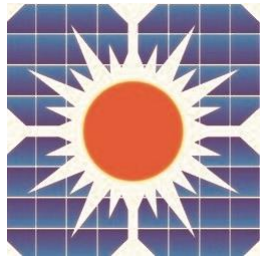


Environmental Monitoring Report
For
30 MW Ground Mounted Solar Power Plant Project
Connected to Thapyaywa Substation
(Operation Phase)

Proposed by



Clean Power Energy Co., Ltd.

Prepared by



E Guard Environmental Services

May, 2023

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1. METHODOLOGY

Baseline environmental parameters and sampling locations were defined according to the objectives for environmental impact assessment, and monitoring purposes. Locations for sampling and analysis of water quality, ambient air quality and noise level of the project site were identified by e Guard Environmental Services Co., Ltd.

1.1 Ambient Air Quality

The emissions of dust particles and gases were measured for 24hrs continuously at the selected sites using the Environmental Perimeter Air Station (EPAS). The results were compared with National Environmental Quality Guidelines NEQG, American Conference of Governmental Industrial Hygienists (ACGIH) and National Ambient Air Quality Standards (NAAQS). EPAS provides direct readings in real time with data-logging capabilities. Air quality is composed of dust and gas emissions of the ambient air.

Table 1. 1 Ambient Air Quality Measurement

Ambient Air Quality (1 location)	
Gas Emission	CO, CO ₂ , SO ₂ , NO ₂
Dust Emission	PM ₁₀ , PM _{2.5}

1.2 Ambient Noise

Noise level LAeq (dBA) will be measured at the selected locations that can reflect the exposure of the nearest local community and sensitive locations. Duration and frequency were measured for 24hrs continuously at the selected site using the Sound Pressure Level Meter.

The monitoring procedures, data analysis and interpretation were carried out in accordance with the instrument's manufacture and National Environmental Quality (Emission) Guidelines, World Health Organization (WHO) and International Finance Corporation (IFC) guidelines in order to be in line with Environmental Conservation Department, Ministry of Natural Resources and Environment Conservation (MONREC). "National Environmental Quality (Emission) Guidelines" for Myanmar was also presented the value of noise level as LAeq (dBA).

Table 1. 2 Noise level monitoring

Noise monitoring (2 locations)	
Noise Emission	LAeq (dBA) (1hrs, 24 hrs.)

Table 1. 3 Equipment used to measure ambient air and noise measurement

<p>Davis Vantage Pro2 Wireless Weather Station Provides detailed current weather conditions and expanded forecasts - all at a glance The Vantage Pro2 uses a frequency-hopping spread spectrum radio from 902 MHz to 928 MHz to transmit and receive data up to 1,000' (300m) line of sight. In addition, the weather station</p>	
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<p>features a bubble level, improved anemometer base, redesigned wind cups, and factory-calibrated wind direction. The integrated sensor suite combines temperature and humidity sensors, rain collector with an aluminum-plated tipping bucket, and anemometer into one package for easy setup. Measure inside and outside temperature and humidity, heat index, barometric pressure, dew point, rainfall, wind direction and speed, and wind chill.</p>	
<p>Haz-Scanner EPAS PM₁₀, PM_{2.5}, NO₂, SO₂, CO, CO₂, Temperature, and Relative Humidity</p>	
<p>Digital Sound Level Meter Noise</p>	

Figure 1. 1 Air Quality Measuring during Operation Period

	<p>Air, Noise quality measuring at Thapyaywa Solar Power Project 09.01.2023 to 10.01.2023 (at source project site)</p>
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1.3 Water Quality

Water samples were collected on site with appropriate sampling equipment and procedures. The sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48hrs.

The sampling and survey team has a list of local laboratories providing analytical services for ground water, waste water and surface water quality analysis. Up to this date, there is no laboratory having accredited certification for water quality testing (environmental analysis) in

Myanmar. SGS (Myanmar), ISO (Myanmar). Laboratories have used for water quality analysis among the list of laboratories. These laboratories have been recognized as a long-term establishment in Myanmar and employed qualified technical staffs.

The following laboratories were used for analysis of water and parameter shown in the **Table 1. 4.**

1. PRO Lab, No. (9), Sabae Housing, Pyi Htaung Su Road, (26) Ward, South Dagon Tsp, Yangon, Myanmar. Tel: 09 893 767424
2. Water Quality Laboratory, Forest Research Institute, Yezin, Nay Pyi Taw. Tel: 09 430 19169, 09 420 705131

Table 1. 4 Environmental Quality Parameters for Water quality

<i>Waste Water Parameters (1 location)</i>	
Physical Parameter	Total Suspended Solids
Chemical Parameter	BOD, COD, pH
Biological Parameter	Total Coliform Bacteria
Nutrients	Total Nitrogen, Total Phosphorus
Compounds	Oil & grease
<i>Ground Water Parameters (1 location)</i>	
Physical Parameter	Total Suspended Solids, Color, Turbidity
Chemical Parameter	BOD, COD, pH, EC, Total Alkalinity
Biological Parameter	Total Coliform Bacteria
Metal	Iron, Manganese
Nutrients	Total Nitrogen, Total Phosphorus, Chloride
Compounds	Oil & grease

Water samplings are conducted using the following equipment as shown in figure (**Table 1. 5**).

Table 1. 5 Equipment for Water Sampling

<p>HORIBA U-50, Multiparameter Water Quality Meter Multiple sensors allow for the measurement of 11 parameters simultaneously. (pH, pH(mv), ORP, DO, Salinity, TDS, Seawater Specific Gravity, Temperature, Turbidity, Water depth) Patented auto-calibration features provide hassle free calibration of pH, dissolved oxygen, conductivity and</p>	
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turbidity.

Ultra-sensitive Turbidity Sensors (Models U-50) Precision has been improved over conventional instruments.

Improved stability of the dissolved oxygen sensor has been achieved with a new 3 electrode design for fast response and polarographic sensor for ease of maintenance.

pH and ORP electrodes can be replaced individually to reduce replacement costs.



Water Sampling Bottle



1.4 Monitoring and Sampling Locations

Sampling locations were confirmed by environmental specialist on site before doing the sampling. Water quality sampling locations consist of one waste water locations (WWQ: outlet of waste water channel from the project site) and one ground water location (GWQ: Project Site) which is situated near the project site). Air quality was monitored at the selected one location (Thapyaywa solar power project site (source) that can get results of the existing ambient air quality).

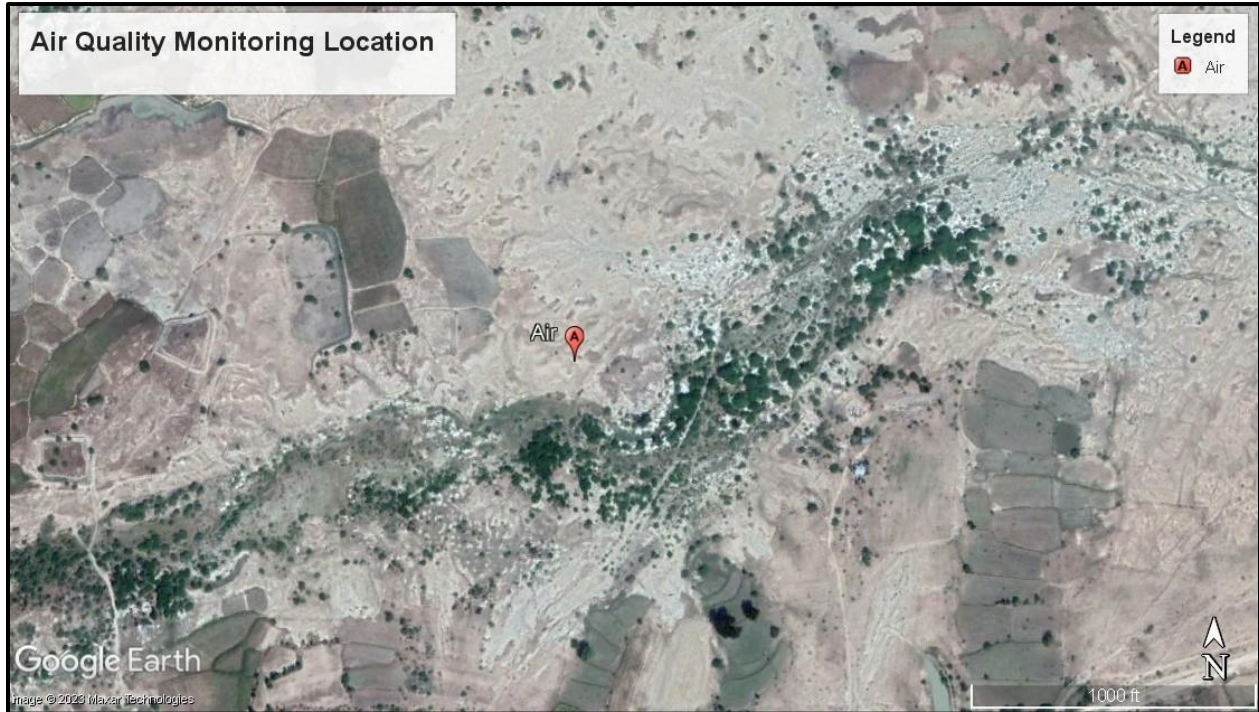


Figure 1. 2 Air Quality Monitoring Locations of Thapyaywa Solar Power Project

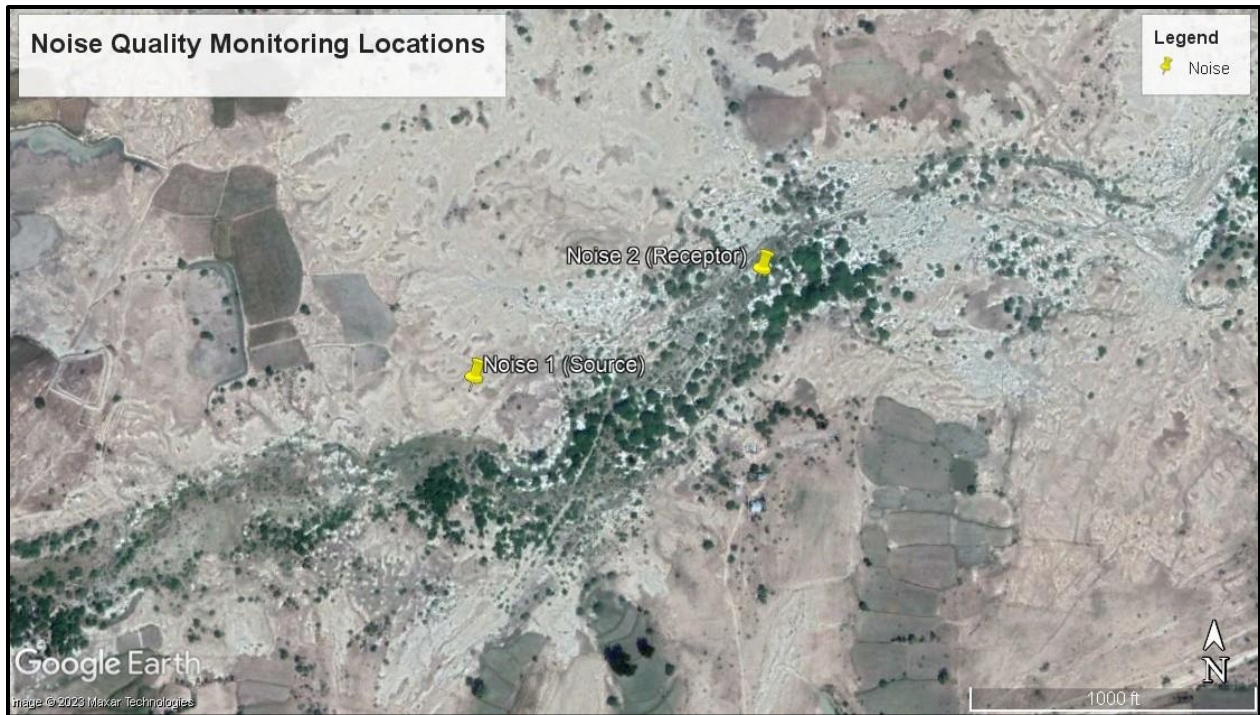


Figure 1. 3 Noise Quality Monitoring Locations of Thapyaywa Solar Power Project



Figure 1. 4 Water Quality Sampling Locations of Thapyaywa Solar Power Project

Table 1. 6 Locations of Environmental Quality sampling points

Locations No.	Points	Coordinate	Locations
Ambient Air Quality Monitoring Location			
1.	AQ1	Lat - 20°58'31.82"N, Long - 96° 0'34.20"E	Project Site
Noise Quality Monitoring Locations			
1.	NQ1	Lat - 20°58'31.82"N, Long - 96° 0'34.20"E	Project Site
2.	NQ2	Lat - 20°58'35.94"N, Long - 96° 0'44.94"E	Project Site (Receptor)
Waste Water Quality Monitoring Location			
1.	WWQ	Lat - 20°58'30.27"N, Long - 96° 0'34.19"E	Outlet of waste water cannel from the project site
Ground Water Quality Sampling Location			
1.	GWQ	Lat - 20°58'35.38"N, Long - 96° 0'45.63"E	Project Site

2. ENVIRONMENTAL QUALITY

2.1 Ambient Air Quality

The air quality monitoring was done at selected locations during 09th to 10th January 2023. During this survey, these parameters were measured with adequate devices named Environmental Perimeter Air Station (EPAS) viz; Particulate Matters (PM₁₀ and PM_{2.5}) and gases CO₂, CO, SO₂, NO₂ via 24-hour basis. The results and guidelines of all emission pollutants are shown in table.

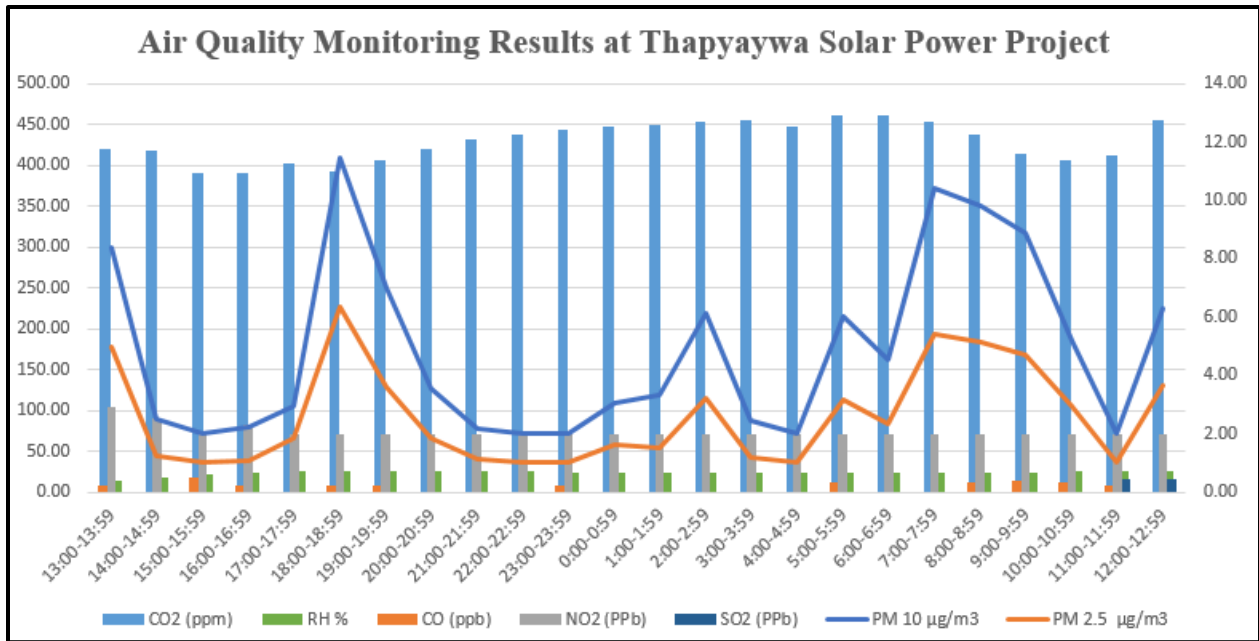


Figure 2. 1 PM Monitoring Results at Thapyaywa Solar Power Project

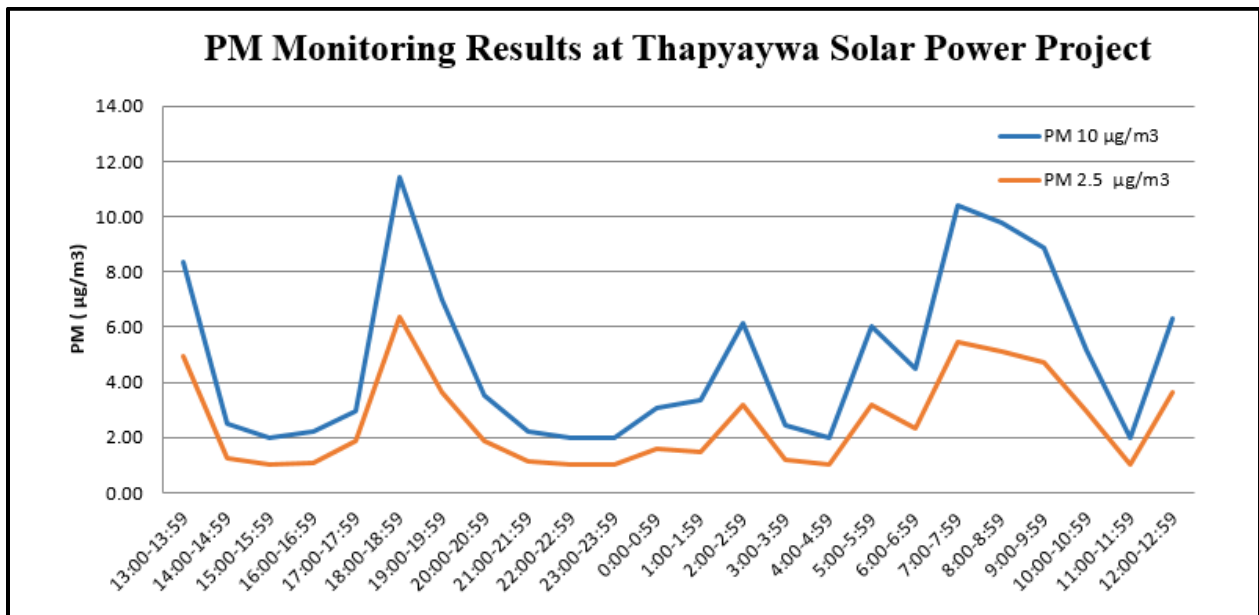


Figure 2. 2 Fluctuation of Air Pollutants during Dial Cycle at Thapyaywa Solar Power Project

Particulate matters (PM₁₀ and PM_{2.5}) results are within guideline values as shown in table. Atmospheric particulate matters such as PM₁₀ and PM_{2.5} have their ability to reach the deepest part of lungs and so affect respiratory process. In this air quality survey of the project site, the surveyed results of these particulate matters gathered from EPAS. The results with one-hour interval are shown in the following table.

Sulfur Dioxide (SO₂) is generated from combustion of fuels such as oil and coal, and as by-

product from some chemical production or wastewater treatment processes. On-road and off-road vehicles are also emission source of SO₂. SO₂ irritates the respiratory tract, injures lung tissues and reduces visibility and level of sunlight. The emission can be controlled by implementation of manufacturer recommended engine maintenance programs, good driving practices, installing and maintaining emissions control devices, and implementing a regular vehicle maintenance and repair program.

Nitrogen Oxides (NO_x) in the ambient air consist of nitric oxide (NO), nitrogen dioxide (NO₂) and nitrous oxide (N₂O). NO₂ is formed by chemical reaction of NO and ozone. The main sources of NO₂ are combustion of fuel and on-road and off-road vehicles. NO₂ decreases lung function and resistance to infection. The gas emission can be monitored by combustion modification, flue gas recirculation, water/ steam injection and the same measures for SO₂ reduction.

Likewise, **Carbon Monoxide (CO) and Carbon dioxide (CO₂)** have the same emission sources and mitigation measures for SO₂ and NO₂. They are poisonous gas and cause damage to the respiratory organ. Guidelines 2013, adopted threshold limit values of CO₂ is 5,000 ppm for 8-hour, time-weighted average. Thus, it can be concluded that the existing CO₂ level is acceptable for human health.

Detail results and variation patterns with one-hour interval of pollutants are shown in tables and figures below. Results of average, peak and minimum of a day are calculated in the table.

Table 2. 1 Air Pollutants Emission Results (Thapyaywa Solar Power Project)

Date	Time		CO ₂ (ppm)	CO (ppb)	NO ₂ (ppb)	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	RH %	SO ₂ (ppb)
09.01.2023	13:00-13:59	Average	419.17	0.20	2.90	8.37	4.97	13.45	0.00
09.01.2023	14:00-14:59	Average	418.17	0.00	2.52	2.48	1.23	17.42	0.00
09.01.2023	15:00-15:59	Average	390.85	0.52	2.03	2.00	1.00	21.07	0.00
09.01.2023	16:00-16:59	Average	389.87	0.22	2.30	2.22	1.10	23.30	0.00
09.01.2023	17:00-17:59	Average	402.78	0.00	2.00	2.93	1.85	24.95	0.00
09.01.2023	18:00-18:59	Average	391.62	0.20	2.00	11.43	6.37	25.00	0.00
09.01.2023	19:00-19:59	Average	406.63	0.22	2.00	6.98	3.62	25.00	0.00
09.01.2023	20:00-20:59	Average	420.78	0.00	2.00	3.55	1.85	25.00	0.00
09.01.2023	21:00-21:59	Average	432.13	0.00	2.00	2.20	1.13	25.00	0.00
09.01.2023	22:00-22:59	Average	437.68	0.00	2.00	2.00	1.00	25.00	0.00
09.01.2023	23:00-23:59	Average	444.05	0.20	2.00	2.00	1.00	24.47	0.00
10.01.2023	0:00-0:59	Average	446.48	0.00	2.00	3.07	1.60	24.00	0.00
10.01.2023	1:00-1:59	Average	449.12	0.00	2.00	3.33	1.50	24.00	0.00
10.01.2023	2:00-2:59	Average	454.12	0.00	2.00	6.15	3.20	24.00	0.00
10.01.2023	3:00-3:59	Average	455.15	0.00	2.00	2.43	1.20	24.00	0.00
10.01.2023	4:00-4:59	Average	448.20	0.00	2.00	2.00	1.00	23.37	0.00
10.01.2023	5:00-5:59	Average	461.30	0.32	2.00	6.03	3.17	23.00	0.00
10.01.2023	6:00-6:59	Average	460.22	0.00	2.00	4.52	2.33	23.00	0.00
10.01.2023	7:00-7:59	Average	454.17	0.00	2.00	10.42	5.43	23.47	0.00
10.01.2023	8:00-8:59	Average	436.90	0.33	2.00	9.78	5.12	24.00	0.00
10.01.2023	9:00-9:59	Average	414.02	0.37	2.00	8.88	4.72	24.00	0.00
10.01.2023	10:00-10:59	Average	405.63	0.33	2.00	5.18	2.93	24.87	0.00
10.01.2023	11:00-11:59	Average	411.68	0.20	2.00	2.00	1.00	25.47	0.43
10.01.2023	12:00-12:59	Average	455.70	0.00	2.00	6.30	3.65	26.00	0.42
Average			429.43	0.13	2.07	4.84	2.58	23.45	0.04
1 hour Minimum			389.87	0.00	2.00	2.00	1.00	13.45	0.00
1 hour Maximum			461.30	0.52	2.90	11.43	6.37	26.00	0.43

Table 2. 2 Air Emission Levels (Standard)

No.	Parameter	Unit	Maximum Concentration	
			National	Average Period
1.	Carbon monoxide	mg/m ³	9	8-hour
2.	Carbon dioxide	ppm	5000	8-hour
3.	Sulfur dioxide	μg/m ³	20 500	24-hour 10-minute
4.	Nitrogen dioxide	μg/m ³	40 200	1 year 1 hour
5.	Particulate matter PM ₁₀	μg/m ³	20 50	1-year 24-hour
6.	Particulate matter PM _{2.5}	μg/m ³	10 25	1-year 24-hour

Source: Myanmar National Environmental Quality (Emission) Guidelines, National Ambient Air Quality Standards (NAAQS), American Conference of Governmental Industrial Hygienists (ACGIH).

Detail results with one-hour interval of pollutants are shown in **Table 2. 1**. The average, peak and minimum values of results per day are calculated. All results are under the Myanmar National Environmental Quality (emission) Guidelines.

Table 2. 3 Observed Ambient Air Quality Results from Selected Points

Parameters	Observed Value	NEQG Guidelines Value	ACGIH Guidelines Value	NAAQS Guidelines Value	Unit	Averaging Period
PM ₁₀	4.84	50	-	-	μg/m ³	24hrs
PM _{2.5}	2.58	25	-	-	μg/m ³	24hrs
CO	0.00019	-	-	9	ppm	8hrs
CO ₂	445.87	-	5000	-	ppm	8hrs
SO ₂	0.093	20	-	-	μg/m ³	24hrs
NO ₂	5.45	200	-	-	μg/m ³	1hrs

2.2 Ambient Noise and Vibration

Ambient noise level for the proposed project was measured with Digital Sound Level Meter at the project site. The noise level measurement is conducted at Thapyaywa solar power project points: these points are nearly the air monitoring points and staff housing on 09th to 10th January 2023. Measuring period is 24 hours continuously. The observed values are described in **Table 2. 4** and **Table 2. 4** and the following figures are noise level measurement at the proposed project.

Table 2. 4 Observed Values of Noise Level Measurement at Thapyaywa Solar Project Site
(Source)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	10.01.2022	7:00:13-7:59:13	48.62	A	Day	48.71
2	10.01.2022	8:00:13-8:59:13	53.25	A	Day	
3	10.01.2022	9:00:13-9:59:13	47.33	A	Day	
4	10.01.2022	10:00:13-10:59:13	47.00	A	Day	
5	10.01.2022	11:00:13-11:59:13	51.22	A	Day	
6	10.01.2022	12:00:13-12:59:13	48.94	A	Day	
7	09.01.2022	13:00:13-13:59:13	46.57	A	Day	
8	09.01.2022	14:00:13-14:59:13	45.92	A	Day	
9	09.01.2022	15:00:13-15:59:13	47.07	A	Day	
10	09.01.2022	16:00:13-16:59:13	47.81	A	Day	
11	09.01.2022	17:00:13-17:59:13	48.92	A	Day	
12	09.01.2022	18:00:13-18:59:13	50.48	A	Day	
13	09.01.2022	19:00:13-19:59:13	49.54	A	Day	
14	09.01.2022	20:00:13-20:59:13	49.11	A	Day	
15	09.01.2022	21:00:13-21:59:13	48.88	A	Day	
16	09.01.2022	22:00:13-22:59:13	49.92	A	Night	50.22
17	09.01.2022	23:00:13-23:59:13	49.00	A	Night	
18	10.01.2022	0:00:13-0:59:13	49.13	A	Night	
19	10.01.2022	1:00:13-1:59:13	49.30	A	Night	
20	10.01.2022	2:00:13-2:59:13	47.99	A	Night	
21	10.01.2022	3:00:13-3:59:13	47.49	A	Night	
22	10.01.2022	4:00:13-4:59:13	49.41	A	Night	
23	10.01.2022	5:00:13-5:59:13	51.22	A	Night	
24	10.01.2022	6:00:13-6:59:13	58.53	A	Night	
Average			49.28			

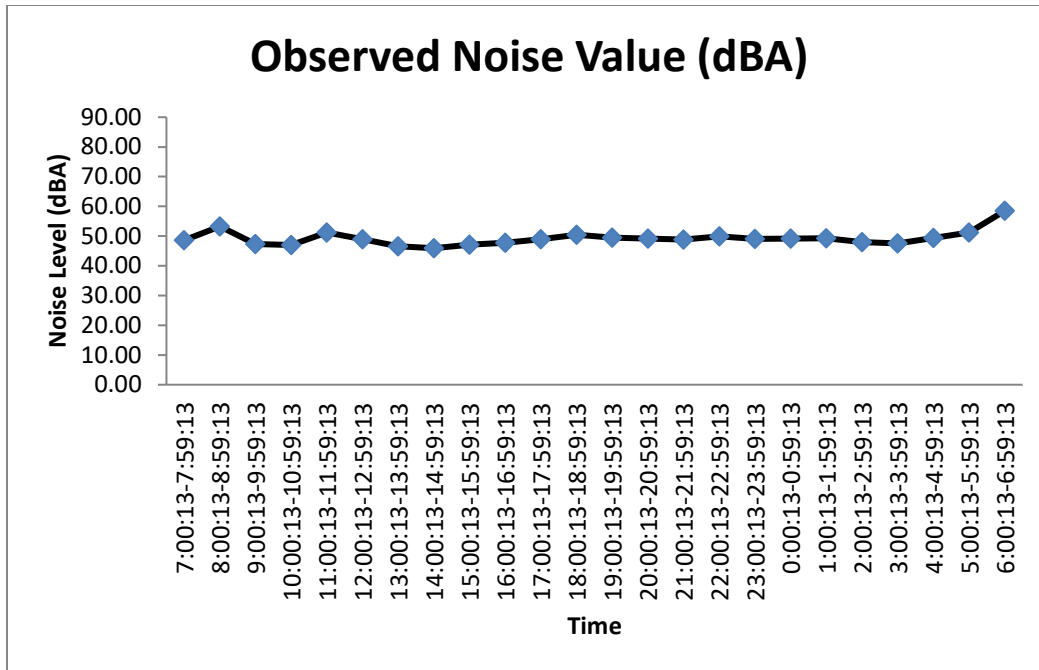


Figure 2. 3 Noise Level at Thapyaywa Solar Project Site (Source)

Table 2. 5 Observed Values of Noise Level Measurement at Staff Housing (Receptor)

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	10.01.2022	7:00:13-7:59:13	48.70	A	Day	46.72
2	10.01.2022	8:00:13-8:59:13	44.25	A	Day	
3	10.01.2022	9:00:13-9:59:13	49.60	A	Day	
4	10.01.2022	10:00:13-10:59:13	57.70	A	Day	
5	10.01.2022	11:00:13-11:59:13	46.43	A	Day	
6	10.01.2022	12:00:13-12:59:13	45.48	A	Day	
7	10.01.2022	13:00:13-13:59:13	46.57	A	Day	
8	09.01.2022	14:00:13-14:59:13	46.86	A	Day	
9	09.01.2022	15:00:13-15:59:13	45.36	A	Day	
10	09.01.2022	16:00:13-16:59:13	52.29	A	Day	
11	09.01.2022	17:00:13-17:59:13	47.04	A	Day	
12	09.01.2022	18:00:13-18:59:13	46.90	A	Day	
13	09.01.2022	19:00:13-19:59:13	46.32	A	Day	
14	09.01.2022	20:00:13-20:59:13	41.47	A	Day	
15	09.01.2022	21:00:13-21:59:13	35.82	A	Day	
16	09.01.2022	22:00:13-22:59:13	35.72	A	Night	37.43
17	09.01.2022	23:00:13-23:59:13	37.29	A	Night	
18	10.01.2022	0:00:13-0:59:13	36.86	A	Night	

19	10.01.2022	1:00:13-1:59:13	34.13	A	Night
20	10.01.2022	2:00:13-2:59:13	35.68	A	Night
21	10.01.2022	3:00:13-3:59:13	34.96	A	Night
22	10.01.2022	4:00:13-4:59:13	37.52	A	Night
23	10.01.2022	5:00:13-5:59:13	39.63	A	Night
24	10.01.2022	6:00:13-6:59:13	45.08	A	Night
Average			43.24		

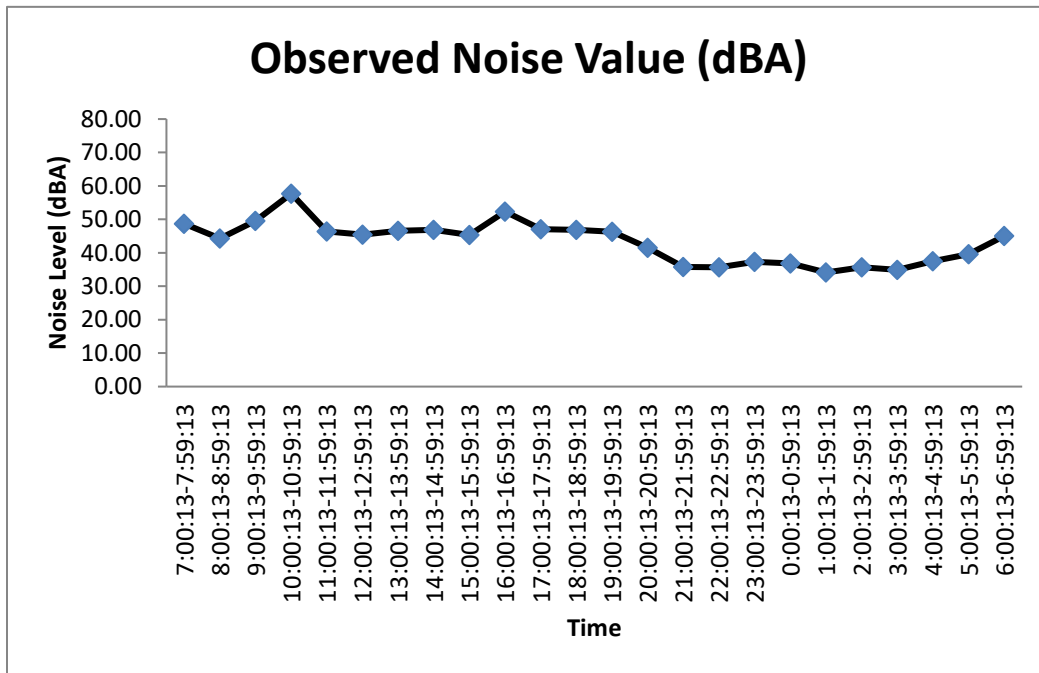


Figure 2. 4 Noise Level at Staff Housing (Receptor)

Table 2. 6 Observed Ambient Noise Level Results from Selected Points

Point	Thapyaywa Solar Power Project	
	Day Time	Night Time
Project Site (Source)	48.71	50.22
Guideline Values for Industrial	70	70
Staff Housing (Receptor)	46.72	37.43
Guideline Values for Residential	55	45

The observed values are compared with the National Environmental Quality (Emission) Guidelines as shown in **Table 2. 6** except receptor point, which indicates the separate level for residential and industrial points.

Table 2. 7 National Environmental Quality (Emission) Guidelines Values for Noise Level

Receptor	One Hour LAeq (dBA)	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for Public Holidays)	Nighttime 22:00 - 07:00 (22:00 - 10:00 for Public Holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

The observed values of the proposed project for daytime at Thapyaywa Solar Power Project Site (source) and Staff Housing (Receptor) are 48.71 dB (A) and 46.72 dB (A). The observed values of the proposed project for nighttime at Thapyaywa Solar Power Project Site (source) and Staff Housing (Receptor) are 50.22 dB (A) and 37.43 dB (A). The observed daytime value and night time value for Thapyaywa Solar Power Project Site (source) and Staff Housing (Receptor) are lower than the guideline value.

2.3 Wind Speed and Direction

The following figures describe the wind speed and wind direction of the proposed project site (Thapyaywa Solar Power Project Site at source) on 09th to 10th January 2023 respectively. According to the data, the wind direction is following **Figure 2. 5** and **Figure 2. 6**.

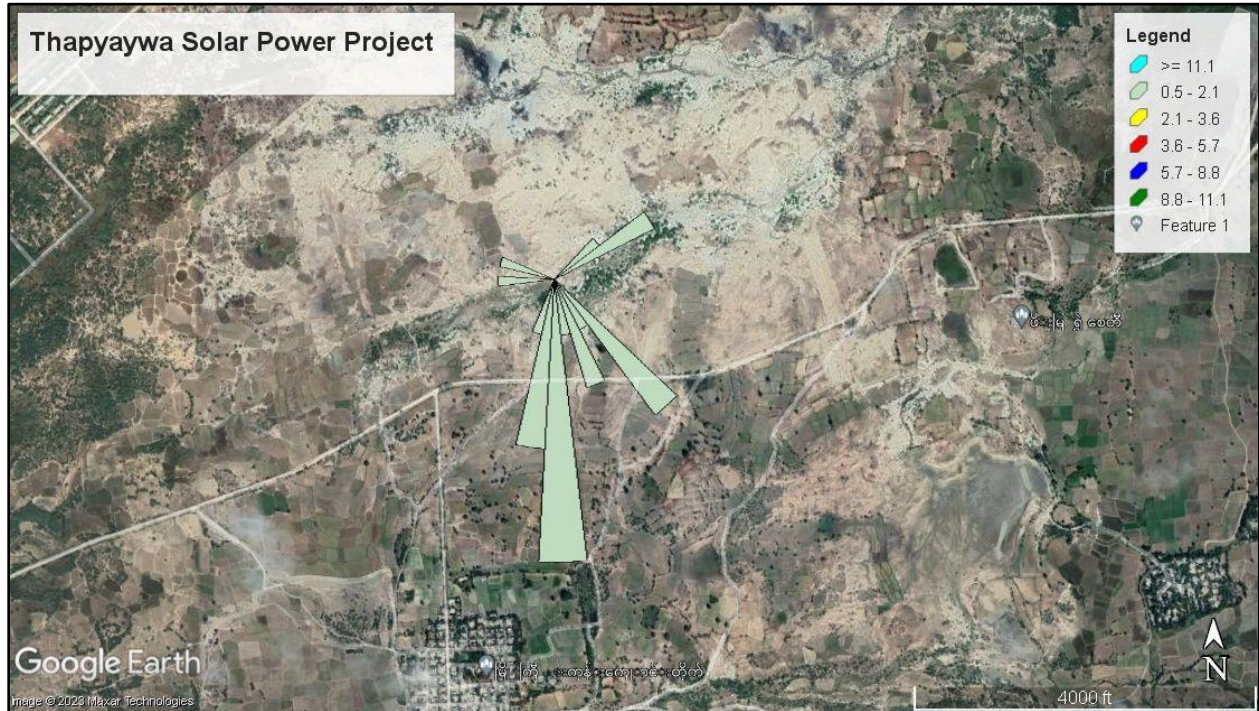


Figure 2. 5 Wind Speed and Wind Direction (Blowing From) at Thapyaywa Solar Power Project Site

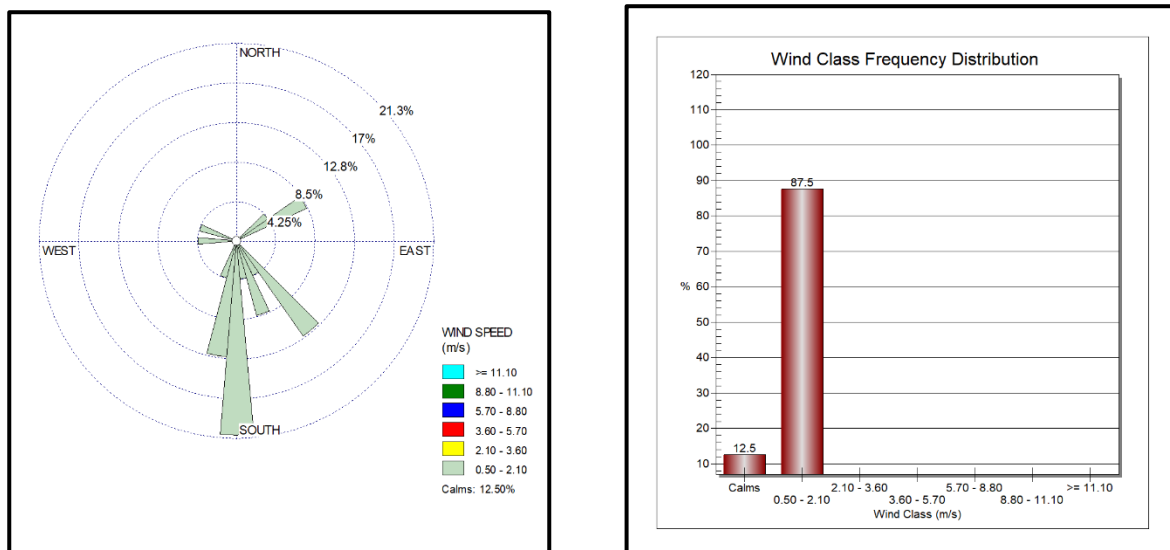


Figure 2. 6 Wind Class Frequency Distribution at the Thapyaywa Solar Power Project Site

2.4 Water quality

The project proponent is responsible for ensuring the drainage or runoff from the project or its related activities do not deteriorate the existing waste water and ground water quality before the project implementation. Waste water and ground water quality were recorded by laboratory analysis at two selected locations systematically. The field surveys for environmental quality monitoring and sampling were done during 10th January 2023. The field surveys for monthly sampling were done on 28th February 2023, 30th March 2023 and 24th April 2023.

Objectives of the sampling and analysis of waste water and ground water is to understand the existing water quality at the selected locations and to monitor the impacts during operation period.

Table 2. 8 Ground Water Quality of Thapyaywa Solar Power Project

Item	Unit	Ground Water	WHO Drinking Water Guideline
Biological Oxygen Demand (BOD)	mg/l	1.39	-
Chemical Oxygen Demand (COD)	mg/l	4.4	-
Color	NTU	Nil	-
Chloride	mg/l	6.85	-
Electrical Conductivity	mS/m	101.1	-
pH	-	7.63	6.5-8.5
Oil & Grease	mg/l	3	-
Turbidity	FNU	0.34	-
Total Alkalinity	mmol/l	8.65	-
Total Nitrogen	mg/l	0.56	-
Total Phosphorus	mg/l	0.022	-
Total suspended solid (TSS)	mg/l	0.25	-
Total coliform bacteria	MPN/ml	<0.3	Not detected
Iron	mg/l	0.02	-
Manganese	mg/l	<0.006	-

Table 2. 9 Waste Water Quality of Thapyaywa Solar Power Project

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Biological Oxygen Demand (BOD)	mg/l	5.94	30
Chemical Oxygen Demand (COD)	mg/l	6.85	125
pH	-	8.17	6-9
Total Nitrogen	mg/l	0.28	10
Total Phosphorus	mg/l	0.027	2
Oil and Grease	mg/l	5	10
Total suspended solid (TSS)	mg/l	40	50

Total coliform bacteria	CFU/100ml	9.3	400
-------------------------	-----------	-----	-----

Table 2. 10 Monthly Waste Water Quality of Thapyaywa Solar Power Project (January)

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Electrical Conductivity	mS/m	93.6	-
pH	-	7.63	6-9
Temperature	°C	20.6	-
Total Dissolved Solids	mg/l	542	-

Table 2. 11 Monthly Waste Water Quality of Thapyaywa Solar Power Project (February)

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Electrical Conductivity	mS/m	96.24	-
pH	-	7.84	6-9
Temperature	°C	26.69	-
Total Dissolved Solids	mg/l	511	-

Table 2. 12 Monthly Waste Water Quality of Thapyaywa Solar Power Project (March)

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Electrical Conductivity	mS/m	96.64	-
pH	-	8.22	6-9
Temperature	°C	29.1	-
Total Dissolved Solids	mg/l	574	-

Table 2. 13 Monthly Waste Water Quality of Thapyaywa Solar Power Project (April)

Item	Unit	Waste Water	National Environmental Quality (Emission) Guideline for Electric Power Transmission and Distribution
Electrical Conductivity	mS/m	109.77	-
pH	-	8.71	6-9
Temperature	°C	30.25	-
Total Dissolved Solids	mg/l	679	-

Photo Record for Water Quality Sampling



WWQ 1
(outlet from the project site)



GWQ
(from the project site)

3. ENVIRONMENTAL MONITORING PLAN

3.1 Monitoring Records for Safety Plan

Monitoring Record for Safety Plan

Monthly Record					
Date	Place	Activity	Organization	Number of Attendees	Remarks
January,2023	Working Area	Aware Training About PPE	Thapyaywa Solar Power Plant	25	
February,2023	Power Station	Fire Safety Training	Thapyaywa Solar Power Plant	60	
March,2023	Working Area	Electrical Safety Training	Thapyaywa Solar Power Plant	30	
April,2023	Power Station	Provide PPE Safety Equipment	Thapyaywa Solar Power Plant	35	
May,2023	Office Meeting Room	Health Care	Thapyaywa Solar Power Plant	80	
June,2023	PV Field	Harzard and Safety Training	Thapyaywa Solar Power Plant	30	
January,2023	Working Area	Aware Training About PPE	Thapyaywa Solar Power Plant	25	
February,2023	Power Station	Fire Safety Training	Thapyaywa Solar Power Plant	60	
March,2023	Working Area	Electrical Safety Training	Thapyaywa Solar Power Plant	30	
April,2023	Power Station	Provide PPE Safety Equipment	Thapyaywa Solar Power Plant	35	
May,2023	Office Meeting Room	Health Care	Thapyaywa Solar Power Plant	80	

Monitoring Record for Occupational Safety Equipment

Date	Place	Type	Quantity	Remark	Inspected By	Supervisor
10-March-2023	Store	Safety Shoe	22		U Shein Min Htet	U Toe Toe
10-March-2023	Store	Safety Helmet	22		U Shein Min Htet	U Toe Toe
10-March-2023	Store	Safety Gloves	22		U Shein Min Htet	U Toe Toe
10-March-2023	Store	Safety Belt	22		U Shein Min Htet	U Toe Toe

Records of Health and Safety Plan Activities



Emergency Contact List Attached in the Project Site

အရေးပေါ်အခြေအနေတုန့်ပြန်မှု အစီအစဉ်		
စီမံကိန်းလုပ်ငန်းအတွင်းမှအရေးကြီးဆက်သွယ်ရမည့် ဖုန်းနံပါတ်များ		
အမည်	ရာထူး	ဖုန်းနံပါတ်
ဦးစည်သူဖြိုးဆွေ	စက်ရုံမှူး	09-777464775
ဦးစိုင်းဘိုဘို	ဒု-စက်ရုံမှူး	09-420732352
ဦးရှိန်းမင်းထက်	အန္တရာယ်ကင်းရှင်းရေးအရာရှိ	09-791635193
ဦးဝင်းမြင့်ထွန်း	ကြီးကြပ်ရေးမှူး	09-400476694
ဦးရှန်ရှိန်ထွန်း	ရှေးဦးသူနာပြု	09-975033920
ဦးအောင်ကျော်မင်း	အရေးပေါ်အခြေအနေ ထိန်းချုပ်ရေးမှူး	09-942107994
အရေးကြီးဆက်သွယ်ရမည့် ဒေသတွင်း ဖုန်းနံပါတ်များ		
အမည်/ ဌာန	အကြောင်းအရာ	ဖုန်းနံပါတ်
မြို့နယ်မီးသတ်ဌာန	မီးလောင်းခြင်းအတွက်	09402665664
တိုက်နယ်ရဲစခန်း	လုံခြုံရေးကိစ္စရပ်များအတွက်	09-450337701
အနီးဆုံးတိုက်နယ်ဆေးရုံ	ထိခိုက်ဒဏ်ရာ ရသူများအတွက်	09449872690
မြို့နယ်လျှပ်စစ်ဌာန	လျှပ်စစ်မီးကိစ္စ	09-256592220
မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဌာန	အထွေထွေအုပ်ချုပ်ရေးကိစ္စ	

Fire Extinguisher Check List

No	Date	Description	Location	Number	Unit	Remark
1	1/12/2022	Fire Extinguisher (50kg)	Power Station	1	nos	
2	1/12/2022	Fire Extinguisher (10kg)	Power Station	3	nos	
3	1/12/2022	Fire Extinguisher (10kg)	Briefing Hall	3	nos	
4	1/12/2022	Fire Extinguisher (5kg)	Office	2	nos	
5	1/12/2022	Fire Extinguisher (5kg)	6 Unit (1)	2	nos	
6	1/12/2022	Fire Extinguisher (5kg)	6 Unit (2)	2	nos	
7	1/12/2022	Fire Extinguisher (5kg)	6 Unit (3)	2	nos	
8	1/12/2022	Fire Extinguisher (5kg)	6 Unit (4)	2	nos	
9	1/12/2022	Fire Extinguisher (5kg)	Staff Housing	2	nos	
10	1/12/2022	Fire Extinguisher (5kg)	Store	3	nos	
11	1/12/2022	Fire Extinguisher (5kg)	Messing	2	nos	
12	1/12/2022	Fire Extinguisher (5kg)	Main Gate	2	nos	
13	1/12/2022	Fire Extinguisher (5kg)	Power Station Gate	2	nos	
14	1/12/2022	Fire Extinguisher (5kg)	East Gate	2	nos	
15	1/12/2022	Fire Extinguisher (5kg)	Kitchen Room	2	nos	
16	1/12/2022	Fire Extinguisher (5kg)	Tower 1	2	nos	
17	1/12/2022	Fire Extinguisher (5kg)	Tower 2	2	nos	
18	1/12/2022	Fire Extinguisher (5kg)	Tower 3	2	nos	
19	1/12/2022	Fire Extinguisher (5kg)	Box X' mer 1	2	nos	
20	1/12/2022	Fire Extinguisher (5kg)	Box X' mer 2	2	nos	
21	1/12/2022	Fire Extinguisher (5kg)	Box X' mer 3	2	nos	
22	1/12/2022	Fire Extinguisher (5kg)	Box X' mer 4	2	nos	
23	1/12/2022	Fire Extinguisher (5kg)	Box X' mer 5	2	nos	

4. Records for CSR activities

Records for CSR Activities

Date	Place	Type	Amount (MMK) / Activities	Received by
4-Feb-2023	သပြေဝရွာ	ရွာအဝင်ဆိုင်ဘုတ်		
15-Feb-2023	မြို့ကြီးကုန်းရွာ	ရွာအဝင်ဆိုင်ဘုတ်		
4-Jan-2023	တမာရွာ	ရွာအဝင်ဆိုင်ဘုတ်		
10-April-2023	ဟံစားမြို့	ရွာအဝင်ဆိုင်ဘုတ်		
2 -May-2023	မန္တလေးမြို့	ကဆုန်လပြည့်နေ့တွင်သံဃာတော်အပါး(၁၀၂၆၈)အား ဆွမ်းဆန်စိမ်းလောင်းလှူခြင်း	၅၀၀၀၀၀၀	
27-April-2023	ဟံစားမြို့	ဟံစားမြို့ ဘက်စုံ ဖွံ့ဖြိုးရေးအတွက် အလှူငွေပေးအပ်ခြင်း	၁၀၀၀၀၀၀၀	
12-March-2023	ဟံစားမြို့	ဖိုးမြရွဲ စေတီတွင် နဂါးရုံဘုရားဆောက်လုပ်လှူဒါန်းခြင်း		
23-Jun-2022	မြို့ကြီးကုန်းရွာ	မြို့ကြီးကုန်းရွာ စာသင်ကျောင်းဆောင် ဆောက်လုပ်လှူဒါန်းခြင်း		

Photo Records of CSR Activities





6. Records for Waste Disposal

Date	Place	Type	Amount	Inspected by
15-Oct-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	50 Kg	U Sai Bo Bo
31-Oct-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	70 Kg	U Sai Bo Bo
15-Nov-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	100 Kg	U Sai Bo Bo
30-Nov-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	85 Kg	U Sai Bo Bo
15-Dec-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	25 Kg	U Sai Bo Bo
31-Dec-2022	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	45 Kg	U Sai Bo Bo
15-Jan-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	50 Kg	U Sai Bo Bo
31-Jan-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	75 Kg	U Sai Bo Bo
15-Feb-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	80 Kg	U Sai Bo Bo
28-Feb-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	45 Kg	U Sai Bo Bo
15-Mar-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	100 Kg	U Sai Bo Bo
31-Mar-2023	ဝန်ထမ်းလိုင်းများ/ရုံး	အမှိုက်စို/ အမှိုက်ခြောက်	50 Kg	U Sai Bo Bo

Records for Waste Disposal





Appendix 1 (Water Results)



Myanmar Innovation Group of Co., Ltd
 Address : No. (9), Sabae Housing, Pyi Htaung Su Road,
 (26) Ward, South Dagon Tsp, Yangon, Myanmar.
 Tel : 09-893 767 424
 E-mail : info@prolabmyanmar.com

LABORATORY ANALYSIS REPORT

- 1 Client Name : Thapyaywa Solar Power Plant Project
- 2 Location : Tharsi Township
- 3 Type of Sample : Ground Water
- 4 Sample No. : 00025/2023
- 5 Contact Person : Ko Wanna Zaw
- 6 Phone No. : 09-797005180
- 7 Date Received : 11.01.2023
- 8 Date of Test Performed : 11.01.2023
- 9 Date of Issued : 20.01.2023
- 10 Result :


No.	Parameter	Result	Unit	WHO STD 2018	Method
1	Color	Nil	PCU	15 TCU	Hanna HI97727 - Color of Water Photometer
2	Iron	0.02	mg/L	0.3 mg/L	⁽¹⁾ 3500-F B, Phenanthroline Method
3	Manganese	< 0.006	mg/L	0.4 mg/L	Hach DR 3900 Spectrophotometer, 1 - (2 - Pyridylazo) - 2 - Napthol (PAN) Method
4	Oil and Grease	3	mg/L	NA	⁽¹⁾ 5520D, Soxhlet Extraction Method
5	Total Coliform	< 0.3	MPN/ml	ND per 100 mL	FDA-BAM: MPN Method

Remark:

This certificate is issued only for the receipt of the test sample.

⁽¹⁾ American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Tested By

Name : MAY THU NAING
 Position : Laboratory Technician
 Signature : 



Approved By

Name : KYAWT KYAWT YIN
 Position : Technical Consultant Manager
 Signature : 

LAB-FO-024-00

LABORATORY ANALYSIS REPORT

- 1 Client Name : Thapyaywa Solar Power Plant Project
- 2 Location : Tharsi Township
- 3 Type of Sample : WW
- 4 Sample No. : 00026/2023
- 5 Contact Person : Ko Wanna Zaw
- 6 Phone No. : 09-797005180
- 7 Date Received : 11.01.2023
- 8 Date of Test Performed : 11.01.2023
- 9 Date of Issued : 20.01.2023
- 10 Result :

No.	Parameter	Result	Unit	WHO STD 2018	Method
1	Oil and Grease	5	mg/L	-	⁽¹⁾ 5520D, Soxhlet Extraction Method
2	Total Coliform	9.3	MPN/ml	-	FDA-BAM: MPN Method

Remark:

This certificate is issued only for the receipt of the test sample.

Dispose treated waste water according to state and local regulations.

⁽¹⁾ American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Tested By

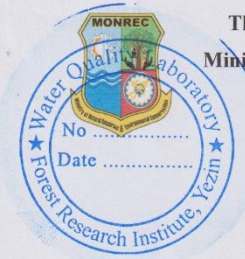
Name : MAY THU NAING
Position : Laboratory Technician
Signature :




Approved By

Name : KYAWT KYAWT YIN
Position : Technical Consultant Manager
Signature :





The Government of the Republic of the Union of Myanmar
 Ministry of Natural Resources and Environmental Conservation
 Department of Forest
 Forest Research Institute
 Water Quality Laboratory, Yezin



Ref: WQL/0007/2023
 Date: 25-1-2023

ANALYTICAL TEST REPORT

Customer Name:Thapaywa Solar Power Project
 Customer Address :

Assignment number	WL/2023-3	Sampling Location	
Sample number	2	Sampling Date	
Sample type	WW(Q)	Sample received date	11-1-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	8.17	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
BOD	5.94	mg/L	Potentiometric	YSI ProDO Tester
COD	6.85	mg/L	Titrimetic	Titration
Total Nitrogen	0.28	mg/L	Kjeldahl	Kjeldahl distillation assembly
Total Phosphorus	26.55	µg /L	NS 4725	SFA(SKALAR SAN plus Analyzer) SA 3000/5000,SA 1100
Total Suspended Solids	40	mg/L	NS 4733:1983	Circulation and Filtration System

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

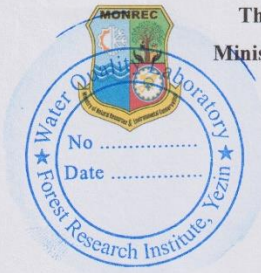
Signature :

Name : Dr. Thida Cho
 Assistant Research Officer

Approved by

Signature :

Name : Daw Thida Swe
 Assistant Research Officer



The Government of the Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation



Department of Forest
Forest Research Institute
Water Quality Laboratory, Yezin

Ref : WQL/0006/2023
Date: 25-1-2023

ANALYTICAL TEST REPORT

Customer Name:Thapyaywa Solar Power Project
Customer Address :

Assignment number	WL/2023-3	Sampling Location	
Sample number	1	Sampling Date	
Sample type	WW(M)	Sample received date	11-1-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	7.63	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Conductivity	93.6	<i>mS/m</i>	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
Total Dissolved Solids	542	<i>mg/L</i>	Manual	PROZOR® TDS&EC Test Meter
Water Temperature	20.6	<i>°C</i>	Potentiometric	HQ40d multi Field Tester

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

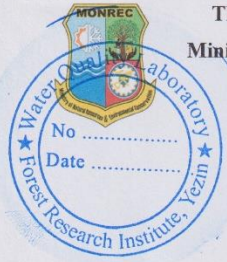
Approved by

Signature :

Name : Dr. Thida Cho
Assistant Research Officer

Signature :

Name : Daw Thida Swe
Assistant Research Officer



The Government of the Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation



Department of Forest
Forest Research Institute
Water Quality Laboratory, Yezin

Ref : WQL/0008/2023
Date: 25-1-2023

ANALYTICAL TEST REPORT

Customer Name:Thapyaywa Solar Power Project
Customer Address :

Assignment number	WL/2023-3	Sampling Location	
Sample number	3	Sampling Date	
Sample type	GW	Sample received date	11-1-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	7.63	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Turbidity	0.34	FNU	ISO 7027:1999	ManTech Robot (MT-165-981)
Total Alkalinity	8.65	mmol/l	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
BOD	1.39	mg/L	Potentiometric	YSI ProDO Tester
COD	4.4	mg/L	Titrimetric	Titration
Conductivity	101.1	mS/m	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
Chloride	6.85	mg/L	Titrimetric	Titration
Total Nitrogen	0.56	mg/L	Kjeldahl	Kjeldahl distillation assembly
Total Phosphorus	22	µg /L	NS 4725	SFA(SKALAR SAN plus Analyzer) SA 3000/5000,SA 1100
Total Suspended Solids	0.25	mg/L	NS 4733:1983	Circulation and Filtration System

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature :

Name : Dr. Thida Cho
Assistant Research Officer

Approved by

Signature :

Name : Daw Thida Swe
Assistant Research Officer



The Government of the Republic of the Union of Myanmar
 Ministry of Natural Resources and Environmental Conservation
 Department of Forest
 Forest Research Institute
 Water Quality Laboratory, Yezin



Ref : WQL/0032/2023
 Date: 3-3-2023

ANALYTICAL TEST REPORT

Customer Name:Thapyaywa Solar Power Project
 Customer Address :

Assignment number	WL/2023-24	Sampling Location	သဘစည်
Sample number	1	Sampling Date	-
Sample type		Sample received date	1-3-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	7.84	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Conductivity	96.24	mS/m	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
Total Dissolved Solids	511	mg/L	Manual	PROZOR® TDS&EC Test Meter
Water Temperature	26.69	°C	Potentiometric	HQ40d multi Field Tester

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature :

Name : Dr. Thida Cho
 Assistant Research Officer

Approved by

Signature :

Name : Dr. Thida Swe
 Assistant Research Officer



The Government of the Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation



Department of Forest
Forest Research Institute
Water Quality Laboratory, Yezin

Ref : WQL/0079/2023
Date: 1-4-2023

ANALYTICAL TEST REPORT

Customer Name:Thapyaywa Solar Power Project
Customer Address :

Assignment number	WL/2023-37	Sampling Location	သာစည်
Sample number	1	Sampling Date	-
Sample type		Sample received date	31-3-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	8.22	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Conductivity	96.64	<i>mS/m</i>	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
Total Dissolved Solids	574	<i>mg/L</i>	Manual	PROZOR® TDS&EC Test Meter
Water Temperature	29.1	<i>°C</i>	Potentiometric	HQ40d multi Field Tester

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Approved by

Signature :

Signature :

Name : Dr. Thida Cho
Assistant Research Officer

Name : Dr. Thida Swe
Assistant Research Officer



The Government of the Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation



Department of Forest
Forest Research Institute
Water Quality Laboratory, Yezin

Ref : WQL/0137/2023
Date: 25-4-2023

ANALYTICAL TEST REPORT

Customer Name:Thapyaywa Solar Power Project
Customer Address :

Assignment number	WL/2023-45	Sampling Location	သာစုစည်
Sample number	1	Sampling Date	-
Sample type		Sample received date	25-4-2023
Comments			

Parameter	Result	Unit	Method reference	Instruments
pH	8.71	-	ISO 10523:2008	ManTech Robot (PC-1300-475E)
Conductivity	109.77	<i>mS/m</i>	NS-ISO 7888:1993	ManTech Conductivity, Model 4510 Conductivity/TDS meter
Total Dissolved Solids	679	<i>mg/L</i>	Manual	PROZOR® TDS&EC Test Meter
Water Temperature	30.25	°C	Potentiometric	HQ40d multi Field Tester

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Approved by

Signature :

Name : Dr. Thida Cho
Assistant Research Officer

Signature :

Name : Dr. Thida Swe
Assistant Research Officer

