THE PROPOSED

ELDORET ICDC INDUSTRIAL PARK

BASELINE SOIL QUALITY AND RADIATION ANALYSIS REPORT

APRIL 6TH 2016

CONSULTANTS:

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i) EXECUTIVE SUMMARY

Experts from Ecoserv Laboratory and Tehilla Company Limited collected soil sample from the proposed Eldoret ICDC Eco-Industrial Park on 6th April 2016 and submitted to NEMA Accredited Laboratory to establish the baseline soil health condition and radiation levels before the development at the site. *(The analysis Report from approved NEMA Laboratory is appended in this report)*

The main soil pollution is mainly from previous usage of the land and not due to any construction.

The results of soil analysis indicate low levels of all parameters measured. This indicates that the soil is not polluted at the proposed site.

Albert Muriuki
Ecoserv Laboratory
NEMA Registered Laboratory

Jimmy Wakaimba
Tehilla Company Limited
NEMA Registered Firm of Experts

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1.0 INTRODUCTION

1.1 Soil samples

The soil samples collected and were taken to Quest Laboratory Ltd a NEMA accredited Laboratory for analysis. The Following parameters were checked:

Ph
Electrical Conductivity (EC)
Lead (Pb)
Zinc (Zn)
Copper (Cu)
Potasium (K)
Sodium (Na)
Calcium (Ca)
Magnesium (Mg)
Manganese (Mn)
Iron (Fe)

1.2 The aim of the assessment

The aim of the assessment was to establish the baseline soil health condition at the proposed ICDC land before development and to obtain data that can be used to form basis for planning the control measures to eliminate or minimize pollution to soil and environment after development.

1.3 The soil standards (benchmark)

After analysis, the soil readings were compared with the standards from NEMA Legal Notice No. 120, Third Schedule 'Guideline Standards for Discharge of effluent into the environment'. The radiation levels were bench marked against International standard limits.

2.0 SOIL HEALTH CONDITION ASSESSMENT

The soil samples were collected by NEMA Lead Expert and taken to NEMA accredited Laboratory for Analysis. The soil sampling positions/locations are indicated on **Plates 1** to **4** .The reports from the laboratory are appended in this report.

2.2 Observations during survey

During the survey, the following observation was made:

- The proposed land was devoid of any development and was used by local community as grazing land.

During the survey period, there was no wind or rain to affect the measurement.

3.0 SOIL RADIATION LEVEL SURVEY

Radiation Monitor with 1.2 Meter Telepole Detector [Type: Rm 703] was used to assess the soil health condition in terms of radioactivity. RADMON (micro) Type : RM703A is a G.M. Detector based, battery powered, hand-held, general purpose radiation Survey Meter. This will be useful for dose rate measurements in Nuclear installations, Radiochemical plants, Reprocessing plants, etc. Additionally it will be useful in medical, agricultural, industrial and other installations where radioactive isotopes are used for a variety of applications. This product is designed around a Microcontroller Chip. It is provided with alpha Numeric LCD display for indicating the dose rate in digits, dose rate as a bar graph, cumulative dose in digits. It covers wide range from 0 to 20 R/hr above the 20 R/hr it will indicate the OVR in the display. This unit has a facility for storing the data into built-in EEPROM along with real time. The stored data can be recalled on to the display or transmitted to PC.

The soil samples collected at the proposed Eldoret ICDC Industrial Park was subjected to radiation measurement and the results are presented in Table 2

4.0 Survey period

The measurements were carried out on 06/04/2016 during day time at the locations shown in **Figure 1**.

IMAGES OF AREAS WHERE SOIL SAMPLES WERE COLLECTED

Plate 1: Block 1 soil sampling location

Plate 2: Sampling Hole Block 2

Plate 3: Soil sample collection hole

Plate 4 :Soil sample collection Block 2

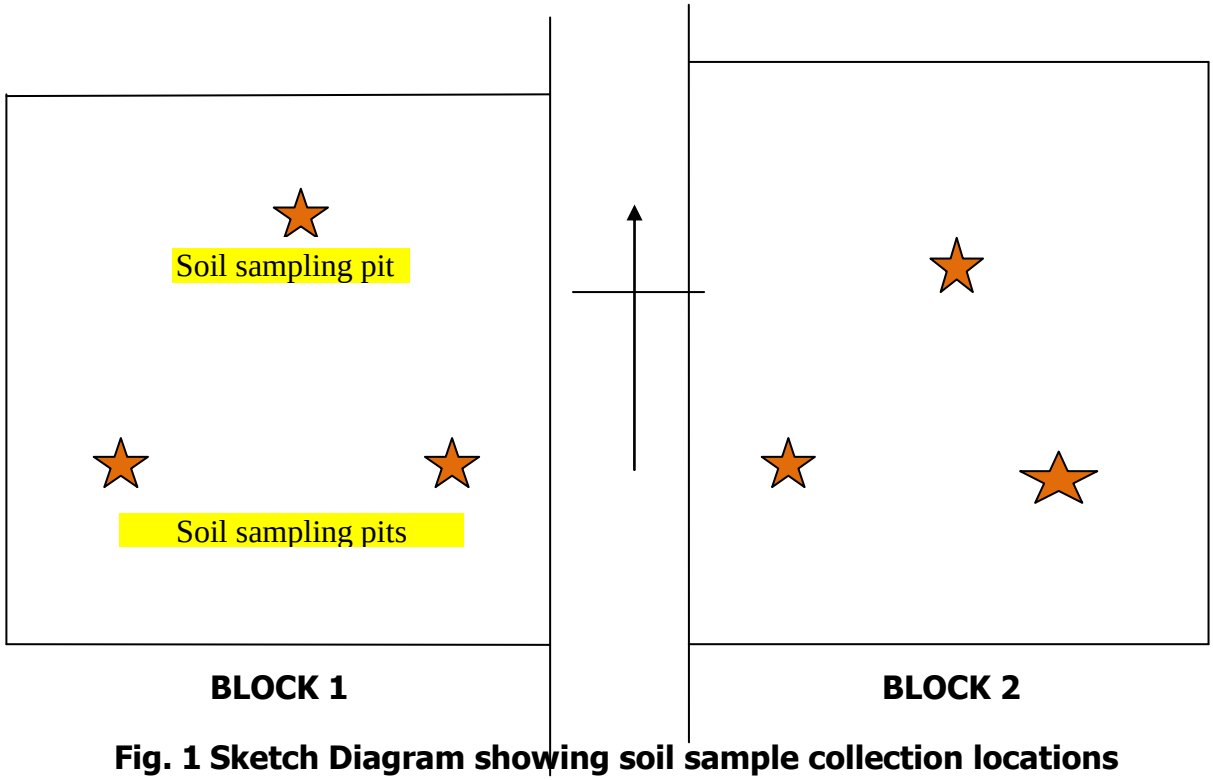

Fig. 1 Sketch Diagram showing soil sample collection locations

2.5 Results

Table 1 Soil Quality

POSITION		MEASUREMENT RESULTS	TLV	REMARKS
I	**BLOCK 1**			
1	Ph	7.60	6.5-8.5	Within the limit
2	Electrical Conductivity (EC) mS/cm	0.23	2	Within the limit
3	Lead as (Pb) mg/Kg	<0.001	0.1	Within the limit
4	Zinc as (Zn) mg/Kg	**0.53**	0.5	Above the limit
5	Copper as (Cu) mg/Kg	0.16	1.0	Within the limit
6	Potassium as (K) mg/Kg	4.75	2	Within the limit
7	Sodium as (Na) mg/Kg	55.32	2	Within the limit
8	Calcium as (Ca) mg/Kg	13.21	2	Within the limit
9	Magnesium as (Mg) mg/Kg	1.18	2	Within the limit
10	Manganese as (Mn) mg/Kg	0.61	10	Within the limit
11	Iron as (Fe) mg/Kg	0.99	10	
II	**BLOCK 2**			
1	Ph	7.79	6.5-8.5	Within the limit
2	Electrical Conductivity (EC)	0.25	2	Within the limit
3	Lead (Pb)	<0.001	0.1	Within the limit
4	Zinc (Zn)	0.15	0.5	Within the limit
5	Copper (Cu)	0.07	1.0	Within the limit
6	Potasium (K)	5.66	2	Within the limit
7	Sodium (Na)	16.15	2	Within the limit
8	Calcium (Ca)	20.53	2	Within the limit
9	Magnesium (Mg)	1.91	2	Within the limit
10	Manganese (Mn)	0.58	10	Within the limit
11	Iron as (Fe) mg/Kg	0.63	10	

Note: [2] means No Reference values quoted for these parameters

Table 2 Radiation Levels

Soil Samples				
	Location	**Radioactivity Levels**	**TLV(mrem)**	**Remarks**
1	Block 1	0.5	300	Within the limit
2	Block 2	0.6	300	Within the limit

2.5.1 Discussion of results

The results of soil analysis, indicate levels of all parameters assessed are within the limit.

The soil radiation levels are within limit. This indicates that the Proposed land does not have radioactive source.

3.0 CONCLUSIONS

From the survey it is concluded that the soil heath condition at the proposed project site is satisfactory.

4.0 RECOMMENDATIONS

Another survey need to be carried out after land development

Albert W. Muriuki MSc (Occ. Hgy.) UK.
NEMA Registered EIA Lead Expert/ Safety Auditor
Ecoserv Laboratory
NEMA Registered Laboratory

Dated 9/04/2016

APPENDIX 1: BLOCK 1-SOIL RESULTS FROM NEMA ACCREDITED LABORATORY

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Member of the Bigg Group

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Nairobi, Kenya
: +254 700 321464
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: www.agriq.com

Serial No: C47741

LABORATORY TEST REPORT

CHEMICAL

Client: ICDC Project Eldoret **Sample ID:** Soil

Batch Ref.: Soil sample 1

Batch No: 16/0233 **Lab. Ref.:** AQ 47741

Date Received: 08/04/2016 **Date Analysis Started:** 11/04/2016 **Date Completed:** 13/04/2016

PARAMETER	Method	Results	[1]Standard (Max Limits)
Chemical			
pH	AQTP 001	7.60	6.5 - 8.5
Electrical Conductivity (EC), mS/cm	AQTP 003	0.23	[2]
Lead as Pb, mg/kg	AQTP 062	<0.001	0.1
Zinc as Zn, mg/kg	AQTP 048	0.53	0.5
Copper as Cu, mg/kg	AQTP 047	0.16	1.0
Potassium as K, mg/kg	AQTP 043	4.75	[2]
Sodium as Na, mg/kg	AQTP 042	35.32	[2]
Calcium as Ca, mg/kg	AQTP 061	13.21	[2]
Magnesium as Mg, mg/kg	AQTP 050	1.18	[2]
Manganese as Mn, mg/kg	AQTP 058	0.61	10
Iron as Fe, mg/kg	AQTP 051	0.99	10

< = Less than; below detection level of 0.001 mg/l.

[1] Standards quoted from Environmental Management & Coordination Regulations 2006, Legal Notice 120, Third Schedule.

[2] No Reference values quoted for these parameters

AQTP - AgriQ Quest Laboratories Work Procedure developed from ISO and APHA Methods of Analysis

APHA - American Public Health Association

ISO - International Organization for Standardization

Interpretation of Analysis Results

High levels of Zinc.

George Okowa
Laboratory Manager

Esther Nthambi
Head of Laboratory Services

APPENDIX 2 :BLOCK 2 SOIL ANAYSIS RESULTS FROM ACCREDITED NEMA LABORATORY

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Serial No: C47742

LABORATORY TEST REPORT

CHEMICAL

Client: ICDC Project Eldoret **Sample ID:** Soil

Batch Ref.: Soil sample 2

Batch No: 16/0233 **Lab. Ref.:** AQ 47742

Date Received: 08/04/2016 **Date Analysis Started:** 11/04/2016 **Date Completed:** 13/04/2016

PARAMETER	Method	Results	Standard (Max Limits)
Chemical			
pH	AQTP 001	7.79	6.5 - 8.5
Electrical Conductivity (EC), mS/cm	AQTP 003	0.25	[2]
Lead as Pb, mg/kg	AQTP 062	<0.001	0.1
Zinc as Zn, mg/kg	AQTP 048	0.15	0.5
Copper as Cu, mg/kg	AQTP 047	0.07	1.0
Potassium as K, mg/kg	AQTP 043	5.66	[2]
Sodium as Na, mg/kg	AQTP 042	16.15	[2]
Calcium as Ca, mg/kg	AQTP 061	20.53	[2]
Magnesium as Mg, mg/kg	AQTP 050	1.91	[2]
Manganese as Mn, mg/kg	AQTP 058	0.58	10
Iron as Fe, mg/kg	AQTP 051	0.63	10

< = Less than; below detection level of 0.001 mg/L

[1] Standards quoted from Environmental Management & Coordination Regulations 2006, Legal Notice 120, Third Schedule.

[2] No Reference values quoted for these parameters

AQTP - AgriQ Quest Laboratories Work Procedure developed from ISO and APHA Methods of Analysis

APHA - American Public Health Association

ISO - International Organization for Standardization

Interpretation of Analysis Results

The sample meets the requirements of the standard in the parameters tested.

George Okowa
Laboratory Manager

Esther Nthambi
Head of Laboratory Services