae	Ondon	Tree	NL
47	*Macaranga tanarius* Muell. Arg.	Euphorbiaceae	Pada	Tree	NL
48	*Mangifera indica* L.	Anacardiaceae	Tha-yet	Tree	NL
49	*Melastoma malabathricum* L.	Melastomataceae=1	Kyet-gale	Shrub	NL
50	*Mimosa pudica* L.	Mimosaceae	Tikayon	Herb	NL
51	*Mimusop elengi* L.	Sapotaceae=1	Khayay	Tree	NL
52	*Moringa oleifera* Lam.	Moringaceae=1	Dan-da-lun	Tree	NL
53*	*Nypa fruticans* Wurmb.	Arecaceae	Dani	Small tree	NL
54	*Olax psittacorum* (Willd.) Vahl	Oleaceae=2	Lelu	Shrub	NL
55	*Phyllanthus niruri* L.	Phyllanthaceae=2	Yaung-ma-ywet	Shrub	NL
56	*Physalis minima* L.	Solanaceae=1	Bauk-pin	Herb	NL
57	*Pongamia pinnata* Pierre.	Fabaceae=10	Thinwin-phyu	Tree	NL
58	*Salacca secunda* Griff.	Arecaceae	Yin-ngan	Small tree	NL
59	*Sida spinosa* L.	Malvaceae=5	Thabyetsi-pin	Shrub	NL
60	*Sida subcordata* Span.	Malvaceae	Katsi-ne	Herb	NL
61	*Smilax* sp.	Smilacaceae=1	Nil	Climber	NL
62*	*Sonneratia alba* J. Smith.	Lythraceae	Lame	Tree	NL
63	*Spinifex littoreus* (Burm. F.) Merr.	Poaceae=4	Nil	Grass	NL
64	*Stephania japonica* (Thunb.) Miers	Menispermaceae=1	Yele	Climber	NL
65	*Streblus asper* Lour.	Moraceae	Okhne	Small tree	NL
66	*Strophostyles helvola* (L.) Elliott.	Fabaceae	Taw-peyaing	Climber	NL
67	*Taliparitiliaceum* (L.) Fryxell	Malvaceae	Ye-ngan-shaw	Small tree	NL
68	*Tamarindus indica* L.	Caesalpiniaceae	Magyi	Tree	NL
69	*Terminalia catappa* L.	Combretaceae	Banda	Tree	NL
70	*Thespesia lampas* (Cav.) Dalzell & A. Gibson.	Malvaceae	Thinbaung-shaw	Shrub	NL
71	*Triumfetta annua* L.	Malvaceae	Katsine	Shrub	NL
72	*Uraria lagopodioides* (L.) DC.	Fabaceae	Kyaungme-pan	Shrub	NL
73	*Vigna adenantha* (G. Mey.) Marechal	Fabaceae	Pe-yaing	Climber	NL
74	*Vigna lutea* (Sw.) A. Gray	Fabaceae	Beach pea	Shrub	NL
75	*Vitex pubescens* Vhal.	Lamiaceae	Kyet-yo	Tree	NL
76	*Zizipus jujube* (L.) Mill & Lam.	Rhamnaceae =1	Zi	Tree	NL
	76 species	**34 family**			

IUCN= International Union for Conservation of Nature; NL= Not listed in threatened categories of red list; NT= Near threatened; * = A total of (7) mangrove plant species

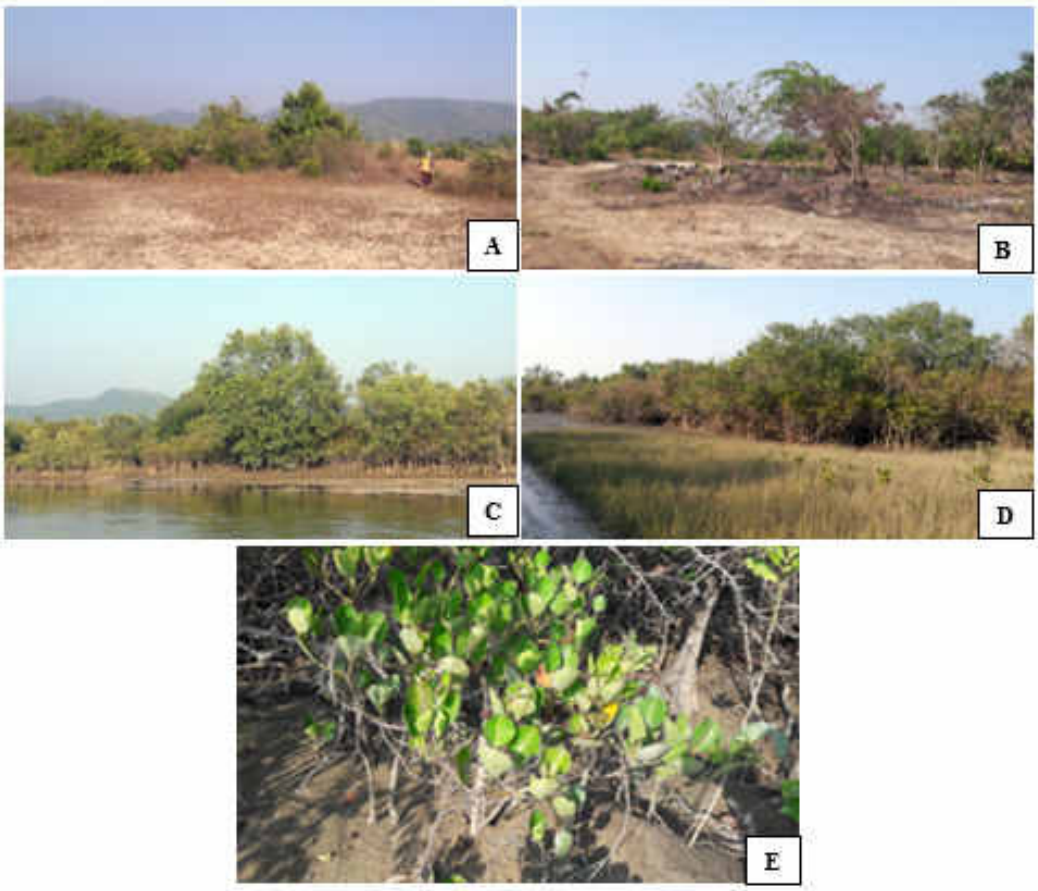


Figure 5.22. Vegetation in and around the Proposed Project Area (A) Shrub Land Vegetation (B) Scattered Small Tree and Tree Species (C-D) Mangrove Communities (E) Aegialitis rotundifolia (Pinle-sa)

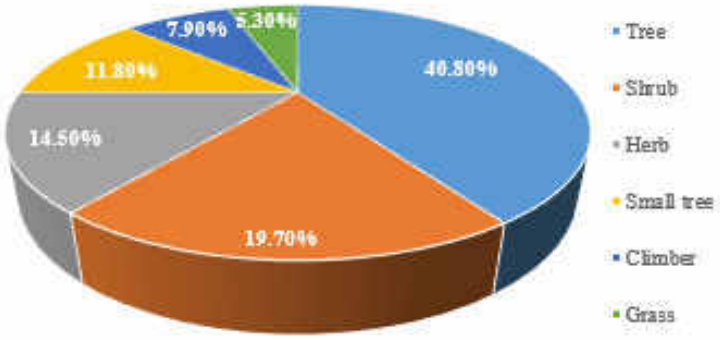


Figure 5.23. Species Composition of Observed Plant Species

Discussion for Flora

A total of (76) plant species from (34) families was observed in which the most significant family of the project area was Fabaceae with (10) species, followed by Malvaceae and Arecaceae with each (5) species and finally Moraceae with (4) species (Table 1). The rest families possessed the three or two or a single species, respectively.

In the project area, wild shrub vegetation, small tree and tree species together with cultivated plant species were growing dispersedly. *Casuarina equisetifolia* (Pinle-kabwe) are growing as a row along the beach in front of the project area. *Anacardium occidentale* (Thiho-thayet), *Pongamia pinnata* (Thinwin-phyu), *Lannea coromandelica* (Nabe), *Duabanga grandiflora* (Myauk-ngo) and *Olax psittacorum* (Lelu) were strangely found in the project area in which *Anacardium occidentale* (Thiho-thayet) was cultivated species because this project site was a cultivated land area of this species in the past. These plant species can affect directly in the first constructional phase of the project development. Moreover, these species are wild type species so that they can be assumed as indicator plant species in this ecology. In fact, these four species together with *Casuarina equisetifolia* (Pinle-kabwe) should be maintained and replanted in landscape plan or as a green belt in the project development programs.

Mangrove communities were found in the eastern part of the proposed project area. Mangrove species are actually provided as ecological and medicinal values. They are now globally conserved for their benefits and ecology. In mangrove community, a total of (7) mangrove species was recorded in which *Acanthus ilicifolius* (Kha-yar), *Aegialitis rotundifolia* (Pinle-sa), *Avicennia officinalis* (Thame-net), *Bruguiera malabarica* (Byu), *Excoecaria agallocha* (Tayaw), *Nypa fruticans* (Dani), and *Sonneratia alba* (Lame) included. Mangroves protect shorelines from damaging storm and hurricane winds, waves, and floods. Mangroves also help prevent erosion by stabilizing sediments with their tangled root systems. They maintain water quality and clarity, filtering pollutants and trapping sediments originating from land (Web. 1). Mangrove forests are home to a large variety of fish, crab, shrimp, and mollusk species. These fisheries form an essential source of food for thousands of coastal communities around the world. The mangrove forests also serve as nurseries for many fish species, including coral reef fish. Moreover, many animals find shelter either in the roots or branches of mangroves. Mangroves serve as rookeries, or nesting areas, for coastal birds (Web 2).

According to Kathiresan *et. al,*(2005), mangrove species are useful for utensils and medicines today in which observed mangrove species of *Nypa* leaves (Dani) are used to thatch roofs,

mats and baskets and mangrove extracts of *Excoecaria agallocha* (Tayaw) are now using for the treatment of leprosy and epilepsy. Moreover, *Acanthus ilicifolius* (Kha-yar) is used in the treatment of rheumatic disorders. *Avicennia* species have tonic effect whereas a beverage is prepared from the fruits of *Sonneratia* spp. Therefore, observed mangrove plant species of *Acanthus ilicifolius* (Kha-yar), *Avicennia officinalis* (Thame-net), *Bruguiera malabarica* (Byu), *Excoecaria agallocha* (Tayaw), *Nypa fruticans* (Dani), and *Sonneratia alba* (Lame) possessed economic, medicinal and ecological values. Thus, these species and their community nearby the proposed project area should be maintained and plantation should be carried out for mangrove ecosystems. In final suggestion, local people and project workers are primarily essential to understand on advantages of plants in environment and their roles so that the developers should be managed propagandas to promote the environmental awareness for them.

Results (Fauna)

Five fauna groups are classified according to their presence in and the surrounding area of the project site. The study was to investigate in respective fauna abundance status and possible impacts on them caused by the project activities. According to survey result, the abundance of individual recorded species in both terrestrial and aquatic environs in and around the project area is low. Zooplanktons were recorded with relatively abundant. No threatened fauna species are recorded during the study period. Fix fauna groups are as follow:

- Herpetofauna (Reptiles and Amphibians)
- Avifauna/birds
- Fish
- Mammals
- Zooplankton

Herpetofauna (Amphibian and reptiles)

Amphibian population was recorded as small in and around the project area as they are inactive in the coastal environment. Generally, herpetofauna with low population and small diversity were recorded. A total of 13 species belong to 8 families were recorded during the survey (Table 5.7). The abundance status of individual species is small number which based on observed frequency. All recorded amphibians and reptiles are common species and none are classified as Red Data species. Regard ecology of those herpetofauna species, they are widely distributed animals. Amphibians and reptiles are one of the important members of aquatic and terrestrial ecosystems as they serve as both predators and prey.

Table 5.7. Recorded Amphibian and Reptile Species (13 species) in the Buffer Zone and the Project Area

Sr. No	Family	Common name	Scientific name	Conservation status IUCN 2016	Habitats	Abundance status
Frog and Toad						
1	Dicroglossidae	Indian cricket frog	*Fejervarya limnocharis*	LC	Grass/pond	S
2	Dicroglossidae	Chinese edible frog	*Hoplobatrachus rugulosa*	LC	Grass/pond	S
3	Microhylidae	Painted bull frog	*Kaloula pulchra*	LC	Grass/pond	S
4	Rhacophoridae	Common tree frog	*Polypedates leucomystax*	LC	Shrub	S
5	Bufonidae	Asian common toad	*Duttaphrynus melanostatus*	LC	Open area/Under log	S
Snake						
1	Colubridae/Homalopsidae	Dog-faced water snaake	*Cerberus rynchops*	LC	Mangrove	S
2	Colubridae	Water snake	*Xenochrophis piscator*	LC	Pond	S
3	Colubridae	Sunbeam snake	*Xenopeltis unicolor*	LC	Open area	S
4	Colubridae	Long-nosed whip snake	*Ahaetulla nasuta*	LC	Shrub/Tree	S
5	Colubridae	Indo-Chinese Rat Snake	*Ptyas korros*	LC	Shrub/grass	S
6	Elapidae	Monocellate cobra	*Naja kaouthia*	LC	Shrub/grass	S
Lizard						
1	Agamidae	Garden fence lizard	*Calotes versicolor*	LC	Shrub	S
2	Gekkonidae	Tockay	*Gekko gecko*	LC	Tree	S

Note: Encountered rate based on individual numbers. S= Small (<25); M= Moderate (<50); L=Large (<75), VL= Very large (>75)

Birds

A total of 12 species of bird belongs to 10 families are recorded around the project area (Table 5.8 and Figure 5.24). All are common species. Among the species, Common myna *Acridotheres tristis* is largely recorded. House sparrow *Passer domesticus* is also observed as moderate number during the survey time. The whimbrel (*Numenius phaeopus*) was found about 20 in the coast nearby the project area. Wikipedia (the free encyclopedia) stated that the whimbrel is a wader in the large family Scolopacidae. It is one of the most widespread of the curlews, breeding across much of subarctic North America, Europe and Asia as far south as Scotland. This is a migratory species wintering on coasts in Africa, South America, south Asia into Australasia and southern North America. It is a coastal bird during migration. It is fairly gregarious outside the breeding season. During the survey period, no migratory and threatened species are observed. Nesting sites of birds are also not found. However, whether the number is small or large recorded, the study acknowledges the value of bird ecological role in nature as the birds are taking play in ecological important role as they serve as in food-chain and food web, seed dispersal and propagation, pollination, pest control and rodent control.

Table 5.8 Recorded Bird Species (12 species) in and Surrounding Area of the Project Site

Sr. No	Family	Common name	Scientific name	Conservation status (IUCN 2016)	Habitats	Abundance Status
1	Apodidae	Edible-nest swiftlet	*Collocalia fuciphaga*	LC	Terrestrial	S
2	Scolopacidae	Whimbrel	*Numenius phaeopus*	LC	Aquatic	S
3	Rallidae	White-breasted waterhen	*Amaurornis phoenicurus*	LC	Aquatic	S
4	Caprimulgidae	Indian nightjar	*Caprimulgus asiaticus*	LC	Terrestrial	S
5	Columbidae	Spotted dove	*Streptopelia chinensis*	LC	Terrestrial	S
6	Dicruridae	Black	*Dicrurus*	LC	Terrestrial	S

		drongo	*macrocercus*			
7	Sturnidae	Common myna	*Acridotheres tristis*	LC	Terrestrial	L
8	Pycnonotidae	Red whiskered bulbul	*Pycnonotus jocosus*	LC	Terrestrial	S
9	Passeridae	House sparrow	*Passer domesticus*	LC	Terrestrial	M
10	Ardeidae	Little egret	*Egretta garzetta*	LC	Aquatic	S
11	Ardeidae	Great egret	*Ardea alba*	LC	Aquatic	S
12	Ardeidae	Indian pond heron	*Ardeola grayii*	LC	Aquatic	S

Note: Encountered rate based on individual numbers. S= Small (<25); M= Moderate (<50); L=Large (<75), VL= Very large (>75)

Numenius phaeopus

Ardeola grayii

Acridotheres tristis

Streptopelia chinensis

Figure 5.24. Some Recorded Birds around the Project Area

Fish

Fish sample collection was made with the help of fisherman who are fishing in near coastal shore with large surrounding net and drift gill net. Those people are fishing for their home consumption and also for selling. No commercial fishing was observed around this area. Small fish are recorded. A total of 15 species under 14 families were recorded (Table 5.9 and Figure 5.25). All recorded fishes are common species and widely distributed in the region. It was not found as an important rare fish species around the project area during the observation. But some common species of small size sharks and rays' information are reported in nearby shallow water of the project area through the interview with local fisherman.

Table 5.9. Recorded Fish Species (15 species) in Costal Water nearby the Project Area

Sr. No	Family	Common name & local name	Scientific name	Conservation status (IUCN 2016)	Habitats	Abundance status
1	Tetraodontidae	bronze pufferfish/ Ngaputin	*Chonerhinos naritus*	LC	Coastal	S
2	Carangidae	Queenfish/ Nga-khanpa	*Scomberoides tol*	LC	Coastal/open sea	S
3	Clupeidae	fringescale sardinella	*Sardinella fimbriata*	LC	Coastal/open sea	S
4	Siilaganidae	Fltaheaded sillga	*Sillaginopsis panijus*	LC	Coastal	S
5	Polynemidae	/Ngataya	*Eleutheronema tetradactylum*	LC	Coastal	S
6	Litadae	Seabass/Kakatit	*Lates calcarifer*	LC	Coastal	S
7	Sciaenidae	Caroun croaker/Nga Poke thin	*Johnius carouna*	LC	Coastal	S
8	Scatophaguidae	Spotted scat/Nga pathon	*Scatophagus argus*	LC	Coastal	S
9	Gobiidae	Golden tank goby/Kathaboe	*Glossogobius aureus*	LC	Coastal	S
10	Hemiramphidae	Needlefish/ Nga Phaung Yoe	*Hyporhamphus limbatus*	LC	Coastal	S

11	Mugilidae	Large scale mullet/Kabilu	*Chelon macrolepis*	LC	Coastal	S
12	Mugilidae	Round headed mullet	*Moolgarda cunnesius*	LC	Coastal	S
13	Plotosidae	Canine Catfish eel/Nga Khu	*Plotosus canius*	LC	Coastal	S
14	Cynoglossidae	Fourlined tonguesole/Nga Hway Shar	*Paraplagusia bilineata*	LC	Coastal	S
15	Ambassidae	Bald glassy	*Ambassis gymnocephalus*	LC	Coastal	M

Note: Encountered rate based on individual numbers. S= Small (<25); M= Moderate (<50); L=Large (<75), VL= Very large (>75)

Scatophagus argus

Chonerhinos naritus

Moolgarda cunnesius

Scomberoides tol

Sillaginopsis panijus

Sardinella fimbriata

Figure 5.25. Some Recorded Fishes in Coastal Water nearby the Project Area

Mammals

Mammal species are not observed nearby the project area expect rat species. Fresh signs of Bandicoot rats 'holes are observed in the grass and near construction sites.

Zooplankton

A total of 3 species of zooplankton were sampled from three sampling points (Table 5.10). These species are *Calanus finmarchicus*, *Cyclopoid* sp and *Hyperia macrocephala* (Figure 5.26). Copepoda was represented by the species *Calanus finmarchicus* and *Cyclopoid* sp. Amphipoda was represented by *Hyperia macrocephala*. Zooplankton sample collection result showed that population and density is not abundant. Average number of zooplankton in each sampling sites is fairly equal. Average 12 individuals of recorded species in 25 liters of sea waters.

The website, www.marinespecies.org/aphia stated that **Zooplankton** are heterotrophic plankton. Plankton are organisms drifting in oceans, seas, and bodies of fresh water and marine water. These organisms serve as an intermediary species in the food chain, transferring energy from planktonic algae (primary producers) to the larger invertebrate predators and fish who in turn feed on them. Zooplankton are highly sensitive to changes in aquatic ecosystems. Zooplankton are also sensitive to their environment and like phytoplankton—a change in zooplankton concentration can indicate a subtle environmental change. As well as providing an essential link in the food chain, the diversity of species, amount of biomass and abundance of zooplankton communities can be used to determine the health of an ecosystem. *Zooplankton are also affected by levels of pH, heavy metals, calcium, and aluminum. Nutrients like nitrogen and phosphorus will affect the prey of zooplankton (like algae, protozoa and bacteria), indirectly affecting zooplankton survival*.

Copepods are a group of small crustaceans found in the sea and nearly every freshwater habitat. Some species are planktonic (drifting in sea waters), some are benthic (living on the ocean floor), and some continental species may live in limnoterrestrial habitats. Many live underground in marine and freshwater caves, sinkholes, or stream beds. Copepods are sometimes used as biodiversity indicators.

Amphipods are an order of malacostracan crustaceans with no carapace and generally with laterally compressed bodies. Amphipods range in size from 1 to 340 millimetres (0.0394 to 13.4 in) and are mostly detritivores or scavengers. They are mostly marine animals, but are found in almost all aquatic environments. They are almost always an important component of aquatic ecosystems, often acting as mesograzers.

Table 5.10. Recorded Zooplankton Species

Sr. No	Phylum	Class	Order	Family	Species
1.	Arthropoda	Maxillopoda	Copepoda	Calanoidae	*Calanus finmarchicus*
2.	-	-	-	Cyclopoidae	*Cyclopoid* sp
3.	-	Malacostraca	Amphipoda	Hyperridae	*Hyperia macrocephala*

Calanus finmarchicus,

Hyperia macrocephala

Cyclopoid sp

In Group

Figure 5.26 Recorded Zooplankton Species

Discussion

Waste water will carry various types of contaminants to the river, lake and groundwater. The quality of freshwater is very important as it is highly consumed by human for drinking, bathing, irrigation etc. The discharge of contaminants from hotel into the sea or water body may harmful to the aquatic living organism too. Thus, in constructional and operational stage of the project is suggested to follow the National Environmental quality (Emission) Guideline (2016) regards the industrial discharges into the freshwater body as shown in the following figure.

However, the natural habitats along the creek and mangroves will provide for alternate habitats naturally for birds and other animals inhabited in the project area as they can move easily there and well adapted.

This guideline applies to tourism and hospitality facilities, including hotels, resorts and other accommodation and catering facilities. Wastewater discharges should be managed through conventional treatment to achieve the indicated guideline values for discharge of sanitary water.

Table 5.11. National Emission Guideline and Effects on Aquatic Lives when Exceed the Values

Parameter	**Unit**	**Maximum Concentration (Guideline values)**	**Effect on aquatic lives if exceed the guideline values**
5-day Biological oxygen demand	Mg/l	30	Depletion of Oxygen affects on fish and other aquatic organisms
Chemical oxygen demand	Mg/l	125	Depletion of Oxygen which is deleterious to higher aquatic life forms.
Oil and grease	Mg/l	10	Depletion of Oxygen which is deleterious to higher aquatic life forms.
pH	S.U.[a]	6-9	With few exceptions, pH values between 6.5 and 9.0 are satishotel, on a long-term basis, for fish and other freshwater aquatic life.
Temperature increase	°C	<3[b]	Changes in temperature affect aquatic life. High and low temperatures that are lethal for aquatic life forms.
Total coliform bacteria	100ml	400	Depletion of water quality and responsible for most waterborne diseases.
Total nitrogen	Mg/l	10	lead to low levels of dissolved oxygen and negatively alter various plant life and organisms.
Total phosphorus	Mg/l	2	lead to water quality problems such as eutrophication and harmful algal growth, even small increases can negatively affect water quality and biological condition.
Total suspended solids	Mg/l	50	can clog fish gills, either killing them or reducing their growth rate

6. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

An impact is any change to the existing condition of the environment caused by human activity or an external influence. Impacts therefore may be positive (beneficial) or negative (adverse). They may also be direct or indirect, long-term or short-term, and extensive or local in effect. Both positive and adverse environmental impacts could arise during the site preparation, construction and the operations phases. Beach pollution not only affects the habitat of the marine life; it also has effects on human hosts who are exposed to the wastes in put out in sea.

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities. Anticipated environmental impacts for the proposed resort project will be conducted into the entire life of the project. To cover the entire life of the project, it is necessary to conduct impact assessment for four major phases as follow:

(a) Phase I: Pre-construction Phase (during the pre-construction period),
(b) Phase II: Construction Phase (during the construction period),
(c) Phase III: Operation Phase (during the operation period), and
(d) Phase IV: Decommissioning Phase (after the operation period).

This (IEE) Study aims to identify the potential positive and negative impacts (both biophysical and social) associated with the proposed project. The potential impacts have been identified through baseline investigations and below are summaries per phase.

6.1. Impact Assessment Methodology

(a) Impact Identification

Impacts were identificed during screening process and combined with environmental baseline study and site survey to make clear.

(b) Impact Evaluation

Professional judgment should ideally be used in conjunction with the different value judgments expressed by various stakeholders. The choice of significance criteria needs to be aligned with a country's political culture and socio-economic framework. The three broad forms of recognition or determination of impact significance are summarized in Table below.

Table 6.1. Determination of Impact Significance

Forms of Recognition	Criteria
Technical recognition	The importance of an environmental resource or attribute is based on scientific or technical knowledge or judgment of critical resource characteristics.
Public recognition	Segments of the public recognize the importance of an environmental resource or attribute. Public recognition may take the form of support, conflict or opposition. Public action may be expressed formally (e.g. letters) or informally (e.g. protest action).
Institutional recognition	The importance of an environmental attribute or resource is acknowledged in the laws, plans or policy statements of government agencies or private groups.

Source: Canter (1996)

Predicted impacts after the identification process are evaluated using impact evaluation technique of EGT (matrix method of EGT) and significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. Impact significance is calculated. Impacts are rated based on their consequence (a combination of magnitude, spatial scale or population size, and duration), and their probability of occurring. Five levels of significance apply to impacts – (1) low, (2) low to medium, (3) medium, (4) medium to high, and (5) high as follow:

Impact Rating Table

Consequence

Likelihood

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	64	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

- Very Low (0- 25)
- Low (26- 50)
- Low to Moderate (51-75)
- Moderate (76-100)
- Moderate to High (101-125)
- High (126 to 150)

The significance of identified physical, biological and social impacts was assessed using an acceptable method and was informed by the stakeholder comments together wih the specialists'findings.

(c) Criterion for Impact Mitigations (Hierarchy for Mitigation Measures)

Practicable mitigation and management measures were recommended in accordance with the IFC's management hierarchy. Management measures sought to avoid, and if avoidance is not possible, then reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design. Requirement of mitigation measures will be considered by the intensity of impact significance as follow:

Mitigation Requirement for Impact Significance

No.	Impact Significance	Mitigation Requirement
1	Very Low (Negligible)	Minor or no mitigation required
2	Low	Required minor mitigations
3	Low to Moderate	Require more or less additional mitigations
4	Moderate	Require a number of additional mitigations
5	Moderate to High	Require a number of additional mitigation or modification of the project design
6	High	Require additional mitigations plus modification of the project design or alternative action may be required

6.2. Anticipated Impacts and Mitigation Measures during Pre-construction Phase

As the proposed project will be constructed in Maung Ma Kan Beach and most of the land used are covered by sand, it is unnecessary too much site clearing and ground levelling. So, the environmental impacts during pre-construction phase of proposed hotel zone will not significant due to the requirement of low number of workforce and heavy machinery (approximately 10 workers, 3 trucks and 1 dozer) for minor site clearing activities. The pre-construction phase will long approximately as 3 months and all of the impacts during pre-construction phase are short-term, temporary and will not be significance. The project area is

not situated in forest area and so no trees are needed to cut down as shown in the following figure.

Figure 6.1. Project Site before Construction

The following table shows the number of vehicles will use in the pre-construction phase.

No.	Pre-construction activities	vehicles	workers	Duration
1	Minor Site/ land clearing	Dozer (1)	(10)	15 days
2	Sand levelling	Track (3)	(15)	2 month
3	Manpower site clearing	-	(30)	1 month

6.2.1. Impacts on Air Environment during Pre-construction Phase

The impacts on air quality during pre-construction phase will be fugitive dust generation and vehicular emissions as follow:

(a) Fugitive Dust Generation

During pre-construction phase, the main source of air pollution will be dust generation due to the operation of dozer and trucks for site clearing and sand levelling activities. The nearest residents will have impact of particulate matter smaller than 10 microns (such as $PM_{2.5}$). Dust generation can cause temporary public nuisance and impact on workers' health. The sensitive receptors are considered to be within a 100m radius of the proposed site due to minor site clearing and sand

leveling activities. But the impact is not significant because the nearest resident is 980 m and these distances will be enough distance for dust despression. moreover the soil type in the project site is sandy and not too much PM are experceted to emmit during the pre-construction activities. The nature of dust generation during pre-construction phase will be short term, temporary and will not significant.

(b) Vehicular Emissions

The gaseous emissions (CO_2, CO, NO_2 and SO_2) will emit into the atmosphere from the operation of vehicles (dozer & trucks) and machineries during the pre-construction phase (including both on-site and on the public road).

(c) Increase in Noise Level

Site clearing and earth working vehicle (1 dozer) and delivery vehicles (2 trucks) traveling to and from the site will produce noise which increase existing noise in pre-construction phase. All of the predicted noise level during pre-construction phase will be based on Patrick Breysse, and Peter S.J. Lees., School of Public Health, Johns Hopkins University, Bloomberg, 2006. The calculations also based on the noise levels of typical construction equipments prepared by "Handbook of Noise Control" as follow:

Typical Construction Equipment Noise Emission Levels

Equipment Type	Noise Level (dBA at 50 Feet)
Dozer	87
Truck (Medium and Heavy)	84

Source: Harris, C.M. "Handbook of Noise Control," McGraw Hill, New York, 1979

The predicted noise level at nearest residents can be calculated by the addition of existing noise level and additional noise from pre-construction phase. Based upon a 6-dBA drop-off rate per doubling of distance, the existing noise level from the project and predicted noise level at nearest receptors are as follow:

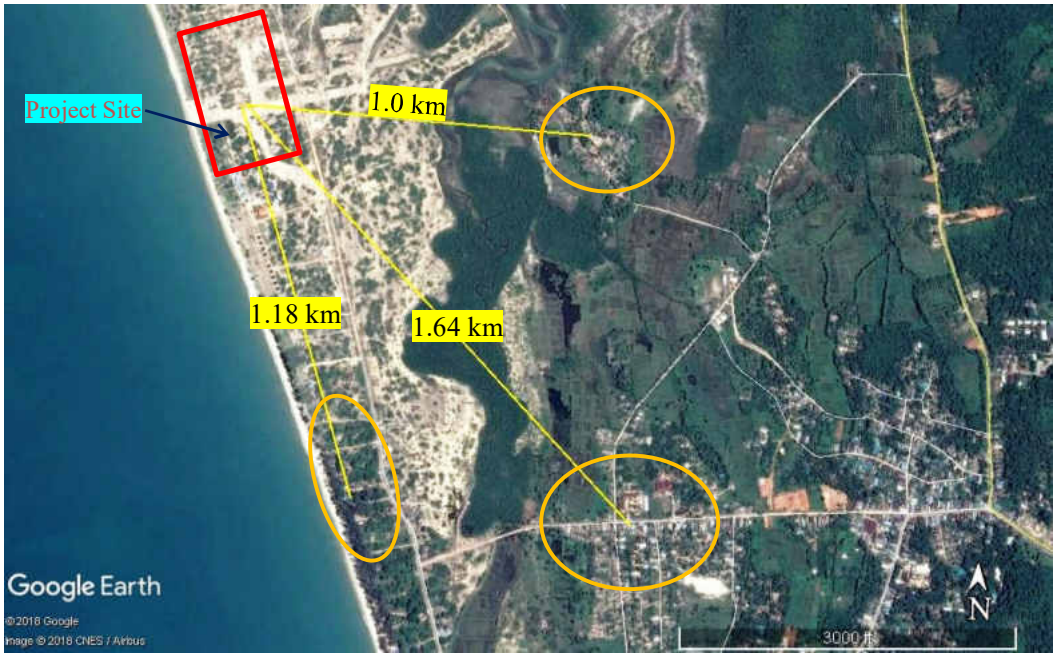


Figure- Distance between the Project Site and nearest Residents

Predicted Noise Levels during Pre-construction Phase

Receptors and distances from project	Existing noise levels monitored by integrated noise level meter (dBA)		Calculated noise level at site (dBA)		Reduced noise level at receptors due to Distance (dBA)	Predicted cumulative noise level at receptors (dBA)		Allowable noised level (existing noised level + 3dBA) (dBA)	
	Day Time	Night Time	Day Time	Night Time		Day Time	Night Time	Day Time	Night Time
Kave Napin 1 km	52.7	42.4	85.2	-	48.72	54.16	42.4	55.7	45.4
Restaurants (Beach Shops) 1.18 km	52.2	42.2			47.28	53.41	42.2	55.2	45.2
Maung Ma Kan 1.64 km	53.6	43.9			44.42	54.08	43.9	56.6	46.9

According to the above table, there is no impacts of noise on nearest residents (Residents in Kave Nalbin, Beach Shops and Maung Ma Gan Vilages) and all of the predicted noise levels during day time and night time are lower than the allowable limit (existing noise level plus

3dB). Although all of the predicted noise levels are based on calculations and the actual noise level may a little change due to the other factors (noise from moving vehicles in Maung Ma Kan Road, seasonal wind direction and wind speed), these changes will not affect local residents.

Significant of Impacts on Air Environment during Pre-construction Phase

According to the impact assessment, the nature of impact on air quality during pre-construction phase will be temporary and not significant as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fugitive dust generation	Site clearing and ground levelling	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Probable (-3)	Low (-28)
Vehicular emission	Site clearing and ground levelling	Negative (-)	Local (-3)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Highly Probable (-4)	Low (-40)
Noise	Noise from dozer and trucks	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Highly Probable (-4)	Low (-32)

Consideration of Mitigation Measures Requirement for Air Environment during Pre-construction Phase

The requirement of mitigation measures for air environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern during Public Consultation	Mitigation Requirement	Mitigation Scale	Responsibility
1.	Fugitive Dust Generation	Low (-28)	No	Yes	Minor	Pre-construction service provider(s)

2.	Vehicular Emission	Low (-40)	No	Yes	Minor	Pre-construction service provider(s)
3.	Noise	Low (-32)	No	Yes	Minor	Pre-construction service provider(s)

Mitigation Measures for Impacts on Air Environment during Pre-construction Phase

The following mitigation measures are recommended to pre-construction service providers for minor mitigation measures requirement.

(a) Mitigation Measures for Dust Generation

Dust will be efficiently countered by sprinkling of water during pre-construction phase. It is also the most cost-effective dust suppressant. For the proposed project, the nearest sources of water for dust control are water from Pan Dad Inn Creek behind the project site. Ground water will not be used for this purpose. Recommended activities to control dust during pre-construction phase are shown in the following table.

Recommended Actions for Dust Control during Pre-construction Phase

Fugitive Dust Source Category	Dust Control Actions
Earth-moving	▪ For any earth moving which is more than 30 m from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 cm in length in any direction.
Disturbed surface areas (except completed grading areas)	▪ Apply dust suppression in a sufficient quantity and frequency to maintain a stabilized surface; ▪ Areas, which cannot be stabilized, as evidenced by wind driven dust, must have an application of water at least twice per day to at least 80 percent of the unstabilized area. Damping down shall take place on a continual basis.
Disturbed surface areas (completed grading areas)	▪ Apply water to at least 80 percent of all inactive accessible disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust.

Inactive disturbed surface areas	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface.
Unpaved roads	▪ Water all roads used for any vehicular traffic at least twice per day of active operation; or ▪ Water all roads used for any vehicular traffic once daily and restrict vehicle speed to 15 mph.
Track-out control	▪ Downwash of trucks (especially tyres) prior to departure from site.

(b) Mitigation Measures for Vehicular Emission

Due to the impact rating and public concern on vehicular emission, there will require minor mitigation measures such as plan to reduce in loading and unloading time and plan to reduce in idle time during working hours.

(c) Mitigation Measures for Noise

According to the requirement of minor mitigation measures for noise during pre-construction phase, mitigation measures will only require to avoid working at night during pre-construction phase.

6.2.2. Impacts on Surface Water Environment during Pre-construction Phase

During pre-construction phase, impacts on water environment will be surface water pollution in Pan Dad Inn Creek due to soil erosion and sedimentation of earth working activities.

Insignificant of Impacts on Surface Water Environment

There will have no very little probability on surface water pollution due to the high porosity of sand in project area.

Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase turbidity in surface water body	Negative (-)	Site (-1)	Very Short term (-1)	Low to Medium (-3)	Rare (-1)	Seldom (-2)	Very Low (-15)

Consideration of Mitigation Measures Requirement for Surface Water Environment

The intensity requirement of mitigation measures surface water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern during Public Consultation	Mitigation Requirement by Impact Evaluation	Mitigation Scale	Responsibility
1.	Increase turbidity in surface water body	Very Low (-15)	No	No	Negligible	Pre-construction service providers

Mitigation Measures for Surface Water Quality

The following prevention measures will also be considered to reduce soil erosion and water pollution.

(a) Limit unnecessary earthworks;
(b) Prevent over-excavation;
(c) Working in a small area at a point of time (phase wise construction),
(d) Temporary sedimentation pond on the waterway to Pan Dat Inn Creek at construction site, and
(e) Vegetation of bare areas after the pre-construction state.

6.2.3. Impacts on Soil and Ground Water Environment

Impacts on soil and ground water environment during pre-construction phase of proposed hotel project will include the following:

(a) Impacts of Soil Quality

A small amount of domestic wastes will be produced from pre-construction workers. Moreover, some biomass (unsuitable soil materials) will produce from site clearing and earth working activities during pre-construction phase. All of these solid wastes will have impact on soil and ground water quality if they are not properly disposed.

(b) Impacts on Ground Water Quality

Impact on ground water will be negligible because of the nature and duration of pre-construction activities and pre-construction will not start in rainy season. Therefore, no mitigation measure is required for ground water pollution during pre-construction phase.

Significant of Impacts on Soil and Ground Water Environment

Domestic wastes from pre-construction workers will be minimal due to the small number of workforce (about 40 people in total). Amount of scrub produced will also be minimal because the site had already cleared. There are very little number of trees to fell down and most of them are bushes. Moreover, according to the soil quality testing and geological investigation, soil type within the hotel zone is not contained toxic organic materials and not environmentally sensitive soil type (sand). So, impacts on soil and ground water environment during pre-construction phase will be negligible as shown in the following table.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Potential to soil contamination	Domestic wastes and unusable materials in soil	Negative (-)	Site (-1)	Short term (-2)	Low (-2)	Rare (-1)	Seldom (-2)	Very Low (-15)
Potential to ground water pollution	Domestic wastes and unusable materials in soil	Negative (-)	Local (-3)	Short term (-2)	Low (-2)	Rare (-1)	Very Seldom (-1)	Very Low (-14)

Consideration of Mitigation Requirement for Soil and Ground Water Environment

The requirement of mitigation measures for soil and ground water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern during Public Consultation	Mitigation Requirement by Impact Evaluation	Mitigation Scale	Responsibility
1.	Potential to soil contamination	Very Low (-15)	No	Yes	Minor	Pre-construction service providers

2.	Potential to ground water pollution	Very Low (-14)	No	Yes	Minor	Pre-construction service providers

Mitigation Measures for Impact on Soil and Ground Water Environment

According to the need of the minor mitigation measures, all of the solid wastes produced from pre-construction phase have to systematically dispose according to the rules and regulations of CDC (Dawei). However, soil contamination will occur while handling of fuel oil and lubricants may constitute a risk for pollution of surface. So, it will control any leakage of oil and lubricant from vehicles and machineries used in pre-construction phase.

6.2.4, Impacts on Biodiversity Environment

Anticipated Impacts on biodiversity environment during pre-construction phase will be as follows:

(a) Impacts on Flora Diversity

In pre-construction phase, significant points are very low as the initial stage of the project activities. So, pre-construction phase of proposed project will have no or very little impact on flora diversity as all of the trees inside the project site are not considered as endangered flora species according to the impact assessment on flora diversity. Generation of dust, lighting and noise will disturb the animal behavior and movement,

- Damage and removal of existing vegetation will loss the habitats
- land contamination will disturb the vegetation.

(b) Impacts on Fauna Diversity

Cutting down of some trees at the project site can affect the habitats of birds, butterflies, and reptiles. Increase in noise during pre-construction phase may affect the feeding, breeding and movement of wildlife in near area.

Significant of Impacts on Biodiversity Environment

Survey resulted that the terrestrial plants and animals are very low in and around the project area as the project site is located in hotel zone. Direct observation method and systematic

sample collection of flora and fauna were conducted in the field. The survey recorded that a total of (76) plant species from (34) families was recorded in which tree species were (40.80%), followed by shrub (19.70%), herb (14.50%), small tree (11.80%), climber (7.90%), and grasses (5.30%) were included. According to IUCN red list (2017), all plant species are common species but only one species from mangrove community which ***Aegialitis rotundifolia*** **(Pinle-sa) was recorded as a near threatened species status (NT)**. In fauna (44) species comprises of (13) amphibian and reptile, (12) species of birds, (15) species of fish, (1) species of mammal and (3) species of zooplankton are recorded during the scoping survey. No red list species of animal are found during the survey period. Abundance status of zooplanktons are investigated which showed as low diversity and small population. Impact analysis investigated that the proposed project will be affected indirectly with small impact (no significant) on terrestrial and aquatic environment. The extent of the impact on fauna and flora is investigated as only in the site specific and duration of the impact is assumed as temporal or permanent.

Significant points were anticipated based on the presence of flora and fauna status in and around the project area. The points are assumed with the respective measuring factors in the left column of the following table. According to the analysis, the points are non-significant affected on flora and fauna as shown in the following table.

Table 6.1. Significant Points in the Respective Flora and Fauna Groups through Measuring Factors

Factors affected on biodiversity	M	S	ST	Amphibians & Reptiles	Fishes	Birds	Small mammal	Zooplankton
Area of influence	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%
percentage of resource affected	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%
sensitivity of resources	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%	1-25%
status of resources	important	normal	normal	normal	normal	Normal	normal	normal
regulatory status	normal	normal	normal	normal	normal	Normal	normal	normal
Social value	normal	normal	normal	normal	normal	Normal	normal	normal

Notes: M=Mangrove vegetation, S=Shrub vegetation, ST= Scatter trees, A&R=Amphibian and reptiles,

Significant points

Low=1-25%, Moderate= 26-50%, High= 51-75%, Very High=>76%

Mangrove communities were found in the eastern part of the proposed project area. Mangrove species are actually provided as ecological and medicinal values. They are now globally conserved for their benefits and ecology. So, impacts on biodiversity environment during pre-construction phase will be low expect from mangrove area are as follows:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Impacts on Flora Diversity	Tree cutting for site clearing	Negative (-)	Site (-1)	Permanent (-5)	Very Low (-1)	Rare (-1)	Probable (-3)	Low (-28)
Impacts on Mangrove	Tree cutting for site clearing	Negative (-)	Limited (-2)	Permanent (-5)	High (-5)	Seldom (-2)	Probable (-3)	Low to Moderate (-60)
Impacts on Fauna Diversity	Noise from pre-construction activities	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Probable (-3)	Very Low (-24)

Considering of Mitigation Requirement for Biodiversity Environment

The requirement of mitigation measures for biodiversity environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern during Public Consultation	Mitigation Requirement by Impact Evaluation	Mitigation Scale	Responsibility
1.	Impacts on Flora Diversity	Very Low (-18)	Yes	Yes	Sensible	Pre-construction service provider(s)
2.	Impacts on Mangrove	Low to Moderate (-60)	Yes	Yes	Sensible	Pre-construction service provider(s)
3.	Impacts on Fauna Diversity	Very Low (-24)	No	Yes	Minor	Pre-construction service provider(s)

(d) Mitigation Measures for Impacts on Biodiversity Environment

The most important mitigation measure during pre-construction phase is not to cut ***Aegialitis rotundifolia*** **(Pinle-sa) which was recorded as a near threatened species status (NT)**. Moreover, in mangrove community, a total of (7) mangrove species was recorded in which *Acanthus ilicifolius* (Kha-yar), *Aegialitis rotundifolia* (Pinle-sa), *Avicennia officinalis* (Thame-net), *Bruguiera malabarica* (Byu), *Excoecaria agallocha* (Tayaw), *Nypa fruticans* (Dani), and *Sonneratia alba* (Lame) included. Mangroves protect shorelines from damaging storm and hurricane winds, waves, and floods. Mangroves also help prevent erosion by stabilizing sediments with their tangled root systems. So, it is necessary to avoid cutting of mangrove species. According to the consideration of intensity of mitigation measures (minor scale), it is just necessary to avoid tree cutting as much as possible, avoid working at night, remain the plants and vegetation as possible as which existing around the project area, and raise environmental conservation awareness among the public and workers.

6.2.5. Impacts on Socio-economic Environment during Pre-construction Phase

During pre-construction phase, the following positive and negative socio-economic impacts will occur.

(a) Positive Socio-economic Impacts during Pre-construction Phase

The potential positive socio- impacts during pre-construction phase are as follow:

Job Creation

The proposed project will provide about 100 temporaries directly or indirectly jobs (site clearing, tree cutting, transportation, services for food and soft drink, etc.) related to the proposed project during pre-construction phase.

Impact Significance of Job Creation without Enhancement Measures

According to the primary data collection, almost all of the young people in nearest villages are going to the foreign boarder city (Thailand) for seeking jobs. Therefore, most of the pre-construction workers will be migrant workers (not from nearest villages) and so job creation during pre-construction phase can be considered as very low without enhancement measures as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Potential to Increase in household income	Jobs opportunities in pre-construction site	Positive (+)	Limited (+2)	Very Short term (+1)	Low (+2)	Regular (+3)	Seldom (+2)	Very Low (+25)

Enhancement Measures for Job Creation

DDPC Co., Ltd. will encourage pre-construction contractor and sub-contractors to use local labor force (at least 70%) as part of tender requirement. Training program will also be provided if the local people do not have enough capacity for pre-construction work.

Impact Significance of Job Creation after Enhancement Measures

The impact will become very low to low after enhancement actions as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Potential to Increase in household income	Jobs in pre-construction site	Positive (+)	Limited (+2)	Very Short term (+1)	Low (+2)	Regular (+3)	Probable (+3)	Low (+30)

6.3. Anticipated Impacts and Mitigation Measures during Construction Phase

The construction period is expected to be about two year. Construction of proposed project will include (1) foundation works for concrete and timber buildings, (2) constructions of timber bungalow and concrete buildings, and (3) minor earth works for internal drainage system. Therefore, the major activities during construction phase will include:

(a) Vehicular movement,
(b) Loading and unloading construction materials,
(c) On site storage of construciton materials,

(d) Erection of timber and concrete structures,
(e) Connection of power supply system,
(f) Maintenance of construction machinery, and
(g) Disposal of solid wastes from both construction site and workers etc.

According to the above activities, construction of proposed project can potentially affect the natural environment and local communities. Moreover, construction activities will be disturbed to wildlife. The following construction operations and considerations, which could have a particularly significant impact, have been included in the assessment of disruption due to construction:

(a) The scale of earth movements;
(b) The storage and treatment of surplus material before removal;
(c) The likelihood of night-time working;
(d) Number, type and routes of vehicle movements;
(e) Storage and re-use of materials;
(f) Duration and nature of construction activities;
(g) Advance works by utilities if required;
(h) Materials logistics such as origin of materials and routes to site;
(i) Quantities of materials required and an estimate on quantities to be discarded;
(j) Identification of wastes that will be generated including sources; and
(k) The likelihood of contaminants being encountered.

6.3.1. Impact on Air Environment during Construction Phase

Impacts on air quality during construction phase will be as follow:

(a) Fugitive dust generation from transportation and construction activities,
(b) Vehicular emissions related to the transportation of personnel and construction materials, and
(c) Noise from construction machineries.

Fugitive Dust Generation

The fugitive dust emissions (very fine particulates) will be emitted from construction activities (transportation of construction materials and construction activities). These

activities will affect neighborhoods (especially for local residents beside the public road to the project site) though construction is not a long term.

Emissions

The gases emissions (CO_2, CO, and SO_2) will be emitted from the operation of vehicles and machinery into the atmosphere during the construction phase (including both on-site and the public roads).

Impacts of Noise

For the proposed project, the major noise generating sources during the construction phase will be movement of trucks, operation of concrete mixer and generator. If most of the construction machineries (concrete mixer, generator, truck etc.) are running at the same time, this cumulative noise level can increase to 91.7 dB(A) at 15 m (about 50 feet) distance as follow:

$$L_{site} = 10 \log \left(\frac{10^{8.5} + 10^{8.4} + 10^{9.0} + 10^{8.5}}{4} \right)$$

$$= 91.7 \text{ dBA}$$

Table 6.2: Typical Construction Equipment Noise Emission Levels

Equipment Type	Noise Level (dBA at 50 Feet)
Concrete Mixer	<85
Truck (Medium and Heavy)	84
Welding	90
Generator	<85

Source: EPA, 1 971; "Noise from Construction Equipment and Operations, Building Equipment,and Home Appliances". NTID 300.1

The predicted noise level at nearest villages during construction phase can be forecasted as follow:

Receptors and distances from project	Existing noise levels monitored by integrated noise level meter (dBA)		Calculated noise level at site (dBA)		Reduced noise level at receptors due to Distance (dBA)	Predicted cumulative noise level at receptors (dBA)		Allowable noised level (existing noised level + 3dBA) (dBA)	
	Day Time	Night Time	Day Time	Night Time		Day Time	Night Time	Day Time	Night Time
KaveNapin 1 km	52.7	42.4	91.7	-	50.27	54.66	42.4	55.7	45.4
Restaurants (Beach Shops) 1.18 km	52.2	42.2			49.1	53.7	42.2	55.2	45.2
Maungmakan 1.64 km	53.6	43.9			48.22	54.25	43.9	56.6	46.9

Impact Significance on Air Environment during Construction Phase

Impacts on air environment during construction phase will not be significant because the proposed project will not contain high rise buildings and will only use 2 trucks for transportation, one concrete mixer and one generator for construction and no heavy machinery (pilling machine, crane, backhoe etc.). Most of the brickwork and steel structure work will be carried out by human activities.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fugitive dust emission	Construction activities	Negative (-)	Site (-1)	Very Short term (-1)	Low (-2)	Very Often (-4)	Probable (-3)	Very Low (-28)
Vehicular emission	Construction activities	Negative (-)	Site (-1)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Highly Probable (-4)	Very Low (-24)
Noise	Noise from construction equipment	Negative (-)	Limited (-2)	Very Short term (-1)	Low (-2)	Very Often (-4)	Highly Probable (-4)	Low (-40)

Consideration of Mitigation Requirements for Air Environment

The requirement of mitigation measures for air environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public Consultation Processes	Mitigation Requirement by Impact Evaluation	Mitigation Scale	Responsibility
1.	Dust generation	Very Low (-28)	No	Yes	Minor	Construction service provider(s)
2.	Gaseous emissions	Very Low (-24)	No	Yes	Minor	Construction service provider(s)
3.	Noise	Low (-40)	No	Yes	Minor	Construction service providers

Mitigation Measures for Air Environment

The following mitigation measures will do for minor mitigation measures for air environment during construction phase.

(a) Mitigation Measures for Dust Generation

Dust will be efficiently countered by sprinkling of water during construction phase. Water spraying just need outside of the project site (along the Maung Ma Kan road) after the transportation of heavy construction materials.

(b) Minimizing of Gaseous Emissions

Certain mitigation measures will be adopted to limit atmospheric impacts to as great an extent as possible during construction phase. For instance, the transportation of personnel and materials will be scheduled such as to avoid periods of peak flow where congested conditions are more likely, and to reduce the overall number of vehicular movements. In addition to careful traffic management, close adherence to the recommended maintenance regime will be applied to both on-site and off-site vehicles.

Improved Maintenance: Recognizing that significant emission reduction will be achieved through regular equipment maintenance.

Reduction of On-site Construction Time: Rapid on-site construction will reduce the duration of traffic interference and therefore, reduce emissions from traffic delay. Off-site fabrication of structural components will also enhance the quality of work, as the production

takes place in controlled settings and external factors such as weather and traffic do not interfere.

(c) Mitigation Measures for Noise

For minor mitigation measures, it is necessary to avoid the following activities:

- running construction machineries at the same time; and
- working at night or working of noisy construction machineries at night.

6.3.2. Impacts on Surface Water Environment during Construction Phase

Potential construction-induced impacts to surface water quality will be soil erosion and sedimentation resulting from excavation and grading activities necessary for the construction of infrastructure during rainy seasons. Drainage and seepage from construction waste dumping site will have potential to surface water pollution. Mobilization and transport of soil particles due to construction activities may result in sedimentation of surface drainage networks, which may result in impacts to the water quality in Pan Datt Inn Creek via drains. In addition, handling of fuel oil, other oil products, chemicals and lubricants may constitute a risk for pollution of surface water. It will be more evidence in rainy seasons (June to September). Waste generated from construction activity will also have potential to surface water pollution and will include construction debris and waste from construction workers.

(a) Construction Debris

Waste materials (pallets, packing crates, steel structure off-cuts, and waste concrete) will be generated during construction period. The unsuitable soil material from foundation preparation will also produce. All of the construction wastes will have potential to soil and water pollutions if they are not properly managed. Drainage and seepage from construction waste dumping site will have potential to surface water pollution.

(b) Oil and Grease

Trucks and cars can leak fuel oil during transportation of construction materials and workers during construction phase. Moreover, lubricants and grease from construction machineries

can also leak during construction phase. All of the fuel oil and lubricants can cause surface water pollution (increase in oil and grease content in Pan Datt Inn) for a while.

(c) Domestic Wastes from Construction Workers

A small amount of domestic waste will be generated from construction workforce (about 50 workers). The establishment of labour camps will also effect on environment through improper waste (solid & garbage /sewage) disposal. A man can produce 0.4 kg per day of solid waste and the total waste produced from construction workers will be as follow:

Total Domestic Waste Produced during Construction Phase = 100 × 0.4 kg
= 40 kg / day
= 0.04 ton/day

Significant of Impacts on Surface Water Environment during Construction Phase

Impact on water environment during construction phase will not be significant due to the amount of wastewater produced during construction phase (the volume of nearest water bodies is very much greater than the volume of wastewater disposed by construction site). Moreover, soil type within the project site is sandy with high porosity and will absorb all of the water produced during construction phase.

Anticipated Impacts	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Surface Water Pollution	Construction Debris	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Seldom (-2)	Very Low (-24)
	Oil and Lubricants	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Seldom (-2)	Very Low (-24)
	Domestic Wastes	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Very Often (-4)	Very Seldom (-1)	Very Low (-20)

Consideration of Mitigation Requirement for Surface Water Environment

The intensity of mitigation measures for surface water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public Consultation Processes	Mitigation Requirement by Impact Evaluation	Required Mitigation Scale	Responsibility
1.	Construction Debris	Very Low (-24)	No	Yes	Minor	Construction Service Provider(s)
2.	Oil and Grease	Very Low (-24)	No	Yes	Minor	Construction Service Provider(s)
3.	Domestic Wastes	Very Low (-20)	No	Yes	Minor	Construction Service Provider(s)

Mitigation Measures for Impacts on Surface Water Environment

According to the above impact identification and evaluation, there will need minor mitigation measures for impact on water environment during construction phase. Proper waste collection and sanitation system will be provided for construction workers. Waste will be collected at construction site as per daily basis and disposed at CDC's approve waste disposal site where do not pressure on local waste collection system. Construction period will not start in rainy seasons. If construction will have to start in rainy seasons, it is necessary to contruct temporary settling pond inside the project compound. The following are the required mitigation measures for surface water quality during construction phase.

Mitigation Measures for Surface Water Pollution

No.	Construction Activities	Mitigation Measures
1.	Stacking and Loading Areas	- All stacking and loading areas will be provided with proper drains to prevent run off from the site to enter any water body.
2.	Waste Water from the Site	- Waste water channels from the site will be connected to septic tank during construction to prevent wastewater from entering the nearest water bodies.

6.3.3. Impacts on Soil and Ground Water Environment

Impact of soil and groundwater environment during construction phase will be leakage of fuel oil, leakage of lubricants and disposal of wastes.

(a) Leakage of Fuel Oil and Lubricants

Potential contamination of soil and groundwater during construction phase will possibly occur as a result of leaking of fuel and lubricants from construction equipment and/or temporary on-site storage facilities. Handling of fuel oil, other oil products, chemicals and lubricants may constitute a risk for pollution of soil and ground water.

(b) Construction Debris and Domestic Wastes

During construction phase, construction debris such as packing materials and domestic wastes from construction workers will produce. There will have potential to soil contamination and ground water pollution if these solid wastes are not properly disposed. Moreover, seepage and drainage from construction waste dump site will also impact on soil and ground water qualities.

Impacts Significance on Soil and Ground Water Environment

Construction related impacts to soil and groundwater in project site will be minor, temporary in nature and low possibility as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Soil and Ground Water Pollution	Leakage of fuel oil and lubricants	Negative (-)	Site (-1)	Short term (-2)	Very Low (-1)	Regular (-3)	Very Seldom (-1)	Very Low (-16)
	Construction debris and Domestic Wastes	Negative (-)	Limited (-2)	Short term (-2)	Very Low (-1)	Very Often (-4)	Very Seldom (-1)	Very Low (-25)

Consideration of Mitigation Requirements for Soil and Ground Water Environment

The requirement of mitigation measures for soil and ground water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public Consultation Processes	Mitigation Requirement by impact evaluation	Required Mitigation Scale	Responsibility
1.	Leakage of fuel oil and lubricants	Very Low (-15)	No	Yes	Minor	Construction Service Provider(s)
2.	Construction debris and domestic Wastes	Very Low (-21)	No	Yes	Minor	Construction Service Provider(s)

Mitigation Measures for Impacts on Soil and Ground Water Environment

According to the above consideration for required mitigation measures, there will be minor mitigation measures such as disposed of solid wastes according to the rules and regulations of CDC (Dawei) and/or rules to reduce impacts of solid wastes during construction phase. Care will be taken not to leak during the handling of fuel oil and lubricants. All of the fuel tank and lubricants container have to store over concrete floor or impermeable pad. Every machinery used in construction phase will be good conditions and regular maintenance.

6.3.4. Impacts on Biodiversity Environment

The anticipated impacts on biodiversity during construction phase of proposed project will be as follow:

(a) Impact on Flora Diversity

Clearing away trees and natural vegetation can cause hazards to the habitats of birds and butterflies. Terrestrial micro flora and fauna at the site are also affected. If waste disposal during construction are not properly done, there will be increased in the habitat loss of native species. In addition, herbaceous and grass communities in the project site will be removed from as a result of clearance for construction.

(b) Impact on Fauna Diversity

Clearing away trees and natural vegetation can cause hazards to the habitats of birds and butterflies. Noise due to construction activities at the site involving human and vehicular movement will disturb aril and wild animals in the area. If waste disposal during construction

are not properly done, there will be increased in the habitat loss of native species. Terrestrial micro flora and fauna at the site are also affected. Although the project is adjacent to Pan Datt Inn Creek, there will be no impact on aquatic lives in that creek because waste water produced from construction site will be little amount from small area and will be sink into the sandy soil.

Significant of Impacts on Biodiversity Environment

Significant of Impacts on Flora Diversity

Unmanaged grassland is a frequent habitat in the area and is not of any particular conservation importance. The project site is near the settlement area; therefore, there will be no concerns for wild life disturbance as there is no suitable habitat in terms of suitable natural flora cover and related fauna. The various areas of improved grassland do not have any conservation value. The total carbon sequestration of herbs and grass communities in proposed hotel will be very little. So that loss of carbon stock by proposed project is very low.

Significant of Impacts on Fauna Diversity

The impact on fauna diversity will be minimal due to the site had already cleared by human activities for hotel zone and no fauna species are found within the project site (direct impact zone). However, there will be a little impact on surrounding fauna diversity (indirect impact zone), due to the construction noise.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Impacts on flora and fauna diversities	Cutting of trees	Negative (-)	Site (-1)	Long term (-4)	Very Low (-1)	Rare (-1)	Very Seldom (-1)	Very Low (-12)
	Cutting of trees, wastes and noise	Negative (-)	Limited (-2)	Short term (-2)	Very Low (-1)	Very Often (-4)	Very Seldom (-1)	Very Low (-25)

Consideration of Mitigation Requirements for Biodiversity Environment

The requirement of mitigation measures for soil and ground water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public Consultation Processes	Mitigation Requirement by impact evaluation	Required Mitigation Scale	Responsibility
1.	Cutting of trees	Very Low (-12)	No	Yes	Minor	Construction Service Provider(s)
2.	Trees cutting, wastes and noise	Very Low (-25)	No	Yes	Minor	Construction Service Provider(s)

Mitigation Measures for Impacts on Biodiversity Environment

It is necessary to avoid tree cutting, dispose wastes properly and avoid working at night to reduce impacts on flora and fauna diversities during construction phase.

6.3.5. Impact on Human Environment

Impacts on human environment will include socio-economic and health impacts. The anticipated socio-economic and health impacts on human environment during construction phase are as follow:

6.3.5.1. Potential Socio-economic Impacts during Construction Phase

During construction phase, the following positive and negative socio-economic impacts will occur.

(a) Positive Socio-economic Impacts during Construction Phase

The potential positive social impacts during construction phase are as follow:

Job Creation

According to the information from the developer, the proposed project will provide about 100 temporary employment opportunities for local people during construction phase.

Impact Significance of Job Creation without Enhancement Measures

There will be great benefit the community to a point. However, the proposed project is located near Dawei City (border city to Thailand) and most of the young people are willing to

go to the boarder city for seeking jobs. So, job opportunities during construction phase can be considered as low without enhancement measures as follow:

Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Potential to Increase in household income	Positive (+)	Limited (+2)	Short term (+2)	Low (+2)	Intermittent (+2)	Seldom (+2)	Very Low (+24)

Enhancement Measures for Job Creation

The following enhancement measures are proposed to the developer for ensuring job opportunities for local people.

(a) As the population of females is slightly higher than that of males in the township, employment opportunities for construction works will also be created to ensure that the local female population also has equal chance for these opportunities (Gender Equality).

(b) Unskilled and semi-skilled job opportunities will be offered to the local communities as much as possible.

(c) DDPC will encourage construction sub-contractor to use local labor force as part of tender requirement.

Impact Significance of Job Creation after Enhancement Measures

If the developer will follow the proposed enhancement measures for job opportunities, the impact will become moderate after enhancement actions as follow:

Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Potential to Increase in household income	Positive (+)	Limited (+2)	Short term (+2)	Low (+2)	Regular (+3)	Highly Probable (+4)	Low (+42)

According to the above impact rating for job opportunities during construction phase, the positive impact for job opportunities can be boosted to low after enhancement measures. Moreover, job opportunities are one of the most public needs according to the primary data

collection. So, the developer has to consider job opportunity for local people during construction phase.

Skill Development for Local People

Local people hired by the proposed project would remain in communities with skills acquired during project construction including construction, woodwork, concrete work, steel/metal work and masonry. Communication skills for local people will also improve in office works during construction period. This is a positive and long-term socio-economic benefit.

Impact Significance of Skill Development without Enhancement Measures

Most of the sub-contractors for minor construction works in nearest villages are not too familiar with modern construction techniques and there is no local construction company in Maung Ma Kan Region. So, the impact significance of local skill development during construction phase without enhancement measures can be considered very low as follow:

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local skill development	Construction Works	Positive (+)	Local (+3)	Long term (+4)	Low to Moderate (+3)	Intermittent (+2)	Very Seldom (+1)	Low (+30)

Enhancement Measures for Skill Development

The followings are the proposed enhancement measures for local skill development.

(a) Training programs (e.g. maintaining of vehicles, welding, wiring, masonry building etc.) will be implemented prior to and during the construction phase because majority of the local people may not be adequately skilled to qualify for positions requiring skilled labor, if required.

(b) Local construction sub-contractors will be chosen as first priority during tender process.

(c) DDPC will encourage construction contractors and sub-contractors to stimulate local skill development as part of tender requirement.

Impact Significance of Skill Development after Enhancement Measure

Skill development for local people will be great benefit for local engineers at Dawei Township. However, it will be a little hard to ensure local skill development for nearest villages during construction phase because local skill development is not the public needs according to the public consultation and most of the young people are willing to work in boarder city (Thailand). So, the impact significance of local skill development during construction phase can be considered as low to moderate after enhancement measures as follow:

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local skill development	Construction Works	Positive (+)	Local (+3)	Long term (+4)	Low to Moderate (+3)	Intermittent (+2)	Probable (+3)	Low to Moderate (+60)

(b) Potential Negative Socio-economic Impacts during Construction Phase

The potential negative socio-economic impacts during construction phase are as follow:

Impacts Associated with Population Influx

The increase of population during construction phase will increase temporary pressure on existing infrastructure and services including health, food, shelter, water, transport and recreational facilities.

Significant of Impacts Associated with Population Influx without Mitigation Measures

As proposed project is very close to urban area (Maung Ma Kan Village) and little number of workers (about 100 people), there will have little impact on local health care facilities and local food consumption. However, the proposed project is situated in the existing facilities of hotel and the requirements for housing, recreational facilities and water for construction workers will be provided by the existing facilities and no more facilities are required. Impact significances related to population influx during construction period are as follow:

Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, and water	Negative (-)	Site (-1)	Short term (-2)	Very low (-1)	Continuous (-5)	Very seldom (-1)	Very low (-24)
Increase pressure on health care facility	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Regular (-3)	Highly Probable (-4)	Low (-42)
Increase pressure on adequate amount of local food	Negative (-)	Limited (-2)	Short term (-2)	Very Low (-2)	Continuous (-5)	Very seldom (-1)	Very low (-36)

Mitigation Measures for Impacts Associated with Population Influx

No mitigation measures is required for pressure on housing, recreational facilities and water for additional workers because the impact rating is very low. Similarly, impact significant of pressure on local food consumption is very low and no mitigation measure is required. All of the impacts associated with population influx can be minimized by the use of local labor force. Own health care facilities will be supported to additional workers during construction period.

Significant of Impacts Associated with Population Influx after Mitigation Measures

All of the impacts due to increase in population can be mitigated by appointing local construction workers and it will also reduce pressure on health care facilities for construction workers. Own health care facilities should be provided for workers during construction phase. So, impact on health care facility due to population influx will be very low after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on health care facility	Anxiety of existing workers	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Intermittent (-2)	Seldom (-2)	Very Low (-24)

Impacts Associated with Population Influx

Infrastructure and facilities to be impacted due to the increase of population during construction phase will increase temporary pressure on existing infrastructure and services including health, food, shelter, water, transport and recreational facilities.

Significant of Impacts Associated with Population Influx without Mitigation Measures

There will be a little impact existing public health care facility in Dawei Township because there were no public health care facilities in nearest villages and most of the construction workers cannot afford for private health care facilities in nearest villages. As Long Lone Township is very close to Dawei and there will have no impact on local food consumption. Moreover, proposed projects are situated in the existing facility of hotel and the requirements for housing, recreational facilities and water for additional people will be provided by the existing facilities. All of the impact significance related to population influx during construction period are as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, and water	Public anxiety	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Very low (-1)	Continuous (-5)	Very seldom (-1)	Very low (-24)
Increase pressure on health care facility	Anxiety of existing workers	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Regular (-3)	Highly Probable (-4)	Low (-42)
Increase pressure on adequate amount of local food	Public and existing workers' anxiety	Influx of construction workers	Negative (-)	Limited (-2)	Short term (-2)	Very Low (-2)	Continuous (-5)	Very seldom (-1)	Very low (-36)

Mitigation Measures for Impacts Associated with Population Influx

No mitigation measures is required for pressure on housing, recreational facilities and water for additional workers because the impact rating is very low. Similarly, impact significant of pressure on local food consumption is very low and no mitigation measure is required. All of the impacts associated with population influx can be minimized by the use of local labor force. Own health care facilities will be supported to additional workers during construction period.

Significant of Impacts Associated with Population Influx after Mitigation Measures

Impact on health care facility due to population influx will be very low after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on health care facility	Anxiety of existing workers	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Intermittent (-2)	Seldom (-2)	Very Low (-24)

6.3.6. Potential Health Impact and Mitigation Measures for Construction Phase

During construction phase, the anticipated health related impacts are as follow:

(a) Increase Infection of Air-borne Diseases

An influx of construction workers from other places can lead to overcrowded conditions where air-borne diseases such as tuberculosis, influenza and meningitis can spread easily.

Impact Significance for Increase Infection of Air-borne Diseases

According to the secondary data collection, infections of TB is one of the common disease in Dawei Region. So, impact rating for air-borne diseases will be considered as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	-

Mitigation Measures for Infection of Air Borne Diseases

This potential impact will be minimized by providing medical check for workers who are susceptible infection of air-borne diseases.

(b) Fugitive Dust Emissions

During construction phase, the main source of air pollution will be dust generation due to site clearing, ground levelling activities, construction activities and transportation of construction materials. Dust will expose the construction workers and the some local people in nearest villages to bronchial and other respiratory tract diseases.

Impact Significance for Fugitive Dust Emissions

The impact will be mainly on construction workers within the project and little on local people in nearest villages.

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	-

Mitigation Measures for Fugitive Dust Emission

Dust can be controlled by:

(a) Wetting of roads by water spraying;
(b) Seeding storage mound surfaces as soon as is practicable;
(c) Spraying exposed surfaces of mounds regularly;
(d) Restricting vehicle speeds;
(e) Watering roadways; and
(f) Wheel or body washing.

(c) Increase Infection of Water Borne Diseases

The incidence rate of water borne diseases such as cholera and diarrhea will increase if there will be no proper sanitation practices at the construction site. Improper waste disposal of

construction debris will also have potential to increase water borne diseases. Project activities could become sources of pollution, as a result of infiltration into the surface stream. The possible negative impacts considered significant are:

- Loose soil from earthworks may be washed into stream.
- Irresponsible dumping of domestic solid waste can lead to underground water contamination, due to contaminants emanating from various products into the groundwater and filtering through to the aquifers. This will be a particular problem during the rainy season.
- Potential surface water pollution can emanate from waste products generated by construction activities entering the surface drainage.

Impact Significance for Increase Infection of Water Borne Diseases

According to the secondary data collection, infections of water borne diseases such as diarrhea are still the most public healthcare problems in Dawie Region and so the impact will be considered as medium as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	√	-	-	√ (HIR 1)	-	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	

Mitigation Measures for Increase Infection of Water Borne Diseases

According to the rural area, proper sanitation system has to be provided for construction workers during construction period. Construction debris will be disposed at suitable location

that does not impact on local water resources. Construction activities will ensure that no loose soil is permitted into watercourses and stockpiles are located away from surface water (Pan Datt Inn Creek). All mixing of cement will be carried out in a designated area away from surface water and areas of potential runoff. All areas of fuel storage will be banned to prevent hydrocarbon pollution of surface water.

(d) Potential to Increase Infections from Mosquito

The water stagnant pond during construction phase will cause bleeding zone for mosquitoes and can cause potential to cause infections from mosquitoes especially in rainy season.

Impact Significance of Infections from Mosquito

The impact can be rated as medium because malaria is still a health problem in Dawei Region.

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	√	-	-	√ (HIR 1)	-	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	

Mitigation Measures for Infections from Mosquito

Proper temporary or permanent drainage system will be compensated as the blocked of drainage system during construction phase. Ensure that there are no stagnant pools of water during the construction phase. Provide local people with impregnated mosquito nets and/or better access to malaria prophylaxis and treatment as part of compensation program to reduce infections from mosquito.

(e) Increase Risk of Sexually Transmitted Infections

During construction phase, the improved economic status of the area and the influx of new people, living away from their families, can also lead to an increased risk of sexually

transmitted infections such as HIV/AIDS, gonorrhoea and chlamydia. Major outbreaks of infectious diseases can have a devastating effect not only on or near the project site but also on local communities.

Impact Significance of Increase Risk of Sexually Transmitted Infections

According to the nature of beach, there will be a lot of entertainment sectors (KTV and reflexology). So, impact rating for sexually transmitted infection can be considered as moderate in Dawei Region (Boarder City to Thailand).

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people in Dawei Region	-	√	-	-	√	-	-	√ (HIR 2)	-

Mitigation Measures for Increased Risk of Sexually Transmitted Infections

Review sexually transmitted infection clinic access and education to reduce spread of sexually transmitted infections within the community. Provide information and education to workers about safe sex and implement HIV control program for migrant construction workers.

(f) Health Impact Related to Increase in Noise Level

Construction activities normally generate a lot of noise. Noises will also arise from various construction machinery at site. Both acute loud noise and chronic lower level noise have been associated with a variety of negative health effects. Hearing loss and impairment are known to occur as a result of exposure to acute, high decibel noise (greater than 85 dB). Noise annoyance can lead to stress related impacts on health such as feelings of displeasure, interference with thoughts, feelings, and activities and disturbed sleep and can have impacts on mood, performance, fatigue, and cognition.

Impact Significance of Increase in Noise Level

The impact will be considered as low for local people due to the distance of nearest villages and medium to construction workers inside the construction site as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)		-
Workers at site	-	√	-	-	-	√	-	-	√ (HIR 2)

Mitigation Measures Health Impact Related to Increase in Noise Level

1. Reduce speed limits for trucks in the project area to reduce noise level.
2. Alert residents of anticipated noise, including time, duration, decibel levels, and machinery to be used to protect public health.
3. Avoid working at night.

6.4. Anticipated Impacts and Mitigation Measures in Operation Phase

The anticipated environmental impacts during operation phase of the hotel project will be as follows:

6.4.1 Impacts on Air Environment during Operation Phase

The following are the anticipated impacts on air environment during operation phase of the proposed project.

(a) Fugitive Dust Emissions

In the proposed project, dust will be generated mainly from transportation of visitors and delivered supplies to the hotel. The most important residents are local people and residents along the public road (Maung Ma Kan Beach Road).

(b) Gaseous Emissions

CO_2, CO and SO_2 will come out from the operation of diesel engine and vehicular movement. Moreover, CO_2 and volatile organic compound (VOC) will also emit from cooking in restaurant and Green House Gases (CFC) will emit from the using of refrigerators and air conditioning system.

(c) Noise

During the operation phase, noise can only generate from transportation vehicles for supporting required commodities of the hotel. The vehicles used by the guests can also generate some extent of noise. However, these impacts can be negligible. One of the major sources of noise will be operation of generator as there is no electrical power from Government. Another source of noise generation during the operation of the hotel will be holding of night parties by guests. As most of the parties are held at night time and this noise level will be impact on nearest villages (Kave Nalbin and Beach Shops).

Impact Significance on Air Environment during Operation Phase

Significant of impact on air environment will be considered as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Air pollution	Fugitive dust emissions	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Continuous (-5)	Highly Probable (-4)	Low to Moderate (-72)
	Gaseous emissions	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Continuous (-5)	Certain (-5)	Moderate to High (-120)
	Noise from Vehicle Movements	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Continuous (-5)	Highly Probable (-4)	Low to Moderate (-72)
	Noise from Generator	Negative (-)	Limited (-2)	Long term (-4)	Moderate (-4)	Continuous (-5)	Certain (-5)	Moderate (-90)
	Noise from Night Parties	Negative (-)	Limited (-2)	Very Short term (-1)	High (-5)	Frequently (-5)	Certain (-5)	Moderate (-90)

Considering of Mitigation Requirement for Air Environment during Operation Phase

The requirement of mitigation measures for air environment according to the consideration of impact evaluation and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public consultation Processes	Mitigation requirement by impact evaluation	Required Mitigation Scale	Responsibility
1.	Fugitive dust emissions	Low to Moderate (-72)	No	Yes	Minor	DDPC
2.	Gaseous emissions	Moderate to High (-120)	No	Yes	Major	DDPC
3.	Noise from Vehicular Movement	Moderate (-72)	No	Yes	Low to Moderate	DDPC
	Noise from Generator	Moderate (-90)	No	Yes	Moderate	DDPC
	Noise from Night Parties	Moderate (-90)	No	Yes	Moderate	DDPC

Mitigation Measures for Impacts on Air Environment

DDPC will do the following mitigation measures to reduce impacts on air quality during operation phase.

(a) Mitigation Measures for Fugitive Dust Generation

Dust from vehicular movement will be controlled by upgrading of internal roads inside the site to asphalt road or concrete road and watering spraying along the public road at least twice a day.

(b)Mitigation Measures for Gaseous Emissions

To reduce gaseous emissions from vehicles and generator, DDPC will do as follow:

(i) Use good engine condition;
(ii) Use battery car inside the hotel;
(iii) Conduct regular engine check and maintenance;
(iv) Use low sulphur content diesel and petroleum.

(v) Use gas collection with sufficient stake height for restaurant.

(c) Mitigation Measures for Noise

DDPC will do mitigation measures for noise during operation phase as follow:

(a) Will use sound proof generator and will place inside the concrete building;

(b) Will limit night party time to 11:00 pm and most of the sound box (large speakers) will be faced to the sea.

6.4.2. Impacts on Surface Water Environment during Operation Phase

Two different types of liquid wastes are expected, used water (grey water) and sewer (black water) form toilets. The used water may include wastewater from laundry with detergents and wastewater from the kitchen with oil and grease.

Impact Significant of Surface Water Quality

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Surface water pollution	wastewater from hotel services	Negative (-)	Limited (-2)	Long term (-4)	Moderate (-4)	Continuous (-5)	Certain (-5)	Moderate (-90)

Consideration of Mitigation Measures for Surface Water Environment during Operation Phase

The requirement of mitigation measures for surface water environment according to the consideration of impact evaluation and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern through Public Consultation Processes	Mitigation Requirement	Required Mitigation Scale	Responsibility
1.	Surface water pollution	Moderate (-90)	Yes	Yes	Moderate	DDPC

Mitigation Measures for Impact on Surface Water Quality

Reduced the Use of Water

Water-saving equipment such as ultra-low flush toilets, spray nozzles, urinals, faucet aerators and low-flow shower head, infrared and ultrasonic sensor, water spigot sand pressure-control valves will be installed to reduce grey water generation. The hotel will be planned to use proper wastewater drainage systems and water efficient equipment will be used in the laundry department and kitchen.

Water Treatment

The wastewater treatment systems are planned to install for treating grey water from kitchen and black water from the toilet. After the wastewater is treated, the water released from the treated system will be reused in toilets, gardening, spraying ground. This will prevent high consumption of water. In addition, water pollution may occur, if discharge of liquid waste and storage of fuel are not properly handled. These liquid waste and spilled fuel can percolate through the soil and contamination of ground water may occur. Contaminated water will be reduced by using leak proof container for storage and transportation of fuels, and keeping the impervious floors of fuel handling areas.

Control Effluent Water

Although, there have very high permeability soli type for water absorption and very little chance to enter nearest surface water source (Pan Datt Inn Creek), special care will be done during rainy season.

Monitoring

Monitoring will be twice a year during operation phase and the check points will be sources of water, wastewater generated areas, wastewater treatment plants and also water outlets from the treatment plant.

6.4.3. Impacts on Soil and Groundwater Environment

The following solid and liquid wastes will have potential to soil and groundwater pollutions if they are not properly managed. Major solid wastes will be generated from daily room cleaning, kitchen, bar, restaurant, cafeteria, souvenir desk, reception/office and staff quarters.

Different kinds of solid wastes, such as tissue paper, food residues (organic wastes), glasses, tins, bottles, packing materials, stationeries, damaged/expired devices or appliances and other miscellaneous will be generated every day. Food wastes can generate offensive odor and make the people unpleasant and finally can affect to the health of employees and guests. It can also affect the nearest local residents if the solid waste disposal site is close enough to the villages. Ground water will also impact for long term solid waste disposal site.

Consideration of Mitigation Requirements for Soil and Ground Water Quality

Public concerns for soil and ground water environment during operation phase according to the public consultation and public meetings are as follow:

Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
Soil contamination	Moderate	Yes	Yes	Sensible	DDPC
Ground water pollution	Low to Moderate	No	Yes	Minor	DDPC

Mitigation Measures for Impacts on Soil and Groundwater Environment

Impact of process solid wastes on soil contamination and ground water pollution will be mitigated by the following procedures:

(a) Reduce the generation of waste at the source:
(b) Reuse all possible items
(c) Recycle all possible items

(a) Reduce the generation of waste at the source

Reducing the generation of wastes such as tissues boxes, drinking water bottle, plastic bags, soft drink bottle etc. are the first option that will be considered. DDPC will reduce on-site wastes by using reusable and recyclable kitchen sets rather than single-use products. Reducing the generation of wastes will also reduce transportation costs and wastes disposal cost.

(b) Reuse all possible items

DDPC will plan to reuse items in their original form for the same or a different purpose rather than discarding them. If an item cannot be reused on site, the property will investigate the possibility of selling it or donating it to employees, charitable organizations, schools, businesses or other interested parties.

(c) Recycle

DDPC will plan to recycle of solid wastes to recyclable and non-recyclable by separation the solid wastes with the use of garbage bins with different colour and will dispose according to the CDC Rule and Regulations. If there have enough capacity for municipal solid waste disposal system for local people, DDPC will make by another third party waste collecting agency.

6.4.4. Impacts on Biodiversity Environment during Operation Phase

The following will be the impacts on biodiversity environment during operation phase of the proposed project.

Impacts on Flora Diversity

Impacts on flora diversity will be gaseous emissions and improper disposal of solid waste during operation phase. At present condition, there are tall trees in it for the roosting for nesting for the birds. However in the indirect zone, there is an area of ecologically sensitive mangrove and its associates. Mangrove habitat is a key to the aquatic animals. Although the impacts from proposed project is not directly affected to mangrove area, the prevention firewood collection in this area is especially important issue in conservation point of view.

Impacts on Fauna Diversity

There are several causes for the impacts for fauna diversity, noise pollution and gaseous emissions produced from the backup power generator and vehicular movement activities. Noise pollution is one of the factors that effect on the breeding performance. Some animals are not breed properly in the natural habitats if the noise is made. There is relatively effect on the bird species due to their mobility behaviour. They have to change a small part of their foraging ground.

Impacts on Aquatic Lives

There will have impacts on aquatic lives in Pan Dat Inn Creek if waste water will dispose to that creek directly. It will also impact on Zooplaton in Andaman Sea if waste from visitors are not controlled.

Impact Significance on Biodiversity Environment

(a) Impact Significance for Flora Diversity

A total of 204 plant species representing 180 genera and 62 families were analyzed in the buffer area. Among them Delonix regia (Bojer ex Hook.) Raf. is assessing in IUCN Red list as vulnerable. In Myanmar it is grown in road side as an ornamental or shade tree and its name is Seinban. Although the species is endanger in the wild, it is widely cultivated elsewhere in Myanmar. So, the impact will be considered as very low.

(b) Impact Significance for Fauna Diversity

There are many bushes of insect habitats at the present (raining season). Insect fauna co-existing with bushes in the direct zone will be locally cleaned up while those in the indirect zone will be affected by the changing of ecosystem. There is no large mammal in the small area, but for the small mammals such as house rats and mice recorded in the zone are pests and better for the human kinds. There is no IUCN Red List fauna in the project area. So, the impact on fauna diversity will also be low.

(c) impact Significant to Aquatic Lives

Impact significant to aquatic lives will be moderate due to the sensitive nature of ocean aquatic lives. The direct solid waste disposal to the Andaman Sea in the west part of the project site and Pan Datt Inn Creek in front of the project site will be significant impact to aquatic lives in these water resources.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Impacts on fauna diversity	Gaseous emissions and improper disposal of solid waste	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Continuous (-5)	Seldom (-2)	Low to Moderate (-56)

Impacts on flora diversity	Gaseous emissions and noise	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Continuous (-5)	Seldom (-2)	Low to Moderate (-56)
Impacts on aquatic lives	Direct waste disposed to nearest water sources	Negative (-)	Local (-3)	Long term (-4)	Moderate (-2)	Continuous (-5)	Probable (-3)	Low to Moderate (-72)

Mitigation Measures for Impacts on Biodiversity Environment

According to the impact rating and public concern, required mitigation measures for impacts on biodiversity environment will be as follow:

Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
Impacts on fauna diversity	Low to Moderate (-64)	No	Yes	Minor	DDPC
Impacts on flora diversity	Low to Moderate (-64)	No	Yes	Minor	DDPC
Impacts on aquatic lives	Low to Moderate (-72)	Yes	Yes	Moderate	DDPC

The following mitigation measures are proposed for minor mitigation scales.

(a) Waste materials produced from the hotel will be kept inside the hotel and disposed systematically.

(b) Will not dispose solid waste directly to the stream and the sea.

(c) Will collect solid waste from visitors on the seashore.

(b) Greenbelt development have to develop around the project corrider and will be plant quick growing tree species as a wind-break behind the wall of the compound to reduce gaseous emissions and noise. Suggested wind-break tree species are listed in the following table.

Table - Wind-break Species

No.	Vernacular Name	Scientific Name	Family Name
1.	Ban-da	*Terminalia catappa* L.	Combretaceae
2.	Palm	*Mimusops elengi* L.	Sapotaceae
3.	Pinle-kabwe	*Casuarina equisetifolia* Forst.	Casuarinaceae

Remark: All of the wind-break tree speices are available in local market.

6.4.5. Utilities Used

The following resources will be consumed during the operation of the proposed project.

(a) Electricity Consumption

Normally, hotel process will consume electrical power especially for air conditioner, hot water system, and lighting decoration. Although the proposed hotel will not use electricity from Government and will run by its own generator, there will still impact because electrical consumption is not directly concerned with impact on nature environmental, the resource utilization is an issue which should be seen from a sustainable development perspective, scarcity of water resources, combustion of fossil fuels, utilization of raw materials, emission of ozone depletion gases, CO_2, etc.

(b) Use of Water as Domestic Purposes

Although DDPC intends to buy drinking water from local market., it is necessary to use surface or underground water for domestic purposes (batching, watering, laundry services, etc.).When the hotel runs its full strength, especially during the peak season (Thingyan Festival and Thadinkyut Holidays), water consumption will be increased which is related to personal use by guests and facility requirements for housekeeping, laundry, cooking and grounds maintenance.

Impact Significance of Utilities Used during Operation Phase

(a) Electricity Consumption

Impact significance for electricity can be rated as moderate to high because electricity consumption and distribution in Dawei Region is still a problem according to the secondary data collection.

(b) Use of Water as Domestic Purposes

Being a coastal region, availability of safe drinking water is still a problem according to the primary socio-economic data collection. So, impact rating for the used of water will be moderate to high.

Mitigation Measures for Utilities Consumption

According to the impact rating table, there will need mitigation measures for the used of electricity and water. So, DDPC will do mitigation measures for the used of electrical power and water as follow:

(a) Mitigation Measures for Electricity Consumption

A reduction in energy consumption is also an important consideration in a pollution prevention program and in lowering the operational cost. There are several methods that can be employed to help conserve electricity, which include:

(a) Install energy and water meters to measure and control consumption throughout the facility;
(b) Implementing good housekeeping measures such as turning off equipment and lights when not in use;
(b) Use LED lights and/or lower wattage lamps;
(c) Using more efficient equipment when replacing old equipment (such as motors and transformer units);
(e) Installation of timers and thermostats to control heating and cooling; and
(f) Preventative maintenance of operational processes and pipes so as to improve efficiency and minimize losses.

(b) Minimizing Water Consumption

As the proposed project uses ground water for domestic uses, water conservation measures are needed to be taken. The reduction in the amount of water consumed in the hotel zone will have several environmental and economic benefits, including conservation of water resources, and consequently, lower wastewater discharge volumes. Domestic water consumption will be minimized by implementing water efficient fixtures such as 3 liters WC flushing cistern, sensor operated urinals and taps to minimize the wastage of water together with other water conservation measures if feasible. Furthermore, to ensure ongoing water conservation, an employee education and awareness programmed will be introduced for the employee of the hotel. Dry type urinals will also be used selectively. The following are specific measures:

(a) Reuse gray water from batching after proper treatment in laundry services.
(b) Reuse black water from latrine in watering of trees after proper treatment.
(c) Awareness campaign to disseminate knowledge on strategies and technologies that can be used for water conservation;
(d) New employees will be issued standard water information packed. The information should include water conservation plans, water conservation methods being adopted in the complex and a list of essential and nonessential water uses;
(e) Manager of proposed hotel zone shall periodically remind the staff for water conservation efforts.
(f) Proper methods of water use will be placed in the toilets and other areas of water consumption.

6.4.6. Impacts on Human Environment during Operation Phase

Human environment during operation phase will include impacts on socio-economic and impact on health situations.

6.4.6.1. Impacts on Socio-economic during Operation Phase

The anticipated socio-economic impacts during operation phase will be both positive and negative impacts as follow:

Positive Socio-economic Impacts during Operation Phase

The anticipated positive socio-economic impacts during operation phase are as follow:

(a) Employment Opportunities

The proposed hotel zone will create about 200 permanent jobs including managers, supervisors, housekeeping, technicians, general workers and security during operation phase

Impact Significance of Employment Opportunities before Enhancement Measures

Increased employment will improve household income levels and livelihood of local people. According to the secondary data collections, there is significant number of unemployment in Longlone Region as follow:

Workable People	Working People	Jobless People	Jobless Percentage
78053	69853	8200	10.51%

Moreover, according to the primary data collection, most of the workable aged people are relied on fishing and young people are going to Boarder City (Thialand) for jobs. So, long-term job opportunities in native town will be great benefit to local people, especially for women, who lived not only in nearest villages (Ka Vee Nal Bin and Maung Ma Kan Villages) but also for the whole Lounglon region. Job opportunities will provide an alternative livelihood to people in the project area other than going to Thailand (Boarder City) for jobs. After consideration of all factors, the impact rating can be considered as moderate without enhancement measures as follow:

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Employment opportunities	Operation of Hotel	Positive (+)	Local (+3)	Long term (+4)	High (+4)	Continuous (+5)	Probable (+3)	Moderate (+88)

Enhancement Measures for Employment Opportunities

The study area features strong stereotypical gender roles, with the male partner the most likely to be receiving the primary income and the female partner either working part time or not at all. Most of the elder people in the project area rely on fishing. Elder household members fishing together and most households have no members who contribute to household income by other jobs. So, secured long term job opportunities for nearest villages are very important not only for elder household (male partner) but also for female partner.

Local people who have potential for office works will be afforded training opportunities and apprenticeship in project operational activities to ensure to support local community in obtaining employment opportunities. DDPC will carry out advertising and disseminating information about employment opportunities that will be offered for local community in project operation in advance since the time of project construction period. Other related job opportunities such as investment and preparation of shop houses for local jobless female in or near the project site and create openings to upgrading of local products (fancy products mollusks and crustaceans to decoration products). By doing so, local people will acquire necessary skills and make preparation for the alternative livelihood that will contribute their substantial household income.

Figure - Beautification with Mollusks and Crustaceans

Impact Significance of Employment Opportunities after Enhancement Measures

As long-term job opportunities are important to sustain local economic development for nearest villages and the impact will be moderate to high after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Employment opportunities	Potential to increase in household income	Jobs in sugar mill	Positive (+)	Local (+3)	Long term (+4)	Moderate (+4)	Continuous (+5)	Certain (+5)	Moderate to High (+110)

According to the data collection, the literate rate of Loung Lone Township is as follow:

Township Population	Population 15 Years and Older	Literate Population	Literacy Rate
105987	90405	90405	100%

The above table means that there will have enough graduates for required jobs for proposed project. So, a large portion of these personnel can be sourced from local communities with sufficient training.

(b) Local Community Development Potential and Increased Living Standard

The project may provide opportunities for continued improvements in basic infrastructure, roads, water supply, supply of electrical power, provision of health care services and education and local skill development as part of CSR program. All of these can also potential for local community development and increased living standard for local people for long run.

Impact Significance of Local Community Development Potential and Increased Living Standard without Enhancement Measures

According to the primary data collection by household survey improvement in roads, health care services, education and skill development will be the essential things and basic needs for local community development as follow:

Village Name	Most Public Needs
Ka Vee Na Pin	• Expanding and Upgrading of village road • Want to create job opportunity
Maung Ma Kan	• Upgrading of Educational facilities • Supporting for health care facilities • Electricity • Maintenance to the seashore roads • CSR program for village development

So, the impact will be rated as medium to high as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local community development potential	Development of nearest villages	CSR program	Positive (+)	Local (+3)	Long term (+4)	Medium (+4)	Intermittent (+2)	Probable (+3)	Low to Moderate (+55)

Enhancement Measures for Local Community Development Potential and Increased Living Standard

This positive impact of the project can be enhanced by adjusting allocation of CSR budget and giving priority for CSR activities relevant to community immediate needs each year after discussion with representatives from local authorities and CBOs.. According to the social survey, it would be better to support the water supply, internal road within the villages, health care facilities and educational supports for local people are the most of the public needs and it will also support community development.

Impact Significance of Local Community Development Potential and Increased Living Standard after Enhancement Measures

The significant of impact will be considered as high after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local community development potential	Development of nearest villages	CSR program	Positive (+)	Local (+3)	Long term (+4)	Medium (+4)	Regular (+3)	Highly Probable (+4)	Moderate (+77)

Comments for Community Development Potential and Increased Living Standard

The developer is intending to use at least 2% of annual net benefit after tax for every year in CSR activities. The developer also has well-established policies and plans for skill-building, providing healthcare services, assisting education, and social-welfare activities. So, with enhancement measures, CSR program will be the basic and essential needs for local community development.

(c) Benefits to National Economy

The project operation will pay revenues in terms of taxes paid to the government and multiplier effect arising from its linkages to other sectors.

Impact Significance of Benefits to National Economy before Enhancement Measures

Taxes from hotel and tourism are important for national economy, and this positive impact will be considered as moderate before enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in government revenue	Benefit to national economy	Taxes	Positive (+)	Regional (+5)	Long term (+4)	Moderate (+4)	Rare (+1)	Highly Probable (+4)	Low to Moderate (+65)

Enhancement Measures for Benefits to National Economy

By creating responsible taxes paying system to local or national government will be great benefit to national economy. Efficient and transparent tax collection mechanisms should be introduced and strengthened. Internal and external audits system should be carried out regularly.

Impact Significance of Benefits to National Economy after Enhancement Measures

After enhancing efficient and responsible tax paying system, this positive impact will be moderate to high after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in government revenue	Benefit to national economy	Taxes	Positive (+)	Regional (+5)	Long term (+4)	Moderate (+4)	Rare (+1)	Certain (+5)	Moderate (+78)

Comments for Benefits to National Economy

Like other coastal regions (Chaung Thar, Ngapali, Ngwe Saung Beach), hotel and tourism sector is very important to local GDP. So, being a developing country, taxes and revenues are very important and DDPC will work in hand in hand with local taxes office and external audits regularly.

(d) Benefits to Local Economy

The project will help to improve local economy by creating related jobs for hotel services (scattered sellers for sea food, transportation services by motorcycle, rental services for bike and swimming kits etc.). Moreover, health care services for visitors will also improve. These will help to improve local economy in short term.

Impact Significance of Benefits to Local Economy before Enhancement Measures

The impact rating for benefit to local economy will be considered as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in local revenue	Benefit to local economy	Operation of project	Positive (+)	Local (+4)	Long term (+4)	Moderate (+4)	Regular (+3)	Probable (+3)	Low to Moderate (+72)

Enhancement Measures for Benefits to Local Economy

DDPC will buy consumable goods and foods for visitors and workers from local market as first priority if feasible. Moreover, DDPC will create job opportunities for local people in required rental services for bike and swimming accessories (motor car tube for swimming and boat).

Impact Significance of Benefit to Local Economy after Enhancement Measures

After enhancement measures, impact can be rated as moderate as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in local revenue	Benefit to local economy	Operation of project	Positive (+)	Local (+4)	Long term (+4)	Moderate (+4)	Regular (+3)	Highly Probable (+4)	Moderate (+84)

Comments for Benefit to Local Economy

DDPC have to pay attention to support local economy by buying required materials in nearest villages as first priority if feasible and providing services for visitors during operation phase.

Negative Socio-Economic Impacts during Operation Phase

The anticipated negative socio-economic impacts during operation phase are as follow:

(a) Loss of Income from Cashew Plantation

The proposed hotel zone will have to fencing existing cashew plantation. Some villagers (women and children) from Kave Nalbin Village were rely on such plantation for their daily income. So, there will loss of income from cashew plantation.

Impact Significance of Loss of Income from Cashew Plantation without Mitigation Measures

According to the household survey, almost all of the male partner in local household are going to the sea for fishing (Offshore fishing) and female partners and children in household number from Kavee Nalbin Village rely on income from Cashew plantation. So, impact significant will be moderate to high.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income from Cashew plantation	Loss of household income	Operation of project	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Continuous (-5)	Highly Probable (-4)	High (-108)

Mitigation Measures for Cashew Plantation

DDPC will create job opportunities for local residents in nearest villages with relevant skills. DDPC will make at least 100 jobs to the offer jobs to local communities will be office staffs, security guards and general workers for restaurant and other places. For local female, DDPC will encourage to become shop houses near the hotel zone.

Impact Significance of Loss of Income from Cashew Plantation after Mitigation Measures

After mitigation measures the impact can be rated as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income from Cashew plantation	Loss of household income	Operation of project	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Regular (-3)	Probable (-3)	High (-72)

(b) Blockage of Access Road to the Beach

Before the project, there will have pass way (small village road) to go to the beach from Kavee Nalbin Village. If the hotel project start, there will have potential to blockage of this road and the villagers will go to the beach by another way which is longer than the original way.

Impact Significance of Blockage of Access Road to the Beach

Most of the villagers are worried about the blockage of this road and they want to go to the beach for fishing purposes without any delay. So, impact significant will be moderate without mitigation measures.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Blockage Internal Road to the Beach	Loss of household income	Operation of project	Negative (-)	Limited (-2)	Long term (-4)	High (-5)	Continuous (-5)	Highly Probable (-4)	Moderate (-99)

Mitigation Measures for Blockage of Access Road to the Beach

DDPC will prepare alternative road way to go to the beach in or near the project site. DDPC will also sure that the alternative road will not take too much delay time according to the distance (the most possible way with the shortest distance).

Impact Significance of Blockage of Access Road to the Beach

After mitigation measures, the impact rating will be as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Blockage Internal Road to the Beach	Loss of household income	Operation of project	Negative (-)	Limited (-2)	Long term (-4)	High (-5)	Intermittent (-2)	Very seldom (-1)	Low (-33)

(c) Water Use

Although DDPC have a plan to buy drinking water from local market, hotel project will use a lot of water as domestic purposes. If required water will use with the same water resources as local communities, there will have significant impact on local water use because there will have limited water resources in Maung Ma Gan Beach. So, there will have significant impact on water availability especially in dry seasons. So, this kind of impact can be rated as high without mitigation measures as follow:

Impact Significance of the Used of Water Resources without Mitigation Measures

The impact can be rated as medium to high without mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Use of surface water	Water use of local people	Operation of project	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Continuous (-5)	Highly Probable (-4)	High (-108)

Mitigation Measures for the Used of Water Resources

DDPC will prepare the use of surface water that do not pressure on local water use. DDPC will have a plan not to use surface water during dry seasons by using recycle water or the used of water from water storage ponds which are intended to store rain water during rainy seasons and use during dry seasons inside the project.

Impact Significance of the Used of Surface Water after Mitigation Measures

Water shortage is still a problem in Maung Ma Gan Region and so the impact can be rated as moderate after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Use of surface water	Water use of local people	Operation of project	Negative (-)	Limited (-2)	Long term (-4)	High (-5)	Continuous (-5)	Highly Probable (-4)	Moderate (-99)

(d) Social Tension on Land Use

There will have social tension on land use of the proposed hotel project (rent permit for land use to the proposed project) because all of the local people in nearest villages does not have land permit.

Significance of Impact on Social Tension on Land Use without Mitigation Measures

This type of social impact can be considered as high because most of the local people in nearest villages would like to get land permit like hotel project.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Social tension on land use	Operation of project	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Continuous (-5)	Highly Probable (-4)	High (-108)

Mitigation Measures for Social Tension on Land Use

DDPC will try their best by cooperation with local authorities and local people to get land permit to local households.

Significance of Impact on Social Tension on Land Use after Mitigation Measures

If DDPC try their best and local people appreciate their effort, the impact will be minimized as moderate as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Social tension on land use	Operation of project	Negative (-)	Local (-3)	Long term (-4)	Moderate (-4)	Continuous (-5)	Probable (-3)	Moderate (-88)

Comments for Social Tension on Land Use

Social tension on land use will be the most public concern during public meeting and so DDPC should pay special attention for this impact.

(e) Diminish Recreation Area for Young People

Most of the young people (groups of friends and couple) usually come to the project site especially in public holiday. So, there will pressure on availability of recreation area for local young people if there will limit the visit of outsiders who are not the guests of the proposed project.

Significance of Impact on Diminish Recreation Area for Local Young People

This kind of impact can be considered as moderate due to the number young people visiting to the proposed hotel zone area is large (at least 50 people during working days and at least 150 people during weekends).

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Limit recreation place to local young people	Prevent entering of ousiders	Negative (-)	Local (-3)	Long term (-4)	Moderate (-4)	Regular (-3)	Highly Probable (-4)	Moderate (-77)

Mitigation Measures for Diminish Recreation Area for Local Young People

DDPC will ensure the following mitigation measures to minimize limitation of recreation place for local young people.

- Construct public garden or recreation place for every visitor with or without staying at the proposed hotel; and
- Construct restaurant for all people inside the hotel zone.

Significance of Impact on Diminish Recreation Area for Local Young People

After proper mitigation measures for creating public places inside the project campus, the impact significant will be low to moderate as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Limit recreation place to local young people	Prevent entering of outsiders	Negative (-)	Local (-3)	Long term (-4)	Moderate (-4)	Seldom (-2)	Rare (-2)	Low (-44)

(f) Increase in Crime and Conflict with Local People

An inflow of migrant workers for seeking jobs to the hotel project during operation phase will increase in social pathologies and crime including drug and alcohol abuse, assault, theft and violence. There will also have potential to conflict with workers and local people during the operation phase especially people from Upper Myanmar (Local Dawei people called Gyan). This will intend to increase demand on emergency and police services due to population influx.

Impact Significance of Increased in Crime and Conflict with Local People before Mitigation Measures

The impact will be considered as medium without mitigation measures because there is limited capacity for public security (the ratio of police to population is 1:956 and 134 preventative crimes in Lounglon region) and there also have high potential to conflict with local people during operation phase.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase crime and security	Increased in population due to migrant workers	Negative (-)	Local (-3)	Long term (-4)	Medium (-4)	Intermittent (-2)	Probable (-3)	Low to Moderate (-55)

Mitigation Measures for Increased in Crime and Conflict with Local People

The use of local people (people from Dawei and Longlone Region) will greatly reduce the probability of increased in crime and conflict with local people. Training program for tourism and hotels will be provided before operation of the hotel project. DDPC will encourage the workers to know about the custom and behaviors of local people (Dawei Tradition). DDPC will continue to work with the local and regional police personnel and local administrative members in the resolution of potential increase in crime and violence. Accommodation for migrant workers will be provided. Limit the nigh out of migrant workers. Project area will be fenced and access road will be controlled to avoid the conflict on resources use with local people.

Impact Significance of Crime and Security after Mitigation Measures

After systematically control of migrant workers and continuous cooperation with local administrative office and police force, the impact will be low as follow.

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase crime and security Public security	Increased in population	Negative (-)	Limited (-2)	Long term (-4)	Medium (-4)	Rare (-1)	Seldom (-2)	Low (-30)

Comments for Increase in Crime and Conflict with Local People

Conflict with local people can also be mitigated through the use of local labor force. Unskilled job opportunities like security and housekeeping will be offered to the local communities as much as possible.

(g) Impacts Associated with Population Influx

A possible population influx due to the migrant workers during operation phase will increase temporary pressure on existing infrastructure and social services including health care, food, water, and recreational facilities.

Significant of Impacts Associated with Population Influx without Mitigation Measures

According to the secondary data collection from local administrative office, the ratio of teacher to pupil is between 1:20 to 1:30 and this factor is this is fair condition for educational services. But there is not enough service for health care (1:17664). Moreover, there is not enough sanitation services (only one truck and 2 workers for sanitation purposes). So, there will impact on local people in Kavee Napin Village. Fortunately, there will have very little impact on Maung Ma Kan Village because Maung Ma Kan Village is ready for visitors and not too far from Dawei Township. So, impact related with pressure on social service due to population influx will be low to moderate as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, health care, water and food	Public anxiety	Migrant workers	Negative (-)	Limited (-2)	Long term (-4)	Low to Medium (-3)	Very often (-4)	Probable (-3)	Low to Moderate (-63)

Mitigation Measures for Impacts Associated with Population Influx

All of the impacts associated with population influx can be minimized by the use of local labor force. Own health care facilities and dormitory for workers will be supported to additional workers during operation period.

Significant of Impacts Associated with Population Influx after Mitigation Measures

Impacts due to population influx will be very low after mitigation measures as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, health care, water and food	Migrant workers	Negative (-)	Limited (-2)	Long term (-4)	Medium (-4)	Intermittent (-2)	Seldom (-2)	Low (-40)

Comments for Impacts Associated with Population Influx

According to social survey, people in nearest villages are not ready for extra food and facilities for additional people. So, the developer should have to ensure the use of local people as much as possible. Moreover, it is also necessary set up policy to encourage local businesses for food and consumer goods during operation phase.

(h) Fire Outbreak Risk

Although fire outbreak risk in Longlone Region is Category C (ARI 100) according to the disaster risk assessment based on secondary data collection, there will have potential to fire outbreak risk due to the increased number in population and buildings in that region.

Type of Disaster	Frequency	Building Losses	Value
Fire	7	37	193.2 Million Kyats

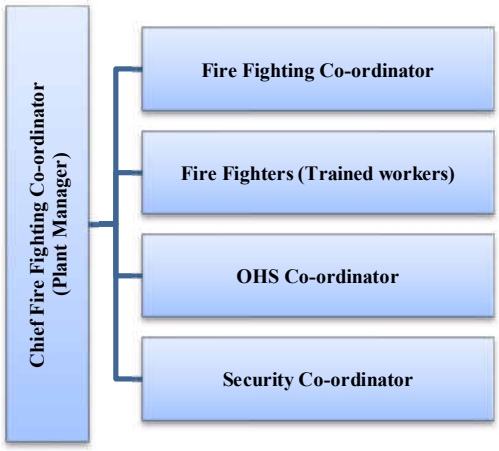
Impact Significance of Fire Outbreak Risk without Mitigation Measures

According to the survey, the project site is a little far from local fire fighting force and Longlon Township had limited fire-fighting capacity. Although it is limited capacity for fire-fighting, the impact cannot be rated as medium or high due to the possibility of fire outbreak risk (Category C).

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fire outbreak risk	Increase in population	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Rare (-1)	Probable (-3)	Low (-44)

Mitigation Measures for Fire Outbreak Risk

So, DDPC will install with their own fire fighting force and fire fighting system. Fire service personnel should be assigned and well trained on how to prevent fire, how to use fire-fighting equipment, and emergency response actions. DDPC will adhere to the fire-fighting regulations of the Ministry of Home Affairs and should collaborate with regional fire brigade in the prevention of fire outbreak and training local fire fighting force. Fire fighting force for the proposed project should be composed as shown in the following figure.



Proposed Fire Fighting Team

The following are the role and responsibilities of each members of fire fighting team.

Team Members	Role	Responsibilities
Plant Manager	Chief co-ordinator	• Make Emergency shut-down of activities. Put everything in Safe condition. • Commence initial emergency case, till fire fighting department (Mandalay) comes to take up.
Fire fighting leader	Fire fighting co-ordinator	• Be Overall in-charge for Fire and Safety. • Coordinate with Local fire fighting station.
Trained workers	Fire	• Put off fire by using available equipment.

and securities	fighters	
Safety officer	OHS co-ordinator	• Establish Emergency Center, Treat affected persons, Transfer/Remove Patients. • Workers Tally • Map showing hazardous storages, Fire horns, Safety equipment, Gates and side gates, Assembly points, List of persons.
Security leader	Security co-ordinator	• Remove Crowd • Arrange Gate security • Contact Police if necessary • Handle news media • Mobilise vehicles

Impact Significance of Fire Outbreak Risk after Mitigation Measures

After consideration of all of the mitigation measures for fire outbreak risk and systematically composed of fire fighting team, impact rating can be reduced as low as follow:

Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fire outbreak risk	Increase in population and buildings	Negative (-)	Local (-3)	Long term (-4)	High (-5)	Rare (-1)	Very Seldom (-1)	Very Low (-24)

6.4.6.2. Anticipated Health Impact and Mitigation Measures during Operation Phase

Beach pollution is wastes combined overtime to create/form a type of bacteria in which spreads illnesses, usually caused by tainted waters from industrial factories. Beach pollution affects wildlife drastically from killing marine life also abusing the coral reef with pollution. Human waste pipelines that are not properly taken care of and leak through to the waters contribute as well. Due to non-properly maintained pipelines, human feces and other wastes are overflowing within the lines and forcing it to squeeze into the water streams. Beach pollution does not necessarily mean direct dumping of wastes into the sea itself. Twenty miles off shores and coastlines are industrial factories that are too far to discharge wastes.

These long traveled distances of wastes from factories and humans are combined together through the same sewage pies and travel towards the sea. Although there are many factories and humans living off shore, this can result in major malfunction of pipe thus causing water to pollute and contaminate living organisms within the miles of its radius.

Polluted beach water makes swimmers sick and hurts coastal economies. Illnesses associated with polluted beach water include stomach flu, skin rashes, pinkeye, respiratory infections, meningitis, and hepatitis. In addition to the health effects of polluted beach water, there may be deep financial impacts as well. The health impacts include;

- Diseases Caused by Pathogens in Bathing Waters
- Contaminated Runoff and Incidence of Disease
- Climate Change and Incidence of Disease
- Threats to Swimmers from Harmful Algal Blooms

The following will be the anticipated positive and negative health impacts of the operation of proposed project.

(a) Increase Risk of Sexually Transmitted Infections

Increased risk of sexually transmitted infections such as HIV/AIDS, gonorrhoea and chlamydia will be continued during operation phase because there will be a lot of KTV and massage related to the nature of hotel project. Major outbreaks of infectious diseases can have a devastating effect not only on or near the proposed plant site but also on local communities. Moreover, the influx of large groups of, generally, male workers can sometimes lead to social unrest which may include violence and sexual assault in Dawei region. Similarly, an increase in commercial sex workers (CSW) can have significant, long term, negative individual and community health and wellbeing impacts. It will also impact on custom of local people.

Impact Significance of Risk of Sexually Transmitted Infections

Increased transmission of sexually transmitted infections and other social harms can cause serious health problem for local people. Impact rating for sexually transmitted infection can be considered as high close to Thailand (World Record AIDS City).

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people in nearest residents	-	-	√	-	√	-	-	-	√ (HIR 3)

Mitigation Measures for Risk of Sexually Transmitted Infections

Review sexually transmitted infection clinic access and education to reduce spread of sexually transmitted infections within the community. Provide information and education to workers about safe sex and implement HIV control program for migrant workers.

(b) Impact on Community Wellness

The commencement of proposed resort project may stimulate some forms of social pathologies and crime including increased substance abuse, crime, human trafficking and decreased social cohesion. It will impact on mental health of people in nearest villages.

Impact Significance of Impact on Community Wellness

Impact significance of impact on community wellness will be as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-

Mitigation Measures for Impact on Community Wellness

The following are some of the suggested ways to reduce the potential impact to community wellness.

1. Establish a mechanism to facilitate on-going community engagement between the developer and local residents for early identification of impacts on community wellness.
2. Implement drug free programs.
3. To protect local communities in case of disease outbreaks among the workforce, a premedical examination for workers should be conducted, followed by routine medical examination during the works and a final post medical examination.

6.5. Anticipated Impacts and Mitigation measures for Decommissioning Phase

Although the proposed project is long-term project, decommissioning of the project would occur at the end of its lifespan. The goal of project decommissioning will be to remove the concrete and wood structures as a whole and return the site to a condition as close to a pre-construction state as feasible. The physical removal of the structures and equipment will be the reversal of the construction process. All areas disturbed by the proposed project would be restored to pre-project conditions and/or to conditions acceptable to the CDC (Dawei). During decommissioning phase, all concrete and wood structures and other facilities will be dismantled and removed. The major activities that will be required for the decommissioning of proposed project are:

(a) Concrete structures removal,
(b) Wood and bamboo buildings removal,
(c) treatment plant removal,
(d) Concrete foundation removal, and
(e) Water supply and electrical system removal.

Impacts during decommissioning are expected to be limited to workers on site. No impacts are anticipated to nearest residences or businesses because all decommissioning activities will be expected to take place during daytime and will only use small number of machineries.

6.5.1. Impacts on Air Environment during Decommissioning Phase

The following are the anticipated impacts on air quality during decommissioning phase.

(a) Fugitive Dust Generation

During decommissioning some localized increase in dust levels will be unavoidable. The impact of dust generation during decommissioning phase will be less than that of pre-construction phase due to the lack of site clearing, ground leveling and earth filling. The sources of dust generation during decommissioning phase will be vehicle movement and demolishing of buildings.

(b) Gaseous Emissions

Gases (CO_2, CO, SO_2) will emit due to the operation of cranes, dozer, trucks and generator during decommissioning period.

(c) Increase in Noise Level

Existing local noise levels will increase temporarily by the operation of heavy machineries (cranes, dozer, trucks and generator) used for demolition of concrete and wood work structures.

Significant of Impacts on Air Quality during Decommissioning Phase

As all of the buildings are one stored building and it is necessary to use dozer, trucks and manpower for decommissioning purposes. So, the impact significance of dust generation, gaseous emissions, and noise level during decommissioning phase will be very low as follow:

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fugitive Dust Generation	Use of dozer and truck	Negative (-)	Limited (-2)	Very Short term (-1)	Low (-2)	Very Often (-4)	Probable (-3)	Low (-35)
Gaseous Emissions	Use of dozer and truck	Negative (-)	Local (-3)	Very Short term (-1)	Very Low (-1)	Intermittent (-2)	Highly Probable (-4)	Low (-36)
Increase in Noise Level	Demolishing Activities	Negative (-)	Limited (-2)	Very Short term (-1)	Low (-2)	Very Often (-4)	Probable (-3)	Low (-35)

Intensity of Mitigation Required for Air Quality during Decommissioning Phase

The requirement of mitigation measures for air environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
1.	Fugitive Dust Generation	Low (-35)	No	Yes	Minor	DDPC
2.	Gaseous Emissions	Low (-36)	No	No	-	DDPC
3.	Increase in Noise Level	Low (-35)	No	Yes	Minor	DDPC

Mitigation Measure for Air Quality during Decommissioning Phase

According to the above table, minor mitigation measures are required for air quality during decommissioning phase as follow:

(a) Spray water for dust control;

(b) Use machineries with good engine with low sulphur content fuel for gaseous emission; and

(c) Avoid working at night for noise control.

6.5.2 Impacts on Surface Water Environment during Decommissioning Phase

Improper disposal of decommissioning debris such as concrete blocks, steel pieces and drainage from solid waste dump will cause surface water pollution on *Pan Dat Inn Creek,* if decommissioning debris is disposed to the river directly.

Impact Significance on Surface Water Environment

The impact on surface water during decommissioning phase will be not be significant because the solid and liquid waste produced during decommissioning phase will be small quantity.

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Surface water pollution	Solid Wastes	Negative (-)	Limited (-2)	Very Short term (-1)	Low (-2)	Intermittent (-2)	Highly Probable (-4)	Low (-30)

Intensity of Mitigation Measures for Surface Water Environment

The requirement of mitigation measures for surface water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
1.	Solid Wastes	Low (-30)	No	Yes	Minor	DDPC

Mitigation Measure for Surface Water Environment

According to the above impact identification and evaluation, there will need minor mitigation measures for impact on surface water environment during decommission phase. The following are the required mitigation measures for surface water quality during decommission phase. Waste water channels from the site should be connected to septic tank during decommissioning to prevent wastewater from entering the nearest water bodies.

(a) Avoid any leakage of oil and lubricant from vehicles and machineries used in decommission phase.

(b) All the solid waste produced during decommissioning phase have to disposed according to the rule and regulations of CDC (Lounglon) and administrative office of Maung Ma Kan.

(c) Vegetation of bare areas after the decommission activities.

6.5.3. Impacts on Soil and Ground Water Environment

Decommissioning debris such as concrete, steel structures, cabling, scrap metal, etc. will produce during decommissioning of the proposed project. Improper dispose of these solid wastes can have potential to soil and ground water pollutions.

Significant of Impact on Soil and Ground Water Environment

The impact on soil and ground water quality during decommissioning phase will not be significant because the solid and liquid waste produced during decommissioning phase will be little amount. The impact on ground water quality will be minimal, short term and low probability. So, the impact will be considered as very low as follow:

Components	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Soil contamination	Solid Wastes	Negative (-)	Limited (-2)	Very Short term (-1)	Low (-2)	Intermittent (-2)	Seldom (-2)	Very Low (-20)
Ground water pollution	Solid Wastes	Negative (-)	Limited (-2)	Very Short term (-1)	Very Low (-1)	Rare (-1)	Very Seldom (-1)	Very Low (-8)

Consideration of Mitigation Requirements for Soil and Ground Water Environment

The requirement of mitigation measures for soil and ground water environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
1.	Soil contamination	Very Low (-20)	No	Yes	Minor	DDPC
2.	Ground water pollution	Very Low (-8)	No	No	-	DDPC

Mitigation Measures for Soil and Ground Water Pollution

All the solid and liquid waste produced during decommissioning phase have to disposed according to the rule and regulations of CDC (lounglon). Vegetation of bare areas after the decommission activities.

6.5.4. Impacts on Socio-economic Environment

Impacts on human environment will include socioeconomic impacts and human health impact. Generally, it tends to reverse the benefits that are got from the operation of the proposed project on closing the project. As an example, it would have to face the cases like giving up job opportunity and losing taxes for National Government.

Loss of Jobs for Local People and Revenues for the Government

In the event of the project closure, there will be potential negative impacts resulting in loss of jobs and indirect employment depending on the operation of proposed and of associated services for tourism as well as loss of revenues for the government.

Significant of Impacts on Socio-economic Environment

Being a developing Township, loss of job opportunities and revenues for regional government will be greatly effect on local GDP. However, impact significant will be considered as low to moderate for loss of jobs due to insignificant number of workers appointed during operation phase and moderate for loss of revenues due to important of income from hotel and tour section in Tanintharyi Region.

Components	Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Loss of jobs	Decline in local economy	Negative (-)	Local (-3)	Permanent (-5)	Low (-2)	Regular (-3)	Highly probable (-4)	Low to Moderate (-70)
Loss of revenues	Decline in regional economy	Negative (-)	Regional (-5)	Permanent (-5)	Moderate (-4)	Rare (-1)	Certain (-5)	Moderate (-84)

Consideration of Mitigation Measures for Socio-economic Environment

The requirement of mitigation measures for socio-economic environment according to the consideration of impact rating and public concerns are as follow:

No.	Parameters	Impact Rating	Public Concern	Mitigation Requirement	Mitigation Scale	Responsibility
1.	Decline in local economy	Low to Moderate (-70)	No	Yes	Minor	DDPC
2.	Decline in regional economy	Moderate (-84)	No	No	-	DDPC

Mitigation Measures for Loss of Jobs and Revenues for the Government

Extensive and comprehensive warning to employees to allow them to source alternative livelihood should be taken early. DDPC will prepare their employees for forced retirement by providing applicable jobs at other factories under the same developer, if feasible. Moreover, the developer should have a plan to reuse the proposed project for other business purpose under the same company or other partner company to retain the revenue for the government. It will also reduce decommissioning impacts.

Components	Anticipated Impact	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Loss of jobs	Decline in local economy	Negative (-)	Local (-3)	Permanent (-5)	Low (-2)	Regular (-3)	Seldom (-2)	Low (-50)
Loss of revenues	Decline in regional economy	Negative (-)	Regional (-5)	Permanent (-5)	Moderate (-4)	Rare (-1)	Probable (-3)	Low to Moderate (-56)

7. CUMMULATIVE IMPACTS ASSESSMENT AND MITIGATION MEASURES

7.1. Methodology and Approach

Cumulative Impact Assessment is the process of assessing potential effects on receptors from environmental and social impacts caused by the combined influence of more than one project. Impacts directly associated with the Project are discussed in the preceding sections. In this section the impacts associated with cumulative effects of the Project and other development are described. Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that:

*"Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses…**areas potentially impacted by cumulative impacts** from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.* "(IFC 2006).

Cumulative impacts in relation to an activity are defined in the EIA Regulations (Government Notice R543) as meaning "*the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area*"

7.2. Anticipated Cumulative Impacts for the Proposed Hotel Project

The anticipated cumulative impacts for the proposed hotel project will be as follow:

(a) Traffic congestion;

(b) Compound Cumulative Impacts (Air Emissions, Noise, Water Use and Waste Generation)

(a) Traffic Congestion and Road Accidents

Traffic may one of the cumulative impacts from the tourism industries. The increased number of traffics and conjunction may be occurred due to the development the proposed project and neighboring hotels. Cumulative traffic intensity will be increased due to vehicles used by guests and local pilgrims.

Mitigation Measures for Increased in Traffic and Road Accidents

DDPC will have a plan to upgrade Maung Ma Kan Beach Road with the cooperation with local authorities. DDPC will also prepare bicycle rental services or will incentive local people to provide bicycle rental service because most of the visitors prefer to enjoy riding bicycles, electronic bikes (e-bike) and carts than visiting with the cars. Moreover, medium to large car (Town Ace to Highway Express) for transportation of guests to the hotel will provide to reduce number of cars used.

(b) Compound Cumulative Impacts (Air Emissions, Noise, Water Use and Waste Generation)

Air emission, water and energy conservation, noise and waste generation from tourist facilities include products of combustion, domestic grey water and black water from bathing and toilet flushing, consuming large amounts of energy in the form of heat energy may cumulative due to the 240 guest rooms for 480 guests and those nearby.

Mitigation Measures for Compound Cumulative Impacts

DDPC will initiate Maung Ma Kan Hotel Management and Development Committee (under Tanintharyi Region Tourism Management Organization) for a focal point of Hotels and Tourism services at the Dawei Area. This committee will take responsible for the inspection of hotels in conformity with the Myanmar Hotels and Tourisms Law, to reduce the cumulative impacts on physical resources such as water and energy consumption, air pollution, noise pollution and waste generation. Otherwise, Maung Ma Kan Hotel Business Association should take care of this case. Often, public talks and meetings will be arranged in order to accrue knowledge for people regarding environmental friendly best practices.

Greenbelt Development for Cumulative Impacts (Gaseous Emissions, Dust and Noise)

Plants can serve as a sink for noise, gaseous pollutants and reduce the flow of dust and so greenbelt can be considered as compensatory plantation for residual impact of dust, noise and gaseous emissions. The following are the advantages of greenbelt development:

(a) Green belts insure a minimum distance between the industrial sources of pollution and the receptors/ residential areas, prone to the health hazards of industrial pollution.

(b) Green belts can absorb noise caused by the industry.

(c) Trees not only assimilate carbon dioxide and release oxygen but also play an important role in trapping some obnoxious gases and particulate matters in the air. Hence, green belt functions both as filter and sink for contaminants.

(d) Green belts can improve the local microclimate. These occur mainly through their influence on wind, temperature and humidity.

(e) Green belts provide picnic spot and recreation grounds.

(f) In the dryer part of the area, the trees reduce the effect of dryness, desiccate hot wind, and increase the availability of soil moisture.

Plant Selection for Proposed Hotel

Any particular species of plant which may be needed in that area from the point of view of soil conservation, moisture conservation, pollution control, dust control, wildlife habitat etc. may also be given preference while deciding the species to be included in the greenbelt. The following aspects are important while selecting the plant species:

(a) The species should be fast growing and having thick canopy cover,

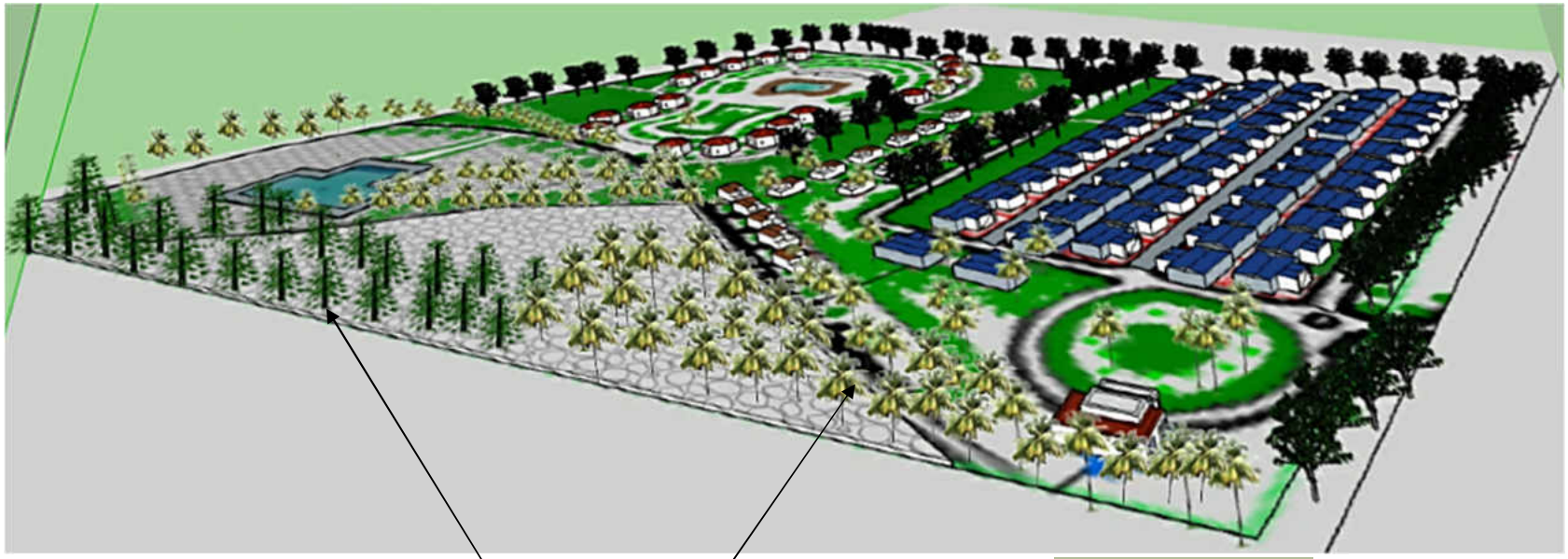
(b) It should be perennial and evergreen and should have large area index,

(c) It should be indigenous and suitable to local climatic conditions,

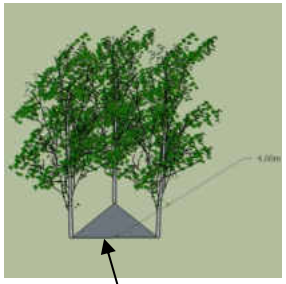
(d) It should be efficient in absorbing pollutants without significant effects on plant growth, and

(e) It should be fruit yielding trees, if possible, especially in wasteland areas.

The appropriate plants for Maung Ma Kan are palm, Thi Ho Bin and Pin Lae Ka Vee. All of these species have relatively high noise and gas absorbance index and can be available in local market.



At least two rows in triangular shape in front of the hotel zone to minimize wind blow



Triangular Shape

Proposed Layout Plan for Green Belt Development

8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

In order to manage the physical, biological and sociological impacts identified in the impact assessment, Dawei Development Public Company Limited (DDPC) has committed to implement an environmental management plan of the project (EMP). This management plan will form the basis for the development of an integrated management system for environmental and community issues. EMP is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental impacts arising from the proposed project and take appropriate actions to properly manage that risk. EMP also ensures the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle.

8.1. Environmental Management and Monitoring Team

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodically monitoring the important environmental parameters within the impact area, so that any adverse effects are detected and timely action can be taken. Main objectives of environment monitoring plan include:

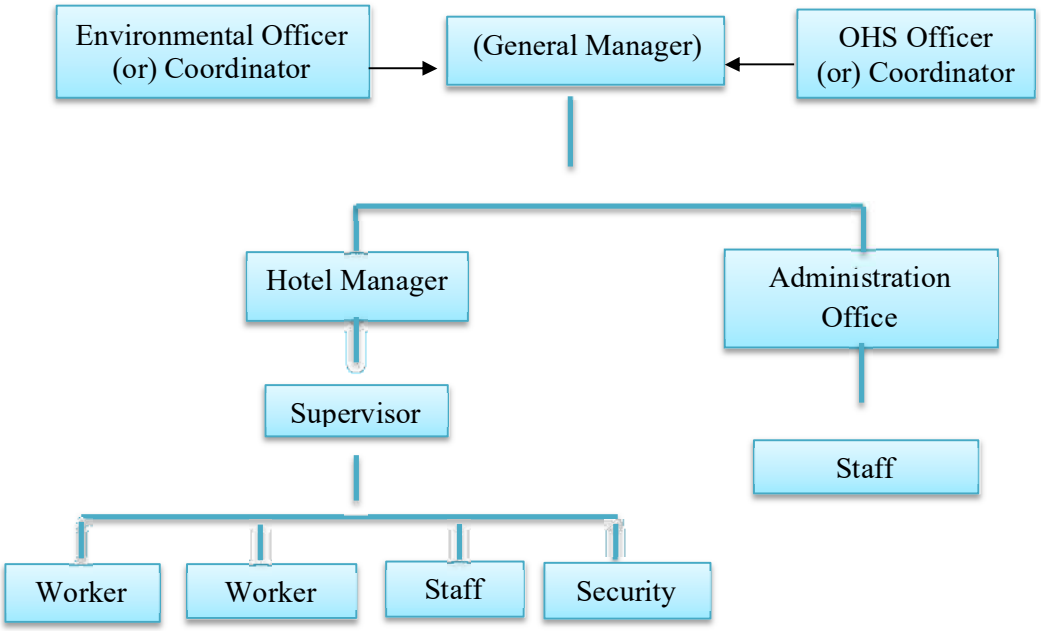
(a) Identify all environment changes which may cause adverse effects on environment by the project implementation;
(b) Monitor discharge sources (gas emission, waste water and solid waste) and operation of environmental protection equipment in order to ensure that these activities will comply with legislative requirements;
(c) Check monitoring process and inspect installation system and equipment in respect of pollution prevention and control;
(d) Prevent potential incidents;
(e) Propose appropriate environment protection measures based on results of environmental monitoring;
(f) Overcome and repair all weak-points based on results of environment monitoring program.

8.1.1. Environmental Monitoring Team for Regular Monitoring

The environmental monitoring team should accomplish regular environmental monitoring. The environmental officer or environmental coordinator should have to be fully responsibility for environmental affair and environmental monitoring. The following table shows proposed organization plan for the environmental monitoring group of the proposed project.

No.	Group Member	Quantity	Remark
1.	Environmental Officer (or) Coordinator	1	To be appointed
2.	Occupational Health and Safety Officer (or) Coordinator	1	To be appointed
3.	Plant Manager	1	Appointed
4.	Supervisor	1	Appointed
5.	Helpers	1	Appointed

According to the above proposed table, it is necessary to reorganized the current organization structure of Dawei Development Public Company Limited (DDPC) as follow:



Proposed Organization Structure

Apart from having an Environmental Management Plan, it is necessary to have a permanent staff charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. So, it is necessary to assign environmental officer with necessary monitoring equipment. According to the above table, it is necessary to appoint environmental officer (or) coordinator and occupational health and safety officer (or)

coordinator. It can be signed as dual duty if site manager is able to do workers' safety and health matters. Training program for safety issues should be completed if necessary. Environmental monitoring can also be done by registered third party monitoring agency. Detailed function of the environmental officer but not limited are as follow:

Environmental Officer

The major duties and responsibilities of the environmental officer or person-in-charge for environmental monitoring of proposed resort should be as given below:

(a) To implement the environmental management plan,
(b) To assure regulatory compliance with all relevant rules and regulations,
(c) To ensure regular operation and maintenance of pollution control devices,
(d) To minimize environmental impacts of operations by strict adherence to the EMP.
(e) To initiate environmental monitoring as per approved schedule.
(f) Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit,
(g) Maintain documentation of good environmental practices and applicable environmental laws as ready reference,
(h) Maintain environmental related records,
(i) Coordination with regulatory agencies, external consultants, monitoring laboratories,
(j) Maintain of log of public inconvenience and the action taken,
(k) Ready to solve any complaints from local people about environmental and social issues especially in waste water and traffic.

Occupational Health and Safety Officer (OHS Officer)

The major duties and responsibilities of the OHS officer or person-in-charge for workplace occupational safety and health of proposed factory should be as given below:

(a) To prevent accidents, injuries and work-related illnesses in the workplace.
(b) To create and implement health and safety policies in accordance with the latest legislation and to ensure that these policies are implemented by management and employees.

(c) To draw health and safety policy in place and to create this document and ensure it's regularly updated to reflect any changes to the law.

(d) To ensure ensure that each member of staff is aware of and adheres to this policy.

(e) To ensure regular inspections and risk assessments, and ensuring that any hazards or defects are rectified immediately. They will also keep an accident book and must record and thoroughly investigate any accident, recommending any improvements in safety standards if required.

(f) To train all staff in safety issues, and advising them on protective clothing and equipment where necessary. They also act as a key point of contact for any member of staff who has a query or concern regarding the safety of the workplace.

(g) To safegurad machinery, fire safety, occupational health, noise, control of hazardous substances, manual handling, working with display screen equipment, and environmental health.

General Manager

Duties and responsibilities of a general manager include formulating policies, managing daily operations, and planning the use of materials and human resources.

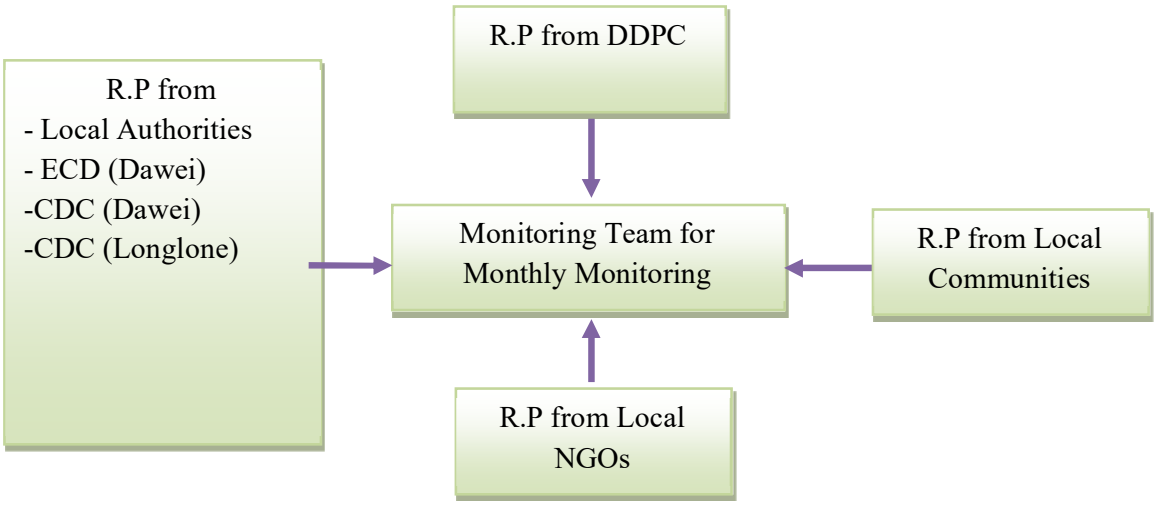
Project Manager

The major duties and responsibilities of the project manager of proposed factory should be as given below:

- Setting up tools and standards for managing the program;
- Planning, tracking, and reporting on outputs and outcomes;
- Information and logistics management;
- Financial planning and tracking ;
- Risk and Issue tracking;
- Cross-project interdependency management;
- Setting quality control standards and tracking implementation;
- Setting and tracking change control procedures;
- Developing stakeholders' map, defining the interest of each group; and
- Planning and executing communication plans to stakeholders.

8.1.2. Environmental Monitoring Team for Monthly Monitoring

Environmental monitoring team for monthly monitoring has to organize representatives from environmental monitoring team for regular monitoring, representative persons from General Administrative Office (GAO, MaungMaKan), General Administrative Office (GAO, Longlone), Environmental Conservation Department (ECD, Dawei), City Development Committee (CDC, Dawei), City Development Committee (CDC, Longlone), local communities and local NGOs as proposed as follow:



Note: should participate , R.P = Representative Persons

Proposed Environmental Monitoring Team for Monthly Monitoring

8.1.3. Parameters, Responsibilities, and Estimated Cost for Mitigation and Monitoring

Monitoring should be conducted daily by the environmental monitoring group of proposed hotel resort and monthly by proposed monitoring team or by the registered monitoring agency. Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Monitoring should be carried out throughout all project implementation phases and the responsibilities for monitoring for construction and operation phases. This chapter will only described summary of environmental impacts before and after mitigation measures in all phases as shown in the following table.

Table 8.1 Environmental Impacts before and after Mitigation Measures of Pre-Construction Phases

Potential Impacts	Components	Impact without Mitigation	Proposed Mitigation Measures	Impact after Mitigation
1. Impacts on Air Environment				
Air Pollution	Fugitive dust from site clearing and ground leveling	Low	Section 6.2.1.(a)	Negligible
	Emissions from vehicle movement	Low	Section 6.2.1.(b)	Negligible
Loss of public amenity	Noise from vehicles	Low	Section 6.2.1.(c)	Negligible
2. Impacts on Water Environment				
Nearest surface water pollution	Sedimentation and soil erosion	Very Low	Section 6.2.2	Negligible
3. Impacts on Land Environment				
Potential to soil contamination	Domestic wastes unusable materials in soil, lubricant	Very Low	Section 6.2.3.(a)	Negligible
Potential to ground water pollution	Domestic wastes unusable materials in soil, lubricant	Very Low	Section 6.2.3.(b)	Negligible
4. Impacts on Biodiversity Environment				
Impact on flora diversity	Site clearing and tree cutting	Low	Section 6.2.4.(a)	Very Low
Impacts on fauna diversity	Tree cutting, Noise	Very Low	Section 6.2.4.(b)	Negligible
Impacts on fauna diversity	Site clearing and tree cutting	Low to Moderate	Section 6.2.4	Low

Table 8.2 Environmental Impacts before and after Mitigation Measures of Construction Phases

Potential Impacts	Components	Impact without Mitigation	Proposed Mitigation Measures	Impact after Mitigation
1. Impacts on Air Environment				
Air Pollution	Fugitive dust from Construction activities	Very Low	Section 6.3.1.(a)	Negligible
	Emissions from vehicle movement	Very Low	Section 6.3.1.(b)	Negligible
Loss of public amenity	Noise from construction equipment	Low	Section 6.3.1.(c)	Negligible
2. Impacts on Water Environment				
Nearest Surface water pollution	Construction Debris	Very Low	Section 6.3.2.(a)	Negligible
	Leakage of oil and grease	Very Low	Section 6.3.2.(b)	Negligible
	Domestic Wastes from Construction Workers	Very Low	Section 6.3.2.(c)	Negligible
3. Impacts on Land Environment				
Potential to soil and ground water pollutions	Leakage of fuel oil and lubricants	Very Low	Section 6.3.3.(a)	Negligible
	Construction debris and domestic Wastes	Very Low	Section 6.3.3.(b)	Negligible
4. Impacts on Biodiversity Environment				
Impacts on flora diversities	Cutting of trees	Very Low	Section 6.3.4.(a)	Negligible
Impacts on fauna diversity	Cutting of trees, wastes and noise	Very Low	Section 6.3.4.(b)	Negligible

Table 8.3 Environmental Impacts before and after Mitigation Measures of Operation Phases

Potential Impacts	Components	Impact without Mitigation	Proposed Mitigation Measures	Impact after Mitigation
1. Impacts on Air Environment				
Air Pollution	Fugitive dust from transportation	Low to Moderate	Section 6.4.1.(a)	Low
	Emissions from DG, vehicle movement, hotel facilities	Moderate to High	Section 6.4.1.(b)	Low
Loss of public amenity	Noise from vehicle movements	Low to Moderate	Section 6.4.1.(c)	Low
	Noise from Diesel Generator	Moderate	Section 6.4.1.(c)	Low
	Noise from Night Parties	Moderate	Section 6.4.1.(c)	Low
2. Impacts on Water Environment				
Surface water pollution	wastewater from hotel services	Moderate	Section 6.4.2	Low
3. Impacts on Land Environment				
Potential to soil contamination	Domestic solid waste from hotel operation	Moderate	Section 6.4.3.(a)	Low
Potential to ground water pollution	Domestic solid waste from hotel operation	Low to Moderate	Section 6.4.3.(b)	Low
4. Impacts on Biodiversity Environment				
Impacts on flora diversities	Gaseous emissions and improper disposal of solid waste	Low to Moderate	Section 6.4.4.(a)	Low
Impacts on fauna diversity	Gaseous emissions and noise	Low to Moderate	Section 6.4.4.(b)	Low

Impacts on Aquatic Lives	Direct waste disposed	Low to Moderate	Section 6.4.4.(c)	Low
5. High Utility Consumption				
High utilities used	Electricity consumption	Moderate to High	Section 6.4.5.(a)	Acceptable Limit
	Water consumption	Moderate to High	Section 6.4.5.(b)	Acceptable Limit

Table 8.4 Environmental Impacts before and after Mitigation Measures of Decommissioning Phases

Potential Impacts	Components	Impact without Mitigation	Proposed Mitigation Measures	Impact after Mitigation
1. Impacts on Air Environment				
Air Pollution	Fugitive dust from vehicle movement	Low	Section 6.5.1.(a)	Negligible
	Emissions from vehicle	Low	Section 6.5.1.(b)	Negligible
Loss of public amenity	Noise from Demolishing activities	Low	Section 6.5.1.(c)	Negligible
2. Impacts on Water Environment				
Nearest surface water pollution	Solid Wastes	Low	Section 6.5.2	Negligible
3. Impacts on Land Environment				
Potential to soil contamination	Solid Wastes and fuel oil	Very Low	Section 6.5.3	Negligible
Potential to ground water pollution	Solid Wastes and fuel oil	Very Low	Section 6.5.3	Negligible

Table 8.5 Summary of Anticipated Socio-economic Impacts before and after Mitigation Measures

No.	Anticipated Impacts	Impact Ratings before Enhancement/ Mitigation Measures	Impact Ratings after Mitigation Measures	Enhancement or Mitigation Requirements	Proposed Enhancement / Mitigation Measures
Pre-Construction Phase (Positive Impacts)					
1.	Job creation	Very Low (+25)	Low (+30)	Yes	Section 6.2.5
Construction Phase (Positive Impacts)					
1.	Job creation	Very Low (+24)	Low (+42)	Yes	Section 6.3.5.1.(a)
2.	Local skill development	Low (+30)	Low to Moderate (+60)	Yes	Section 6.3.5.1.(a)
Construction Phase (Negative Impacts)					
1.	Pressure on housing	Very low (-24)	-	No	Section 6.3.5.1.(b)
	Pressure on health care facility	Low (-42)	Very Low (-24)	Yes	Section 6.3.5.1.(b)
	Pressure on food	Very low (-36)	-	No	Section 6.3.5.1.(b)
Operation Phase (Positive Impacts)					
1.	Employment opportunities	Moderate (+88)	Moderate to High (+110)	Yes	Section 6.4.6.1.(a)
2.	Local community development potential and increased living standard	Low to Moderate (+55)	Moderate (+77)	Yes	Section 6.4.6.1.(b)
3.	Benefits to National economy	Low to Moderate (+65)	Moderate (+78)	Yes	Section 6.4.6.1.(c)

4.	Growth of local economy	Low to Moderate (+72)	Moderate (+84)	Yes	Section 6.4.6.1.(d)
Operation Phase (Negative Impacts)					
1.	Loss of Income from Cashew Plantation	Moderate to High (+108)	Moderate (+72)	Yes	Section 6.4.6.2.(a)
2.	Blockage Internal Road to the Beach	Moderate (-99)	Low (-33)	Yes	Section 6.4.6.2.(b)
3.	Used of Water Resources	Moderate to High (-108)	Moderate (+99)	Yes	Section 6.4.6.2.(c)
4.	Social tension on land used	Moderate to High (-108)	Moderate (+88)	Yes	Section 6.4.6.2.(d)
5.	Diminish recreation area for young people	Moderate (-77)	Low (-44)	Yes	Section 6.4.6.2.(e)
6.	Crime and conflict with local people	Low (-55)	Low (-30)	Yes	Section 6.4.6.2.(f)
7.	Impact associated with population influx	Low to Moderate (-63)	Low (-40)	Yes	Section 6.4.6.2.(g)
8.	Fire outbreak risk	Low (-44)	Low (-24)	Yes	Section 6.4.6.2.(h)
Decommissioning Phase (Negative Impacts)					
1.	Loss of jobs for local people	Low to Moderate (-70)	Low (-50)	Yes	Section 6.5.4
2.	Loss of revenues for government	Moderate (-84)	Low to Moderate (-56)	Yes	Section 6.5.4

The parameters base on EMP to be monitored; location of the monitoring sites; frequency and duration of monitoring, responsibilities and estimated cost for each of the monitoring parameters are presented in the following Tables.

Environmental Management and Monitoring Plan

Item	Project Activities	Potential Environmental Impact	Mitigation Measures	Estimated Cost (USD)	Frequency	Responsible Party
A. Pre-construction & Construction Phase						
1.	Soil excavation	Soil quality degradation, top soil losses	- Soil waste should be disposed of properly or cut and fill should be adopted - Landscaping should be done after construction with indigenous tree species if possible	1000	One time after construction	Construction contractor(s)
2.	Earth moving activities for operation of heavy machineries and site cleaning (transportation vehicles)	Air pollution, noise pollution, nuisance, injury	- Spraying the working ground with water - Control speed of vehicles and operation machineries - Ensure sound condition of construction machinery and equipment - Use of modernized equipment - Workers must be provided with proper PPEs such as dust masks during dry and windy conditions and ear plugs during working in noisy area. - Local residents will be given notice of intended noisy activities so as to calm down from getting upset	1,500	Quarterly	Construction contractor(s)
3.	Traffic congestion	Accidents, nuisance	- Provide adequate parking and driveways - Enforcement of speed limits	500	One time after construction	Construction contractor(s)

4.	Storage of construction materials	Air pollution, soil contamination, fire hazard	- Fine grained materials (sand, marl, etc.) should be stockpiled away from surface drainage channels and features. - Flammable materials (e.g. fuels) will be properly stored in appropriate containers and kept separately. Conspicuous warning signs (e.g. 'No Smoking') will also be posted. Firefighting equipment will be placed. - Paved the ground of the storage area or leak proof epoxy flooring will be applied	800	Twice a year	Construction contractor(s)
5.	Labor on project site	Soil pollution, water pollution, injury, water consumption	- Provide PPEs - Provision of temporary toilets - Separate septic tanks - Applied best construction practices such as using safety harness and life line while working at heights - Provide adequate first aid facilities - Site fencing and safety signboard	900	Twice a year	Construction contractor(s)
6.	Constriction waste disposal	Nuisance, Accident,	- Waste collection, segregation and disposal should be properly managed and contact to Township Municipality for final disposal. - Reusable inorganic waste (e.g. excavated soil) should be stockpiled away from drainage features and used for in filling where necessary. - Reusable or recyclable materials should be recycled and reapplied in order to reduce waste generation - Cleaning should be done daily	800	Every two month	Construction contractor(s)

B. Operation Phase						
1.	Vehicle movements to transport required commodities to hotel and vehicles used by guests.	Air Pollution, soil pollution, noise, Traffic congestion accident and fatal case	- Regular vehicle maintenance should be done - Speed control should be enforced. - Traffic management measures and additional road infrastructure will be planned by the developers with the consent of the concerned authorities to meet the increased traffic loads.	1,000	Quarterly	DDPC and also EMM Team
2.	Operation of emergency generator, refrigerators and air conditioning systems	Air Pollution, Soil Contamination, noise, nuisance, accident, fire hazard	- Regular maintenance should be done - Silent type should be used - Secondary Containments should be used - Kept separately with fuel storage area - Fire extinguishers should be kept	1,000	Quarterly	DDPC and also EMM Team
3.	Water consumption in hotel facilities such as toilet,	Water resources depletion	- Water-saving devices should be installed including ultra-low-flush toilet, spray nozzles, urinals, and low- flow showerheads - Install water meter.	1,000	Twice a year	DDPC and also EMM Team
4.	Electricity and fuel used in hotel services	Increased energy and fuel consumption	- Energy saving devices such as energy saving bulbs, intelligent door lock and energy saving switch card will be used to reduce energy consumption. - Auto switching off electrical equipment will be installed to control energy conservation.	600	Twice a year	DDPC and also EMM Team

5.	Storage and Handling of materials used for Kitchen	Odor, Health hazard,	- Store in separate freezer cabinets for meals, vegetable and other foods - Everyday check all foods for its expiry date and their validity - Provide adequate such as gloves, masks, hats, etc., - Used qualified chefs - Train the followers to understand food hygiene - Take care the chefs and followers' personal hygiene - Intensive housekeeping should be done at working and storage areas	1,500	Quarterly	DDPC and also EMM Team
6.	Solid waste from hotel rooms and general waste	Nuisance, Soil contamination, injury	- Waste segregation system should be adopted - Provide a numbers of bins with labels - Pave the floor of temporary waste storage area in order to save leaking - Recyclable waste should be sent to recycler and reusable waste should be reused - Final disposal should be follow the guidelines of Township Municipality	600	Quarterly	DDPC and also EMM Team
7.	Solid waste from kitchen and restaurants	Odor, nuisance, Soil pollution, health hazard	- Food wastes should be collected in enclosed bins - Regular disposal on daily basis - Install incinerator if possible or otherwise dispose by composting - Record waste transfer by notes	1,000	Twice a year	DDPC and also EMM Team

8.	Liquid waste from hotel rooms, spa, kitchen and restaurants	Soil pollution, water pollution,	- Install oil and grease separator method should be used - Arrange drains to be well-drained and ensure wastewater not to go outside of the project area before treated - Install wastewater treatment plants - Frequently check the septic tank not to overload sludge and pump out - Record waste transfer by notes	1,500	Quarterly	DDPC and also EMM Team
9.	Hazardous waste	Environmental quality degradation	- Use environmental friendly refrigerants for air-conditioners such as R401A, instead of R22. - Used bottles used in cleaning, washing and spa should be collected in separate bins and disposed properly - Record waste transfer by notes	800	Twice a year	DDPC and also EMM Team
10.	Foreigners show lack of respect to cultural and local people while touring	Archaeological resources, social and cultural impact and may conflict with local people	- Hotel should provide awareness program with the assistance of Ministry of Hotels and Tourism. - To avoid traditional, social and cultural impacts, the proponent should adopt the Myanmar Hotel and Tourism Law - Do's and Don'ts labeling in the vicinity area of the hotel - Sharing of leaflets to foreigners for Do's and Don'ts while visiting in Myanmar	800	Annually	DDPC

11.	Emergency Fire	Fire hazard, Fatal case	- Provide adequate fire extinguishers and firefighting equipment - Sprinklers should be installed especially in kitchens - Develop firefighting plan and evacuation plan - Organize firefighting, evacuation and first aid trainings. Organize a volunteer firefighting team with hotel employees	800	Twice a year	DDPC and EMM Team
12.	Employee and Staff	Occupational health and safety problem, damage mentality, air pollution, soil contamination, pollution and infectious diseases	- Equip anti slip stair tape treads. - Do not allow workers to enter kitchen without kitchen wear. - Provide proper PPEs and qualified first-aider at all times. - Arrange welfare plan and Create good working conditions - Food-handling, preparation and storage areas must well-managed for workers and guests, especially for food hygiene. - Arrange 24 hours standby car for emergency health case - Give knowledge and awareness training to the workers about the transmitted diseases (including sexual)	2,000	Thrice a year	DDPC and EMM Team

Note: Construction service provider (contractor) will have the responsibility for monitoring during construction phase. DDPC should ensure that the construction company has the responsibility of monitoring during construction periods and this monitoring responsibility should be included in the agreements of the construction contract. DDPC is the most responsible agency for environmental monitoring during operation phase.

Environmental Monitoring Plan

Item	Environmental Concerns	Parameters	Frequency	Estimated Cost (USD)	Locations	Responsible Party
A	**Pre-Construction & Construction Phase**					
1	Ambient air quality	PM 10, PM2.5, CO, CO2, NO2, SO2	Twice a Year	1000	One point on construction site	DDPC Monitoring Team
2	Noise level	Integrating Noise Level Meter dB(A)	Twice a Year	500	At major construction area	DDPC Monitoring Team
3	Water Quality	Colour, Turbidity, Total Hardness, Biological Oxygen Demand (BOD), Suspended Solid, Oil and Grease	Twice a year	50	2 points, sea water &Tube wells of the project site and residential area	DDPC Monitoring Team
B	**Operation Phase**					
1	Ambient air quality	PM 10, PM2.5, CO, CO2, NO2, SO2, O3	Once a Year	1000	One point in project area	DDPC Monitoring Team
2	Noise level	Equivalent noise level dB(A)	Once a Year	500	One point at the entrance of the project (as receptor)	DDPC Monitoring Team
3	Water Quality	pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids, Total Coliform Bacteria, and Total Nitrogen, Total phosphorus	Twice a Year	50	Treated water output from waste water treatment plant	DDPC Monitoring Team

8.1.4. Important Factors for Environmental Monitoring

The following factors should be considered during the environmental monitoring.

(a) Monitoring have to done by registered third party monitoring agency or proposed environmental monitoring team of the proposed team. and at least three representatives from proposed monitoring team have to be participated in every monitoring process.
(b) If monitoring results show constantly (3 consecutive years) and significantly (e.g. less than 75 percent) better than the required levels, frequency of monitoring can be reduced (IFC, World Bank, 2007).
(c) By studying the wind rose, the most dominant wind direction and wind speed for every season can be predicted and monitoring station for dust, noise and gas emissions should be carried out at that wind direction.

8.1.5. Environmental Management Training Program

Environmental management training program is an important part in EMP. Training and human resource development is an important link to achieve sustainable operation of the facility and environmental management.

Training Program for Construction Phase

During construction phase, construction contractor must ensure that project staffs are trained on labor safety and environment protection during construction phase.

Training Program for Operation Phase

In operation phase, all staff of proposed project must be trained on environment safety throughout training courses to be familiar with operation processes and guidelines, fire fighting exercises and practices, etc. Project Management Board should be established and maintain training programs that are regularly updated to help staff at all levels and related functional departments are aware of their responsibility on environment protection. For successful functioning of the project, relevant EMP's should be communicated to the following groups of people:

Employees

Employees must be made aware of the importance of safety, waste segregation and storage, and energy conservation. This awareness can be provided through leaflets and periodic in

house meetings. They should be informed about their responsibilities for successful operation of various environmental management schemes inside the premises.

Site Staff

Relevant personnel at site must be trained for:

(a) Collection, segregation and storage of the solid and waste generated during operation,
(b) Operation and maintenance of sewage treatment plant and reclamation system,
(c) Requirements of the emergency response plan in case of an emergency,
(d) Techniques for waste minimization, water conservation and energy conservation,
(e) Applicable environmental, health and safety regulations and compliance requirements,
(f) Functioning of the environmental management system including environmental monitoring, reporting and documentation needs.

8.1.6. Record Keeping

Record keeping and reporting of performance is an important management tool for ensuring sustainable operation. Records should be maintained for regulatory, monitoring and operational issues. Typical record keeping requirements for the site is summarized in following table.

Record Keeping Requirements

Parameter	Particulars
Resources Use	- Daily quantity of electrical power consumption through power meter - Daily quantity of water use for domestic through water meter
Solid Waste Handling and Disposal	- Weekly quantity and management of residue from water treatment system - Daily quantity and management of domestic solid waste from the proposed resort
Monitoring and Survey	-Records of all monitoring carried out as per the finalized monitoring protocol.

Complaints from Nearest Residents	- Records of all complaints from the nearest villages
Employee Health and Safety Record	- Daily record for accidents at the resort
Others	- Equipment inspection and calibration records, where applicable - Vehicle maintenance and inspection records

8.1.7. Environmental Audits and Corrective Action Plans

To assess whether the implemented EMP is adequate, DDPC will conduct periodic environmental audits. Environmental audit is an independent and objective oriented examination of whether the practice complies with expected standards. Broadly, environmental audit means a check on some aspects of environmental management, and implies some kind of testing and verification.

There are two levels of Environmental Audits, i.e. Environmental Impact Audit and Environmental Management Audit. Environmental Impact Audit involves comparing the impacts predicted in an IEE with those that actually occur after implementation of the project while Environmental Management Audit involves checks against adherence to plans, mitigation measures and general compliance of terms and conditions. These audits will be followed by Corrective Action Plans (CAP) to correct various issues identified during the audits.

8.1.8. Reporting Monitoring Results

Results of recorded in files to monitor and audit monitoring will be carried out strictly as required by the related national regulations and the monitoring results of required parameters will be reported to ECD (Nay Pyi Daw) at every 6 months.

8.2. Disaster Management Plan

The overall objective of a disaster management plan is to make use of the combined resources created or available at the site and/or off-site services to achieve the following:

- To minimize the effects the accident on people and property;
- Effect the rescue and medical treatment of casualties;

- Safeguard other people, outside the project boundary
- Evacuate people to safe areas with utmost care and with minimum casualties;
- Inform and collaborate with statutory local and state authorities;
- Initially contain and ultimately bring the incident under control;
- Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency;
- Investigate and take steps to prevent recurrence of similar incidents

8.2.1. Risk Assessment Likely Hazards and Possible Disasters

Dangerous conditions or events that threaten or have the potential for causing injury to life or damage to property or the environment is called hazard. Hazards can be categorized in various ways, but based on the origin, they worldwide are basically grouped in two broad headings:-

1. Natural Hazards (hazards with meteorological, geological or even biological origin)
   e.g. Earthquake, Tsunamis, Storms, Lightning strikes etc.
2. Manmade Hazards (hazards with human-caused or technological origin)
   e.g. Fire & Explosions, Drowning, Sabotage etc.

Vulnerability

Vulnerability may be defined as the probability of exposure of a village, city or a community to a hazard. A society or project may be vulnerable to various hazards to different extents depending upon various reasons including environmental, geographical, social, economic etc.

Disaster

A disaster occurs when a hazard such as earthquake, flood or windstorm coincides with a vulnerable situation. It is hence the product of are two main components: Hazard and Vulnerability. A disaster seriously disrupts the normal functioning of a society, causing widespread human, material, economic or environmental losses that exceed the society's capability to cope without external relief.

8.2.2. Standard Operating Procedures

Standard Operating Procedures have been laid down to guide project authorities and staff to be prepared for disasters and act positively in times of disasters. As disasters can be of

various types, separate standard operating procedures have been developed for each kind. These procedures have been prepared with the aim to guide the authorities and staff through the following stages with regards to disaster:

1) Precautionary measures
2) Disaster Preparedness Onsite
3) Disaster Preparedness Offsite
4) Emergency response in the event of disaster
5) Relief and Rehabilitation
6) Evacuation

(1) Precautionary Measures

Precautionary measures for any disaster are to be taken by all the users/visitors of the proposed resort. Hence the measures mentioned below are to be meticulously followed by occupants of the Resort. To be well informed about such precautions a printed booklet will be kept in each resort villa/room.

Earthquake

- BIS codes relevant to the project site shall be adopted for building standards
- Fasten shelves securely to walls.
- All the occupiers should be made aware to place large or heavy objects on lower shelves.
- Information would be provided to store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.
- Hang heavy items such as pictures and mirrors away from beds, settees, and anywhere people sit.
- Brace overhead light and fan fixtures.
- Repair defective electrical wiring and leaky gas connections. These are potential fire risks.
- Secure a water heater, LPG cylinder etc., by strapping it to the wall studs and bolting it to the floor.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shaves.
- Identify safe places indoors and outdoors for occupiers:

a) Under strong dining table or bed

b) Against an inside wall.

c) Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcase or other heavy furniture could fall over.

d) In the open, away from building, trees, telephone and electrical lines, flyovers, bridges.

• Emergency telephone number (doctor, hospital, police, etc.) would be displayed on both floors and booklet of the same should be available/ displayed prominently in all rooms.

Floods

- Sewerage and storm water systems to be checked at regular intervals for their proper functioning.
- Provision will be made to harvest most of the rain water from the proposed site. This will reduce the water shortage as well as runoff water on the site.

Cyclones

- Periodical checking of all resort buildings for structural faults, to secure loose tiles, and to carry out timely repairs, will be resorted to.
- Keep some wooden boards ready so that glass windows can be boarded if needed.
- Periodical removal of dead wood or dying trees close to the villas to be undertaken.
- Hurricane lanterns filled with kerosene, battery operated torches and enough dry cells will always be made available during emergencies.
- Keep some extra batteries for transistors.
- Keep some dry non-perishable food always ready for emergency use.

Tsunamis

- An earthquake that lasts 20 seconds or longer in a coastal area may cause tsunamis.
- When the shaking stops, people will be moved quickly to higher ground away from the coast. A tsunami may be coming within minutes.

Lightning Strikes

If Outdoors

- Seek shelter in a hardtop (metal-bodied) vehicle or solid building but not open structures or tents

- Do not take shelter under trees
- Fishing rods, Umbrellas and other metal rods to be avoided
- Distance should be maintained from fences, metal poles, clotheslines etc.
- If on boat or swimming, one should aim to reach the shore as soon as possible

If Indoors

- Disconnect external aerial and power leads to radios and television sets. Disconnect computer s and power leads.
- Draw all curtains and keep clear of windows, electrical appliances, pipes and fixtures (e.g. avoid using bath, shower and electrical equipment's)
- Avoid using telephones, in case of emergency, calls should be brief.
- Avoid touching metal, brick or concrete or tiled floors.

Fire & Explosions

- Good house-keeping.
- Compulsory use of ashtrays while smoking.
- Welding /Cutting jobs to be carried out under strict supervision.
- Fire Rescue drills to be carried out at regular intervals.

Since fires of different classes require specific precautionary measures to be taken in each case, precautionary measures to be taken for different classes of fires are listed below.

a) Electrical Fires

The following basic precautions are recommended:

- Install only appliances that have the label of a recognized testing laboratory.
- Switches and fuses to conform to correct rating of circuit.
- Use only surge protectors or power strips that have internal overload protection and have ISI or BEE label
- Use light bulbs that match the recommended wattage on the lamp or fixture.
- High voltage points and instruments to be secured and labeled prominently.
- Avoid putting cords where they can be damaged or pinched by furniture, under rugs and carpets, or across doorways.
- Replace any electrical tool if it causes even small electrical shocks, over heats, shorts out or gives off smoke or sparks.

- Routinely check your electrical appliances and wiring. Replace all worn, old or damaged appliance cords immediately. Do not try to repair them.
- Electrical work should be done only by a qualified electrician. Call an electrician if you have any of the following:
    - Recurring problems with blowing fuses or tripping circuit breakers
    - A tingling feeling when you touch an electrical appliance
    - Discolored or warm wall outlets or switches
    - A burning smell or rubbery odor coming from an appliance
    - Flickering lights
    - Sparks from a wall outlet
    - Cracked or broken wall outlets
- Keep clothes, curtains, and other items that can catch fire at least three feet from all portable electric space heaters.

b) Earthquake Fires

- Never place a container with water such as a flower vase or water tank near an electrical appliance. Spilt water on a plug in a socket is likely to cause fire.
- Avoid keeping anything easily inflammable from falling from shelves around a gas cookers in the kitchens and villas, wherever LPG cylinder is used for cooking

Sabotage

- The resort will be fully secured all around the periphery and there will be only one entry and one exit to the entire facility.
- The entry and exit points will be manned for 24 hours with specially trained security staff fully equipped with latest security gadgets including closed circuit electronic surveillance cameras/CCTVs monitoring all sensitive areas within the Resort Complex. A log book will be maintained to record the identities of all "vehicles/staff/guests/visitors" entering and leaving the Resort.
- All "persons/vehicles" entering the resort will be fully checked for explosives and weapons.

Drowning

- Sign ages should be placed on the beach indicating depth at every 0.5 meter till 2.5 meter depth from low tide line, up to a distance of 100 m from low-tide line.

- Daily tide timings should be prominently displayed near the beachfront and should be proactively updated daily.
- Lifeguards should be employed to keep a watch on visitors swimming in the beach.

8.3. Disaster Preparedness Onsite

The plan will include alarm equipment's and other measures and the budget for capital and running cost of the plan.

Fire Alarms/Other Measures

Given the location of the resort, it is important to have a proper fire management system. Fire could take place from various accidents; one of them being faulty electrical materials.

Hence all electrical wiring of the proposed building would be made as per Government standards. Also maintenance of the wiring should be carried out at regular intervals through a professional electrician. Fire and smoke alarm must be installed in every room. An alarm system will be developed so that visitors are informed and all the staff will be informed and trained with regard to the actions taken and operations necessary to efficiently use the system.

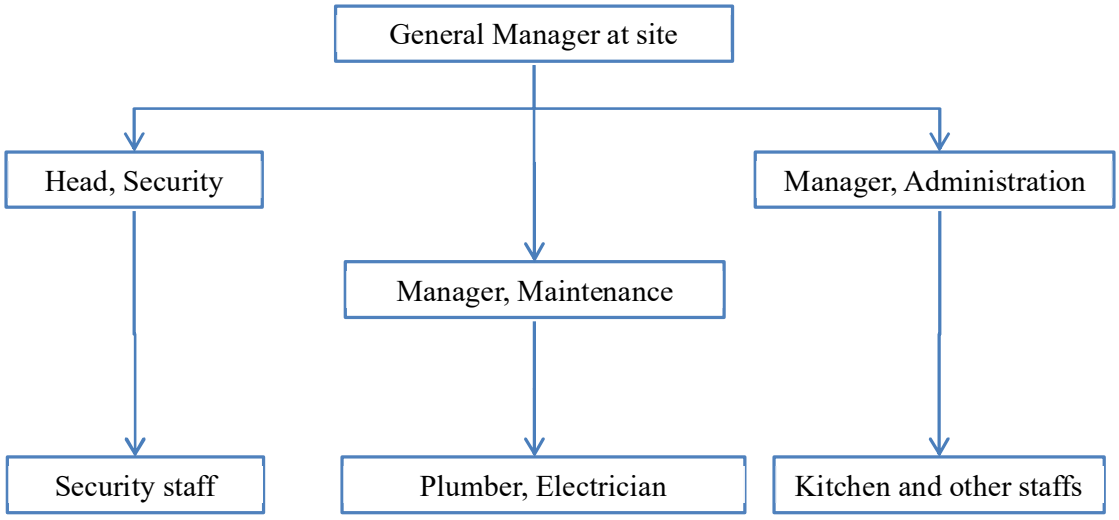
To meet the requirements, the following measures will be taken:

- Posters indicating evacuation routes will be displayed in all rooms/villas/kitchens etc. of the resort clearly indicating the position of the poster with 'You are here' mark. Route of evacuation should be indicated by way of arrows, leading to the assembly point.
- Fire and smoke alarms will be installed in all covered places such as rooms, lobbies, halls, kitchens, offices, etc. The functioning of these fire alarms will be checked every week by the resort security staff.
- Courtyard will be paved suitably to bear the load of fire engines.
- Electrical meter room will be sealed with non-combustible materials.
- The lighting in all fire escape routes will be based on independent circuits backed by DG sets.
- Underground and overhead water storage tanks having appropriate capacity will be provided for fire fighting.
- Automatic water sprinklers will be installed in all internal covered spaces.
- Fire Hydrants, Fire Hoses and Fire Extinguishers will be installed throughout the resort as mandated by the Fire Fighting Department (Lounglon).

- Portable fire extinguishers of dry chemical powder will be provided in the electric meter rooms and basements.
- Lightning conductors and other equipment's mandatory as per existing Government Rules will be installed.

Onsite DMP Team

The structure of the team is given below. During the operational phase of the resort, name of the authority and their contact details will be included in the following chart. This will be part of DMP kit which should prominently placed and accessible to all.



Onsite DMP Team

Emergency Equipment's

The site security officer will maintain a list of emergency handling equipment including details of fire extinguishers their validity and potency, protective clothing, and personal protective equipment for emergency handlers etc. The major hospitals, clinics, emergency services shall be kept in the knowledge of all concerned. Fire fighting related water tank with adequate water quantity and system with fire hoses will be kept readily available. All the location of fire extinguisher will be displayed by a notice board.

Disaster Emergency Kit

An emergency kit will be prepared which will have following items:

Table - Emergency Kit and Items and Numbers

Sr. No.	Emergency Kit Item	Numbers
1.	First aid kit and Whistle	1 for each room/villa/kitchen/restauarent/spa
2.	Portable fire extinguisher	4 on each floor of each building
3.	Safety ropes	5

The emergency kit will be augmented frequently after its check regularly. The project proponent will provide a disaster emergency kit which would consist of:

1. Battery operated torch
2. Extra batteries
3. Battery operated radio
4. First aid kit and manual
5. Candles and matches in a waterproof container
6. Knife
7. Chlorine tablets or powdered water purifiers.
8. Can opener
9. Essential medicines
10. Thick ropes and cords
11. Sturdy shoes

Medical and Related Resources

The medical managements for the possible emergency situation essentially consist of First Aid facility. The Security manager must maintain the staff including sweepers, security persons, etc. so that during medico emergency equal weight age would be given to all the members of the society.

Also Security manager should keep the numbers of emergency. Hospitals, so that doctors could be connected at the earliest at the time of medical emergency. These numbers must be prominently displayed on the notice board and can be accessed by the members in absence of Security manager.

Drills

Mock drills activating the Disaster Preparedness Plan will be conducted periodically for ensuring its efficiency during emergency as well as refinement and updation. These drills

based on the plan will help achieve its objectives. Head, Security shall be the main coordinator for making people aware of the situation and emergency condition response.

Fire extinguishers would be placed in all floors of all villas and hotel rooms. Every member of staff would be given training on how to use these fire extinguishers. Working of these fire extinguishers would be evaluated every year by a qualified and trained person. If any faulty equipment is observed or any further improvement is needed then it would be repaired. Proper evacuation plan would be chalked for the resort. The map for the evacuation plan for each hotel/ villa/ restaurant/ kitchen/ spa would be displayed in the respective places. A mock demonstration for evacuation of guests/visitors would be carried out at interval of every six months. These mock drills would be performed in presence of qualified professional. Information would be given to all the members of staff on how react in case of disaster.

Emergency Response in the Event of Disaster

In case of emergency due to any type of disaster a quick and immediate response is essential. This response depends on the actions taken by individuals to avoid or mitigate the adverse effects of a disaster and to undertake search and rescue operations. Following are the actions which will be taken in various emergent situations.

(1) Action in the event of Fire

Extinguishing fires: A small fire at the point of leakage will be extinguished by enveloping it with a water spray or a suitable smothering agent such as CO_2 or DCP (Dry Chemical Power). Trained staff will be engaged in combating fire. Fire fighting personnel working close to un-ignited vapour clouds or close to fire, will be protected continuously by water sprays.

(2) Actions in case of Flood/Tsunami

The resort management shall take all necessary precautions in consultation with the State weather and disaster management authorities.

(3) Lightning strike

Apply immediate heart massage and mouth-to-mouth resuscitation to lightening victims until medical help arrives.

Relief and Rehabilitation

Relief authorities at the site will:

• Encourage self-help in every activity of their day-to-day living.
• Provide assistance for identification/assessment of human and material loss.
• Provide assistance in maintenance of law and order.
• Provide assistance in maintaining sanitation standards and in disposal of waste.
• Promote cultural and recreational activities for mental health.

Measures during Earthquake

- Relief authorities will: Conduct a week-long survey to locate quake related hazards/damages in the resort.
- Work with local emergency services and officials to help affected people and those likely to be affected.
- Provide tips for conducting earthquake drills.

Actions to be taken to prevent impact of Cyclone

- Residents/visitors will be advised to stay tuned to weather advisories broadcast on radio or TV. Radios and TVs in Resort lobbies/restaurants etc. will also be activated for the benefit of residents/guests.
- All windows and external doors of the resort complex will be shut and appropriately secured to withstand high wind speeds.
- Extra food, which can be eaten without cooking, and surplus drinking water will be stocked for the benefit of residents/guests to tide over long power failures and damage to F&B infrastructure.
- Hurricane lanterns, torches and other emergency lights will be made available.
- All loose and unsecured materials which can fly and cause damage due to strong winds, will be removed to safe locations and/or securely fastened.
- Electrical mains will be switched off except for emergency utilities.
- The management will be continuously in touch with the State Disaster Management Authority and scrupulously follow its instructions with respect to the need for evacuation of the resort or any other eventuality.

Evacuation Plan for the Beach Resort

A standard response plan that is to be following by any personal that comes across an emergency situation such as fire needs to follow RACE.

RACE method of Evacuation Plan:

R -*Remove All Persons In Danger!*

A -*Always Pull The Alarm and Call the Emergency Services*.

C -*Contain The Fire By Closing the Windows and Doors*.

E -*Extinguish the Fire Only if You Are Trained and Confident*.

Followed by this primary response, the evacuation of public vulnerable to fire hazard is the most important step during any emergency fire. Proper co-ordination, prior basic knowledge on how to act is a situation is also essential. The guidelines given below are for the local evacuators and evacuees as well as planners and designers of the emergency response.

- Guidelines for Evacuation In-charge
- Evacuation and Exit Routes for each villa, Hotel room, Kitchen, Restaurant & spa

An assigned on-duty employee will be evacuation in-charge who will command and coordinate the situation.

- The number of exit routes will be adequate, normally two or more depending on: Exit discharge will lead directly outside or to a street, walkway, refuge area, public way, oropen space with access to the outside and the area will be large enough.
- Exit stairs that continue beyond the level on which the exit discharge is located will be interrupted at that level by doors, partitions, or other effective means that clearly indicate the direction of travel leading to the exit discharge.
- Exit doors will be able to open from the inside at all times without keys, tools, or special knowledge.
- Exit route will support the maximum permitted occupant load for each floor served.
- Capacity must not decrease in the direction of exit route travel to the exit discharge.
- Ceiling will be at least 7-1/2 ft. high with no projection reaching a point less than 6 ft. - 8 in. from floor.
- An exit access will be at least 28 in. wide at all points.
- Objects that project into the exit route will not reduce the width of the exit route to less than the minimum width requirements for exit routes.
- The assembly point has sufficient area to accommodate persons (0.3 m^3/person)
- The plans given below shows the refuge area that can be preferred and the service area that can be useful as a junction for escape route.
- The terrace area shown in the plan is open to sky that can accommodate sizable people in case of disaster, also the fire escape passage is provided as an exit route.

9. PUBLIC CONSULTATION AND DISCLOSURE

9.1 Importance of Public Consultation and Information Disclosure

The opinions of the local people, social organizations and stakeholders with the development of the proposed project have been taken into account in the IEE. The public consultation indicated the transparency of IEE's proponents to the local people. Consultation meetings were held with various stakeholders including communities near project area, administrative, community based and social organizations. The results getting from the consultations meeting and negotiations with environmentally and socially of the affected people were taken into consideration in evaluation of impacts, design of mitigation measures and monitoring plans. Negotiation with related governmental organizations was also done. All feedbacks from public consultation meetings were well addressed and considered in the formulation of EMP, environmental monitoring plan and CSR plan.

9.2. Data Collection

The primary data for environmental, social and health profiles were collected by household survey during study period. The project data, site layout plans and design parameter are provided by Dawei Development Public Co. Ltd. Some secondary data on demographic distribution in the area are sourced from local government offices of Dawei and Lounglon.

9.3. Public Consultation and Participation Process

Integral to the impact assessment is the process of stakeholder engagement which has been ongoing. The public participation process included:

(i) Identifying interested and affected parties (stakeholders);
(ii) Informing and providing the stakeholders with sufficient background and technical information regarding the proposed development;
(iii) Creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development;
(iv) giving the stakeholders feedback on process findings and recommendations; and

(v) Ensuring compliance to process requirements with regards to the environmental and related legislation.

The IEE includes the activities undertaken during detailed design stage to engage the stakeholders, and planned information disclosure measures and processes for carrying out consultation with affected people and facilitating their participation during implementation stage. Three rounds of engagements have been undertaken as follow:

Table - Public Consultation and Stakeholder Engagement Process

Round	Method	Stakeholders
Round 1: Information sharing and issues identification	(a) Conduct house hold survey	Village leaders and local people in project affected area, local non-government and community based organizations.
Round 2: Key Stakeholders Meeting	(a) Invitation letters distributed to all key identified stakeholders (b) Handout, report and presentations were used during the meetings.	Key stakeholders in civil society, Government officials, supporting committees for Thanitharyi Region Government, Dawei based NGO's and CBO's.
Round 3: Public Meetings (First public meeting)	(a) Invitation letters, handout, and report for current situation were distributed. (b) Posters and presentations were used during the meeting.	Key stakeholders in civil society, Government officials, supporting committees for Thanitharyi Region Government, NGO's, INGO and CBO's, community leaders, and local people
Round 4: (Second public meeting)	(a) Invitation letters, handout, and report for current situation were distributed. (b) Posters and presentations were used during the meeting.	Key stakeholders in civil society, Government officials, supporting committees for Thanitharyi Region Government, NGO's, INGO and CBO's, community leaders, and local people
Round 5: Public disclosure process	(a) Distribution of executive summary and IEE report	Civil society, NGO's and CBO's, Government officials, community leaders

9.4. Primary Data Collection by Household Survey

Household sample survey was conducted to evaluate primary socio-economic conditions of the project area and to understand the mood, perceptions and extent of preparedness of the people towards the proposed project. The household survey was carried out to tap the baseline socio-economic conditions of project area and to assess project perceptions and attitudes of the local people over a period of five days. To get the accurate data, primary data collection will be conducted by social specialist, social consultants, local authorities and local people.

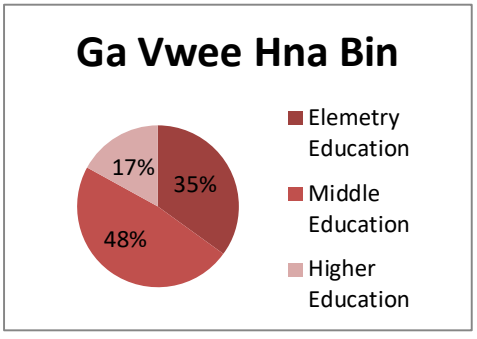
9.4.1. Baseline Socio-economic Profile by Primary Data Collection (Household Survey)

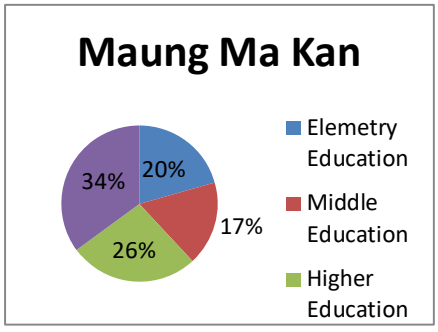
Socio-economic profiles resulting from the primary data collection will be collected as follows:

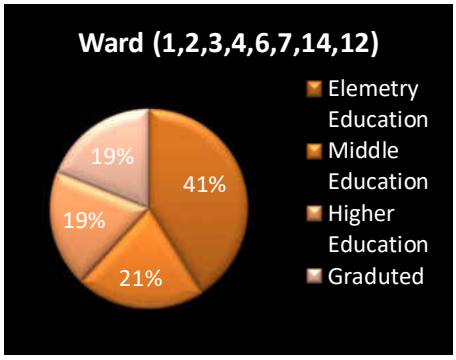
- Education
- Educational Attainment
- Livelihood and Occupational Pattern
- Energy Sources for Lighting
- Energy Sources for Cooking
- Domestic Use of Water
- Health
- Shelter
- Transportation
- Public Need and Concerns
- Alternative Way to Reduce Socio-economic Impacts

(a) Education State

Most People are completing their elementary and middle education. There are also graduated persons in Ward(1,2,3,4,6,7,14 and 12).

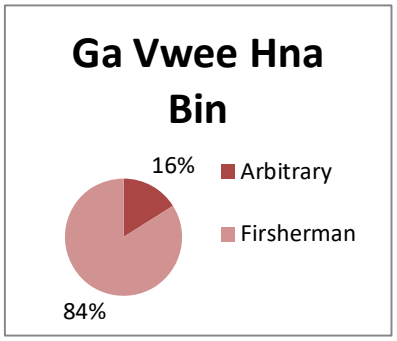


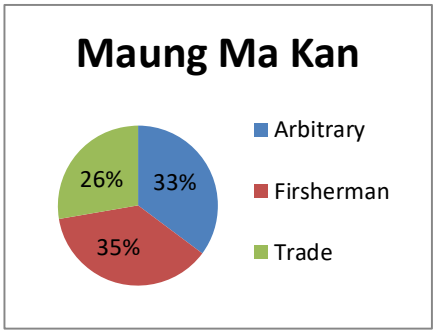


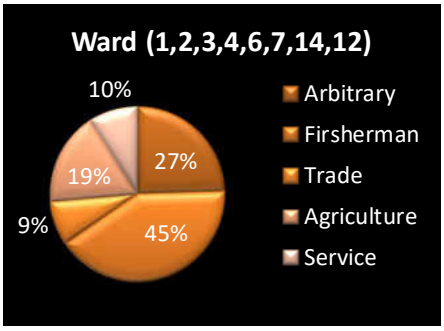


(b) Occupation Pattern

Most of the residents are fishermen and arbitrary workers. There are also livestock farmer, trader and governmental staffs.

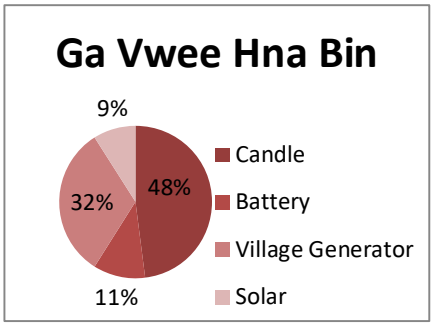


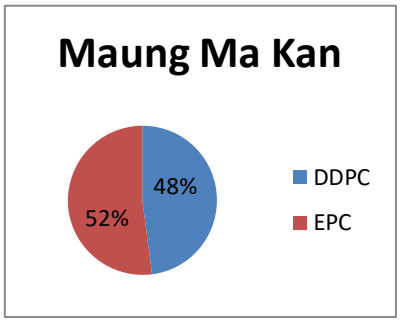


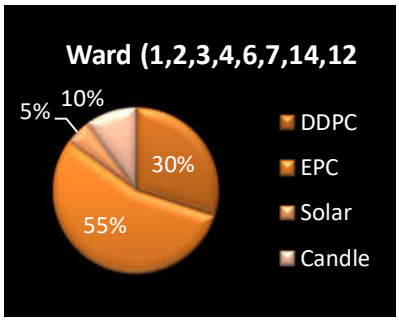


(c) Electrical Power (%)

Most of resident are using electricity from EPC and DDPC. Only Ga Vwee Hna Bin village mostly depends on candle source.

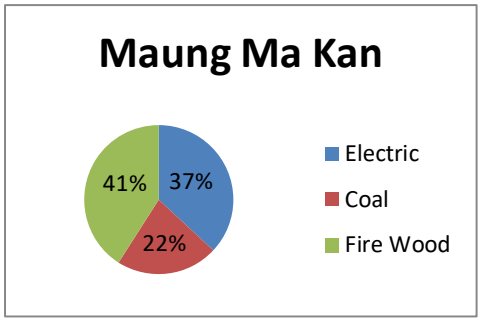


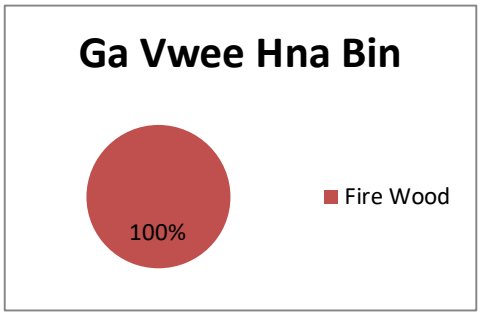


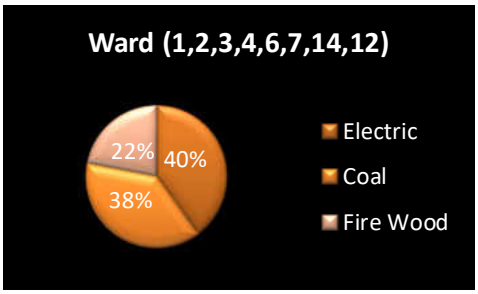


(d) Cooking Fuel (%)

The residents mainly use electricity and firewood for cooking although some use coal and Ga Vwee Hna Bin village are using firewood mainly.

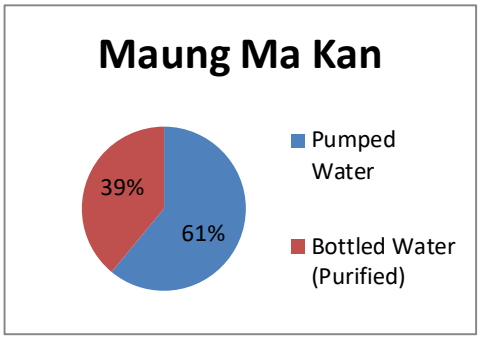


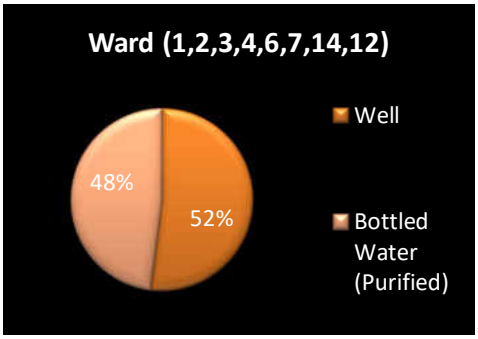




(e) Drinking Water Source (%)

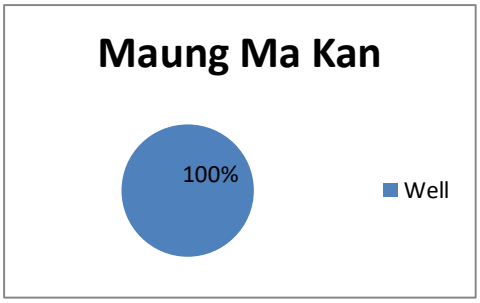
They drink bottled (purified) water and water from well.

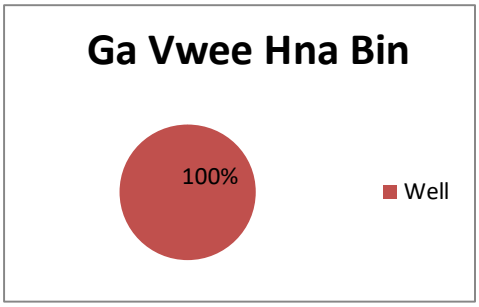


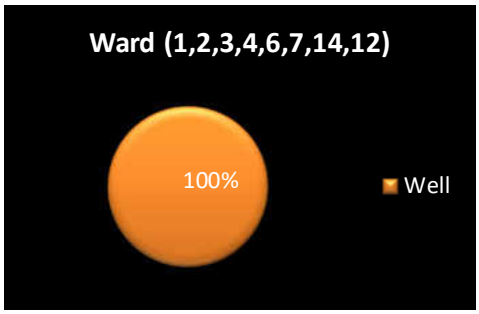


(f) Domestic Water Source (%)

They use well as a source of domestic water.

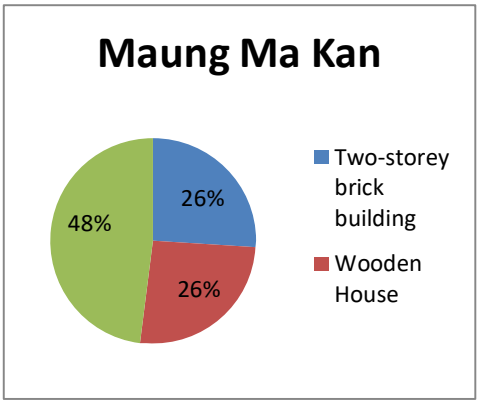


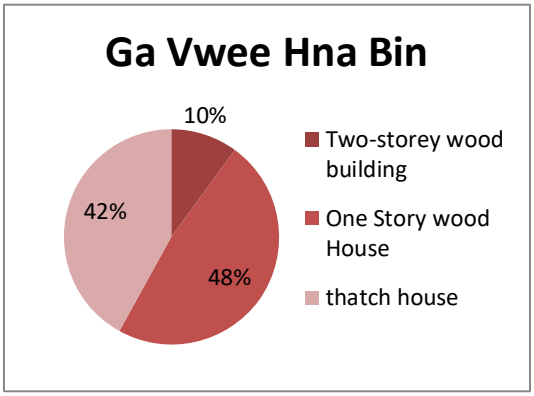


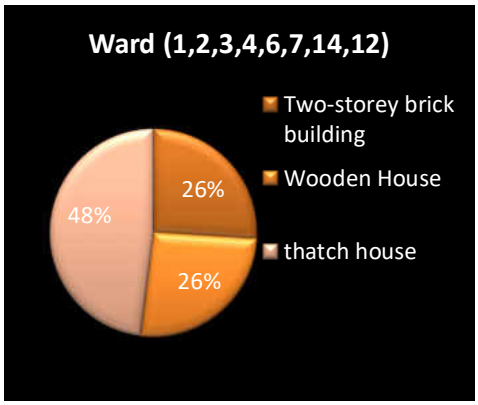


(g) Type of Houses (%)

The residents mostly live with thatch houses and wooden houses, some live in brick building.

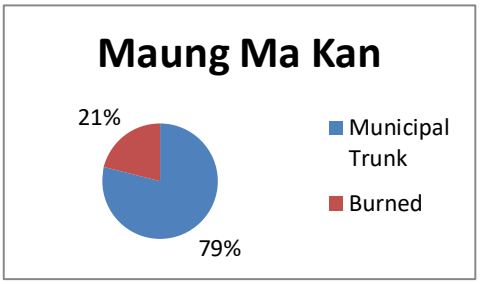


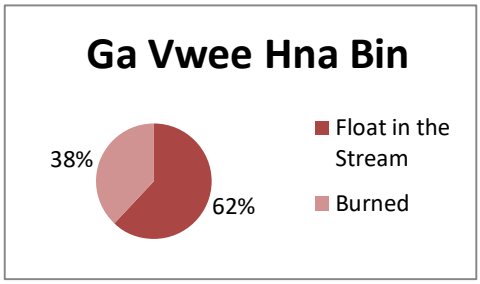


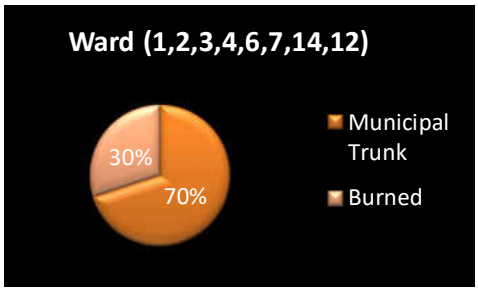


(h) Types of Solid Waste Disposal

Nearly the entire resident at Maung Ma Kang village and Ward (1, 2, 3, 4, 5, 6, 7, 14 and 12) are relay on the Municipal services for waste disposal. At the others, the residents of remaining village (Ga Vwee Hna Bin) discharge their waste by float into stream and burned.

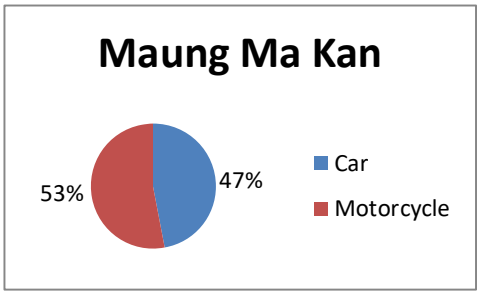


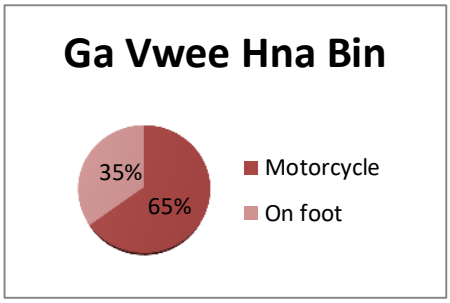


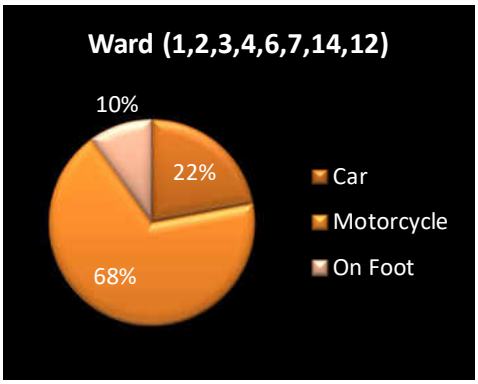


(i) Transportation Pattern

Motorcycle is the commonly used vehicle and car followed as second. There are also people who walk to their works.







(j) Main Road use

Maung Ma Kan	- Maung Ma Kan Main Road
Ga Vwee Hna Bin	-No.(2) Kabwei Road and Maung Ma Kang Road
Ward(1,2,3,4,5,6,7,14,12)	-Maung Ma Kang – Dawei Road

9.4.2. Sample Size Determination for Household Survey

The estimated number of total populations in 10 wards were more than 10000 and the sample size was determined using Yamane's formula. The sampling error was considered as 7 % as the confident level was set at 93%. Thus, total sample size is 200 as per formula. However, the total of 261 households were surveyed to get higher representative results.

$$n = \frac{N}{1 + N e^2}$$

Where,

n = sample size

N =total number of households in the study area

e = desired margin error

In order to have a clear understanding about the sampling error "e" value, the correlation between sample size and "e" value were presented in the following table.

Size of Population	Sample Size (n) for Precision (e) of:			
	±3%	±5%	±7%	±10%
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99

Source: Updated from Glenn D. Israel, 2003

Then sample size was distributed according to the number of households in each ward. However, the selection was done by the number of households located in the project affected

part of the ward. Thus, the sampled households will be more or less differ from ward to ward. The following presented the sampled households distributed in the survey.

Table: Selected Villages Information and Numbers of Sampled Households

Village	Sampled Households
Ga Vwee Hna Pin	67
Ward-1	6
Ward-2	6
Ward-3	22
Ward-4	31
Ward-6	38
Ward-7	24
Ward-12	29
Ward-14	8
Maung Ma Kan Village	30
Total	261

ii. Sampling method

The sampling unit is individual household in the study area. The sampling will be carried out by stratified random sampling with the following steps.

- Step-1, Wards/villages within 3-km radius from the project site were selected to conduct household survey
- Step-2, Households were systematically selected every fifth or sixth along the street in the ward/village according to the sample size



Some Recorded Photos during Household Survey

Most Public Needs and Concerns during Household Survey

During household survey, the most important positive outcomes from the project expected by the local people and most of their concerns about proposed project are as follow:

Village Name	Most Public Needs	Most Pubic Concerns
Ka Vee Na Pin	• Expanding and upgrading of village roads • Want to create job opportunity • Need land rent permit for village land	• Will be Strong wind from the sea because less windy shield trees • Blockage of road to the sea • Land compensation
Maung Ma Kan	• Upgrading of Educational facilities • Supporting for health care facilities • Electricity • Maintenance to the seashore roads • CSR program for village development • Need land rent permit for village land	• Traffic and road accidents • Ground water depletion

9.5. Public Meetings

Public meeting ware held two times as part of the public participation process as follow:

9.5.1. First Public Meeting

First public meeting was held in (7.4.2018) Maung Ma Kan village. There were about 150 people from local communities who are directly or indirectly affected by the proposed project are attended in this meeting. The key findings from the first public meeting are:

(i) Not to block road to the beach from Kavee Nalpin Village or provide alternative way if block the existing road to the beach;
(ii) Not to pressure on local water use;
(iii) Donation of CSR;
(iv) Land use; and

(v) Job opportunities.

Meeting minutes, attendance list and suggestion letters of first public meeting is shown in Appendix I.

Recorded Photos during First Public Meeting

9.5.2. Second Public Meeting

Second public meeting was held in (19.5.2018) Dawei. There were about 80 people from Government officials, supporting committees for Thanitharyi Region Government, NGO's, INGO and CBO's, community leaders, and local people who are directly or indirectly affected by the proposed project are attended in this meeting. Key discussion during seconding public meeting are:

(a) Impact on cultural;
(b) Land use and help to get land permit to local people; and
(c) Use of water.

Recorded Photos during Second Public Meeting

Meeting minutes, attendance list and suggestion letters for second public meeting are shown in Appendix II.

9.5.3. Public Disclosure Process

Hardcopy of IEE report will be available in Regional Government, DDPC and Maung Ma Kan Administrative Office. Softcopy of IEE report will be available in DDPC website.

10. COMMUNITY DEVELOPMENT PROGRAM

Community development program will contain CSR program and communities' capacity building program.

10.1. Corporate Social Responsibility (CSR) Program

Contribution at random places with no records will have some social problem due to the lack of transparency. So, DDPC should have CSR program to contribute and manage CSR fund effectively.

10.1.1. CSR Fund

DDPC will set up fixed CSR fund for local community development. It is important that CSR activities should be accomplished not only by financial assistance but also by technical assistance and manpower in some donations to retain good relation with local communities. Allocated percent of CSR fund is based on local community needs according to the public survey. Proposed allocated percent of CSR budget are as follow:

No.	Activities	Proposed allocated per cent of CSR budget	Public Needs according to Public Consultation Processes
1.	Donation to NGOs and CBOs	20%	Yes
2.	Construction of roads	20%	Yes
3.	Donation to schools	20%	Yes
4.	Donation to health care facilities	20%	Yes
5.	Provide upgrading of local products to value added products	20%	Yes
Total		100%	

10.1.2. CSR Officer (or) Coordinator

DDPC should assign CSR officer (or) CSR coordinator to closely relate with local people in order to manage the contributions of CSR fund effectively. HR manager can also be assigned as CSR officer. CSR officer should donate CSR fund after the discussion with representative people from nearest villages.

10.1.3. Proposed CSR Activities

The following are the proposed CSR activities and most of the CSR activities are according to the public needs during social survey and determination of SIA Team for local community development. All of the proposed activities will improve the socio-economic conditions of nearest villages significantly.

(a) Health Care Facilities

According to social survey, there is limited public health care facility for nearest residents. So, health care facilities of proposed project will be assessed to nearest local people with lowest or no charge as part of CSR program. Ambulance for emergency case will be provided for local people in nearest villages.

(b) Education

Distribution of education materials and financial aid or scholar grants to the students who are economically deprived in the nearest villages of the proposed resort will have a great benefit for students. Most of the schools in nearest villages are furnished inadequately and upgrade and fulfillment of educational requirements and facilities are recommended to be included in CSR program.

(c) Participating Government Schemes for Social Welfare

DDPC will actively participate in implementation of government schemes for welfare of the society of the Maungmakan region.

(d) Cooperation with Local NGOs

DDPC will cooperate with local NGOs and CBOs in nearest villages in the activities to improve regional, religious, and all round developments in Dawei Region. Some percentage of CSR fund will provide regularly to NGOs and CBOs in nearest villages.

10.2. Capacity Building Program

DDPC will prepare the following as communities' development program.

(a) Training Program for Communities Development

DDPC will organize training program for machinery maintenance, computer (Desktop Publishing -DTP), and sewing. All of the training program for local people capacity building will be based on the available job opportunities for local people.

(b) *Upgrading of Local Product to Value Added Product*

DDPC will use 20% of CSR fund in upgrading of local products (sea food, decorative materials from mollusks and crustaceans, beautiful products from coconut etc.)

(c) Awareness Program for Public Health

DDPC will also held to improve knowledge on local public health by exhibition health awareness program at least twice a year.

(d) Sport Supporting Program

DDPC will continuous support to improve public health by exhibition regular sport program (football, basketball, Chin Lone, etc.).

10.3. Declare the Contribution of CSR Fund

All of the CSR activities and contribution programs will be declared to public by means of local media, company annual report or company's website on a regular basis. Audit on contribution of CSR fund should be carried out together with environmental and social audits through independent external audit team for transparency.

11. CONCLUSION

This IEE report reviews the key anticipated environmental and social impacts of proposed project. Moreover, proper mitigation measures for these anticipated impacts and good environmental management practices, which do not reduce hotel process were described in this report. According to the IEE study, all of the major and minor environmental and social impacts can be reduced by proper mitigation measures described in this report. To summarize, it can be concluded that the proposed project need not to conduct comprehensive EIA and all of the anticipated adverse impacts of the project can be minimized by the proper mitigation measures described in this report and the proposed hotel zone project can be allowed to operate if the DDPC will do all of the mitigation and enhancement measures described in this report.

APPENDICES

APPENDIX 1

ATTENDANCE LIST OF FIRST PUBLIC MEETING

နေရာ - ရွာလယ်ကျောင်းတိုက်၊ မောင်းမကန်ကျေးရွာ နေ့စွဲ ၇-၄-၂၀၁၉

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁။	[illegible]	Dawei Beauty	7320349	
၂။	ဦးတင့်နိုင်	[illegible]	09250615526	
၃။	[illegible]	[illegible]	[illegible]	
၄။	[illegible]	[illegible]	[illegible]	
၅။	[illegible]	"		
၆။	ဦးသက်နိုင်ထွေး	[illegible]	09457669277	
၇။	[illegible]	DDPC	09-253706379	
၈။	[illegible]	DDPC	09-252008552	
၉။	[illegible]	မောင်းမကန်		
၁၀။	ဦးသန်းတင်အောင်	"	09-	

နေရာ - ရွာလယ်ကျောင်းတိုက်၊ မောင်းမကန်ကျေးရွာ နေ့စွဲ ၇-၄-၂၀၁၉

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	—	—	

နေရာ - ရွာလယ်ကျောင်းတိုက်၊ မောင်းမကန်ကျေးရွာ နေ့စွဲ ၇-၄-၂၀၁၉

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	[illegible]	09785526076	

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	[illegible]	09.797911888	[illegible]
	[illegible]	DDPL	09.450989284	[illegible]
	[illegible]	မောင်းမကန်	09-422207836	[illegible]
	[illegible]	[illegible]	09.428123629	[illegible]
	[illegible]	[illegible]	09-	[illegible]
	[illegible]	"	-	[illegible]
	[illegible]	"	-	[illegible]
	[illegible]	"	-	[illegible]
	[illegible]	[illegible]	09.403858969	[illegible]
	[illegible]	[illegible]	-	-

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	U Zaw Htun	Chairman / Future Light	09.422208736	[illegible]
	Mg Thin [illegible] Oo		09.423362420	[illegible]
	[illegible]	[illegible]	09 - 422208727	[illegible]
	[illegible]	မောင်းမကန်		[illegible]
	[illegible]	မောင်းမကန်		[illegible]
	[illegible]	"		-
	[illegible]	"	-	[illegible]
	[illegible]			[illegible]
	[illegible]	"		[illegible]
	[illegible]	မောင်းမကန်		[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	-	09-260186613	[signature]
	[illegible]	[illegible]	09-4319088	[signature]
	[illegible]		09-422217991	[signature]
	[illegible]	[illegible]	09-250466297	[signature]
	[illegible]	[illegible]	-	[signature]
	[illegible]	[illegible]	09 422218249	[signature]
	[illegible]	"	09-444959225	-
	[illegible]		09-252176294	[signature]
	[illegible]			
	[illegible]	[illegible]	-	[signature]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
1	Tint Lwin	Reporter/ Hinthar Media	09780070549	[signature]
2	U Tun Tun Oo	Assistant Director (ECD)	09-455197811	[signature]
3	Daw Nyunt Nyunt Lwin	Assistant Director (MOPF)	09-795396495	[signature]
4.	Daw Hla Than Kyi	MMG		-
5	[illegible]	[illegible]	09784215856	[signature]
6.	U PHYO KYAW Thu	[illegible]	09425012508	
7	[illegible]	DDPC	09-5-111435	[signature]
8	[illegible]	DDPC	09-41004313	[signature]
9	[illegible]	[illegible]	09-785031824	[signature]
	[illegible]	[illegible]		[signature]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	ဦးချစ်မြင့်	[illegible]	—	[illegible]
	ဦးလှမြင့်	—	—	[illegible]
	[illegible]	—	—	[illegible]
	မတင်မြ	—		မတင်မြ
	မစန်းအေး	မောင်းမကန်	09775317036	မစန်းအေး
	[illegible]	၁၂ ရပ်ကွက်		
	[illegible]	[illegible]		[illegible]
	[illegible]	၅-ရပ်ကွက်	09259674876	[illegible]
	[illegible]	၁၄ ရပ်ကွက်	09422208693	[illegible]
	[illegible]	[illegible]		[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	[illegible]	[illegible]	09783604020	[illegible]
၂	[illegible]	[illegible]	—	
၃	[illegible]	DDPC	[illegible]	[illegible]
၄	[illegible]	MMG	—	[illegible]
၅	[illegible]	"	—	[illegible]
၆	[illegible]	"	—	[illegible]
၇	[illegible]	[illegible]		
၈	[illegible]	[illegible]		
၉	[illegible]	[illegible]		[illegible]
၁၀	[illegible]			[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးဝင်းနိုင်	[illegible]	09 783604020	
၂	ဒေါ်[illegible]	ကမ္ဘီးနက်ပင်	–	
၃	ဦး[illegible]	DDPC	[illegible]	
၄	ဒေါ်သီးနှင်း	MM G	–	ဒေါ်သီး:နှင်း
၅	ဒေါ်စိုးဝေ	"	–	စိုး
၆	ဒေါ်[illegible]	"	–	[illegible]
၇	ဒေါ်[illegible]	ကမ္ဘီးနက်ပင်		
၈	ဒေါ်[illegible]	၁၂ မိုင်		
၉	မ[illegible]	၄ ကမ္ဘီးနက်ပင်		[illegible]
၁၀	မ[illegible]နွယ်			နွယ်

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	ဦး[illegible]	12 ရပ်ကွက်		[illegible]
	ဒေါ်[illegible]	13 ရပ်ကွက်		
	[illegible]			
	ဒေါ်[illegible]	–	–	
	ဒေါ်[illegible]	10 ရပ်ကွက်	09422207672	Ei Htwe.
	ဒေါ်[illegible]	7 ရပ်ကွက်	09763081514	
	ဦး[illegible]	(12)	09 254854466	
	[illegible]	12		
	ဦး[illegible]	၁၃ ရပ်ကွက်		
	[illegible]	[illegible] ရပ်ကွက်	09 [illegible]	

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	–	–	–
	[illegible]			
	[illegible]	[illegible]	[illegible] 09 49850240 .	[illegible]
	[illegible]			
	[illegible]	Dawei Development Public Co.ltd.	09.50.29285	[illegible]
	[illegible]	DDPC	09.450990566	[illegible]
	[illegible]		09449001175	[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	[illegible]	–	[illegible]
	[illegible]	[illegible]	–	[illegible]
	[illegible]	[illegible]	–	[illegible]
	[illegible]	[illegible]	–	[illegible]
	[illegible]	–	–	[illegible]
	[illegible]	[illegible]	–	[illegible]
	[illegible]	"		
	[illegible]	"		[illegible]

APPENDIX III

Meeting Minutes for First Public Meeting

Place – Ywar Layl Kyawn

Date - 7.4.2018

Time – (1:00 PM)

မောင်းမကန် ဟိုတယ်ဇုန်စီမံကိန်း ပထမအကြိမ်လူထုတွေ့ဆုံပွဲ

နေ့ရက်- **၇/၄/၂၀၁၈**

နေရာ -**မောင်းမကန် ဘုန်းတော်ကြီးကျောင်း**

တွေ့ဆုံဆွေးနွေးပွဲအတွင်းဆွေးနွေးချက်များ

ဦးထွန်းတင် (ကဗျိုးနှစ်ပင်)

- ကဗျိုးနှစ်ပင်ဒေသခံများ အဓိက အသက်မွေးနေရသော သီဟိုဠ်တောများ ပြုန်းတီးသွား၍ စီးပွားရေးခက်ခဲမှုဖြစ်၊
- သီဟိုဠ်ပင်များ နည်းသွားသဖြင့် ပင်လယ်လေကြမ်း တိုက်ခံရမှုပိုဖြစ်လာ။
- ချောင်းတူးဖော်မှုကြောင့် ရွာမှဒေသခံများ ချောင်းဖြတ်သန်း သွားလာရေးခက်။

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- ဒေသခံများ၏ အလုပ်အကိုင်အခွင့်အရေးအတွက် လူဦးရေ (၅၀) ကျော် အလုပ်ခန့်ထားပြီးဖြစ်ပါ ကြောင်း၊ ရာချီသော အလုပ်အကိုင်အခွင့်အလမ်းများ ပေါ်ပေါက်လာမည်ဖြစ်ပြီး ဒေသခံများ၏ ပူးပေါင်းမှုဖြင့် value added ဖြစ်ရန် ကျွမ်းကျင်သူများ ခေါ်ယူပြီး လေ့ကျင့်ပေးသွားနိုင်ရန် ကူညီပေးမည်ဖြစ်ပါကြောင်း၊
- ချောင်းတူးဖော် သဲစုပ်ယူမှုအား အာဏာပိုင်အဖွဲ့၏ ခွင့်ပြုချက်ဖြင့်သာ ဆောင်ရွက်ခဲ့ခြင်းဖြစ်ပြီး ယခု သဲစုပ်ယူမှု မပြုလုပ်တော့ပါကြောင်း

ဦးစံဝေ (မောင်းမကန်- ၈ ရပ်ကွက်)

- နောက်မျိုးဆက်များအကျိုးရှေးရှု၍ မြေနေရာလွတ်များ ထားရှိပေးစေလိုကြောင်း၊
- စီမံကိန်းနှင့်မသက်ဆိုင်သော မြေလွတ်များအား ရယူအသုံးပြုခြင်းမပြုဘဲ ထားရှိပေးစေလိုကြောင်း ဆွေးနွေးပါသည်။

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- မြေနေရာ ရယူမှုနှင့်ပတ်သက်၍ ၈၀ ကျော် ပြန်လည်စွန့်လွှတ်ပြီး ကျေးရွာပိုင်မြေအဖြစ် ပေးအပ်ထားပါကြောင်း၊
- လက်ရှိယူထားသော မြေဧရိယာအတွင်းတွင်သာ စီမံကိန်းဖော်ဆောင်မည်ဖြစ်ပါကြောင်း။

ဦးယုသိန်း (မောင်းမကန်- ၃ ရပ်ကွက်)

- ဒေသတွင်းတည်ဆောက်မည့် စီမံကိန်းဖြစ်သဖြင့် ကြိုဆိုပါကြောင်း၊ ဒေသခံများ အလုပ်အကိုင် ရရှိစေရေးနှင့် ဒေသဖွံ့ဖြိုးရေး ဦးစားပေးဆောင်ရွက်စေလိုပါကြောင်း ဆွေးနွေးပါသည်။

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- ဒေသခံများပါဝင်သော အစုရှယ်ယာရှင်များနှင့် ဖွဲ့စည်းထားသော ကုမ္ပဏီဖြစ်သဖြင့် ဒေသခံများ၏ အကျိုးစီးပွားအား ရှေ့တန်းတင်ဆောင်ရွက်သွားမည် ဖြစ်ကြောင်း ကတိပြုပြောကြားပါသည်။

ဦးနိုင်နိုင်ဝေ (မောင်းမကန်- ၈ ရပ်ကွက်)

- လက်ရှိမောင်းမကန်ကျေးရွာ၏ မြေပိုင်ဆိုင်မှုမှာ ကြိုးဝိုင်းပြင်ပ ကာကွယ်တောအဖြစ် သတ်မှတ်ထားပြီး

  ဂရုန်မရှိကြောင်း၊ စီမံကိန်းဧရိယာအား နိုင်ငံတော်မှ ဂရုန်ပေးသည်ဟုသိရသဖြင့် မောင်းမကန်ရွာအား ဂရုန်ရရှိရေးဆောင်ရွက်ပေးပါရန်။

ဦးဇော်ဝင်း (မောင်းမကန်- ၁၁ ရပ်ကွက်)

- ဒေသခံများ အိမ်ယာမြေပိုင်ဆိုင်မှု ဂရန် ရရှိပြီးမှသာ စီမံကိန်းဆောင်ရွက်စေလိုပါကြောင်း၊ ဂရန်ရရှိနိုင်ရန်ဒေသခံများ စုပေါင်းလက်မှတ်ထိုးပြီး ဌာနဆိုင်ရာသို့ တင်ပြထားပြီးဖြစ်ပါကြောင်း ဆွေးနွေးပါသည်။

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- DDPC ၏မြေပိုင်ဆိုင်မှုအတွက် ဂရန်ရရှိရန် ၃ နှစ်ကြာမျှ ဆောင်ရွက်ရပါကြောင်း၊ တရွာလုံးအနေဖြင့် ဒေသခံများ စည်းလုံးညီညွတ်စွာ ဆောင်ရွက်ရန်လိုအပ်ပါကြောင်း၊ ကုမ္ပဏီအနေဖြင့်ပူးပေါင်းဆောင်ရွက်ပေးမည်ဖြစ်ပါကြောင်း၊အဓိကဆက်သွယ်လုပ်ဆောင်ရန် ဦးကျော်သန်းနိုင်အား တာဝန် ပေးမည်ဖြစ်ပါကြောင်း၊

ဦးမော်ကြီး (မောင်းမကန်- ၆ ရပ်ကွက်)

- မောင်းမကန်ဒေသသည် ပင်လယ်ကမ်းခြေဒေသဖြစ်သဖြင့် ရေရရှိမှု ခက်ခဲသဖြင့် ဒေသခံများရေအခက်အခဲမဖြစ်ပေါ်စေရန်ဟိုတယ်စီမံကိန်းအတွက်အသုံးပြုရန်လိုအပ်သောရေအရင်း အမြစ်အား ဒေသခံများ သုံးစွဲနေသော ရေအရင်းအမြစ်အား လုံးဝသုံးစွဲခြင်းမပြုရန် အဓိကထား တောင်းဆိုချင်ပါကြောင်း၊

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- မောင်းမကန်စီမံကိန်းစတင်သည့်အချိန်ကတည်းက ရေအရင်းအမြစ်အတွက် စဉ်းစားထားပြီး ဖြစ်ပါကြောင်း။

  ရေအရင်းအမြစ်အတွက် ကရင်ကြီးနေရာနှင့် သဇြေတြို့မှ ရေရရှိလာပါက မောင်းမကန်ရေအား အသုံးပြုမည်မဟုတ်ပါကြောင်း။ စွန့်ပစ်ရေများအား Treatment လုပ်ပြီးပြန်သုံးမည်ဖြစ်ပါကြောင်း။

ဦးဟန်ဦး (မောင်းမကန်- ၁၄ ရပ်ကွက်)

- ဒေသခံရေလုပ်သားများ ငါးဖမ်းလှေမှ ငါးများသယ်ယူရာတွင် စီမံကိန်းဧရိယာမှ ဖြတ်သန်းသွားရသည် များ ရှိသဖြင့် ယာဉ်အန္တရာယ်ထိခိုက်မှု ရှိလာနိုင်သဖြင့် ကူညီဖြေရှင်းပေးစေလိုပါကြောင်း၊
- လက်ရှိစီမံကိန်းသည် BOT စနစ်ဖြင့် ဆောင်ရွက်ခြင်းလား ကိုယ်ပိုင်လား သိလိုပါကြောင်း မေးမြန်းပါသည်။

ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- ရေလုပ်သားများ သွားလာရေးအဆင်ပြေစေရန် ညှိနှိုင်းဆောင်ရွက်ပေးမည်ဖြစ်ပါကြောင်း၊
- စီမံကိန်းအနေဖြင့် BOT စနစ်ဖြင့် ဆောင်ရွက်ခြင်းမဟုတ်ဘဲ ကိုယ်ပိုင်စီမံကိန်းအဖြစ် ဂရန်ရယူ ဆောင်ရွက်ခြင်း ဖြစ်ပါကြောင်း ရှင်းလင်းပါသည်။

ဦးဇော်ထွန်း (CBO, Future Life)

- CSR ဆောင်ရွက်ရာတွင် သတ်မှတ်ကဏ္ဍအလိုက် ခွဲခြားသုံးစွဲပေးစေလိုကြောင်း၊ ဒေသခံလူမှုအဖွဲ့အစည်းများနှင့် ဆွေးနွေးပြီး ဆောင်ရွက်စေလိုပါကြောင်း၊ ပညာရေးမြှင့်တင်မှုအတွက် ဆင်းရဲသောရပ်ကွက်မှ ကလေးများအား ထောက်ပံ့ပေးခြင်း၊ Youth Recreation Zone ပြုလုပ်ပေးခြင်း၊ Capacity Building Training များပေးခြင်း ပြုလုပ်ပေးစေလို ပါကြောင်း၊
- Waste Management Plan သေချာဆွဲထားပြီး ဆောင်ရွက်စေလိုပါကြောင်း ဆွေးနွေးအကြံပြုပါသည်။

ဦးတင့်လွင် (အကြီးတန်းသတင်းထောက်၊ဟသံမီဒီယာ)

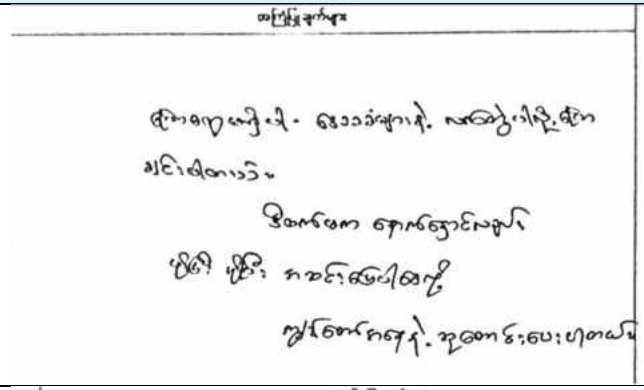
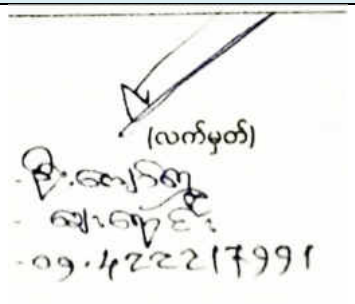
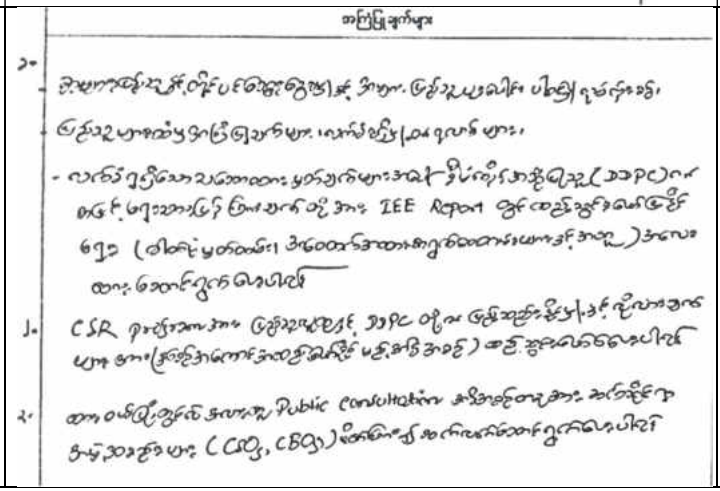
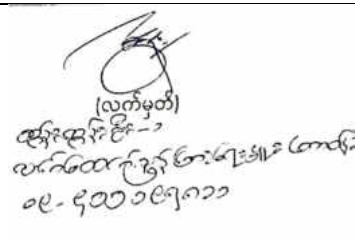
- CSR သုံးစွဲရာတွင် ဒေသခံများ၏ ပါဝင်စီမံခန့်ခွဲခွင့် နှင့် (ကုမ္ပဏီ+ဒေသခံ+အုပ်ချုပ်ရေးအဖွဲ့) ပူးပေါင်းဆောင်ရွက်စေလိုပါကြောင်း၊
- အလှူ နှင့် ဒေသဖွံ့ဖြိုးရေး ဆောင်ရွက်မှုအား ခွဲခြားသုံးသပ်ပြီး ဆောင်ရွက်စေလိုပါကြောင်း ဆွေးနွေးပါသည်။

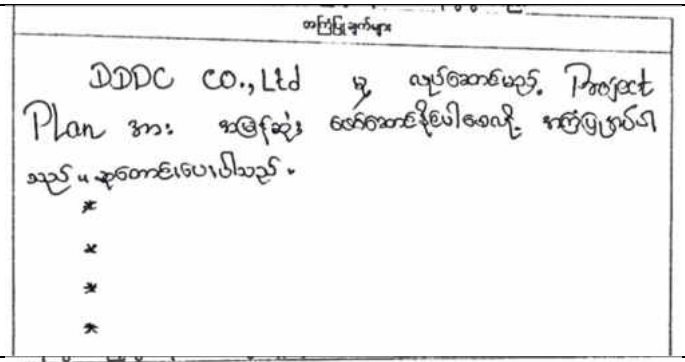
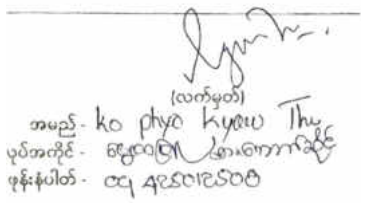
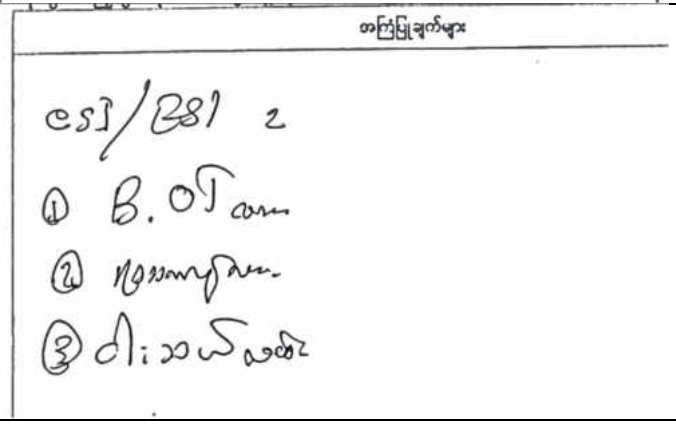
ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)

- ယခုကဲ့သို့အကြံပြုပေးပါသဖြင့် များစွာ ကျေးဇူးတင်ရှိပါကြောင်း၊ CSR စီမံခန့်ခွဲရန် အခက်အခဲတခု ဖြေရှင်းပြီးသွားခြင်းဖြစ်ပါကြောင်း၊ CSR ရန်ပုံငွေအား ကုမ္ပဏီမှ ကိုင်တွယ်သုံးစွဲခြင်းမပြုလုပ်တော့ဘဲ ဒေသခံအဖွဲ့အစည်းများသို့ ပေးအပ်ပြီး ဆောင်ရွက်ခြင်းက ပိုမိုထိရောက်မည်ဖြစ်ပါကြောင်း၊

ကုမ္ပဏီအနေဖြင့် ဆောင်ရွက်ပေးနေသော ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများအား ဆက်လက်လုပ်ဆောင်ပေးသွားမည်ဖြစ်ကြောင်း ရှင်းလင်းပြောကြားပါသည်။

COMMENTS BY SUGGESTION LETTERS DURING FIRST PUBLIC MEETING

စဉ်	အကြံပြုချက်	အကြံပြုဆွေးနွေးသူ	ပြန်လည်ဖြေကြားသူ/ဖြေကြားချက်
၁။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** DDPC သည် အများပိုင်ကုမ္ပဏီဖြစ်သလို ဒေသအကျိုး အတွက် ဦးစားပေးဆောင်ရွက်နေသည့် ကုမ္ပဏီ တစ်ခုဖြစ်ပါသည်။ ကျေးဇူးတင်ပါသည်။
၂။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** စီမံကိန်းနယ်မြေရှိ ဒေသခံများ ၊ သက်ဆိုင်ရာ ဌာနဆိုင်ရာများ ၊ CSO များ ပါဝင်သော တွေ့ဆုံပွဲအား (၁၉.၅.၂၀၁၈) ရက်နေ့တွင် Royal Palace Hall တွင် ကျင်းပခဲ့ပါသည်။ ဒေသခံများ CSR အတွက် ဒေသခံများ သဘောတူသည့် အဖွဲ့တစ်ဖွဲ့အား ရွေးချယ်၍ ကော်မတီဖွဲ့ရန် ။အဖွဲ့အား ဝိုင်းဝန်း၍ စီမံနိုင်ရန် DDPC မှ အကြံပြုထားပါသည်။

၃။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** အမြန်ဆုံးအကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်ပါသည်။ ကျေးဇူးတင်ပါသည်။	
၄။		-	**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** ကုမ္ပဏီပိုင်စီမံကိန်းအဖြစ် ဂရမ်ရယူဆောင်ရွက်ခြင်းဖြစ်ပါသည်။ ရေလုပ်သားများ သွား လာရေး အဆင်ပြေစေရန် ညှိနှိုင်းဆောင်ရွက်ပေးပါမည်။	

APPENDIX II
ATTENDANCE LIST OF SECOND PUBLIC MEETING

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	DDPC Supermarket (Bell boy)	09-783610544	[illegible]
	[illegible]		09-254822126	[illegible]
	[illegible]	[illegible] (D.D.P.C)		[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	[illegible]	09-780424089	[illegible]
	[illegible]	[illegible]	09-770019957	[illegible]
	[illegible]	[illegible]	09-254098519	[illegible]
	[illegible]	[illegible]	09-773308712	[illegible]
	[illegible]	[illegible]	09-780108099	[illegible]
	[illegible]	[illegible]	09-4[illegible]22209937	[illegible]
	[illegible]	[illegible]	09-457169648	[illegible]
	[illegible]	[illegible]	09-789539701	[illegible]
	[illegible]	[illegible] / Sale	09-788582135	[illegible]
	[illegible]	[illegible]	09-457165472	[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]		[illegible]	[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
1	ဦးဝင်းလတ်		ရွာ၊ ကုက္ကိုပင်ရွာ	
2	ကိုဇော်		လောင်းလုံးမြို့နယ်	
3	ဒေါ်သန္တာဝင်း		09.455193540	
4	ဒေါ်ခင်ဆွေမိုး		09-253446075	
	ဒေါ်နီနီဝေမွှေး		09-441335754	
	ဒေါ်လဲ့လဲ့ခိုင်		09-426002203	

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	Aung Zaw Hein	DDPC	09-252005552	
	Kyaw Kyaw	DDPC	09.50.23285	
	Aung Zaw Tun	DDPC	09252229911	
	Khin Pyone Win.	DDPC.	09 422191871	
	July Myint Htay	"	09-421112817	
	Thet Thet Htay	"	09-458226387	
	Thein Zaw Latt	"	09-250803060	
	Daw Chue Chue Saw		09783905204	
	Daw Khin Nyein Paing			
	Thi Zaw Latt		09250146763	

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၂၁	[illegible]	Finance Dept.	09254 557329	
၂၂	[illegible]	Finance	09-260417303	
၂၃	[illegible]	Finance	09.264243775	
၂၄	[illegible]		[illegible]	
၂၅	[illegible]	[illegible]	09-444032190	

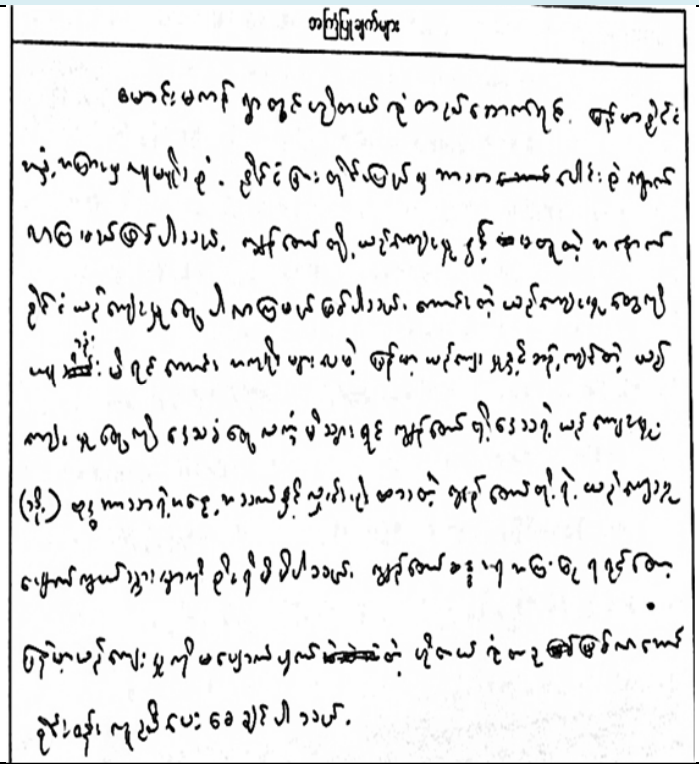
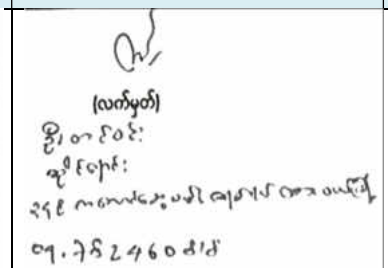
စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးအောင်ထွန်း		ESO / [illegible] 09-250734865	
၂	ဦးထွန်းဖြင့်		[illegible] 09-450994832	
၃	[illegible]	[illegible]		
၄	[illegible]	[illegible]	09-5057362	
၅	[illegible]		[illegible] 09-428741171	
၆	[illegible]		098742642	
၇	[illegible]	EO / DDPC	09-450990659	
၈	[illegible]	CD / DDPC	09-41004313	
၉	[illegible]	[illegible]	09-5650038	
၁၀	[illegible]		095154815	

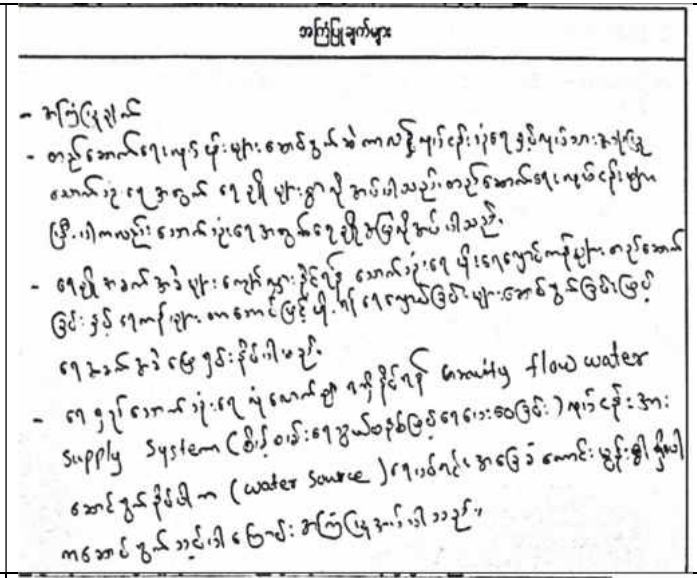
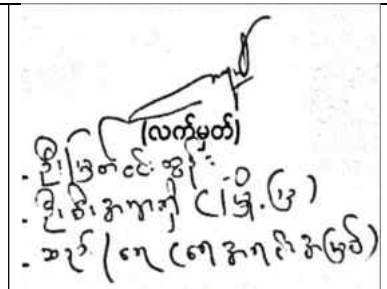
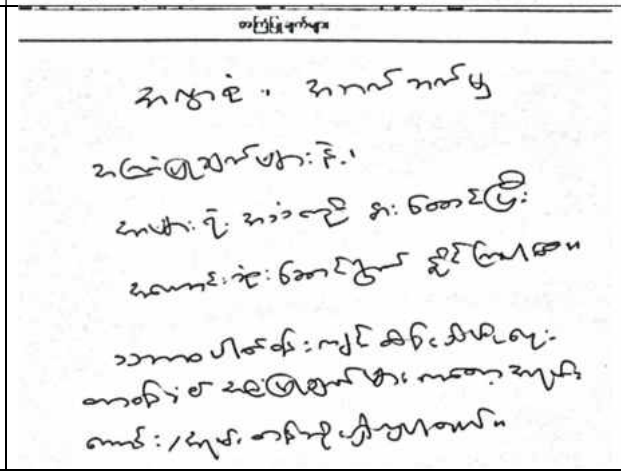
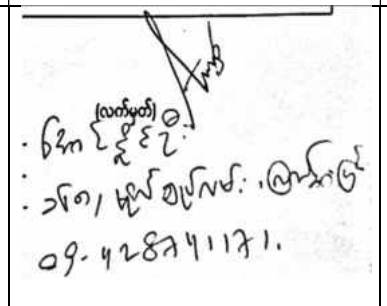
စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးနိုင်ဝင်းဇော်	Director (DDPC)		
၂	ဦးအောင်မြင့်	Director (DDPC)		
၃	ဦးမျိုးသန့်		အမှတ်(၅၆)၊ ဗိုလ်ချုပ်လမ်း၊ ဧရိမ်းရပ်၊ ထားဝယ်မြို့	
၄	ဦးကျော်မြင့်	Director (DDPC)		
၅	ဦးဇော်ဝင်း	Manager	AIG. G. Ltd.	
၆	ဦးအောင်ဖြိုးဇင်		ထားဝယ် Future Light	
၇	ဦးနိုင်ထိုက်		ဧရိမ်းရပ်၊ ထားဝယ်မြို့	
၈	ဦးမိုးကြည်ထွန်း (MWD)	Media		
၉	Tint Lwin	Hinthar Media	09780070549	
၁၀	ဒေါ်ခင်မာဆွေ	အသင်းဥက္ကဋ္ဌ	09258187833	
၁၁	ဦးနေနိုင်ထွန်း	ရပ်ကွက်လူကြီး	၂၀၁၄၉	
၁၂	ဦးတင်ဝင်း	ရာ့ -	၂၀၆၄၉	
၁၃	ဦးမြင့်	ကျောင်း	၂၃၄၄၄	
၁၄	ဒေါ်သူဇာ	ဘုန်းကျော်ရပ် (Staff)	ဘုန်းကျော်ရပ်	
၁၅	ဒေါ်ဝင်းဝင်းမော်	Staff	ကပေါ်ကုန်ဈေး	
၁၆	ဒေါ်ရွှေဝေအောင်	DDPC		
၁၇	ဒေါ်မောက	ဒုဦးစီးအရာရှိ		
၁၈	ဒေါ်ဝင်းခိုင်ကြည်	ဒုဦးစီး		
၁၉	ဒေါ်ခင်စန်းရီ	ဒုဦးစီးအရာရှိ	ထားဝယ်မြို့	
၂၀	ဒေါ်စီစီထွန်း	DDPC	09-440726079	

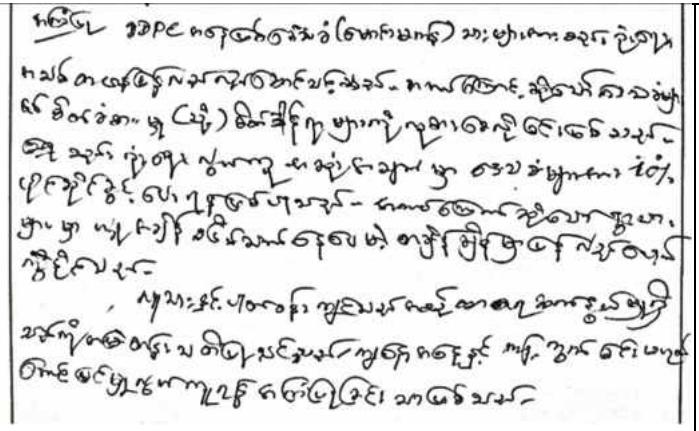
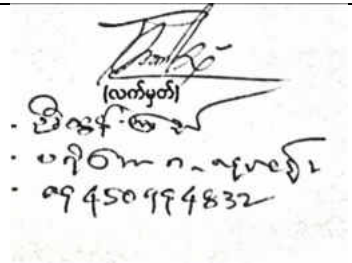
စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	[illegible] (Reception)	09.262788117	[illegible]
	[illegible]	DDPC (SM) QC	09.250834398	[illegible]
	[illegible]	DDPC(SM) Q.C.Super	09250127427	[illegible]
	[illegible]	DDPC (SM) QC	09.781050107	[illegible]
	[illegible]	DDPC supermarket	09.250833605	[illegible]
	[illegible]	DDPC Supermarket Inventory As	09.401478753	[illegible]
	[illegible]	DDPC supermarket	09.254243731	[illegible]
	[illegible]	DDPC supermarke staff	09.250948131	[illegible]
	[illegible]	DDPC supermarke	09448738344	[illegible]
	[illegible]	DDPC Supermarke	09-451061795	[illegible]

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
	[illegible]	DDPC Supermarket	09-761766055	[illegible]
	[illegible]	DDPC Supermarket	09-857967191	[illegible]
	[illegible]	DDPC Supermarket	09-781784057	[illegible]
	[illegible]	DDPC Supermarket	09.788909181	[illegible]
	[illegible]	DDPC Supermarket Admin staff	09.422222124	[illegible]
	[illegible]	Security Officer DDPC	09 254345911	[illegible]
	[illegible] (2)	DDPC Supermarket	09 775319165	[illegible]
	[illegible] (1)	DDPC Supermarket	09.788708974	[illegible]
	[illegible]	DDPC Supermarket	09.420480188	[illegible]
	[illegible]	DDPC Supermarket <Warehouse staff>	09 420493331	[illegible]

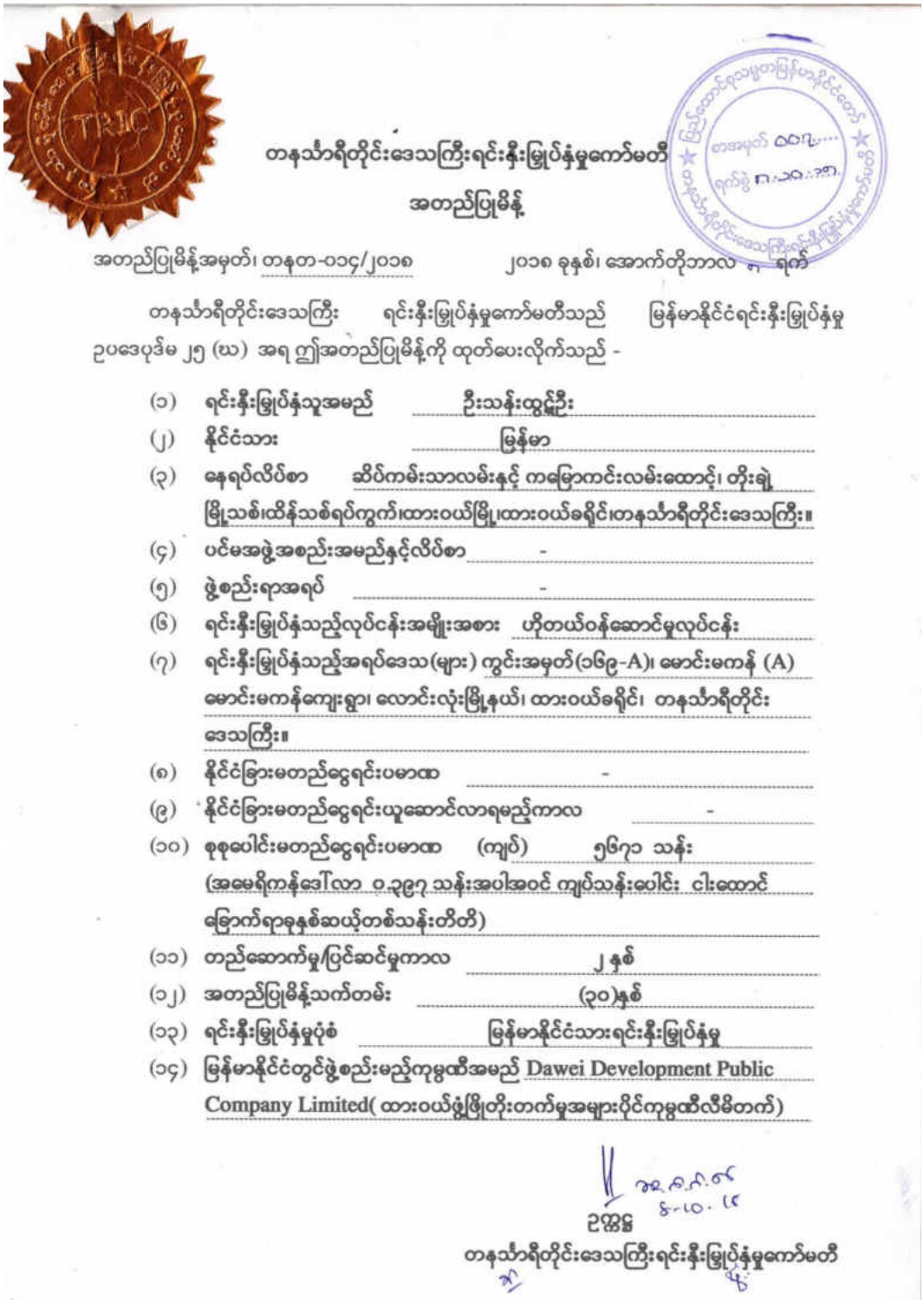
COMMENTS BY SUGGESTION LETTERS DURING SECOND PUBLIC MEETING

စဉ်	အကြံပြုချက်	အကြံပြုဆွေးနွေးသူ	ပြန်လည်ဖြေကြားသူ/ဖြေကြားချက်
၁။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** အကြံပြုဆွေးနွေးထားတာ ကျေးဇူးတင်ပါသည်။ DDPC သည် ဒေသခံများဖြင့် ဖွဲ့စည်းထား သည့် အများပိုင်ကုမ္ပဏီဖြစ်သည့်အတွက် ဒေသအကျိုး ဦးစားပေးဆောင်ရွက်သည့် ကုမ္ပဏီတစ်ခုဖြစ်ပါသည်။ မြန်မာ့ယဉ်ကျေးမှုကို မပျောက်ပျက်စေဘဲ ဒေသ ယဉ်ကျေးမှုကို ထိန်းသိမ်းကာကွယ်ပြီး ဆောင်ရွက်သွားပါမည်။

၂။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** သောက်သုံးရေ သိုလှောင်ကန်တည်ဆောက်ပြီး အသုံးပြုသွားမည်ဖြစ်ပါသည်။ Recycle စနစ်ဖြင့် Water Treatment လုပ်ပြီး Landscape ရေလောင်းသွားပါမည်။ စီမံကိန်းဧရိယာသို့ ရေသယ်ယူခြင်းဖြင့် လည်းကောင်း ၊ သွယ်ယူခြင်းဖြင့် လည်းကောင်း အသုံးပြုသွားနိုင်ရေး စီစဉ်ဆောင်ရွက် လျှက်ရှိပါသည်။
၃။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** ကျေးဇူးတင်ပါသည် ။ သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအတွက် ယခုဆောင်ရွက်နေ သော IEE အကြံပြုချက်များအတိုင်း အလေးထား အကောင်အထည်ဖော်ဆောင်ရွက်သွားပါမည်။

၄။			**ဦးခင်စိုး (ဥက္ကဋ္ဌ၊ DDPC)** DDPC သည် အများပိုင် ကုမ္ပဏီဖြစ်သလို ဒေသအကျိုးအတွက်ဦးစားပေးဆောင်ရွက်နေသည့် ကုမ္ပဏီ တစ်ခုဖြစ်ပါကြောင်း။ DDPC ၏အားနည်းချက်များအား ထောက်ပြပေးခဲ့သောဦးထွန်းကြည်အား ကျေးဇူးတင်ရှိပါကြောင်း။ဒေသခံများမှ CSR အတွက် သဘောတူသည့်အဖွဲ့တစ်ဖွဲ့အား ရွေးချယ်၍ ကော်မတီဖွဲ့ရန် ၊အဖွဲ့အားပိုင်း၍စီမံနိုင်ရန် အတွက်အကြံပြုပါကြောင်း။ယနေ့အစည်းအဝေးသို့ တက်ရောက်လာသည့်ဦးထွန်းကြည်နှင့် အဖွဲ့သည်ဒေသခံများနှင့်အတူစည်းရုံးပြီးပူးပေါင်းဆောင်ရွက်ပေးရန် လိုအပ်ပါကြောင်း။ DDPC သည်ရရှိလာ သည့် ဂင်ငွေအပေါ်တွင် နိုင်ငံတော်အား ကုန်သွယ်ခွန် (၅%) နှင့် (၇%) အထိသွင်းနေပြီး ရရှိလာသည့်အကျိုးအမြတ်ပေါ်တွင်(25%)သွင်းပြီးပိုသည့်ငွေကိုသာလျှင် ခွဲဝေရမည်ဖြစ်သောကြောင့် (10%)အတွက် နည်းလမ်း ရှာပေးရမည်ဖြစ်ပါကြောင်း။

ခွင့်ပြုမိန့်များ



တနင်္သာရီတိုင်းဒေသကြီးရင်းနှီးမြှုပ်နှံမှုကော်မတီ

အတည်ပြုမိန့်

အတည်ပြုမိန့်အမှတ်၊ တနတ-၀၁၄/၂၀၁၈ ၂၀၁၈ ခုနှစ်၊ အောက်တိုဘာလ ၈ ရက်

တနင်္သာရီတိုင်းဒေသကြီး ရင်းနှီးမြှုပ်နှံမှုကော်မတီသည် မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေပုဒ်မ ၂၅ (ဃ) အရ ဤအတည်ပြုမိန့်ကို ထုတ်ပေးလိုက်သည် -

(၁) ရင်းနှီးမြှုပ်နှံသူအမည် ဦးသန်းထွဋ်ဦး

(၂) နိုင်ငံသား မြန်မာ

(၃) နေရပ်လိပ်စာ ဆိပ်ကမ်းသာလမ်းနှင့် ကမြောကင်းလမ်းထောင့်၊ တိုးချဲ့မြို့သစ်၊ထီနန်းသစ်ရပ်ကွက်၊ထားဝယ်မြို့၊ထားဝယ်ခရိုင်၊တနင်္သာရီတိုင်းဒေသကြီး။

(၄) ပင်မအဖွဲ့အစည်းအမည်နှင့်လိပ်စာ -

(၅) ဖွဲ့စည်းရာအရပ် -

(၆) ရင်းနှီးမြှုပ်နှံသည့်လုပ်ငန်းအမျိုးအစား ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်း

(၇) ရင်းနှီးမြှုပ်နှံသည့်အရပ်ဒေသ(များ) ကွင်းအမှတ်(၁၆၉-A)၊ မောင်းမကန် (A) မောင်းမကန်ကျေးရွာ၊ လောင်းလုံးမြို့နယ်၊ ထားဝယ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး။

(၈) နိုင်ငံခြားမတည်ငွေရင်းပမာဏ -

(၉) နိုင်ငံခြားမတည်ငွေရင်းယူဆောင်လာရမည့်ကာလ -

(၁၀) စုစုပေါင်းမတည်ငွေရင်းပမာဏ (ကျပ်) ၅၆၇၁ သန်း (အမေရိကန်ဒေါ်လာ ၀.၃၉၇ သန်းအပါအဝင် ကျပ်သန်းပေါင်း ငါးထောင် ခြောက်ရာခုနှစ်ဆယ့်တစ်သန်းတိတိ)

(၁၁) တည်ဆောက်မှု/ပြင်ဆင်မှုကာလ ၂ နှစ်

(၁၂) အတည်ပြုမိန့်သက်တမ်း (၃၀)နှစ်

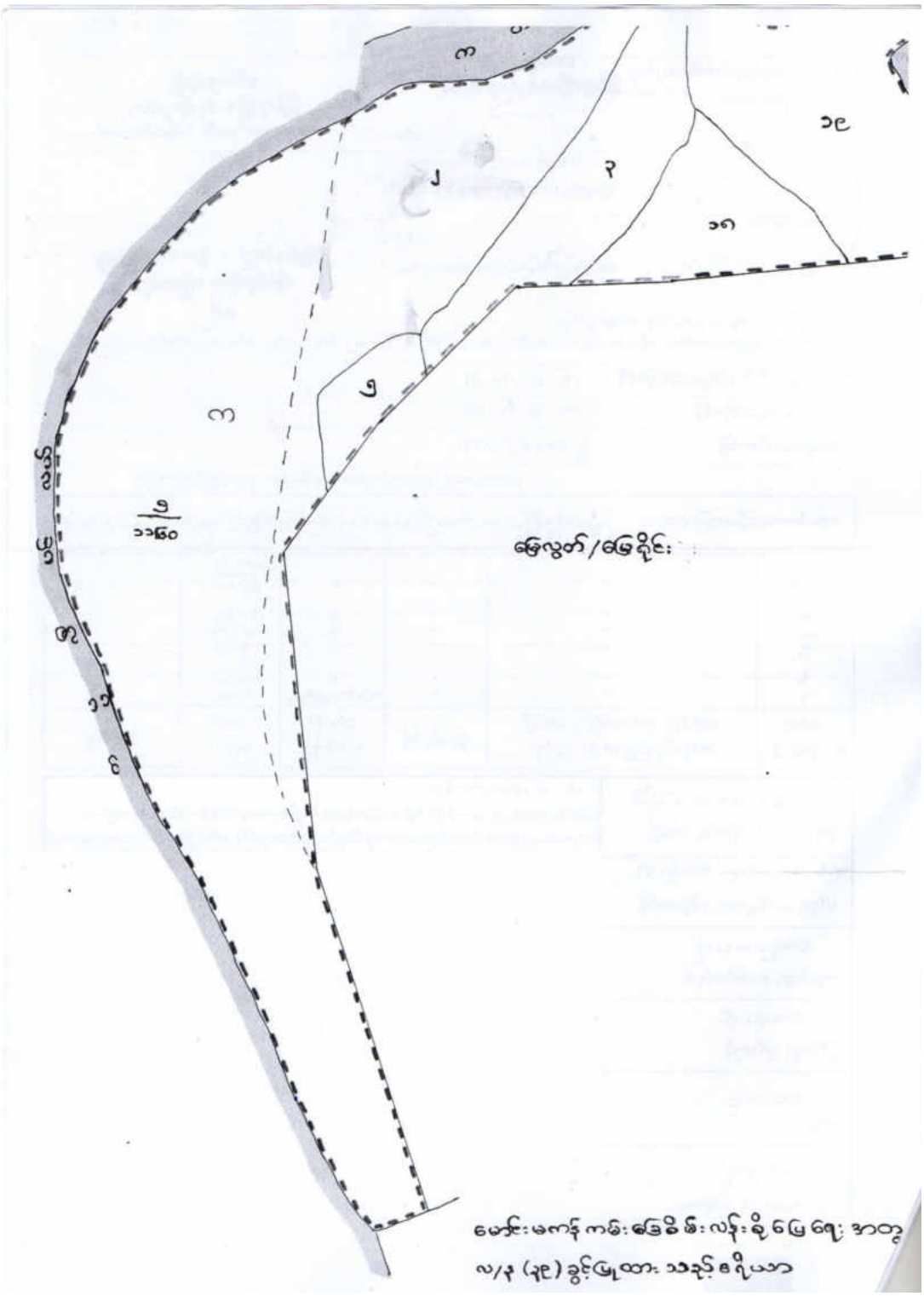
(၁၃) ရင်းနှီးမြှုပ်နှံမှုပုံစံ မြန်မာနိုင်ငံသားရင်းနှီးမြှုပ်နှံမှု

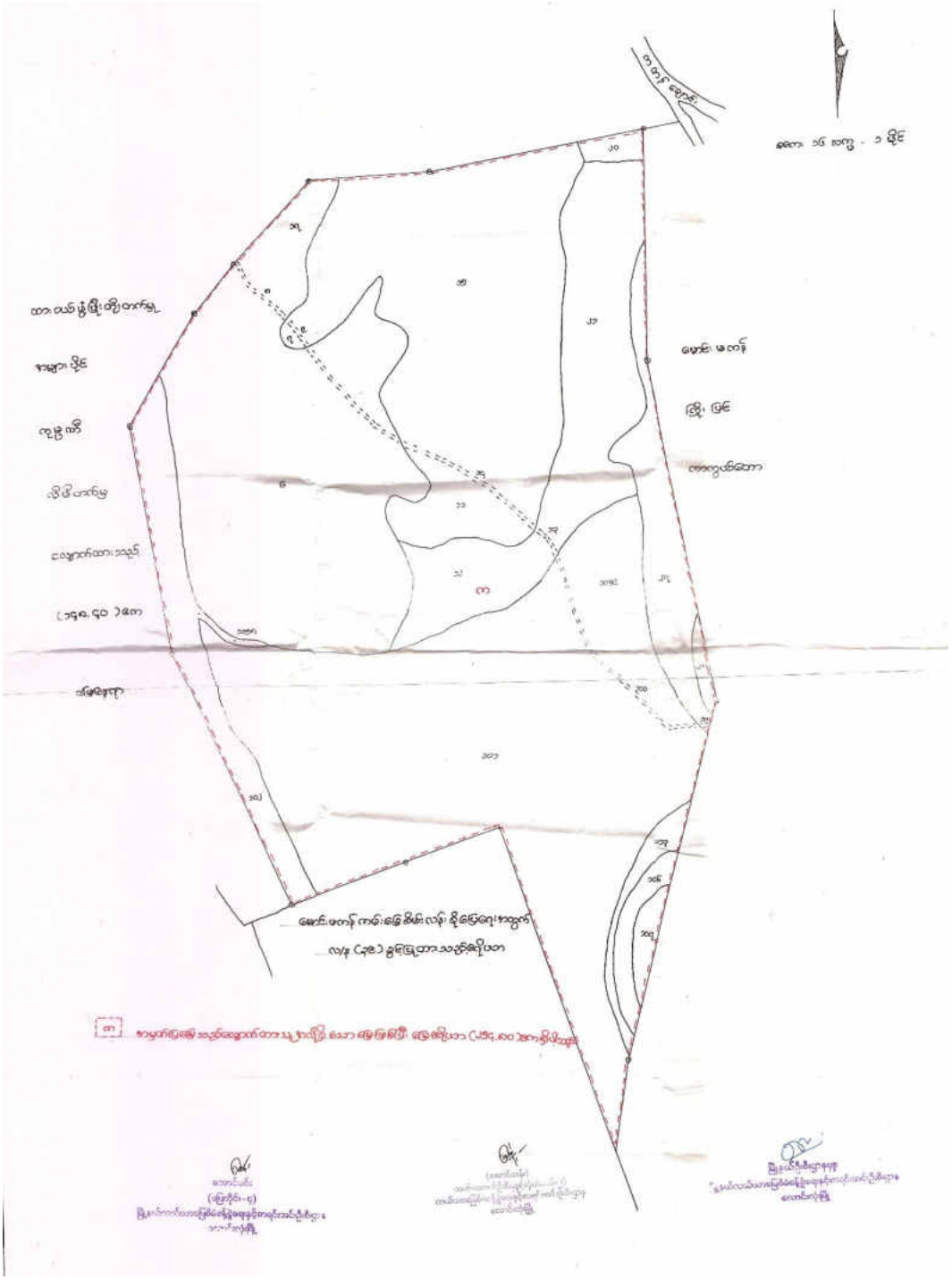
(၁၄) မြန်မာနိုင်ငံတွင်ဖွဲ့စည်းမည့်ကုမ္ပဏီအမည် Dawei Development Public Company Limited(ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှုအများပိုင်ကုမ္ပဏီလီမိတက်)

၈-၁၀-၁၈

ဥက္ကဋ္ဌ

တနင်္သာရီတိုင်းဒေသကြီးရင်းနှီးမြှုပ်နှံမှုကော်မတီ


မြေလွတ်/မြေရိုင်း



တိုင်းဒေသကြီး/ ပြည်နယ် တနင်္သာရီ	
ခရိုင် ထားဝယ်	
မြို့နယ်/ မြို့နယ်ခွဲ လောင်းလုံး	
ရပ်ကွက်/ ကျေးရွာအုပ်စု မောင်းမကန်	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၁၆၉ - A / မောင်းမကန် (A)	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၂ + ၃ + ၅ + ၁၈ + ၁၉ + ၅/၁၁၆၀	[illegible] မြေလွတ်/မြေရိုင်း အသုံးပြုခွင့် လျှောက်ထားသော မြေနေရာဖြစ်ပြီး ဧရိယာ (၁၄၈.၄၀) ဧက ရှိသည်။

မြေ ဦးပိုင်ကွက် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ ပိုင်ရှင်/ ဂရန်ရှင်/ အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၂	-	-	မြေလွတ်/မြေရိုင်း	၃၀.၁၉	
၃	-	-	"	၁၄.၀၇	
၅	-	-	"	၃.၆၇	
၁၈	-	-	"	၁၁.၆၆	
၁၉	-	-	"	၂၂.၉၃	
၅/၁၁၆၀	-	-	"	၆၅.၈၈	
				၁၄၈.၄၀	

ရေးကူးပေးသည့်အကြောင်းအရာ	ဟိုတယ်ဇုန်တည်ဆောက်နိုင်ရေးအတွက် မြေလွတ်/မြေရိုင်း၊ အသုံးပြုခွင့်လျှောက်ထား၍

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်။)

လျှောက်ထားသူအမည် - ဦးလေမြေအေး

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၂၈. ၅. ၂၀၁၉

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၂၈. ၅. ၂၀၁၉

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၉-၂၀၁၆) ခုနှစ် အတွက် နောက်ဆက်တွဲတိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

အမှုထမ်း/မြေတိုင်းစာရေးလက်မှတ် - [illegible]

နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည်။

လက်ထောက်ဦးစီးမှူးလက်မှတ် - [illegible]

နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် [illegible]

မြေစာရင်းပုံစံ – ၁၀၅

2014 - 0391475

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

အထူးကပ်တံဆိပ်ခေါင်း
SPECIAL ADHESIVE
၅၀ကျပ် K 50

တိုင်းဒေသကြီး/ ပြည်နယ် တနင်္သာရီ	
ခရိုင် ထားဝယ်	
မြို့နယ်/ မြို့နယ်ခွဲ လောင်းလုံး	
ရပ်ကွက်/ ကျေးရွာအုပ်စု မောင်းမကန်	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၁၆၉.A မောင်းမကန်ဘေး	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ပေါင်း ၉၂၂ ကွက်	

ဦးပိုင် မြေကွက် အမှတ်ပေါင်း	အခွန်စည်းကြပ်ခံရသူ/ ပိုင်ရှင်/ ဂရန်ရှင်/ အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၉၂၂ ကွက်	-	-	မြေလွတ်မြေရိုင်း	၂၅၄.၈၀	

ရေးကူးပေးသည့်အကြောင်းအရာ	မြေလွတ်၊ မြေလပ်နှင့် မြေရိုင်းများ လုပ်ပိုင်ခွင့်၊ အသုံးပြုခွင့်ရရှိရန်လျှောက်ထားခြင်း

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်။)

လျှောက်ထားသူအမည် – ဦးလေးမြေအေး (ထားဝယ်ဖွံ့ဖြိုးတိုးတက်မှုအများပိုင်ကုမ္ပဏီ)

လျှောက်လွှာတင်သည့်နေ့စွဲ – ၁၂. ၁၁. ၂၀၁၉

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ –

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၉-၂၀၂၀) ခုနှစ် အတွက် မြေကွက်တွဲတိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ဒေါ်အောင်မင်း
(မြေတိုင်း–၄)
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
လောင်းလုံးမြို့

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် –
နေ့စွဲ –

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည်။
လက်ထောက်ဦးစီးမှူးလက်မှတ် –
နေ့စွဲ –

မြို့နယ်ဦးစီးဌာနမှူး
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
လောင်းလုံးမြို့

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် နေ့စွဲ

APPENDIX IV

WATER TEST RESULT

Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Rood, Ahlone Township, Yangon, Myanmar.
Tel: +9567-431139, 431138, +951-221387, 210844,
Fax: +9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	6-7-2018
		Reported Date:	10-7-2018
Site Name:	အသုံးပြုမည့်ရေ DDPC	**Reg no:**	147/2018
Address:	Ever Green Tech		

Analyses	Ref: value	Unit	Results	Method
Color	15	TCU	1	*Platinum Cobalt Method*
Turbidity	5	NTU	0.05	*Absorption Method*
Arsenic	0.05	mg/L	5	*Arsenator*
Chloride	250	mg/L	140	*Argentometric Method*
Hardness	500	mg/L as $CaCO_3$	0.92	*Unit Dose Vials Method*
Iron	1	mg/L	0.2	*Bipyridyl Method*
pH	6.5 – 8.5		6.2	*Ion selected Electrode Method*
Total Dissolved Solid	1000	mg/L	60	*Ion selected Electrode Method*
Sulphate	250	mg/L	7	Barium Chloride Method
Magnesium	150	ppm	1.0	Magnecol Method
Zinc	3	mg/L	0.04	*Zincon Method*
Electro conductivity	1500	µmhos/cm	60	*Ion selected Electrode Method*

Reference: National Drinking Water Quality Standard

Tested by	Checked by	Signed by
OH (Lab)	Laboratory Officer	Dr. Kay Khine Aye
U Zin Min Thu.	Daw Aye Aye Thinn	Deputy Director
MLT. G. II		Occupational and Environmental Health Division

OEHDlab results (2018)/Drinking Water

Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Rood, Ahlone Township, Yangon, Myanmar.
Tel: +9567-431139, 431138, +951-221387, 210844,
Fax: +9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	6-7-2018
		Reported Date:	10-7-2018
Site Name:	DDPC ပင်လယ်ရေ	**Reg no:**	146/2018
Address:	Ever Green Tech		

Analyses	Ref: value	Unit	Results	Method
Color	15	TCU	1	*Platinum Cobalt Method*
Turbidity	5	NTU	0.05	*Absorption Method*
Arsenic	0.05	mg/L	0	*Arsenator*
Chloride	250	mg/L	370	*Argentometric Method*
Hardness	500	mg/L as $CaCO_3$	240	*Unit Dose Vials Method*
Iron	1	mg/L	0.16	*Bipyridyl Method*
pH	6.5 – 8.5		6.2	*Ion selected Electrode Method*
Total Dissolved Solid	1000	mg/L	>4000	*Ion selected Electrode Method*
Sulphate	250	mg/L	98	Barium Chloride Method
Magnesium	150	ppm	56.0	Magnecol Method
Zinc	3	mg/L	0.03	*Zincon Method*
Electro conductivity	1500	µmhos/cm	>6000	*Ion selected Electrode Method*

Reference: National Drinking Water Quality Standard

Tested by	Checked by	Signed by
OH (Lab)	Laboratory Officer	Dr. Kay Khine Aye
U Zin Min Thu	Daw Aye Aye Thinn	Deputy Director
MLT. G II		Occupational and Environmental Health Division

OEHDlab results (2018)/Drinking Water