AGEDI

مبادرة أبوظبي العالمية للبيانات البيئية

Abu Dhabi Global Environmental Data Initiative

Environment Agency – Abu Dhabi
AGEDI

National Reporting Toolkit- Phase 1

Data Standards, Schema & Dictionary

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November 2013

خطيب و علمي

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This document is based on GTM2 Revision: 1.2

Revision Status Log					
Doc: Document1					
Rev	**Date**	**Description**	**Prepared By**	**Checked By**	**Approved By**
0.1	19/11/2013	Draft report issued for review	Tamer Abdulkadir		
1.0		Approved for use			

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1 Introduction

This document defines the data standards for NRT Phase 1 project.
It contains the information & assessment of the data received during phase 1 implementation. Also it contains source data catalogue, data model, and data dictionary.

The following sections describe each of the components with more details.

2 Data Catalogue

2.1 NRT Data Import Specifications

Air Quality Parameters

- CO
- NO2
- SO2
- O3
- PM10

File Type: Excel CSV (Comma Separated Values)
File Description: the file should contain the quarter averages within a certain year that the user will provide to the tool.
File format: each line should match the following description: "Monitoring Station Name, Quarter, Value".

The station name value should be one of the stations previously provided by EIS&OM, which are:

- Hamdan Street
- Khadejah School
- Khalifa School
- Mussafah
- Baniyas School
- Al Ain Islamic Institute
- Al Ain Street
- Bida Zayed
- Gayathi School
- Liwa Oasis
- Ruwais
- Habshan South
- E11 Road

- Bain Al Jessrain
- Khalifa City A
- Al Mafraq
- Sweihan
- Al Tawia
- Zakher
- Al Quaa

Also, for the "Quarter" field value, it should be one of the following:

- Q1
- Q2
- Q3
- Q4

Marine Water Quality Parameters

- Ammonia
- Chlorophyll
- Dissolved Oxygen
- Enterococci
- Nitrate N
- Phosphate

File Type: Excel CSV (Comma Separated Values)
File Description: the file should contain the monthly reading for each monitoring station for a certain year that the user will provide to the tool.
File format: each line should match the following description: “Monitoring Station Name, Month, Value”.
The station name value should be one of the stations previously provided by EISON, which are:

- Al Salamiyah Channel
- Mussafah South Channel
- Mussafah Industrial Area
- Mangrove Area - Eastern corniche
- Eastern Corniche
- Near shangrila - Hotel Channel
- Palace Beach
- Emirates Palace Beach
- Corniche Beach
- Intercontinental Jetty

- Port Mina Zyed
- Ruwais
- Um Al Nar
- Taweela
- Mirfah
- Marawah
- Al Basam
- Butinah
- Al Yasat
- Sea grass
- Mangroves
- Corals
- Reference

Also, for the "Quarter" field value, it should be one of the following:

- Q1
- Q2
- Q3
- Q4

Protected Area

File Type: Esri Shape file (SHP)
File description: polygon features of terrestrial protected area

Environmental Awareness

File Type: Text (PDF), Excel Tables
Description: Free text including graphs describing the environmental awareness status in the emirate of AD.

2.2 Catalogue

List of Receivables/Source Data Catalogue				
Parameter	**Related information**		**Source***	**Format**
	Spatial	**Non-Spatial**		
Air Quality				
CO2	Point features of Air Quality stations	Quarterly readings, then average is calculated per each station	EIS&OM	Esri Shape file (SHP), Excel Comma-Separated Values (CSV)
NO2				
SO2				
O3				
PM10				
Marine Water Quality				
Ammonia-N	Point features of Marine water Quality Stations	Quarterly readings, then average is calculated per each station	EIS&OM	Esri Shape file (SHP), Excel Comma-Separated Values (CSV)
Chlorophyll-a				
Dissolved Oxygen				
Enterococci				
Nitrate-N				
Phosphate-P				
Protected Areas				
Terrestrial & Marine Protected Areas	Polygon features of terrestrial areas		EIS&OM	Esri Shape file (SHP)
Environmental Awareness				
Environmental Awareness		Free text and graphs	EIS&OM	Adobe Acrobat (Pdf)
* EIS&OM are the source for the data import to the system, but raw data is provided by relevant organizations such as NILU, AD municipality..etc				

3 Data Dictionary

3.1 Data Dictionary

Data dictionary is the description of each field in the table of received spatial data

1- Air Quality

This dataset represents Monitoring Stations (Air Quality, Meteorology and Noise) across the Emirate of Abu Dhabi. Air Quality and Meteorology data are collected from 20 fixed (across Emirate of Abu Dhabi) meteorological stations installed by EAD in 2007. These stations collect the following data: Climate: temperature, humidity, wind speed, Air Quality.

Non-Spatial					
Field Name	**Description**	**Type**	**Length**	**Domain**	
StationID	Station code / unique ID	Long			
StationType	Refers to the stations type / Domain (Contains all types of stations)	Short			
StationName	Refers to the station name	Text	255		
StationLocation	Refers to name area as a (Rural Industrial site downwind of industrial area/Downtown)	Text	255		
CaptureSource	Refers to the resource as a EAD/EISOM	Text	255		
Comment	Refers to any additional observations	Text	255		
Shape	Point feature	Geometry			

AQParameterRecords_Table					
Field Name	**Description**	**Type**	**Length**	**Allow NULL Values**	**Unit of Measurement**
StationID	Refers to station code / unique ID	Long		No	
Quarter	Refers to date of recording	Date		Yes	
TimePeriod	Refers to time period of recording	Text	50	Yes	
Value	Refers to quarter averages per each station				
PM10	Refers to **particulate matter** (PM10:suspended particles less than or equal to 10 µm in diameter) **Note:** Federal limit is 150 µg/m³ in a 24-hour	Double		Yes	ug/m3

	period.				
NO2	Refers to **nitrogen dioxide** **Note:** Federal limit is 400 µg/m³ over a 1-hour period and 150 µg/m³ in a 24-hour period.	Double		Yes	ug/m3
O3	Refers to **Ozone** (Ground-level ozone concentrations). **Note:** Federal limit is 200 µg/m³ in a one hour period and 120 µg/m³ in an 8-hour period.	Double		Yes	ug/m3
SO2	Refers to **Sulphur dioxide** **Note:** Federal limit is 350 µg/m³ in a 1-hour period and 150 µg/m³ in a 24-hour period.	Double		Yes	ug/m3
CO	Refers to **Carbon monoxide** (Carbon monoxide concentrations). **Note:** Federal limit is 30 mg/m³ in a one hour period and 10 mg/m³ in a 24-hour period.	Double		Yes	ug/m3
PM2.5	Refers to **particulate matter** (PM2.5:suspended particles less than or equal to 2.5 µm in diameter) **Note:** Federal limit is 150 µg/m³ in a 24-hour period.				
FromTime	Refer to the start time of recording.			Yes	
ToTime	Refer to the end time of recording.			Yes	
GlobalID	Refers to International code (Unique ID).			No	

2- Marine Water Quality

This layer represents the Marine Water Quality Monitoring Locations spread across the Abu Dhabi territorial Waters. Monitoring is done at various locations like Public Beaches, Desalination Plants, Protected Areas, vicinity of discharge outfalls, Ports and Marinas etc on a monthly basis for multiple Water Quality indicators like Chemical and Microbiological parameters.

Non-Spatial					
Field Name	**Description**	**Type**	**Length**	**Allow NULL Values**	**Unit of Measurement**
SiteCode	Refers to the name of site as a code(S001…S002)	Text	50		
Category	Refers to monitoring sites	Text	50		
SiteName	Refers to monitoring sites name	Text	100000		
Comment	Refers to any additional observations	Text	255		
CaptureSource	Refers to the source information (Marine Water Quality Section - EAD/EISOM)	Text	255		
Shape	Point feature	Geometry			

AQParameterRecords_Table					
Field Name	**Description**	**Type**	**Length**	**Allow NULL Values**	**Unit of Measurement**
Ammonia-N Chlorophyll-a Dissolved Oxygen Enterococci Nitrate-N Phosphate-P	Average annual load from land sources and discharged into coastal waters.	Double		Yes	Tons/Year

3- Protected Areas

Terrestrial & Marine Protected Areas

Non-Spatial			
Field Name	**Description**	**Type**	**Length**
Name	Refers to the name of the protected like (Jabel Hafit National Park)	Text	254
CaptureSource	Refers to the source information (Marine Water Quality Section - EAD/EISOM)	Text	255
LandOwner	Refers to the owner of the land that contains the protected	Text	254
Comment	Refers to any additional observations	Text	254
CaptureSou	Refers to the source information like (Data Supplied by:EAD)	Text	254
CreatedOn	Refers to Date Created	Date	
ValidatedOn	Refers to Date Validated	Date	
ValidatedBy	Refers to Responsible for validating	Text	254
Location	Refers to name area	Text	254
Type	Refers to type the protected like as a (Terrestrial Marine)	Text	254
SHAPE	Polygon	Geometry	

4 Data Assessment

This section aims to present the assessment and analysis of the GIS Data collected by K&A for NRT Phase 1 project.

4.1 Area of Interest

The project area is all Abu Dhabi Emirate.
The image below showing the full extent of Abu Dhabi emirate.

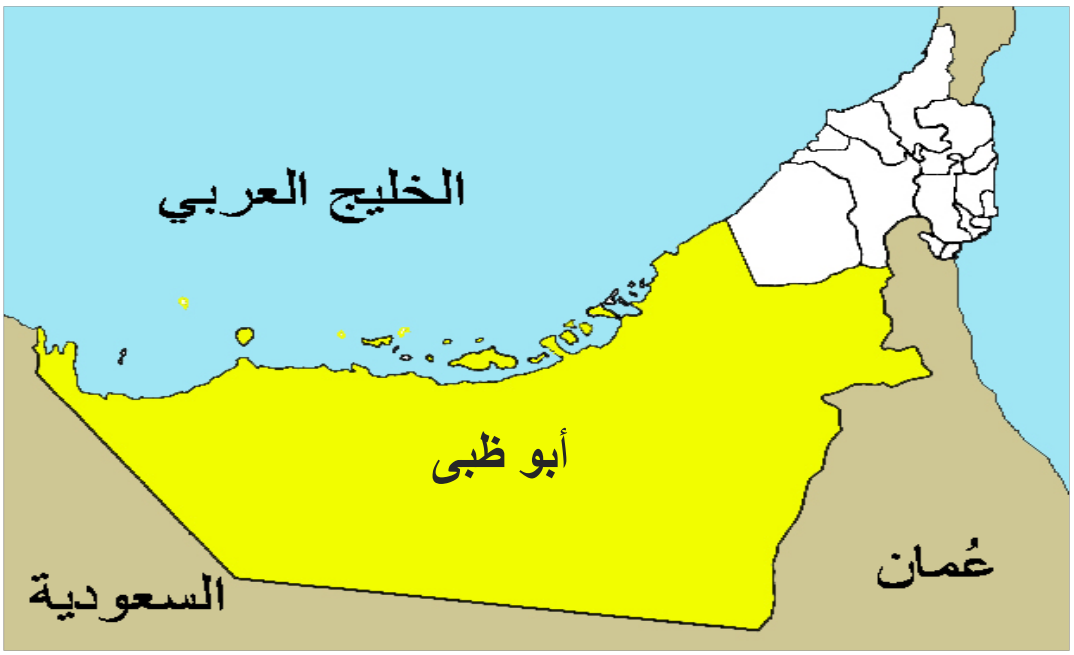

Figure 4: Area of Interest

5 Data Quality Terminology

The following section will describe each aspect should be taken into account, and the applicable threshold of specification to be measured in the received data.

- Accuracy.
- Completeness.
- Correctness.

These aspects are applicable as per the received data; some other aspects might be regarded when more data is made available for example:

- **Dependency:** Addresses sequence of data capture and methodology. This mainly focuses on the layers that are generated based on other layers, such as: dissolving features, joining features, intersection, etc…
- **Extendibility:** Possibility of extending both the database structure and the data.
- **Maintainability:** How often should it be updated? The initial estimate states quarterly updates are enough as per the environmental reporting.
- **Portability:** Possibility of exporting and importing data in different formats without losing any of the other qualities.
- **Timeliness:** Refers to the age of the data source and is based on the currency of the database. How current the data is and when was it last updated.
- **Consistency:** The degree to which the data satisfies a set of constraints.

5.1 Accuracy

One of the major points that should be taken into consideration while assessing data quality is to evaluate the data accuracy in line with Abu Dhabi's geographical location.

Absolute accuracy is the maximum deviation by coordinate systems between the location of the data and its location in the real-world.

- Assessing the absolute accuracy of the data means comparing the location of the geographic data to its location in the real-world. Assessing the absolute accuracy of the data has been done based on specification, we do not have a clear way to make sure this accuracy so can be available by 30% for example as a location for the

geographic data. But all data should be the same geographic coordinate system is GCS_WGS_1984.

5.2 Completeness

Completeness is the assessment for Abu Dhabi's geographical location.

Completeness would be insuring that all indicators as a geographic data and their attributes are complete as per the required analysis and presentation types.

Below image shows full extent, as an example of data completeness.

Figure 2 : Geographic Data

- Below images show the difference between the complete and incomplete data attributes:

Station ID	Date of Record	TimePeriod	PM2_5 (ug/m3)	From Time	To Time
8	29/10/2012	1hr	735.74	17:00	18:00
8	29/10/2012	1hr	620.74	16:00	17:00
10	04/08/2012	1hr	559.92	17:00	18:00
10	04/08/2012	1hr	453.96	18:00	19:00
8	29/10/2012	1hr	452.17	18:00	19:00
6	05/08/2012	1hr	411.26	18:00	19:00
10	04/08/2012	1hr	378.2	19:00	20:00
2	05/07/2012	1hr	364.44	16:00	17:00
6	05/08/2012	1hr	343.91	19:00	20:00
2	01/08/2012	1hr	343.58	13:00	14:00
10	04/08/2012	1hr	318.45	20:00	21:00
6	05/08/2012	1hr	316.32	11:00	12:00
6	05/08/2012	1hr	309.13	16:00	17:00
7	29/10/2012	1hr	307.24	18:00	19:00
2	03/08/2012	1hr	285.54	13:00	14:00

Complete Data of PM2.5 readings

Station ID	Date of Record	TimePeriod	PM10 (ug/m3)	NO2 (ug/m3)	O3 (ug/m3)	SO2 (ug/m3)	Co (ug/m3)
8	24/04/2012	1hr	101.55	19.62	74.44	1.15	<Null>
9	12/02/2012	1hr	73.58	5.03	<Null>	6.43	<Null>
7	20/12/2012	1hr	68.38	38.77	<Null>	7.93	1.57
5	18/01/2013	1hr	47	7.85	79.75	0.31	<Null>
3	12/07/2012	1hr	213	<Null>	41.45	5.79	<Null>
7	23/09/2012	1hr	203.83	51.51	<Null>	3.74	1.34
9	03/10/2012	1hr	79.99	<Null>	<Null>	3.19	<Null>
9	26/11/2012	1hr	129.27	2.52	<Null>	<Null>	<Null>
9	03/08/2012	1hr	126.68	3.34	<Null>	1.57	<Null>
3	15/08/2012	1hr	476	3.16	72.5	<Null>	<Null>
9	01/04/2012	1hr	41.34	3.45	<Null>	2.33	<Null>
10	12/08/2012	1hr	<Null>	<Null>	<Null>	<Null>	<Null>
4	28/01/2013	1hr	32.22	47.97	<Null>	2.87	<Null>
10	05/01/2012	1hr	93.2	7.76	114.82	1.81	<Null>
10	06/07/2012	1hr	386.89	1.67	118.09	3.09	<Null>
6	13/12/2012	1hr	122.34	13.78	41.21	1.86	<Null>
8	26/07/2012	1hr	934.68	13.56	75.44	10.64	<Null>
6	26/02/2013	1hr	140.72	15.18	<Null>	6.67	<Null>
7	20/11/2012	1hr	81.76	43.38	<Null>	<Null>	1.26

Incomplete Data of PM10 readings

Figure 3 : Attributes Data

5.3 Correctness

Relates to the truth and full knowledge of the information contained (Parameter Records and attribute data combined).

- Below image show correct data recording:

Places-2012	Stations	Depth	January	February	March	April	May	June	July	August
Confined Areas	Stn-1	Surface	6.86	4.49	4.51	10.72	5.86	4.65	6.06	5.66
		Bottom	5.54	4.4	4.42	3.99	2.53	4.58	2.49	4.98
	Stn-2	Surface	3.87	6.84	7.53	5.72	9.05	2.99	1.23	3.35
		Bottom	0.34	6.59	5.54	1.32	0.79	0.23	0.35	0.24
	Stn-3	Surface	5.69	4.95	4.85	6.04	5.61	4.13	4.32	4.66
		Bottom	5.44	4.87	4.84	5.76	5.19	3.99	4.22	4.03
	Stn-4	Surface	5.55	5.65	4.93	5	3.49	3.6	4.4	4.38
		Bottom	4.24	5.12	4.95	3.59	2.17	2.38	4.23	4.37
Point Sources	Stn-5	Surface	5.4	7.94	6.3	4.8	3.73	4.4	4.21	5.29
		Bottom								
	Stn-6	Surface	5.31	8.02	8.73	4.92	4.41	5.18	5.25	6.55
		Bottom								
Public Beaches	Stn-7	Surface	5.49	4.84	4.78	5.03	3.85	4.08	4.03	5.01
		Bottom	5.48	4.95	5.74	5.01	3.67	4.05	3.87	4.84
	Stn-8	Surface	5.25	4.97	4.81	5.08	4.29	4.41	5.43	5.44
		Bottom	5.24	4.95	4.82	5.04	4.21	4.35	5.23	5.25
	Stn-9	Surface	5.31	5.21	5.26	5.32	4.06	4.43	4.12	4.45
		Bottom	5.3	5.16	5.22	5.17	3.94	3.85	4.11	4.51
Port & Marinas	Stn-10	Surface	5.23	5.15	5.06	5.07	4.65	5.26	4.41	4.03
		Bottom	5.22	5.39	5.22	5.01	2.25	4.33	3.96	3.88
	Stn-11	Surface	5.07	5.69	5.43	4.93	4.19	3.01	4.22	4.47
		Bottom	5.15	5.2	5.18	5.01	3.96	3.3	4	4.45
	Stn-12	Surface					5.06	4.45		

Nitrate-N | Ammonia-N | Phosphate-P | Chlorophyll-a | DissolvedOxygen | Enterococci

Figure 4 : Correct Data Recording

6 Database Design

The model below shows the tables' schema, database relationships, and the model design