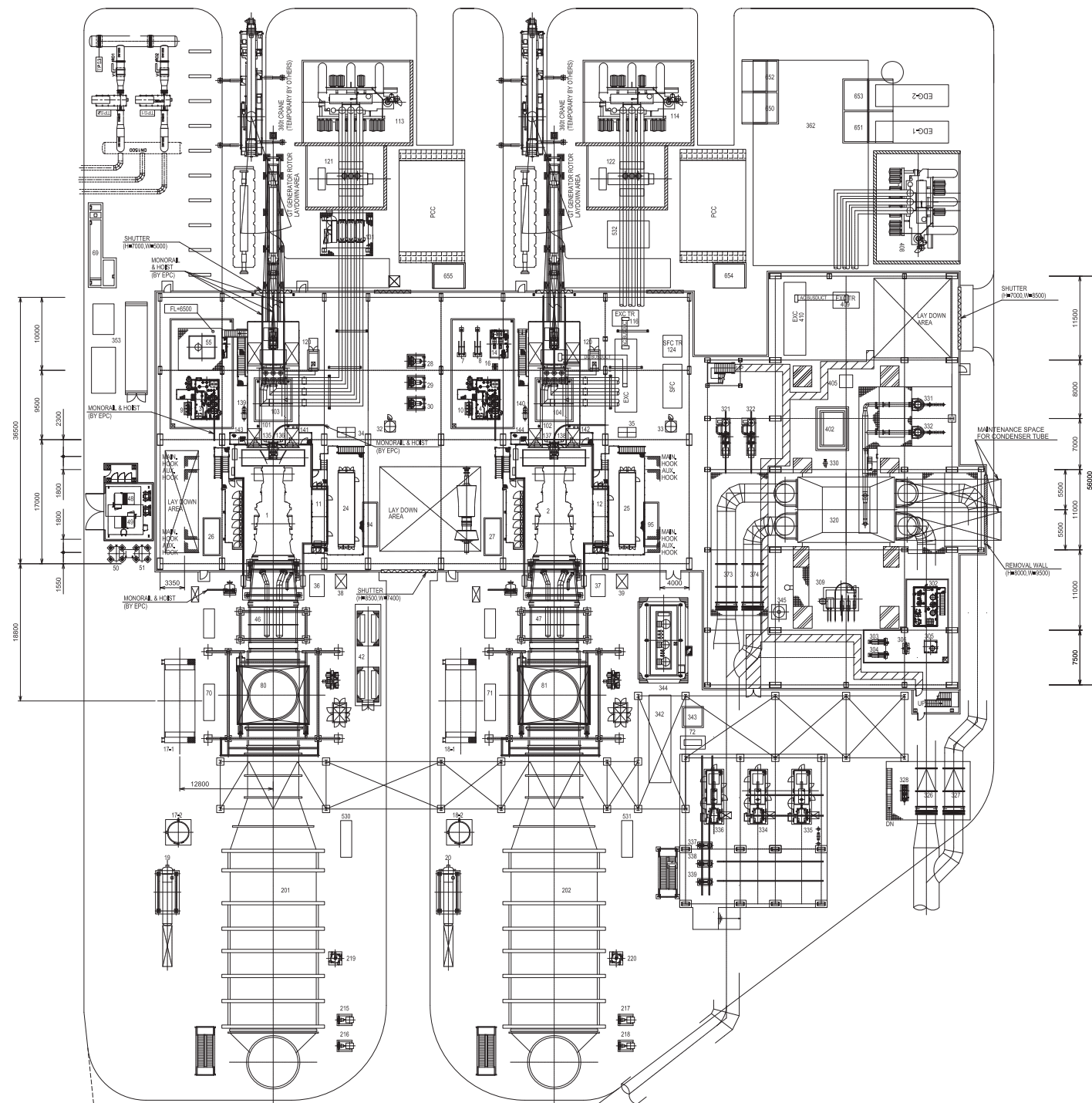




ANNEXURE 5 – EQUIPMENT LAYOUT OF THE PROPOSED FACILITY

Equipment Layout

NOTES:
 1. CONSTRUCTION BETWEEN GENERATOR STEP UP TRANSFORMER AND SHUTTER ARE ON HOLD AND EXCLUDED FROM PRELIMINARY AND COMMERICAL OFFER UPON FURTHER INFORMATION FROM SEWEDY.
 2. OFFSHORE STRUCTURE (TOWER AND OUTFALL) CONCEPT DESIGN WILL BE DEVELOPED AFTER FURTHER REVIEW AND APPROVAL.



No.	EQUIPMENT LIST	No.	EQUIPMENT LIST
1	NO.1 GAS TURBINE	121	NO.1 UNIT TR.
2	NO.2 GAS TURBINE	122	NO.2 UNIT TR.
3	NO.1 GT LUBE OIL RESERVOIR	123	SFC TR. (A) (NOT INDICATED)
4	NO.2 GT LUBE OIL RESERVOIR	124	SFC TR. (B)
5	NO.1 GT LUBE OIL COOLER (A) (NOT INDICATED)	127	SFC CUBICLE (A) (NOT INDICATED)
6	NO.1 GT LUBE OIL COOLER (B) (NOT INDICATED)	128	SFC CUBICLE (B)
7	NO.2 GT LUBE OIL COOLER (A)	131	NO.1 GTG GIMCB
8	NO.2 GT LUBE OIL COOLER (B)	132	NO.2 GTG GIMCB
9	NO.1 GT LUBE OIL ACCUMULATOR	135	NO.1 GTG COOLING WATER VALVE STATION (A)
10	NO.2 GT LUBE OIL ACCUMULATOR	136	NO.1 GTG COOLING WATER VALVE STATION (B)
11	NO.1 GT FUEL GAS UNIT	137	NO.2 GTG COOLING WATER VALVE STATION (A)
12	NO.2 GT FUEL GAS UNIT	138	NO.2 GTG COOLING WATER VALVE STATION (B)
13	NO.1 GT CONTROL OIL UNIT (NOT INDICATED)	139	NO.1 GTG LOOP SEALTANK
14	NO.2 GT CONTROL OIL UNIT	140	NO.2 GTG LOOP SEALTANK
15	NO.1 GT CONTROL OIL CLEANING UNIT (NOT INDICATED)	141	NO.1 GTG WATER DETECTOR
16	NO.2 GT CONTROL OIL CLEANING UNIT	142	NO.2 GTG WATER DETECTOR
17-1	NO.1 GT COOLING AIR COOLER (A)	143	NO.1 GTG VAPOR EXTRACTOR
17-2	NO.1 GT COOLING AIR COOLER (B)	144	NO.2 GTG VAPOR EXTRACTOR
18-1	NO.2 GT COOLING AIR COOLER (A)	201	NO.1 HEAT RECOVERY STEAM GENERATOR
18-2	NO.2 GT COOLING AIR COOLER (B)	202	NO.2 HEAT RECOVERY STEAM GENERATOR
19	NO.1 GT FUEL GAS HEATER	215	NO.1 HRSG PREHEATER RECIRCULATION PUMP (A)
20	NO.2 GT FUEL GAS HEATER	216	NO.1 HRSG PREHEATER RECIRCULATION PUMP (B)
21	NO.1 GT FUEL OIL UNIT	217	NO.1 HRSG PREHEATER RECIRCULATION PUMP (A)
22	NO.2 GT FUEL OIL UNIT	218	NO.1 HRSG PREHEATER RECIRCULATION PUMP (B)
23	NO.1 GT WATER INJECTION SKID	219	NO.1 HRSG BLOW FLASH TANK
24	NO.2 GT WATER INJECTION SKID	220	NO.2 HRSG BLOW FLASH TANK
25	GT PURGE AIR COMPRESSOR (A)	302	ST LUBE OIL TANK
26	GT PURGE AIR COMPRESSOR (B)	303	ST OIL COOLER (A)
27	GT PURGE AIR COMPRESSOR (C)	304	ST OIL COOLER (B)
28	NO.1 GT PURGE AIR RECEIVER	305	ST OIL PURIFIER
29	NO.2 GT PURGE AIR RECEIVER	306	ST LUBE OIL FILTER
30	NO.1 GT CASING COOLING FAN	309	ST CONTROL OIL UNIT
31	NO.2 GT CASING COOLING FAN	320	CONDENSER
32	NO.1 GT FUEL GAS INLET FILTER SPACE	321	CONDENSER VACUUM PUMP (A)
33	NO.2 GT FUEL GAS INLET FILTER SPACE	322	CONDENSER VACUUM PUMP (B)
34	NO.1 GT FUEL OIL DRAIN TANK & PIT	326	COND.TUBE CLEANING SYS. BALL STRAINER (A)
35	NO.2 GT FUEL OIL DRAIN TANK & PIT	327	COND.TUBE CLEANING SYS. BALL STRAINER (B)
36	CO2 FRESHENING SYSTEMS FOR GT (PACKAGE)	328	COND. TUBE CLEANING SYS. BALL COLLECTOR AND BALL RECIRCULATION PUMP
37	ELECTRICAL & CONTROL BUILDING FOR NO.1 GT & NO.2 GT	330	CONDENSATE LEAK DETECTOR MONITORING PANEL
38	NO.1 GT EXHAUST DUCT	331	CONDENSATE EXTRACTION PUMP (A)
39	NO.2 GT EXHAUST DUCT	332	CONDENSATE EXTRACTION PUMP (B)
40	PLANT AIR COMPRESSOR (A)	334	HP FEED WATER PUMP (A)
41	PLANT AIR COMPRESSOR (B)	335	HP FEED WATER PUMP (B)
42	INS. AIR RECEIVER	336	HP FEED WATER PUMP (C)
43	SER. AIR RECEIVER	337	LP FEED WATER PUMP (A)
44	NO.1 GT LUBE OIL MIST SEPARATOR	338	LP FEED WATER PUMP (B)
45	NO.2 GT LUBE OIL MIST SEPARATOR (NOT INDICATED)	339	LP FEED WATER PUMP (C)
46	TRANS AREA OIL SEPARATOR	342	SAMPLING EQUIPMENT
47	NO.1 GT FUEL GAS FLOW METER SPACE	343	ST BUILDING CHEMICAL DRAIN PIT
48	NO.2 GT FUEL GAS FLOW METER SPACE	344	CHEMICAL DOSING EQUIPMENT
49	R410 PANEL	345	ST FLASH TANK
50	NO.1 GT BYPASS STACK	353	EMERGENCY D/G PACKAGE
51	NO.2 GT BYPASS STACK	362	COMMON ELECTRICAL & CONTROL BUILDING
52	NO.1 GT MFOF UNIT	373	DEBRIS FILTER (A)
53	NO.2 GT MFOF UNIT	374	DEBRIS FILTER (B)
101	NO.1 GT GENERATOR	402	STG SEAL OIL SUPPLY UNIT
102	NO.2 GT GENERATOR	405	STG GAS CONTROL UNIT
103	NO.1 GTG SEAL OIL SUPPLY UNIT	408	STG TRANSFORMER
104	NO.2 GTG SEAL OIL SUPPLY UNIT	409	STG EXC.TR.
113	NO.1 GTG TRANSFORMER	410	STG EXC.CUB.
114	NO.2 GTG TRANSFORMER	530	NO.1 BURNER SKID
115	NO.1 GTG EXC. TRANSFORMER (NOT INDICATED)	531	NO.2 BURNER SKID
116	NO.2 GTG EXC. TRANSFORMER	532	GT-01/GT-02 LOW VOLTAGE TRANSFORMER
117	NO.1 GTG EXC. CUB. (NOT INDICATED)	650	10BFT10 MVA-LV TRANSFORMER COMMON SERVICES 1
118	NO.2 GTG EXC. CUB.	651	10BFT20 MVA-LV TRANSFORMER COMMON SERVICES 2
119	NO.1 GTG NGR CUB.	652	10BFT71 MVA-LV TRANSFORMER COMMON SERVICES 1
120	NO.2 GTG NGR CUB.	653	10BFT11 MVA-LV TRANSFORMER COMMON SERVICES 2
		654	11BFT10 MVA-LV TRANSFORMER GT1
		655	12BFT20 MVA-LV TRANSFORMER GT2



Sharjah Electricity and Water Authority
 Layyah Power Station
 Layyah Power Station
 Sharjah U.A.E.

OVERALL PLANT LAYOUT

ANNEXURE 6 – PROJECT IMPLEMENTATION SCHEDULE

Project Implementation Schedule

SEWA Layyah Pre & Post LNTF Schedule (2018/05/28)				2018												2019												2020												2021									
				Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Ma	Apr	Ma	Jun	Jul	Aug	Sep	Oct		
Activity Description	Dur. (Months)	Start	Finish																																														
Target LNTF Date			31-Jul-18																																														
EPC Contract Preparation	~	~	31-Jul-18																																														
Limited Notice to Proceed Preparation	~	~	31-Jul-18																																														
MFS - Technical Spec. Finalization	~	~	31-Jul-18																																														
Subsupplier/Subcontractor List Finalization	~	~	31-Jul-18																																														
Terms & Conditions of EPC Contract Finalization	~	~	31-Jul-18																																														
Ramadan	17-May-18	15-Jun-18																																															
SEWA visit in Japan	17-Jun-18	24-Jun-18																																															
Expected Finance Close Date			31-Dec-18																																														
GTG#1 S/C COD			1-May-20																																														
GTG#1 30 days R/R Completion			1-Jun-20																																														
GTG#2 S/C COD			15-Dec-20																																														
C/C COD			15-Jun-21																																														
Early Site Activities																																																	
Owner Obligations / Approval (Authorization Letter From SEWA To ELSEWEDY)		31-May-18																																															
Topographical Survey	1	17-Jun-18	17-Jul-18																																														
Geophysical & Soil Investigation	2	17-Jun-18	16-Aug-18																																														
Meta Ocean Studies	2	1-Jul-18	30-Aug-18																																														
Environmental Impact Assessment (ESIA) Study	3	17-Jun-18	30-Sep-18																																														
JBIC/NEXI Environmental Due Diligence for Finance	3	30-Sep-18	31-Dec-18																																														
Power Train Components (GTGs/STGs/HRSGs)																																																	
Engineering	18.5	1-Aug-18	15-Feb-20																																														
GT#1 Manufacturing & Procurement	11.2	1-Aug-18	7-Jul-19																																														
GTG#1 Manufacturing & Procurement	12.0	1-Aug-18	31-Jul-19																																														
GT#2 Manufacturing & Procurement	12.5	15-Dec-18	31-Dec-19																																														
GTG#2 Manufacturing & Procurement	13.5	15-Dec-18	31-Jan-20																																														
HRSG#1 Procurement	15.0	1-Aug-18	30-Oct-19																																														
HRSG#2 Procurement	15.5	1-Aug-18	15-Nov-19																																														
ST Manufacturing & Procurement	16.0	1-Aug-18	30-Nov-19																																														
STG Manufacturing & Procurement	16.5	1-Aug-18	15-Dec-19																																														
Auxiliaries and BoP Procurement, Erection and Commissioning																																																	
BOP RFQ Preparation, Procurement Cycle & Manufacturing																																																	
GT #11 Transportation & Installation	7	7-Jul-19	15-Feb-20																																														
Interface & Lube Oil Flushing	1	16-Feb-20	16-Mar-20																																														
Hot Commissioning Works	1	17-Mar-20	15-Apr-20																																														
RTR Preparation Works	0.5	16-Apr-20	30-Apr-20																																														
GT #1 S/C R/R (30days)	1	1-May-20	1-Jun-20																																														
GT #12 Transportation & Installation	8	1-Jan-20	30-Aug-20																																														
Interface & Lube Oil Flushing	1.0	1-Sep-20	1-Oct-20																																														
Hot Commissioning Works	1.0	2-Oct-20	31-Oct-20																																														
RTR Preparation Works	0.5	1-Nov-20	15-Nov-20																																														
GT #12 S/C R/R (30days)	1	16-Nov-20	15-Dec-20																																														
HRSG#11 Transportation	5	1-Aug-19	31-Dec-19																																														
HRSG#11 Installation	14.0	1-Oct-19	1-Dec-20																																														
HRSG#11 Commissioning	5.4	2-Dec-20	15-May-21																																														
HRSG#12 Transportation	5	15-Aug-19	15-Jan-20																																														
HRSG#12 Installation	13.5	15-Oct-19	30-Nov-20																																														
HRSG#12 Commissioning	5.4	1-Dec-20	15-May-21																																														
ST #10 Transportation	2.5	1-Dec-19	15-Feb-20																																														
ST #10 Installation	10	1-Feb-20	30-Nov-20																																														
Chemical Cleaning	1	1-Dec-20	31-Dec-20																																														
Restoration After Chemical Cleaning	0.5	1-Jan-21	15-Jan-21																																														
Combined Cycle Conversion (Outage)	1.0	1-Jan-21	31-Jan-21																																														
Steam Blow & Restoration	1.4	1-Feb-21	15-Mar-21																																														
Synch. Optimization and Performance Tests	2.0	16-Mar-21	14-May-21																																														
C/C R/R (30 days)	1	15-May-21	15-Jun-21																																														

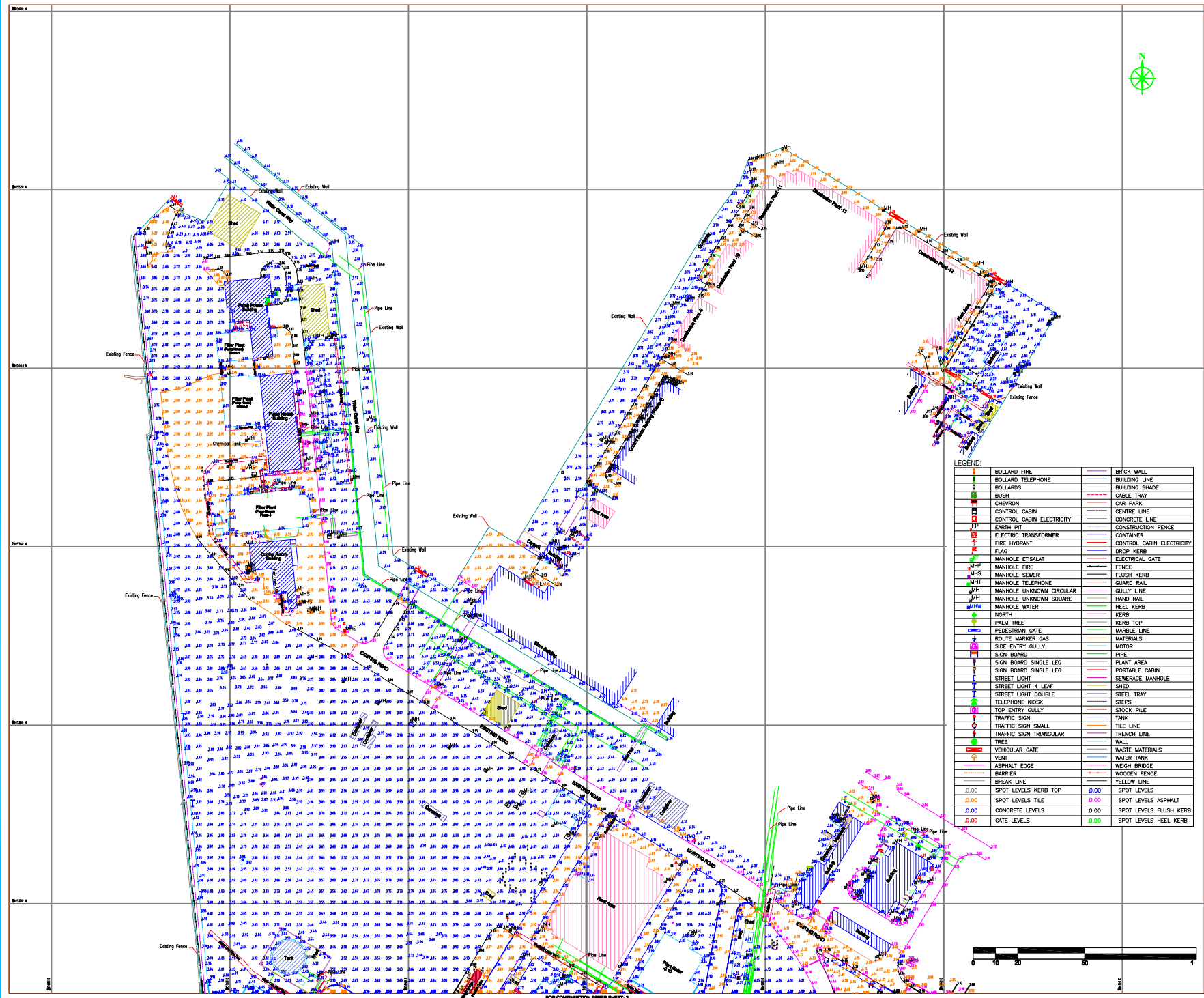
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- Pre-Award Activities
- Engineering Activities
- Procurement Activities
- Erection Activities
- Startup and Commissioning Activities

ANNEXURE 7 – TOPOGRAPHIC SURVEY

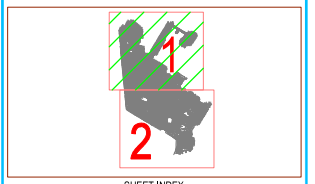
Topographic Survey Report

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LEGEND:

BOLLARD FIRE	BRICK WALL
BOLLARD TELEPHONE	BUILDING LINE
BOLLARDS	BUILDING SHADE
BUSH	CABLE TRAY
CHEVRON	CAR PARK
CONTROL CABIN	CENTRE LINE
CONTROL CABIN ELECTRICITY	CONCRETE LINE
EARTH PIT	CONSTRUCTION FENCE
ELECTRIC TRANSFORMER	CONTAINER
FIRE HYDRANT	CONTROL CABIN ELECTRICITY
FLAG	DROP KERB
MANHOLE ETISALAT	ELECTRICAL GATE
MANHOLE FIRE	FENCE
MHS	FLUSH KERB
MHT	GUARD RAIL
MHT	GULLY LINE
MANHOLE UNKNOWN CIRCULAR	HAND RAIL
MANHOLE UNKNOWN SQUARE	HEEL KERB
MANHOLE WATER	KERB
NORTH	KERB TOP
PALM TREE	MARBLE LINE
PEDESTRIAN GATE	MATERIALS
ROUTE MARKER GAS	PIPE
SIDE ENTRY GULLY	PLANT AREA
SIGN BOARD	PORTABLE CABIN
SIGN BOARD SINGLE LEG	SEWERAGE MANHOLE
SIGN BOARD SINGLE LEG	SHED
STREET LIGHT	STEEL TRAY
STREET LIGHT 4 LEAF	STEPS
STREET LIGHT DOUBLE	STOCK PILE
TELEPHONE KIOSK	TANK
TOP ENTRY GULLY	TILE LINE
TRAFFIC SIGN	TRENCH LINE
TRAFFIC SIGN SMALL	WALL
TRAFFIC SIGN TRIANGULAR	WASTE MATERIALS
TREE	WATER TANK
VEHICULAR GATE	WEIGH BRIDGE
VENT	WOODEN FENCE
ASPHALT EDGE	YELLOW LINE
BARRIER	SPOT LEVELS KERB TOP
BREAK LINE	SPOT LEVELS
.000	SPOT LEVELS TILE
.000	CONCRETE LEVELS
.000	GATE LEVELS
.000	SPOT LEVELS FLUSH KERB
.000	SPOT LEVELS HEEL KERB



NOTES

1. ALL DIMENSIONS AND CHANGES ARE IN METRES UNLESS STATED OTHERWISE.

PROJECT CO-ORDINATES SYSTEM

- Map Projection : UTM 40 North
- Plan Datum : WGS 84
- Height Datum : Sharjah Town Planning & Survey Datum

SURVEY CONTROL STATIONS

NAME	EASTING	NORTHING	ELEVATION
SS327	33000.410	220471.004	6.616
SS328	33050.077	220468.467	6.242

BENCHMARKS INCLUDED AND SURVEY UPDATED

NO.	SU	AR	DATE	COMMENTS
1	SREE	AR	26.07.18	COMMENTS UPDATED
2	SREE	AR	24.07.18	ISSUED FOR APPROVAL

Project: Sharjah Electricity and Water Authority
Layyah Power Station
Sharjah U.A.E.



Contractor: **ELSEWEDY POWER**

Consultant: **Environmental Solutions and Consultancy**

Surveyed By: **Middle East Survey Engineering**
 PO BOX 34644, Dubai, U.A.E.
 Tel: +971 4 286 8633, Fax: +971 4 286 8029
 Email: info@mesurvey.com, www.middleestsurvey.com

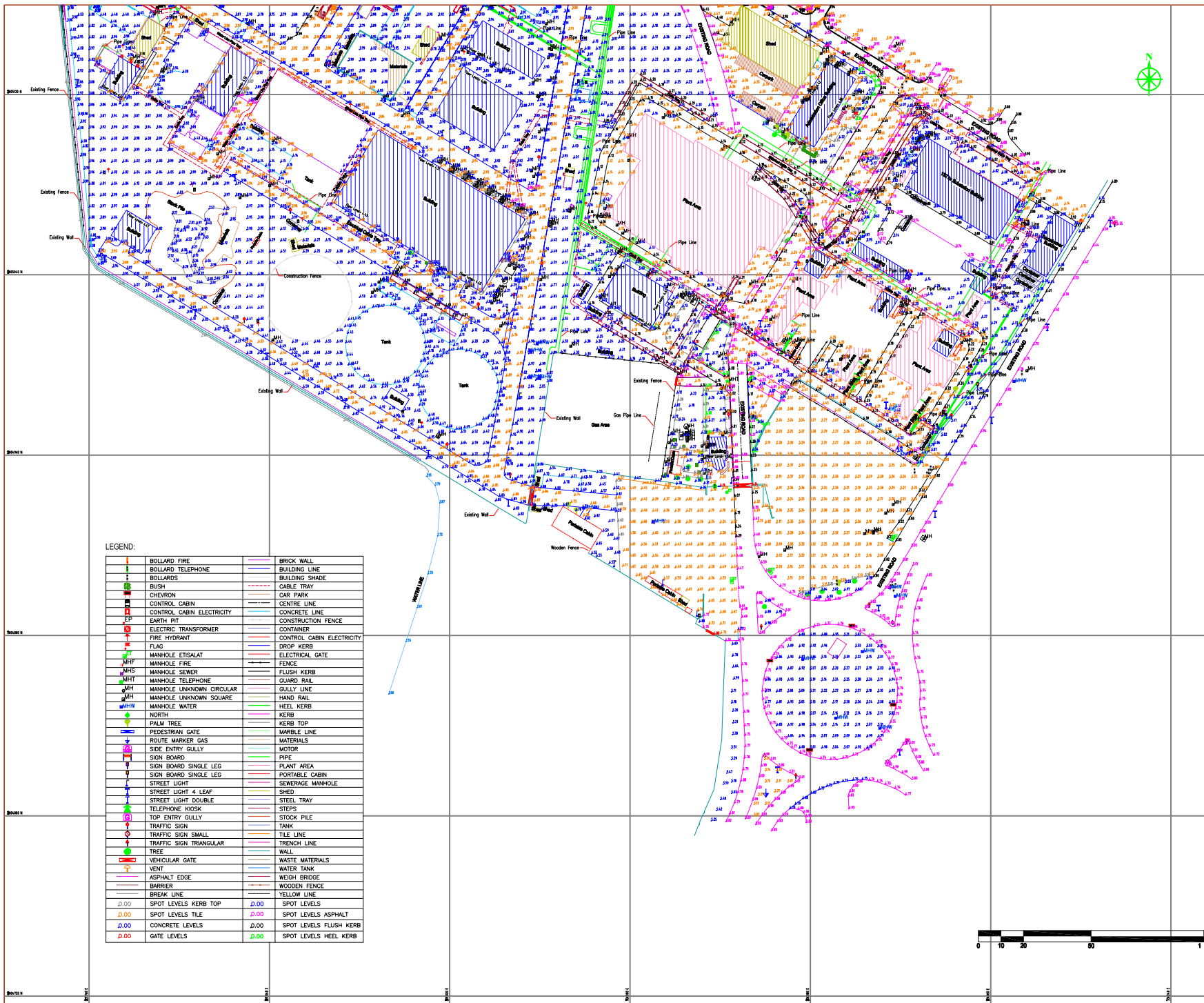
TOPOGRAPHIC SURVEY
SHEET 1 OF 2

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 Drawn by: SREE AUGUST 2018



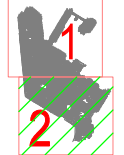
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LEGEND:

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	BOLLARD TELEPHONE		BUILDING LINE
	BOLLARDS		BUILDING SHADE
	BUSH		CABLE TRAY
	CHEVRON		CAR PARK
	CONTROL CABIN		CENTRE LINE
	CONTROL CABIN ELECTRICITY		CONCRETE LINE
	EARTH PIT		CONSTRUCTION FENCE
	EP		CONTAINER
	ELECTRIC TRANSFORMER		CONTROL CABIN ELECTRICITY
	FIRE HYDRANT		DROP KERB
	FLAG		ELECTRICAL GATE
	MANHOLE ETISALAT		FENCE
	MANHOLE FIRE		FLUSH KERB
	MANHOLE SEWER		GUARD RAIL
	MANHOLE TELEPHONE		GULLY LINE
	MANHOLE UNKNOWN CIRCULAR		HAND RAIL
	MANHOLE UNKNOWN SQUARE		HEEL KERB
	MANHOLE WATER		KERB
	NORTH		KERB TOP
	PALM TREE		MARBLE LINE
	PEDESTRIAN GATE		MATERIALS
	ROUTE MARKER GAS		MOTOR
	SIDE ENTRY GULLY		MHP
	SIGN BOARD		PLANT AREA
	SIGN BOARD SINGLE LEG		PORTABLE CABIN
	SIGN BOARD SINGLE LEG		SEWERAGE MANHOLE
	STREET LIGHT		SHED
	STREET LIGHT 4 LEAF		STEEL TRAY
	STREET LIGHT DOUBLE		STEPS
	TELEPHONE KIOSK		STOCK PILE
	TOP ENTRY GULLY		TANK
	TRAFFIC SIGN		TILE LINE
	TRAFFIC SIGN SMALL		TRENCH LINE
	TRAFFIC SIGN TRIANGULAR		WALL
	TREE		WASTE MATERIALS
	VEHICULAR GATE		WATER TANK
	VENT		WEIGH BRIDGE
	ASPHALT EDGE		WOODEN FENCE
	BARRIER		YELLOW LINE
	BREAK LINE		
	0.00 SPOT LEVELS KERB TOP		0.00 SPOT LEVELS
	0.00 SPOT LEVELS TILE		0.00 SPOT LEVELS ASPHALT
	0.00 CONCRETE LEVELS		0.00 SPOT LEVELS FLUSH KERB
	0.00 GATE LEVELS		0.00 SPOT LEVELS HEEL KERB



SHEET INDEX

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- Map Projection : UTM 40 North
- Plan Datum : WGS 84
- Height Datum : Sharjah Town Planning & Survey Datum

SURVEY CONTROL STATIONS			
NAME	EASTING	NORTHING	ELEVATION
SS327	33000.410	280471.804	6.616
SS326	33650.077	280468.467	6.242

		BENCHMARKS INCLUDED AND SURVEY UPDATED	
2	SU	AR	07.08.18
1	SKEE	AR	26.07.18
1	SKEE	AR	24.07.18
ISSUED FOR APPROVAL			
Rev.	By	Checked	Approved
			Date
			Description

Project
 Sharjah Electricity and Water Authority
 Layyah Power Station
 Sharjah U.A.E

Engineer:
 EDF

Contractor
 ELSEWEDY POWER

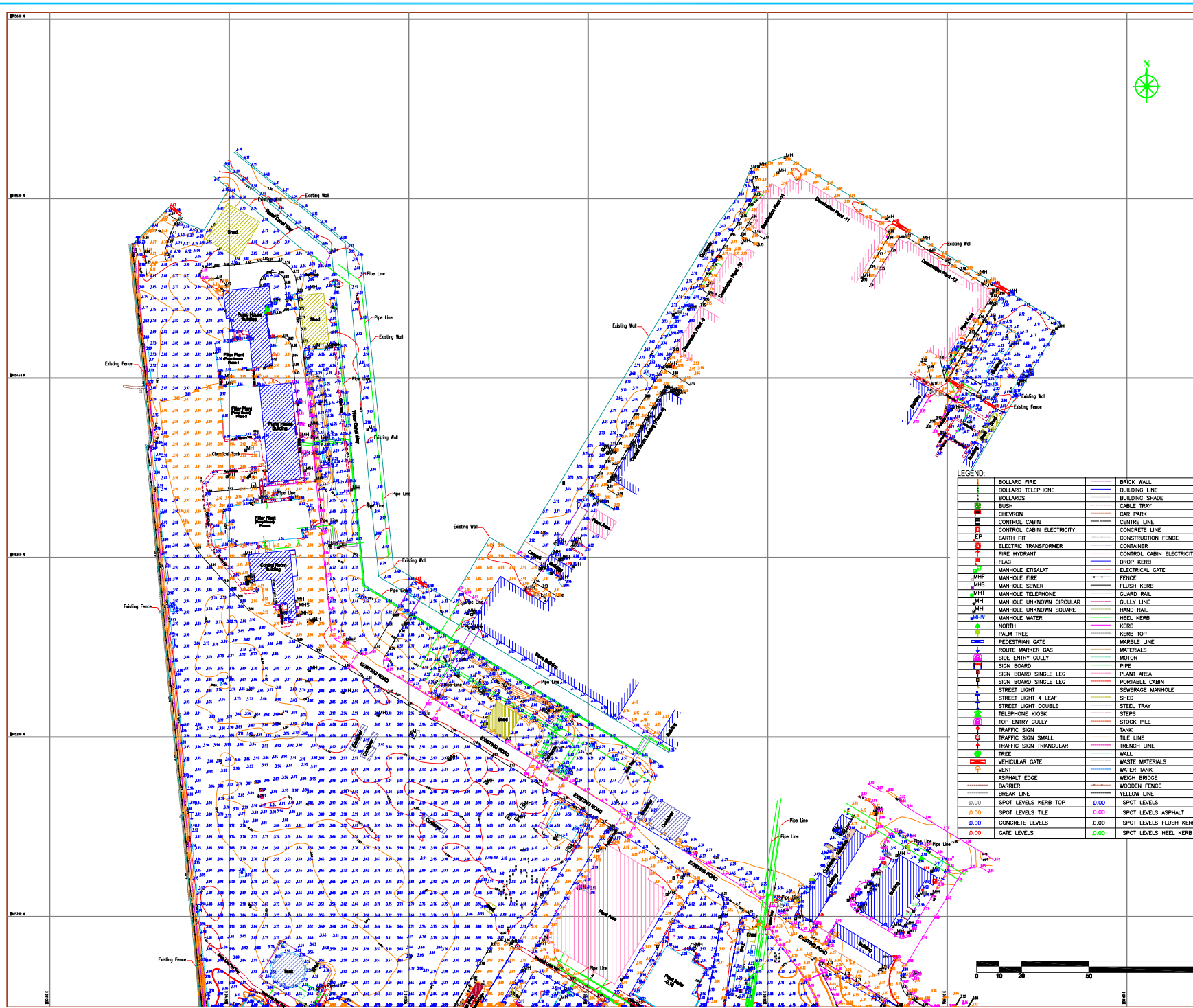
Consultant
 Environmental Solutions and Consultancy

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 Email: info@mesurvey.com
 www.middleeastsurvey.com

Title
 TOPOGRAPHIC SURVEY
 SHEET 2 OF 2

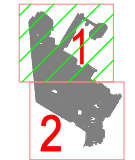
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 Drawn by: SU
 Revision: 2
 AUGUST 2018





LEGEND:

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[Symbol]	BOLLARD TELEPHONE	[Symbol]	BUILDING LINE
[Symbol]	BOLLARDS	[Symbol]	BUILDING SHADE
[Symbol]	BUSH	[Symbol]	CABLE TRAY
[Symbol]	CHEVRON	[Symbol]	CAR PARK
[Symbol]	CONTROL CABIN	[Symbol]	CENTRE LINE
[Symbol]	CONTROL CABIN ELECTRICITY	[Symbol]	CONCRETE LINE
[Symbol]	EARTH PIT	[Symbol]	CONSTRUCTION FENCE
[Symbol]	ELECTRIC TRANSFORMER	[Symbol]	CONTAINER
[Symbol]	FIRE HYDRANT	[Symbol]	CONTROL CABIN ELECTRICITY
[Symbol]	FLAG	[Symbol]	DROP KERB
[Symbol]	MANHOLE ETISALAT	[Symbol]	ELECTRICAL GATE
[Symbol]	MANHOLE FIRE	[Symbol]	FENCE
[Symbol]	MANHOLE SEWER	[Symbol]	FLUSH KERB
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[Symbol]	SIGN BOARD SINGLE LEG	[Symbol]	PORTABLE CABIN
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[Symbol]	VENT	[Symbol]	WATER TANK
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[Symbol]	BARRIER	[Symbol]	WOODEN FENCE
[Symbol]	BREAK LINE	[Symbol]	YELLOW LINE
[Symbol]	0.00 SPOT LEVELS KERB TOP	[Symbol]	0.00 SPOT LEVELS
[Symbol]	0.00 SPOT LEVELS TILE	[Symbol]	0.00 SPOT LEVELS ASPHALT
[Symbol]	0.00 CONCRETE LEVELS	[Symbol]	0.00 SPOT LEVELS FLUSH KERB
[Symbol]	0.00 GATE LEVELS	[Symbol]	0.00 SPOT LEVELS HEEL KERB



SHEET INDEX

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- Plan Datum : WGS 84
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Layhan Power Station
Sharjah U.A.E.

Engineer: EDF

Contractor: ELSEWEDY POWER

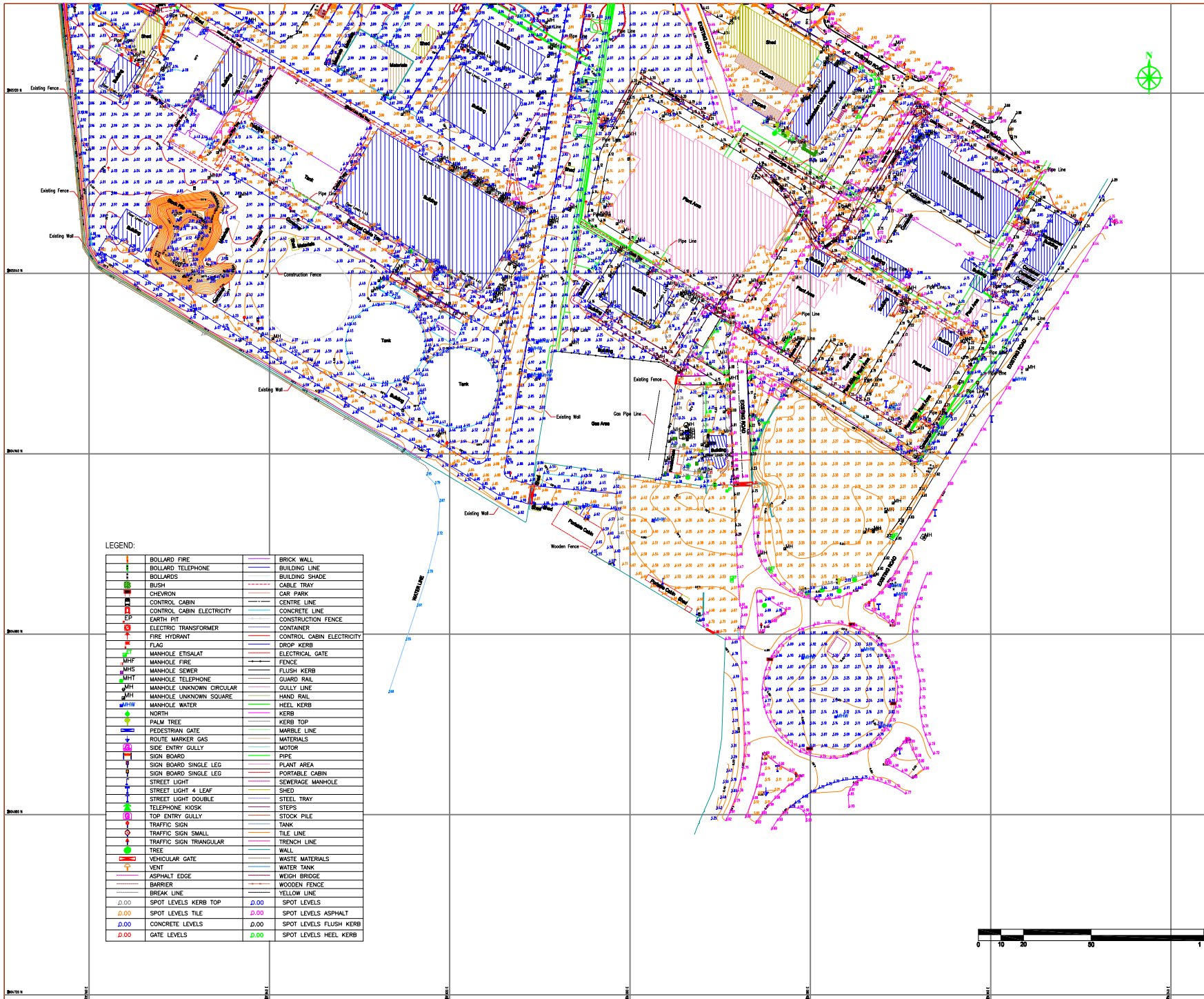
Consultant: Environmental Solutions and Consultancy

Surveyed By: Middle East Survey Engineering

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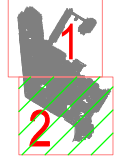
Title: **CONTOURING**
SHEET 1 OF 2

Drawing No: MES/1701303
Revision: 2
Drawing Scale: 1:800@A1
Drawn by: SREE
AUGUST 2018



LEGEND:

	BOLLARD FIRE		BRICK WALL
	BOLLARD TELEPHONE		BUILDING LINE
	BOLLARDS		BUILDING SHADE
	BUSH		CABLE TRAY
	CHEVRON		CAR PARK
	CONTROL CABIN		CENTRE LINE
	CONTROL CABIN ELECTRICITY		CONCRETE LINE
	EARTH PIT		CONSTRUCTION FENCE
	EP		CONTAINER
	ELECTRIC TRANSFORMER		CONTROL CABIN ELECTRICITY
	FIRE HYDRANT		DROP KERB
	FLAG		ELECTRICAL GATE
	MANHOLE ETISALAT		FENCE
	MANHOLE FIRE		FLUSH KERB
	MANHOLE SEWER		GUARD RAIL
	MANHOLE TELEPHONE		GULLY LINE
	MANHOLE UNKNOWN CIRCULAR		HAND RAIL
	MANHOLE UNKNOWN SQUARE		HEEL KERB
	MANHOLE WATER		KERB
	NORTH		KERB TOP
	PALM TREE		MARBLE LINE
	PEDESTRIAN GATE		MATERIALS
	ROUTE MARKER GAS		MOTOR
	SIDE ENTRY GULLY		PIPE
	SIGN BOARD		PLANT AREA
	SIGN BOARD SINGLE LEG		PORTABLE CABIN
	SIGN BOARD SINGLE LEG		SEWERAGE MANHOLE
	STREET LIGHT		SHED
	STREET LIGHT 4 LEAF		STEEL TRAY
	STREET LIGHT DOUBLE		STEPS
	TELEPHONE KIOSK		STOCK PILE
	TOP ENTRY GULLY		TANK
	TRAFFIC SIGN		TILE LINE
	TRAFFIC SIGN SMALL		TRENCH LINE
	TRAFFIC SIGN TRIANGULAR		WALL
	TREE		WASTE MATERIALS
	VEHICULAR GATE		WATER TANK
	VENT		WEIGH BRIDGE
	ASPHALT EDGE		WOODEN FENCE
	BARRIER		YELLOW LINE
	BREAK LINE		
	0.00 SPOT LEVELS KERB TOP		0.00 SPOT LEVELS
	0.00 SPOT LEVELS TILE		0.00 SPOT LEVELS ASPHALT
	0.00 CONCRETE LEVELS		0.00 SPOT LEVELS FLUSH KERB
	0.00 GATE LEVELS		0.00 SPOT LEVELS HEEL KERB



SHEET INDEX

NOTES

- ALL DIMENSIONS AND CHANGES ARE IN METRES UNLESS STATED OTHERWISE.

PROJECT COORDINATES SYSTEM

- Map Projection : UTM 40 North
- Plan Datum : WGS 84
- Height Datum : Sharjah Town Planning & Survey Datum

SURVEY CONTROL STATIONS			
NAME	EASTING	NORTHING	ELEVATION
SS327	330080.410	2804871.804	8.816
SS328	336850.877	2804498.487	6.242

Rev.	By	Checked	Approved	Date	Description
2	SU	AR	AR	07.08.18	BENCHMARKS INCLUDED AND SURVEY UPDATED
1	SKEE	AR	AR	26.07.18	COMMENTS UPDATED
1	SKEE	AR	AR	24.07.18	ISSUED FOR APPROVAL

Project
 Sharjah Electricity and Water Authority
 Layyah Power Station
 Sharjah U.A.E

Engineer:
 EDF

Contractor
 ELSEWEDY POWER

Consultant
 Environmental Solutions and Consultancy

Surveyed By
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 PO BOX 34644 Dubai U. A. E
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Title
 CONTOURING
 SHEET 2 OF 2

Drawing No: MES/17013/04 Revision: 2
 Drawing Scale: 1:800@A1
 Drawn by: SU AUGUST 2018



ANNEXURE 8 – CLIMATE AND METEOROLOGY OF UAE REGION

Climate and Meteorology of UAE Region

CLIMATE AND METEOROLOGY OF UAE REGION

UAE is generally warm and dry in the winter, however during summer months coastal weather brings in humidity along with very high temperatures. Due to the presence of the Al Hajar al Gharbi Mountains in the proximity, high altitudes lead to generally cooler weather conditions. UAE climate can be broadly classified as two main seasons' summer and winter. Summers are between April to September with very dry weather conditions. Where in the temperature rise to about 48 degrees Centigrade in coastal cities – with accompanying humidity levels reaching as high as 90%. In the southern desert regions, temperatures can increase to as high as 50° Centigrade. Major part of the country is subject to violent dust storms with rainfall being infrequent and irregular. This report describes the typical weather at the **Sharjah International Airport** (Sharjah, United Arab Emirates) weather station (which is located at 12.5 km from project site on Eastern direction and **Dubai International Airport** weather station (which is located at 10 km from project site on Southern direction).

TEMPERATURE

The Arabian Gulf has substantial impact to the climate and temperature in project site due to the proximity to the coast. As like of project site, a large portion of Sharjah is located adjacent to coastal areas. The Arabian Gulf exerts a strong influence on Sharjah's climate, particularly in rainfall, humidity and surface wind characteristics. The temperature statistics of UAE - National Center of Meteorology and Seismology (NCMS) indicates that highest average temperature (Mean) observed in a specific month during 2003-2017 was recorded in July (it was 35.8°C) and lowest average temperature was recorded in January with 13°C. The monthly averages for minimum, maximum and average in 2017 was higher than these averages during 2003-2017 with average difference about 0.7 °C.

Data from National Center of Meteorology and Seismology (NCMS) during 2013-2017 for Sharjah International Airport and Dubai International Airport station is presented in

Table 1.

Perusal on Sharjah International Airport (SIA) data, it indicates that lowest minimum absolute temperature (Min.) observed in a specific month during 2013 – 2017 was 5.2°C in January, 2013 and highest maximum absolute temperature (Max.) was 48.8°C in July, 2013. The lowest average temperature (Mean) observed in a specific month during 2013 – 2017 was 18.4°C in January, 2014 and highest average temperature was 37.7°C in July, 2017.

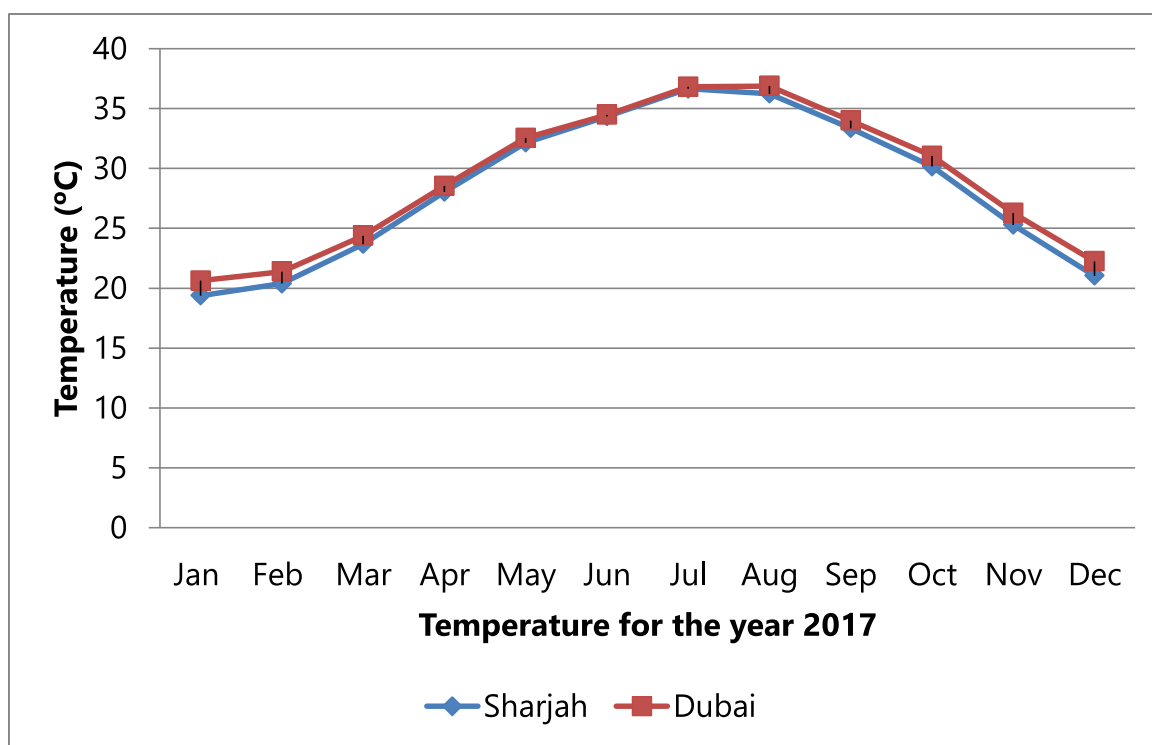


Figure 1 – Monthly Trend of Average Temperature (Mean) for the year 2017 at Sharjah International Airport and Dubai International Airport (Source - NCMS)

Perusal on Dubai International Airport data, lowest minimum absolute temperature observed in a specific month during 2013 – 2017 was 12.10°C in January, 2017 and highest maximum absolute temperature was 48.8°C in August, 2016. The lowest average temperature (Mean) observed in a specific month during 2013 – 2017 was 19.8°C in January, 2014 and highest average temperature was 38.3°C in August, 2016. The lowest mean of minimum temperature (Mean Min.) observed in a specific month during 2013 – 2017 was 15.9°C in January, 2013 and highest mean of maximum temperature (Mean Max.) was 44.1°C in August, 2016.

Table 1 – Min., Mean min., Mean, Mean max., and Maximum¹ of temperature (°C) during the years, 2013 – 2017 at Sharjah International Airport and Dubai International Airport station (Source - NCMS)

Year	Parameters	Months											
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Sharjah International Airport Station													
2013	Min.	5.2	8.9	12.8	16.1	22.0	22.7	28.4	28.4	24.0	20.7	16.0	9.1
	Mean Min.	12.8	14.4	16.7	21.6	24.0	27.2	31.0	30.8	27.9	24.0	19.5	15.4
	Mean	19.3	20.4	23.6	27.9	30.9	33.4	36.6	35.9	33.4	29.8	24.9	21.0
	Mean Max.	25.5	27.2	30.8	34.7	38.1	40.5	43.5	42.6	40.5	36.5	31.1	26.6
	Max.	30.1	32.0	36.7	40.8	44.5	43.9	48.8	45.3	44.1	40.2	37.7	31.8
2014	Min.	11.2	9.9	14.1	17.7	21.4	24.6	28.7	29.2	26.0	21.3	15.5	10.7
	Mean Min.	13.1	13.7	17.5	21.9	25.5	27.5	30.9	30.9	28.2	24.8	19.4	14.7
	Mean	18.4	19.4	23.4	29.0	32.4	34.1	36.4	35.9	33.7	31.0	25.0	21.0
	Mean Max.	23.8	25.6	29.7	36.4	39.3	41.7	43.2	42.6	40.9	37.5	30.7	27.2
	Max.	28.2	31.2	36.7	40.4	45.1	46.5	47.0	48.3	44.6	40.6	36.2	31.1
2015	Min.	9.9	11.5	10.5	18.0	17.6	25.7	26.2	28.0	23.2	19.7	18.0	9.3
	Mean Min.	13.0	16.2	17.1	21.3	25.4	29.1	30.5	30.4	27.2	24.5	21.0	15.1
	Mean	19.1	22.0	23.4	28.0	33.0	35.0	36.9	36.6	33.0	30.3	26.3	21.0
	Mean Max.	25.0	28.1	29.4	34.3	39.7	41.3	43.6	43.2	39.4	36.5	32.1	26.4
	Max.	30.1	35.6	38.0	41.0	44.0	47.9	47.5	47.0	44.0	40.8	36.1	32.9
2016	Min.	9.7	10.0	14.3	16.3	19.1	27.0	27.9	29.4	25.7	19.3	14.7	12.2

¹ Min – Lowest minimum absolute temperature observed in a specific month; Mean Min – Average of minimum absolute temperature observed in a specific month; Mean – Average of daily temperature observed in a specific month; Mean Max – Average of maximum absolute temperature observed in a specific month; Max – Highest maximum absolute temperature observed in a specific month.

Year	Parameters	Months											
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
	Mean Min.	14.1	14.0	18.6	20.1	25.4	32.0	31.2	25.3	28.2	23.9	19.2	16.2
	Mean	19.6	20.3	24.0	26.4	32.1	33.9	36.2	36.6	33.5	29.7	25.2	21.9
	Mean Max.	24.6	25.8	29.2	31.9	38.7	40.7	42.6	43.7	39.8	35.6	31.6	27.9
	Max.	30.9	33.4	37.3	39.9	43.9	44.5	46.1	48.5	44.0	39.2	34.8	31.9
2017	Min.	8.7	6.4	14.0	18.5	22.2	24.2	26.6	25.5	21.8	20.2	13.7	9.7
	Mean Min.	14.7	15.1	18.3	21.1	24.5	28.3	30.5	29.5	25.7	23.2	18.2	13.6
	Mean	20.5	19.8	24.0	28.9	32.4	35.3	37.2	36.2	33.2	30.0	25.0	20.3
	Mean Max.	26.0	24.5	30.0	37.2	40.7	42.5	44.5	43.3	41.2	37.3	31.6	27.0
	Max.	29.7	30.4	36.9	41.4	43.7	47.3	47.1	46.5	44.7	41.2	36.1	30.1
Dubai International Airport Station													
2013	Min.	12.1	14.0	16.1	17.6	22.4	24.3	29.2	30.4	25.5	24.3	18.4	13.5
	Mean Min.	16.6	17.2	19.6	23.9	25.8	28.4	32.6	32.5	30.2	26.6	22.4	18.2
	Mean	20.9	21.7	24.5	28.6	31.1	33.2	36.7	36.2	34.1	30.7	26.3	22.4
	Mean Max.	25.1	26.5	29.6	33.9	36.5	38.5	42.4	41.8	39.4	35.2	30.8	26.3
	Max.	30.0	31.8	36.1	40.1	43.0	42.5	48.5	44.7	44.6	39.7	38.0	31.7
2014	Min.	14.1	13.3	15.8	19.2	23.5	26.7	28.9	30.9	27.9	24.2	18.9	15.1
	Mean Min.	15.9	16.4	19.9	24.1	27.5	29.2	32.0	32.2	30.2	27.7	21.9	17.9
	Mean	19.8	20.6	24.1	29.3	32.6	34.1	36.2	35.9	34.1	31.8	26.1	22.6
	Mean Max.	23.6	25.0	28.9	35.0	38.4	40.4	41.3	41.2	39.7	36.6	29.9	26.7
	Max.	27.9	30.7	36.2	39.5	44.1	45.5	46.3	46.3	44.1	40.0	35.4	31.2
2015	Min.	12.5	15.5	15.0	18.1	22.5	28.6	30.1	31.2	25.9	25.4	19.0	15.4
	Mean Min.	16.5	19.3	20.5	23.1	28.1	30.8	33.1	33.6	30.4	27.8	23.0	18.4
	Mean	21.1	23.4	24.6	28.5	33.8	35.1	37.3	37.8	34.2	31.6	27.0	22.3
	Mean Max.	25.2	28.6	29.5	33.8	39.3	40.4	43.0	43.3	39.4	36.5	31.2	26.1
	Max.	30.1	35.8	38.0	41.1	44.7	47.9	47.1	47.3	43.5	40.2	36.2	30.8



Year	Parameters	Months											
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
2016	Min.	14.2	14.0	17.8	17.0	23.0	30.0	30.5	33.7	28.6	23.5	21.1	16.9
	Mean Min.	16.9	17.0	20.8	22.7	27.6	34.0	33.0	30.8	30.9	27.2	23.1	19.3
	Mean	20.8	21.4	24.7	27.4	32.8	34.7	36.7	38.3	34.4	31.1	27.0	23.6
	Mean Max.	24.6	25.6	29.0	32.0	38.4	40.6	42.5	44.1	39.5	35.2	31.3	27.8
	Max.	30.7	33.4	37.5	39.5	44.2	45.4	46.2	48.8	44.5	38.3	35.2	32.3
2017	Min.	15.4	11.4	17.7	20.1	25.4	27.2	30.9	30.6	26.5	24.5	19.8	15.8
	Mean Min.	18.2	17.5	21.1	25.5	28.2	30.8	34.0	33.0	30.5	27.1	22.8	18.1
	Mean	20.5	19.8	24.0	28.9	32.4	35.3	37.2	36.2	33.2	30.0	25.0	20.3
	Mean Max.	25.8	24.4	29.7	35.9	39.1	41.7	44.0	43.0	40.7	36.8	31.4	26.9
	Max.	29.3	30.4	37.2	41.0	42.9	46.3	47.3	46.2	44.7	41.1	35.6	30.1

RELATIVE HUMIDITY

The relative humidity statistics of UAE in 2017 indicates that highest value of mean maximum relative humidity in winter reached to 86% in January and the highest value of average relative humidity was 64% in January. The lowest value of the mean minimum was in summer months especially in June was 19% and this is consistent with high temperatures in summer.

Data from National Center of Meteorology and Seismology (NCMS) during 2013-2017 for Sharjah International Airport and Dubai International Airport station are presented in **Table 2**. The graphical representation of monthly trend of mean of relative humidity for the year, 2017 is presented in **Figure 2**.

Perusal on Sharjah International Airport (SIA) data on relative humidity, lowest minimum absolute relative humidity (Min.) observed in a specific month during 2013 – 2017 was 4% in October, 2014 and highest maximum absolute relative humidity (Max.) was 99% in the months of January to April, 2013 and March, 2016. The lowest value of mean minimum relative humidity (Mean Min.) observed in a specific month during 2013 – 2017 was 15% in May, 2015 and highest value of mean maximum relative humidity (Mean Max.) was 89% in February, 2013.

Perusal on Dubai International Airport data on relative humidity, lowest minimum absolute relative humidity during 2013 – 2017 was 4% in May, 2015 and highest maximum absolute relative humidity was 100% during winter season. The lowest value of mean minimum relative humidity observed in a specific month during 2013 – 2017 was 14% in July, 2016 and highest value of mean maximum relative humidity was 81% in January, 2015.

Table 2 – Min., Mean min., Mean max., and Maximum² of Relative Humidity (%) during the years, 2013 – 2017 at Sharjah International Airport and Dubai International Airport station

Year	Parameters	Months											
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Sharjah International Airport Station													
2013	Min.	7	16	10	9	9	10	8	17	13	18	19	20
	Mean Min.	38	35	30	24	24	28	27	28	28	32	37	38
	Mean Max.	87	89	83	72	70	76	67	69	74	82	81	84
	Max.	99	99	99	99	98	91	90	91	96	98	93	98
2014	Min.	8	18	12	5	11	7	16	10	8	4	16	13
	Mean Min.	51	48	48	37	35	37	37	38	39	33	38	42
	Mean Max.	82	84	88	82	75	78	77	80	82	74	69	75
	Max.	93	98	98	98	86	95	95	85	91	85	89	96
2015	Min.	18	10	7	8	6	5	9	6	10	14	15	26
	Mean Min.	33	28	26	24	15	23	17	18	24	28	30	41
	Mean Max.	83	74	75	70	57	65	62	58	74	76	71	79
	Max.	96	96	95	95	89	86	82	85	93	93	83	90
2016	Min.	11	18	16	12	10	11	14	7	19	12	11	22
	Mean Min.	43	36	36	27	23	24	33	18	34	35	38	44
	Mean Max.	84	83	85	71	62	70	70	66	81	79	79	87
	Max.	96	95	99	89	89	86	85	98	93	96	89	98

² Min – Minimum absolute relative humidity by month; Mean Min – Mean of monthly minimum relative humidity; Max – Maximum absolute relative humidity by month; Mean Max – Mean of monthly maximum relative humidity.



Year	Parameters	Months											
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
2017	Min.	7	21	16	7	10	7	6	9	6	15	11	12
	Mean Min.	41	42	36	22	22	26	21	23	21	28	30	36
	Mean Max.	84	81	81	69	70	76	66	72	78	88	76	82
	Max.	97	94	97	95	88	94	86	90	97	98	93	98
Dubai International Airport Station													
2013	Min.	16	14	10	8	9	7	7	13	14	18	14	18
	Mean Min.	38	35	31	24	25	30	27	25	29	34	34	38
	Mean Max.	78	80	76	65	66	73	64	63	68	74	71	73
	Max.	98	96	97	97	97	87	86	78	87	86	92	95
2014	Min.	25	16	6	6	10	7	11	15	7	9	13	11
	Mean Min.	43	36	36	22	21	23	28	30	26	27	36	37
	Mean Max.	76	78	79	70	65	75	72	73	78	70	67	75
	Max.	90	99	97	97	89	94	94	89	91	84	88	100
2015	Min.	16	9	7	7	6	4	8	6	11	14	16	21
	Mean Min.	35	29	29	27	15	25	18	17	24	30	30	39
	Mean Max.	81	72	75	73	53	64	60	54	70	72	65	70
	Max.	100	100	96	100	85	85	81	80	96	94	89	87
2016	Min.	10	12	12	11	9	10	11	7	15	14	10	19
	Mean Min.	41	35	34	25	23	22	26	14	30	34	36	41
	Mean Max.	75	75	76	64	57	61	65	52	72	69	68	79
	Max.	96	91	97	83	85	80	83	87	100	85	80	100
2017	Min.	20	24	13	6	12	10	6	10	6	13	12	12
	Mean Min.	43	40	33	22	23	27	20	22	21	30	29	37
	Mean Max.	74	71	71	57	63	68	58	63	72	79	65	73
	Max.	100	87	88	90	88	91	78	85	96	92	81	100

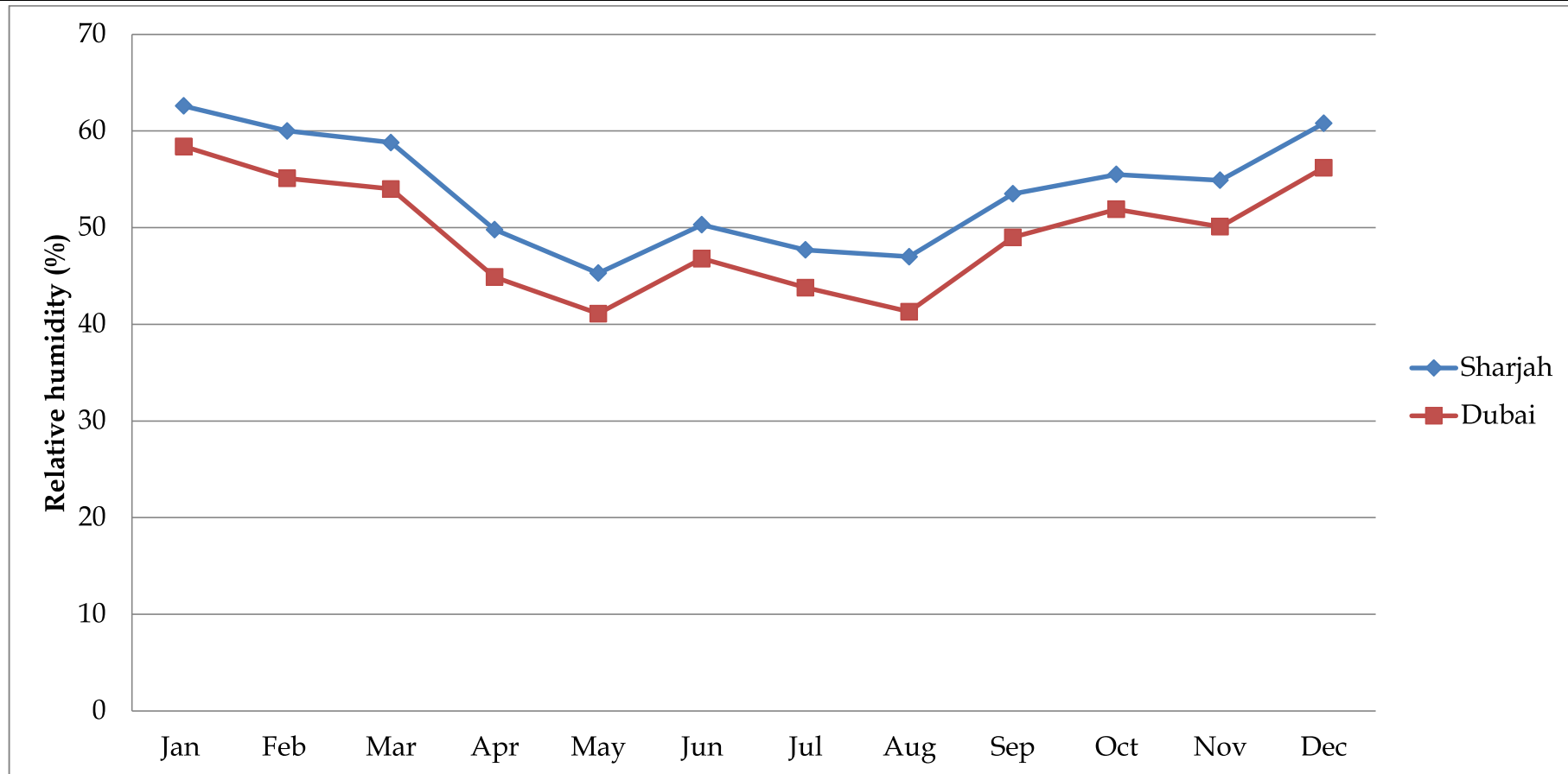


Figure 2 – Monthly Trend of average Relative Humidity (Mean) for the year 2017 at Sharjah International Airport and Dubai International Airport station

WIND SPEED AND WIND DIRECTION

The wind speed and wind direction for Sharjah International Airport is represented by wind rose diagram which is given in **Figure 3**. The wind rose diagram indicates that North-western directions, East, West & South-eastern are the most prevalent wind flowing directions. The average wind speed for the last 5 years is 7.5 miles per hour at Sharjah International Airport and 8.7 miles per hour at Dubai International Airport.



[OMS] SHARJAH INTL ARP
 Windrose Plot [All Year]
 Period of Record: 01 Jan 2013 - 31 Dec 2017

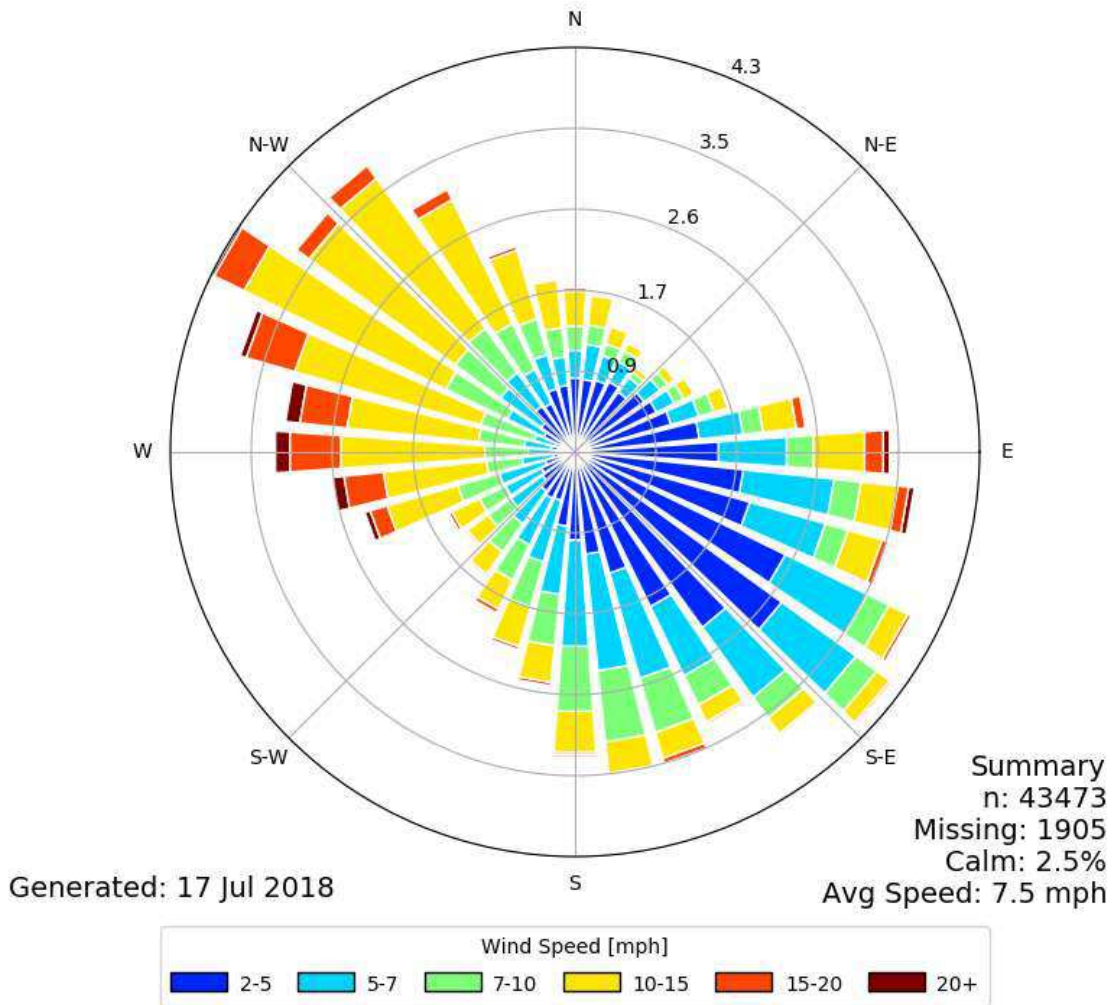


Figure 3 - Wind rose diagram of Sharjah International Airport for Jan. 2013 – Dec. 2017

(Source: Iowa Environmental Mesonet Web - <http://mesonet.agron.iastate.edu/>)



[OMDB] DUBAI INTL AIRPO
 Windrose Plot [All Year]
 Period of Record: 01 Jan 2013 - 31 Dec 2017

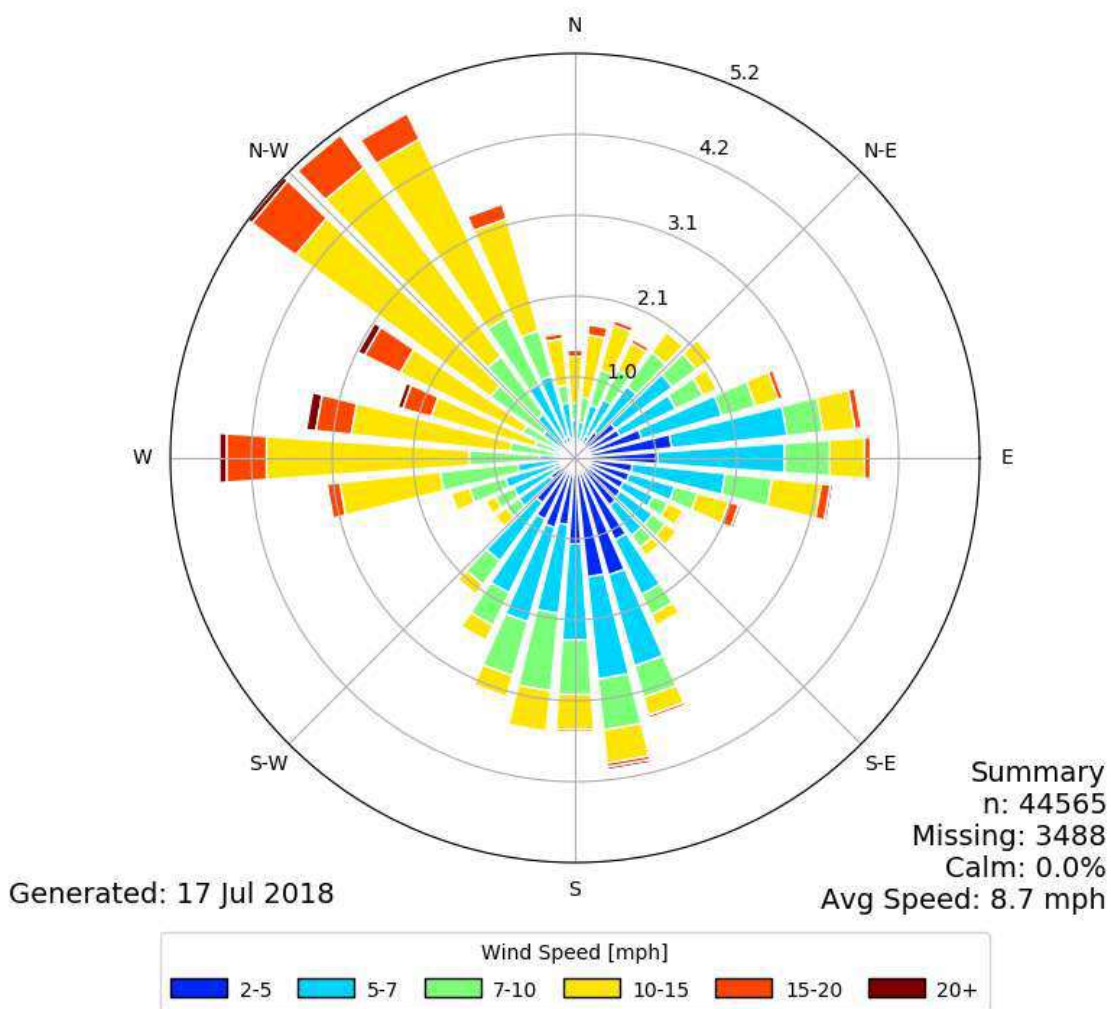


Figure 4 - Wind rose diagram of Dubai International Airport for Jan. 2013 – Dec. 2017

(Source: Iowa Environmental Mesonet Web - <http://mesonet.agron.iastate.edu/>)

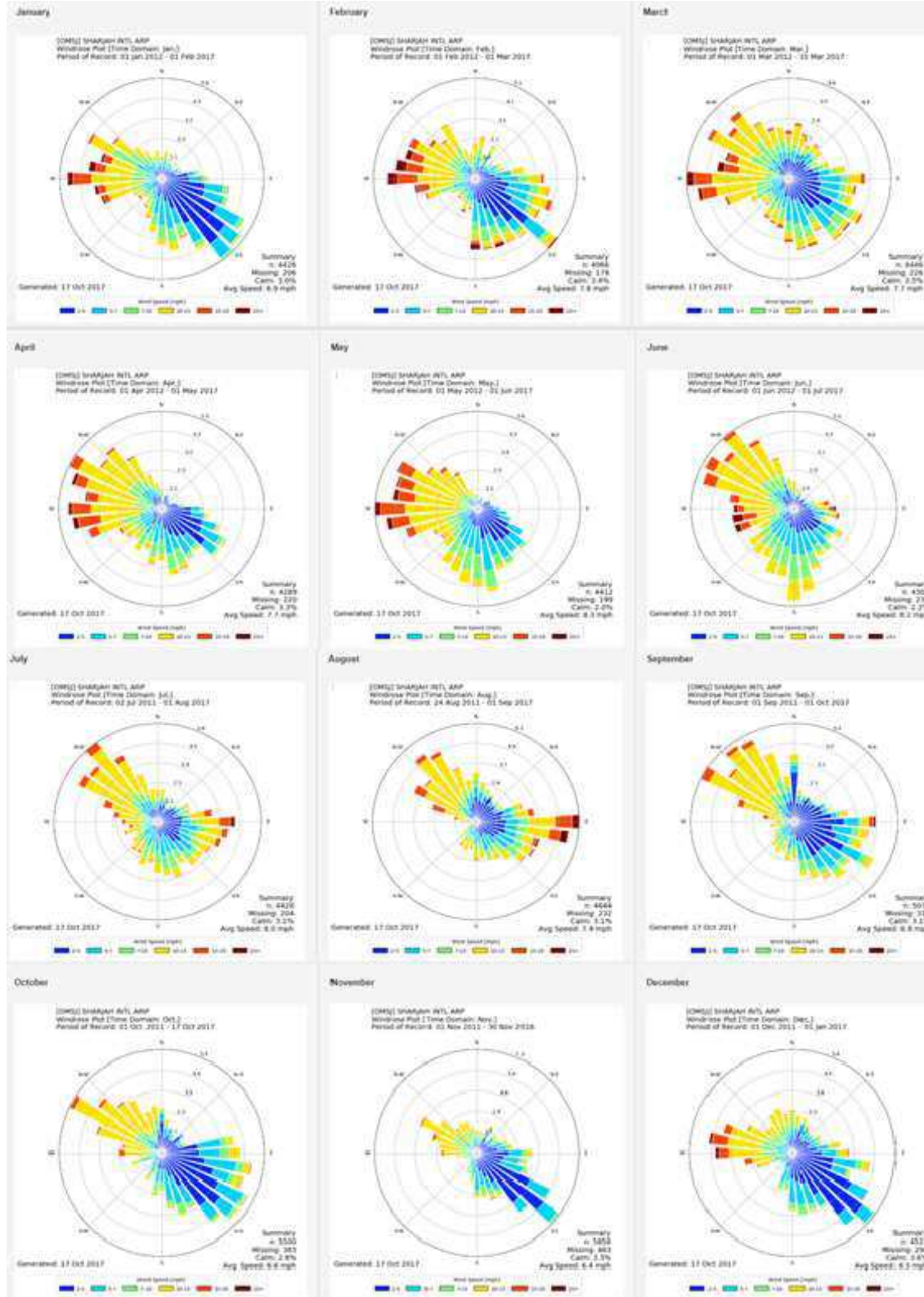


Figure 5 – Monthly wind rose diagram of Sharjah International Airport for the period of 2011-2017

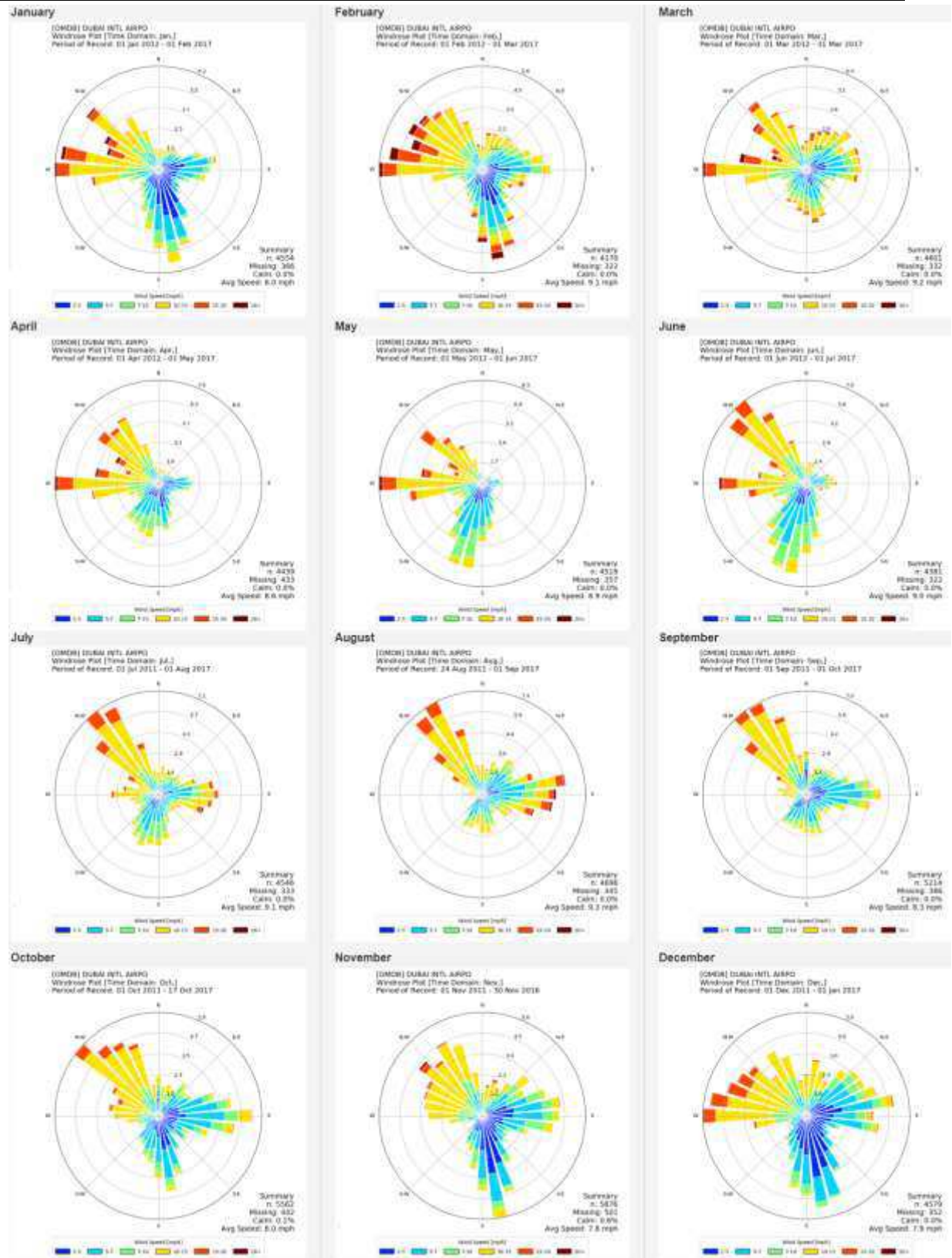


Figure 6 – Monthly wind rose diagram of Dubai International Airport for the period of 2011-2017

RAINFALL

The data on annual rainfall and number of rainy days recorded during 2007 – 2017 at Sharjah International Airport and Dubai International Airport station are presented in **Table 3**. Rainfall pattern is graphically presented in **Figure 7** and **Figure 8**.

Table 3 – Annual rainfall and number of rainy days in Sharjah and Dubai during 2007 – 2017

Years	Sharjah International Airport		Dubai International Airport Station	
	Rainfall (mm)	Rainy days	Rainfall (mm)	Rainy days
2007	13.6	20	7.68	15
2008	125.6	27	135.88	25
2009	135.5	32	107.79	31
2010	93.0	24	53.80	18
2011	18.4	21	23.91	19
2012	19.5	19	50.36	16
2013	85.9	23	55.09	18
2014	46.2	23	59.83	19
2015	49.9	14	32.86	13
2016	48.0	15	37.89	17
2017	61.7	31	62.10	31.00

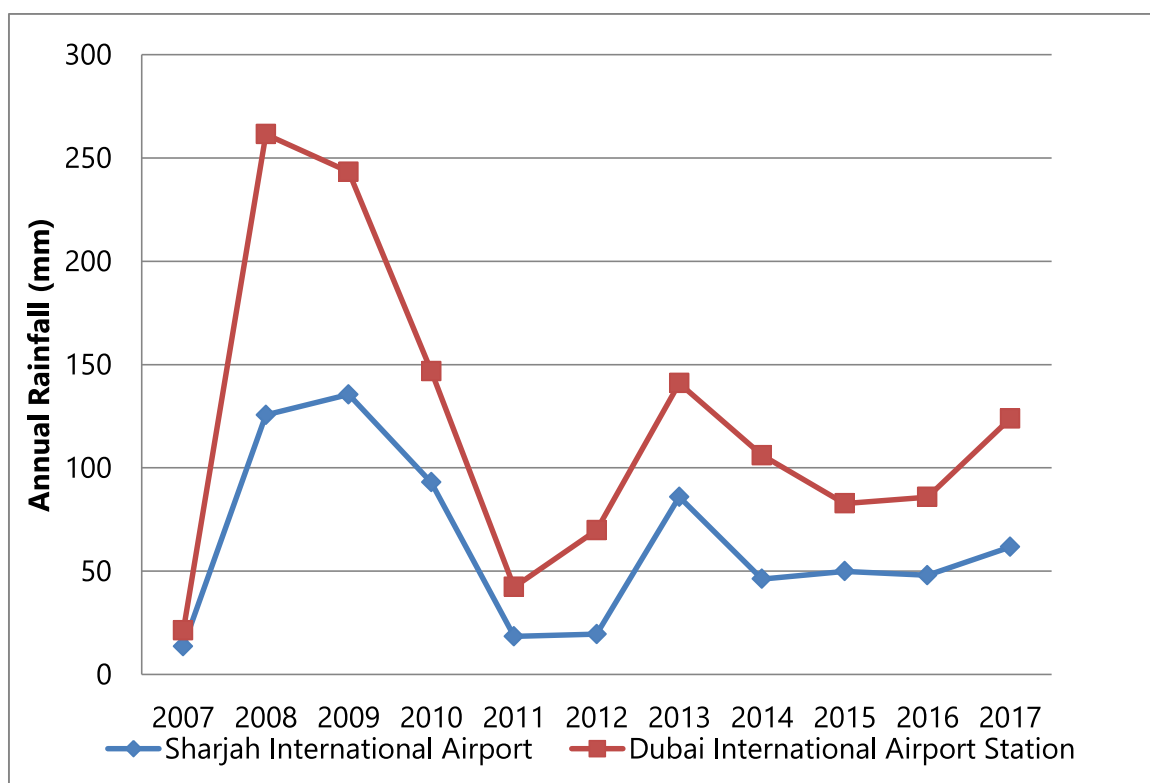


Figure 7 – Graphical representation of annual rainfall during 2007 - 2017

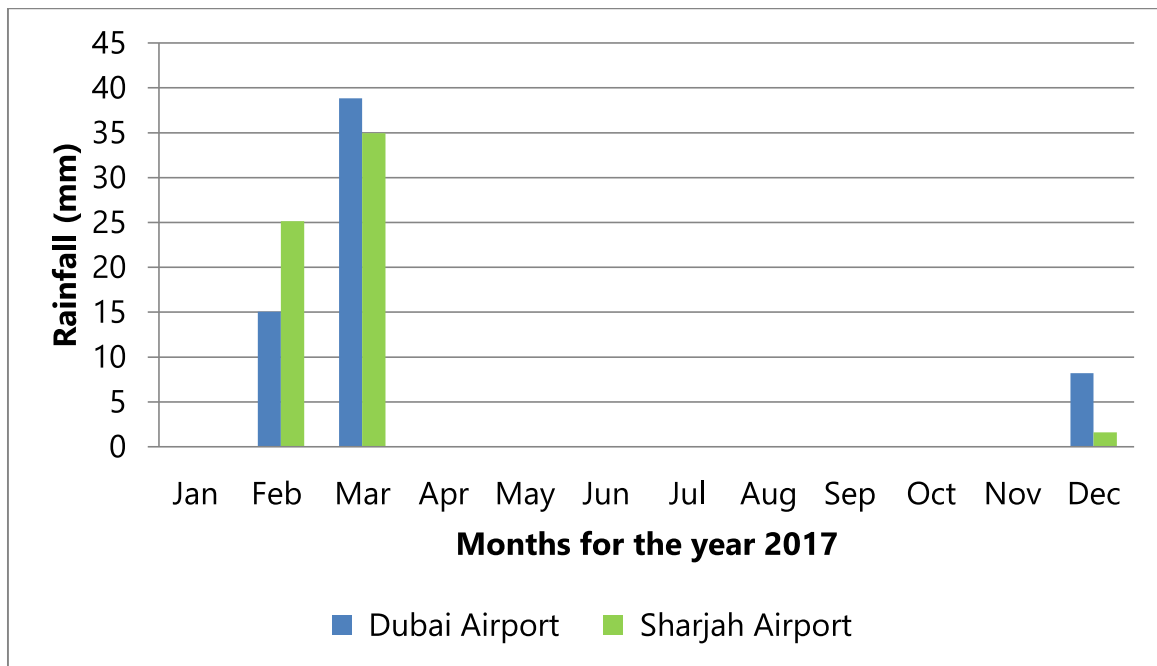


Figure 8 – Monthly rainfall pattern during 2017 at Sharjah and Dubai

The rainfall in the UAE is known in its fluctuation during 2007-2017 and there is variation in the average of rainfall from one area to another also. The higher level of rainfall received in Sharjah was 135.5mm during 2009, 135.88 in Dubai during 2008 when compared with last 11 years data (2007 – 2017).

SOLAR RADIATION

The daily average of solar radiation in Ajman and Dubai region are month-wisely presented in **Table 4**. There is no available data for Sharjah emirate from NCMS. Perusal on data recorded in Dubai international airport station, the highest value of average daily solar radiation was in May, 2016 (7,669 wh/m²) and the lowest was in December, 2016 (3,179 wh/m²). Perusal on data recorded in Ajman station, the highest value of average daily solar radiation was in May, 2014 (7,087wh/m²) and the lowest was in December, 2016 (3,179 wh/m²).

Table 4 – Month-wise daily average of solar radiation (wh/m²) in Ajman and Dubai during 2013 – 2016

Year	Months											
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Ajman Station												
2013	...	...	...	...	...	...	6,429	5,986	5,846	4,854	3,721	3,599
2014	3,400	4,505	5,219	6,580	7,087	6,712	5,715	5,140	4,655	4,055	4,318	3,806
2015	4,001	4,755	5,170	6,437	6,125	6,403	6,351	6,879	5,848	5,007	4,573	3,426
2016	3,714	4,844	4,909	6,114	6,966	6,377	6,384	6,209	5,625	4,874	3,621	3,179
2017	3,523	3,191	4,564	6,769	7,042	6,885	6,489	6,520	5,666	4,963	4,045	3,404
Dubai International Airport Station												
2013	4370	5296	6309	6228	7550	7397	7032	6356	6551	5742	4456	4393
2014	4157	5199	5793	7250	7016	7236	7034	6743	6198	5812	4924	4438
2015	4646	5301	5836	7059	7438	7419	6897	7097	6331	5644	4595	4133
2016	3758	5270	5302	6635	7669	7402	6816	6698	6091	5345	4416	4060
2017	4130	3339	4967	7072	7418	7460	7042	6866	6290	5535	4801	4021

..... Data not available

ANNEXURE 9 – BASELINE ENVIRONMENTAL SURVEY - REPORTS

Baseline Environmental Survey Reports – Terrestrial Environment

**REPORT ON
AIR QUALITY &
NOISE MONITORING**

FOR

**ENVIRONMENTAL SOLUTIONS
AND CONSULTANCY**

SHARJAH

UNITED ARAB EMIRATES

By

Rak  Lab

P.O.Box 86, Khor Khwair, Ras Al Khaimah, U.A.E

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Email.ID:- info@raklab.com

Report No. : RP-245906-18

Date: 09th July 2018

Jo.No. : JO-262-14

**PROPOSED TERRESTRIAL
ENVIRONMENTAL SURVEY
AT LAYYAH POWER
SHARJAH
UNITED ARAB EMIRATES**

Report No. : RP-245906-18

Date: 09th July 2018

CLAUSES	TABLE OF CONTENTS	PAGE NUMBERS
1	INTRODUCTION	1
2	AMBIENT AIR QUALITY	1
2.1	Objective	1
2.2	Test Methods	1-2
2.3	Monitoring Locations	2
2.4	Results	2-3
2.5	Equipment Details	3
2.6	Aerial View of Tested Locations	4
3	NOISE MONITORING	5
3.1	Test Method	5
3.2	Monitoring Locations	6
3.3	Results	6
3.4	Equipment Details	7
4	Photographs of monitoring	7-9
5	Conclusion	9
	APPENDICES	
A	CALIBRATION CERTIFICATES	

Report No: RP-245906-18

Date: 09th July 2018

1.0 INTRODUCTION

Environmental solution & consultancy has awarded the work of Air quality and Noise monitoring in **proposed terrestrial environmental survey at layyah power**. The test was carried out from 05th to 07th of July 2018 as per standard sampling and testing procedures.

2.0 AMBIENT AIR QUALITY

2.1 Objective

The objective of the tests was to estimate the following:

- Total Suspended Particulate Matter (TSPM)
- Respirable Suspended Particulate Matter (PM 10)
- Sulfur Dioxide (SO₂)
- Carbon Monoxide (CO)
- Ozone (O₃)
- Nitrogen Dioxide (NO₂)
- Total Volatile organic compounds (TVOC)
- Lead (Pb)

2.2 Test Methods

Air quality was monitored using a calibrated high flow-rate Respirable dust sampler (Model AAS 217 BL). The volumetric flow rates of the sampler were maintained at 0.9 - 1.4 m³/min for TSPM and RSPM parameters.

The sampling and analysis of air quality parameters was carried out in accordance with the procedures described in the relevant parts of US EPA – eCFR, **the United States Environment Protection Agency-electronic Code of Federal Regulations: Title 40: Part 50 and 53.**

Meteorological data of the day was collected using an Automatic Weather Station. Automatic Weather Station is a micro controller based weather station. All sensors (wind speed & direction, temperature, humidity, dew point and solar radiation) are attached with the data logger for the collection of real time data automatically.

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Page 1 of 9



Report No: RP-245906-18

Date: 09th July 2018

Gases quality was monitored using calibrated multi gases sensors (electro chemical , infrared , photo ionization detector) attached gas detectors (model- Gas Alert and Multi RAE Lite). The sensors is detecting the gases in different concentration. The sampling and analysis of gas monitoring was carried out in accordance with the procedures described in the relevant parts of BSEN 60079-29-2; 2007, BSEN 45544-1; 2000 and BSEN 50271; 2010.

2.3 Monitoring locations

The following locations were monitored for ambient air quality.

Table 2.3 Monitoring locations

Test Date	Monitoring Time (24 Hours)	Sample Number	Locations	GPS Co-ordinates
05 – 06 July 2018	11.45 – 11.45	SA-156441-18	AAQ 1	N 25°21'20.6" E 55°22'03.4"
06 – 07 July 2018	12.00 – 12.00	SA-156442-18	AAQ 2	N 25°21'20.4" E 55°22'18.6"
05 – 06 July 2018	11.30 – 11.30	SA-156443-18	AAQ 3	N 25°21'12.5" E 55°22'06.1"
06 – 07 July 2018	11.45 – 11.45	SA-156444-18	AAQ 4	N 25°21'18.9" E 55°22'22.2"

2.4 Results

2.4 (a) Average Meteorological Data

Tested Date	Temperature. Dry (°C)			Relative Humidity (%)			Wind Speed (m/s)	Wind Direction (°)	Solar Radiation (W/m ²)	Dew point (°C)
	Max	Min.	Avg.	Max.	Min.	Avg.				
05 – 06 July 2018	44.28	33.0	38.53	79.15	23.52	51.57	1.2	144	455	25.82
06 – 07 July 2018	45.16	34.52	39.10	69.11	26.45	50.21	1.3	199	447	26.37

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Page 2 of 9



Report No: RP-245906-18

Date: 09th July 2018

Table 2.4 (b) Results

Parameters	Units	Sampling test method	Results				MoEW U.A.E Limits (Ref.1)
			AAQ 1	AAQ 2	AAQ 3	AAQ 4	
*Total Suspended Particulate Matter (TSPM)	µg/Nm ³	USEPA eCFR Title 40 Part 50 and 53	217	204	223	196	230
*Respirable Suspended Particulate Matter (PM 10)			83	98	115	89	150
*Sulphur-dioxide (SO ₂)	µg/Nm ³	BSEN 60079-29 BSEN 50271;2010 BSEN 45544-1:2000	< 0.1	< 0.1	26.2	< 0.1	150
*Nitrogen Dioxide (NO ₂)	µg/Nm ³		18.8	< 0.1	18.8	< 0.1	150
*Carbon monoxide (CO)	µg/Nm ³		< 1	< 1	< 1	< 1	10000**
*Ozone (O ₃)	µg/Nm ³		58.9	78.5	78.5	58.9	120**
*Total Volatile Organic Compounds (TVOC)	ppm		0.05	< 1	0.03	< 1	-
Lead (Pb)	ppm	ICP OES	< 0.01	< 0.01	< 0.01	< 0.01	-

Note 1: Ref1- Ministry of Environment and Water UAE

2: ppm-parts per million

3: *This test is accredited by ENAS (Emirates National Accreditation System) & GAC (GCC Accreditation Center)

4: **Indicates Limits for 8 Hrs. Monitoring (CO & O₃)

2.5. Equipment Details

Equipment Name	Equipment ID	Model	Make
Dust Sampler	RL-EN-01,04	AAS 217 BL	ECOTECH
Automatic Weather Station	RL-WE-01	AWS	ECOTECH
Gas detector	RL-GD-09,10	GAS ALERT MICRO 5	BWT
Gas detector	RL-GD-05,08	MULTIRAE LITE	RAE SYSTEMS
Gas detector	RL-GD-03	Drager Xam 5000	Drager
ICP OES	RL-ICP-01	700 series	Agilent Technologies

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Page 3 of 9



Report No: RP-245906-18

Date: 09th July 2018

2.6 Aerial View of Tested Locations.



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Page 4 of 9

Report No: RP-245906-18

Date: 09th July 2018

3.0 NOISE MONITORING

3.1 Test Method

Equivalent Continuous Sound Level was measured at site in A-weighting using calibrated integrating sound level meters manufactured by sinus tango and Casella. The measurement was according to the standard ISO 1996-2:2007.

Details of the instruments are listed below.

1. (a). Sinus Tango (Class 1), sound level meter.
(b). Acoustic calibrator (Class 1)

- 2 (a) Casella 63 (Class 1), sound level meter.
(b). Acoustic calibrator (Class 1)

The sound level meters exceed the minimum requirements of the following standards and organizations.

- IEC 61672-1 2002-5
- ANSI, S1.4 ;1983 , ANSI S1
- IEC 60651 ;1979
- IEC 60804 ;1985

The sound level meters hold valid calibration certificates issued by a qualified third party calibrating body. The meters were used in conjunction with on-site calibration equipment to ensure stability of performance.

Report No: RP-245906-18

Date: 09th July 2018

3.2 Monitoring locations

The following locations were monitored for noise

Table 3.2 Noise monitoring locations

Test date	Monitoring Time (Hours)	Sample number	Locations	Schedule
05 – 06 July 2018	11.00 – 11.00	SA-156445-18	ANQ 1	24 Hours
06 – 07 July 2018	11.30 – 11.30	SA-156446-18	ANQ 2	
05 – 06 July 2018	11.15 – 11.15	SA-156447-18	ANQ 3	
06 – 07 July 2018	11.30 – 11.30	SA-156448-18	ANQ 4	

3.3 Results

Table 3.3 Noise Monitoring Results

Locations	Duration (Hours)	Day time				MoEW U.A.E. LIMITS (ref)	Duration (Hours)	Night time			MoEW U.A.E. LIMITS (ref)
		Noise levels dB(A)			Noise levels dB(A)						
		Leq.	Lmax.	Lmin.	Leq.			Lmax.	Lmin.		
ANQ 1	13 Hours	69.7	89.5	56.4	70	11 Hours	65.4	75.8	52.9	60	
ANQ 2		72.7	96.6	58.7			69.6	92.3	54.5		
ANQ 3		64.3	93.8	50.2			61.6	91.2	48.3		
ANQ 4		80.9	96.1	58.5			76.4	93.7	54.7		

Notes: 1: Ref1- Ministry of Environment and Water UAE

2: This test is accredited by ENAS (Emirates National Accreditation System) & GAC (GCC Accreditation Center)

Report No: RP-245906-18

Date: 09th July 2018

3.4 Equipment Details

Equipment Name	Equipment ID	Model	Make
Sound Level Meter	RL-DSM-06,07	Tango	sinus
Sound Level Meter	RL-DSM-05	Casella 63	Casella

4.0 PHOTOGRAPHS OF MONITORING

AIR QUALITY MONITORING



AAQ-1



AAQ-2

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 Page 7 of 9

Report No: RP-245906-18

Date: 09th July 2018



AAQ-3



AAQ-4

NOISE MONITORING



ANQ-1



ANQ-2

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 Page 8 of 9

Report No: RP-245906-18

Date: 09th July 2018



ANQ-3



ANQ-4

5 CONCLUSION

5.1 Ambient Air Quality

The levels of TSPM and PM10 measured, Concentrations of air pollutants Sulfur dioxide (SO₂), Nitrogen dioxide (NO₂), Ozone (O₃) and Carbon monoxide (CO) are below the limits of MoEW at the time of survey.

5.2 Ambient Noise Quality

In day time the noise level measured exceeds from the MoEW guidelines in location ANQ 2 and ANQ 4. Night time noise level measured exceeds from the MoEW guidelines in all locations at the time of survey.



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

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Page 9 of 9



REPORT ON CHEMICAL ANALYSIS OF WATER

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O Box 68595, Sharjah, U.A.E		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247051-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 10/07/2018
Sample number	: SA-156300-18	Time sample received	: 08:00 Hrs
Sampling ref. #	: SC-25090-18	Sampling location	: Borehole#01 , Layyah Power Station
Sampling procedure ref.	: APHA 22nd Edition 2012/ Grab	Sampled by	: Rak lab representative
Sampling condition	: Normal	Sample brought in by	: Rak lab representative
Sampling date & time	: 09/07/2018, 11:00 Hrs	Sampling method variation	: None
Sample description	: Water	Senders ref. #	: LPO: ESC/EC/73
Sample size	: 3 Ltr (Approximate)	Condition of sample	: Hazy
Source of sample	: Layyah Power Station		

Test Data	On Site Treatment	: <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Transport in cool condition
Date test started	: 10/07/2018	<input type="checkbox"/> None
Date test completed	: 17/07/2018	Tested by
		: NH/AH

Parameters	Test Methods	Units	Results
Temperature	APHA : 2250 : B	(°C)	29.2
Odour	APHA	-	Un Objectable
Color	APHA	Co/Pt	Normal
Oil & Grease	APHA : 5520 : B	mg/L	<5
Conductivity @ 25 °C	APHA : 2510 : B	µmhos/cm	5270
Turbidity	APHA 2130-B	NTU	7.75
pH at 25°C	APHA 4500-H ⁺ B	-	7.82
Total Suspended Solids (TSS)	APHA 2540-D	mg/L	26
Total Dissolved Solids at 180°C (TDS)	APHA 2540-C	mg/L	2820
Chemical Oxygen Demand (COD)	APHA 5220-B	mg/L	128
Biochemical Oxygen Demand , 5 days @ 20°C (BOD)	APHA 5210-B	mg/L	38
Chloride (Cl)	APHA 4500-Cl ⁻ B	mg/L	1524
Calcium (Ca)	APHA 3500-Ca B	mg/L	58
Fluoride (F)	APHA:4500:F D	mg/L	0.59
Phosphorus (P)	APHA:4500:P C&E	mg/L	0.30
Sulfate (SO ₄)	APHA:4500:SO ₄ C&E	mg/L	95
Total Hardness as (CaCO ₃)	APHA 2340-C/B	mg/L	365
Phenols	APHA:5530: C	mg/L	<0.02

REPORT ON CHEMICAL ANALYSIS OF WATER

Customer : ENVIRONMENTAL SOLUTIONS & CONSULTANCY

Address : P.O Box 68595, Sharjah, U.A.E

Report number : RP-247051-18

Report date : 17/07/2018

Sample number : SA-156300-18

Job order number : JO-262-14

Parameters	Test Methods	Units	Results
Total Alkalinity	APHA 2320-B	mg/L	80
Magnesium (Mg)	APHA:3500 :Mg B	mg/L	53.5
Total Nitrogen (TN)	APHA:4500 :N B	mg/L	8

Metals (ICPOES)				
Sodium (Na)	APHA 3120- B	mg/L		996
Potassium (K)	APHA 3120- B	mg/L		24.01
Iron (Fe)	APHA 3120-B	mg/L		0.05
Manganese (Mn)	APHA 3120-B	mg/L		0.01
Chromium (Cr)	APHA 3120-B	mg/L		<0.01
Copper (Cu)	APHA 3120-B	mg/L		0.01
Lead (Pb)	APHA 3120-B	mg/L		<0.01
Zinc (Zn)	APHA 3120-B	mg/L		0.41
Nickel (Ni)	APHA 3120-B	mg/L		<0.01
Cadmium (Cd)	APHA 3120-B	mg/L		<0.01

APHA/AWWA/WEF; Standard Methods For the Examination of Water & Waste Water 22nd Edition 2012.

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF WATER

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O Box 68595, Sharjah, U.A.E		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247050-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 05/07/2018
Sample number	: SA-155845-18	Time sample received	: 15:00 Hrs
Sampling ref. #	: SC-24984-18	Sampling location	: Borehole#02 , Layyah Power Station
Sampling procedure ref.	: APHA 22nd Edition 2012/ Grab	Sampled by	: Rak lab representative
Sampling condition	: Normal	Sample brought in by	: Rak lab representative
Sampling date & time	: 05/07/2018, 11:30 Hrs	Sampling method variation	: None
Sample description	: Water	Senders ref. #	: LPO: ESC/EC/73
Sample size	: 3 Ltr (Approximate)	Condition of sample	: Hazy
Source of sample	: Layyah Power Station		

Test Data		On Site Treatment	: <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Transport in cool condition
Date test started	: 05/07/2018		<input type="checkbox"/> None
Date test completed	: 16/07/2018	Tested by	: NH/AH

Parameters	Test Methods	Units	Results
Temperature	APHA : 2250 : B	(°C)	28.0
Odour	APHA	-	Un Objectable
Color	APHA	Co/Pt	Normal
Oil & Grease	APHA : 5520 : B	mg/L	<5
Conductivity @ 25 °C	APHA : 2510 : B	µmhos/cm	1242
Turbidity	APHA 2130-B	NTU	1.64
pH at 25°C	APHA 4500-H ⁺ B	-	7.38
Total Suspended Solids (TSS)	APHA 2540-D	mg/L	<5
Total Dissolved Solids at 180°C (TDS)	APHA 2540-C	mg/L	602
Chemical Oxygen Demand (COD)	APHA 5220-B	mg/L	24
Biochemical Oxygen Demand , 5 days @ 20°C (BOD)	APHA 5210-B	mg/L	11
Chloride (Cl)	APHA 4500-Cl ⁻ B	mg/L	305
Calcium (Ca)	APHA 3500-Ca B	mg/L	60
Fluoride (F)	APHA:4500:F D	mg/L	0.79
Phosphorus (P)	APHA:4500:P C&E	mg/L	0.01
Sulfate (SO ₄)	APHA:4500:SO ₄ C&E	mg/L	34
Total Hardness as (CaCO ₃)	APHA 2340-C/B	mg/L	210
Phenols	APHA:5530: C	mg/L	<0.02

REPORT ON CHEMICAL ANALYSIS OF WATER

Customer : ENVIRONMENTAL SOLUTIONS & CONSULTANCY

Address : P.O Box 68595, Sharjah, U.A.E

Report number : RP-247050-18

Report date : 17/07/2018

Sample number : SA-155845-18

Job order number : JO-262-14

Parameters	Test Methods	Units	Results
Total Alkalinity	APHA 2320-B	mg/L	38
Magnesium (Mg)	APHA:3500 :Mg B	mg/L	14.6
Total Nitrogen (TN)	APHA:4500 :N B	mg/L	3

Metals (ICPOES)			
Sodium (Na)	APHA 3120- B	mg/L	146
Potassium (K)	APHA 3120- B	mg/L	7.51
Iron (Fe)	APHA 3120-B	mg/L	0.07
Manganese (Mn)	APHA 3120-B	mg/L	0.09
Chromium (Cr)	APHA 3120-B	mg/L	<0.01
Copper (Cu)	APHA 3120-B	mg/L	0.01
Lead (Pb)	APHA 3120-B	mg/L	<0.01
Zinc (Zn)	APHA 3120-B	mg/L	1.18
Nickel (Ni)	APHA 3120-B	mg/L	<0.01
Cadmium (Cd)	APHA 3120-B	mg/L	<0.01

APHA AWWA WEF: Standard Methods For the Examination of Water & Waste Water 22nd Edition 2012.

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247057-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155851-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24990-18	Sampling location	: SQ6
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Normal	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 13:00 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252117.52 E#55228.44
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.88
pH @ 25°C	-	7.07
Conductivity @ 25°C	µmhos/cm	41250
Chloride (Cl)	mg/kg	1347
Total Alkalinity	mg/kg	28
Total Nitrogen (TN)	mg/kg	250
Phosphate (PO ₄)	mg/kg	0.9
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	97.84
Nickel (Ni)	mg/kg	<0.01
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	<0.01
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	<0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.24

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015.3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247056-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155850-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24989-18	Sampling location	: SQ5
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Normal	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 12:40 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252115.23 E#55228.10
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.56
pH @ 25°C	-	7.42
Conductivity @ 25°C	µmhos/cm	12450
Chloride (Cl)	mg/kg	3758
Total Alkalinity	mg/kg	24
Total Nitrogen (TN)	mg/kg	30
Phosphate (PO ₄)	mg/kg	0.9
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	80.79
Nickel (Ni)	mg/kg	<0.01
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	0.02
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	<0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.08

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015 , 3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247055-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155849-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24988-18	Sampling location	: SQ4
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Normal	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 12:15 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252116.96 E#55226.21
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.46
pH @ 25°C	-	7.63
Conductivity @ 25°C	µmhos/cm	8610
Chloride (Cl)	mg/kg	2623
Total Alkalinity	mg/kg	32
Total Nitrogen (TN)	mg/kg	33
Phosphate (PO ₄)	mg/kg	0.6
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	69.27
Nickel (Ni)	mg/kg	<0.01
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	<0.01
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	<0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.04

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015 , 3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247054-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155848-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24987-18	Sampling location	: SQ3
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Sunny	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 11:50 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252119.45 E#55225.59
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.34
pH @ 25°C	-	7.70
Conductivity @ 25°C	µmhos/cm	2380
Chloride (Cl)	mg/kg	425
Total Alkalinity	mg/kg	32
Total Nitrogen (TN)	mg/kg	23
Phosphate (PO ₄)	mg/kg	0.5
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	17.49
Nickel (Ni)	mg/kg	<0.01
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	<0.01
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.05

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015 , 3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247053-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155847-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24986-18	Sampling location	: SQ2
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Sunny	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 11:20 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252116.53 E#55223.94
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.63
pH @ 25°C	-	7.46
Conductivity @ 25°C	µmhos/cm	10200
Chloride (Cl)	mg/kg	3120
Total Alkalinity	mg/kg	36
Total Nitrogen (TN)	mg/kg	22
Phosphate (PO ₄)	mg/kg	1.0
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	88.73
Nickel (Ni)	mg/kg	0.03
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	<0.01
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	<0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.07

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015 , 3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah

REPORT ON CHEMICAL ANALYSIS OF SOIL

Customer	: ENVIRONMENTAL SOLUTIONS & CONSULTANCY		
Address	: P.O. Box 68595, 408, Sarah Shopping Mall, Rolla Bank Street, Sharjah, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: SEWA
Project name	: Baseline Terrestrial Environmental Survey @ Layyah Combined Cycled Thermal Power Plant	Project location	: Sharjah
Report number	: RP-247052-18	Report date	: 17/07/2018
Job order number	: JO-262-14	Date sample received	: 08/07/2018
Sample number	: SA-155846-18	Time sample received	: 17:00 Hrs
Sampling ref. #	: SC-24985-18	Sampling location	: SQ1
Sampling procedure ref.	: ASTM D75/D75 M -14	Sampled by	: Rak Lab representative
Sampling condition	: Sunny	Sample brought in by	: Rak Lab representative
Sampling date & time	: 08/07/2018 , 11:00 Hrs	Sampling method variation	: None
Sample description	: Soil	Senders ref. #	: N#252118.93 E#55223.73
Sample size	: 10 kg (Approximate)	Condition of sample	: Moist
Source of sample	: Not Given		

Test Data

Date test started	: 09/07/2018	Date test completed	: 16/07/2018
Tested by	: NH/AH/SC*		

PARAMETERS	UNITS	RESULTS
Moisture	% by weight	0.56
pH @ 25°C	-	7.54
Conductivity @ 25°C	µmhos/cm	21600
Chloride (Cl)	mg/kg	6736
Total Alkalinity	mg/kg	28
Total Nitrogen (TN)	mg/kg	55
Phosphate (PO ₄)	mg/kg	0.5
*Total Petroleum Hydrocarbons		<0.01
Potassium (K)	mg/kg	156.5
Nickel (Ni)	mg/kg	<0.01
Arsenic (As)	mg/kg	<0.01
Copper (Cu)	mg/kg	<0.01
Iron (Fe)	mg/kg	<0.01
Zinc (Zn)	mg/kg	0.04
Manganese (Mn)	mg/kg	<0.01
*Mercury (Hg)	mg/kg	<0.001
Lead (Pb)	mg/kg	<0.01
Cadmium (Cd)	mg/kg	<0.01
Chromium (Cr)	mg/kg	<0.01
Selenium (Se)	mg/kg	<0.01
Barium (Ba)	mg/kg	0.09

Test methods : 1. BS 1377 - 3: 1990
2. APHA 22nd: 2012
3. EPA 8015 , 3350C

Test method variation : None

Remarks : None



Joseph Rego, Laboratory Manager
For RAK lab L.L.C., Ras Al Khaimah