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An assessment and evaluation of dissolved methane concentrations at a natural gas extraction site in the Free State Province, South Africa

Patel, Khalid

2018

https://hdl.handle.net/10539/26960

Patel, Khalid (2018) An assessment and evaluation of dissolved methane concentrations at a natural gas extraction site in the Free State Province, South Africa, University of the Witwatersrand, Johannesburg, https://hdl.handle.net/10539/26960

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APPENDIX 1D: FEBRUARY 2017 LABORATORY RESULTS

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
VAT No 4340243221
Unit 3 Carrera House ◦ 17 Sovereign St ◦
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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH01
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH03

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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Attention: Liam Whitlow
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TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH04
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH05
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.1936 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

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2017-02-09

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TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH07
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0274 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

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TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No BH08
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

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Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No **BH09**

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.2336 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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2017-02-09

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No **SW01**

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 14845A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

SAMPLE No SW02
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 14845C

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2017-02-07
DATE ANALYSED	2017-02-07
DATE ISSUED	2017-02-09

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Sample ID	Results
BH01	<10 µg/liter
BH03	<10 µg/liter
BH04	<10 µg/liter
BH05	<10 µg/liter
BH07	<10 µg/liter
BH08	<10 µg/liter
BH09	<10 µg/liter
SW01	<10 µg/liter
SW02	<10 µg/liter

Authorised Signatory : *2017-02-09*

Reinardt Cromhout

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sanas Testing Laboratory T0419

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management S
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Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 **DATE ANALYSED** 2017-02-08 **DATE ISSUED** 2017-02-09

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH01 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-02-09

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CLIENT INFORMATION

Environmental Impact Management S
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Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 DATE ANALYSED 2017-02-08 **DATE ISSUED** 2017-02-09

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH03** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,I]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 DATE ANALYSED 2017-02-08 **DATE ISSUED** 2017-02-09

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH04** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 **DATE ANALYSED** 2017-02-08 **DATE ISSUED** 2017-02-09

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH05** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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Analysis Report

Lab No : 14845 B

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS	METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07	DATE ANALYSED 2017-02-08 **DATE ISSUED** 2017-02-09
SAMPLE INFORMATION	**Matrix:** Water
SAMPLE No BH07	**Project number** 1074/LW/ss
CONTAINER TYPE Glass	**Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

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Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 DATE ANALYSED 2017-02-08 DATE ISSUED 2017-02-09

SAMPLE INFORMATION
SAMPLE No BH08
CONTAINER TYPE Glass

Matrix: Water
Project number 1074/LW/ss
Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1 µg/liter
Acenaphthene	<0.1 µg/liter
Acenaphthylene	<0.1 µg/liter
Flourene	<0.1 µg/liter
Phenanthrene	<0.1 µg/liter
Anthracene	<0.1 µg/liter
Fluoranthene	<0.1 µg/liter
Pyrene	<0.1 µg/liter
Benzo[a]anthracene	<0.1 µg/liter
Crysene	<0.1 µg/liter
Benzo[k+b]fluoranthene*	<0.1 µg/liter
Benzo[a]pyrene*	<0.1 µg/liter
Benzo[g,h,i]perylene *	<1 µg/liter
Dibenz[a,h]anthracene *	<5 µg/liter
Indeno[123-cd]pyrene *	<1 µg/liter

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory TD419

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Results marked "A" - Concentration outside calibration range, estimate only

2017-02-09

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2017-02-07	DATE ANALYSED 2017-02-08	**DATE ISSUED**	2017-02-09
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No BH09		**Project number**	1074/LW/ss
CONTAINER TYPE Glass		**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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Results marked "A" - Concentration outside calibration range, estimate only

2017-02-09

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED	2017-02-07	**DATE ANALYSED** 2017-02-08	**DATE ISSUED** 2017-02-09
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No	**SW01**	**Project number**	1074/LW/ss
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 14845 B

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-02-07 **DATE ANALYSED** 2017-02-08 **DATE ISSUED** 2017-02-09

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No SW02 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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2017-02-09

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CLIENT INFORMATION
Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 14845

DATE RECEIVED 2017-02-07
DATE COMPLETED 2017-02-07

Project number 1074/LW/ss

Matrix Water

Sample Number	Total Oil and Grease	
BH01	<1	mg/liter (ppm)
BH03	<1	mg/liter (ppm)
BH04	<1	mg/liter (ppm)
BH05	1	mg/liter (ppm)
BH07	<1	mg/liter (ppm)
BH08	2	mg/liter (ppm)
BH09	1	mg/liter (ppm)
SW01	1	mg/liter (ppm)
SW02	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***09 February 2017***

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 14845 E

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD: Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017-02-07
DATE ANALYSED 2017-02-07
DATE ISSUED 2017-02-09

SAMPLE INFORMATION

Project Name
Project number 1074/LW/ss
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017-02-09*

Reinardt Cromhout

sanas Testing Laboratory T0419

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M&L LABS

Ref. No. : ML-2017-02385-A
Issued at. : Johannesburg
Date : 24/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505

Consulting Industrial Chemists, Analysts_Samplers

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Amended Certificate Of Analysis

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE
SUBJECT	: ANALYSIS OF 8 SAMPLES OF WATER
PROJECT REFERENCE	: WATER SAMPLE-1074/WL/SS
INSTRUCTED BY	: SIMONNE SMITH
ORDER NUMBER	:
RECEIVED ON	: 03/02/2017
ANALYSIS COMPLETED	: 24/02/2017
DATE ANALYSED	: 03/2/2017 - 03/02/2017

BDL - Below Detection Limit
*** Denotes test method not accredited to ISO 17025**
 # Denotes test method is outsourced

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Date : 24/02/2017
Contract No. : 10200772

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Laboratory Number			E000823	E000824	E000825
Sampled Date					
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		8.0	7.3	7.8
Conductivity @ 25°C(mS/m)	W044-27-O		170	81.2	207
Total dissolved solids, TDS(mg/l)	W044-03-W	1	996	462	1220
Calcium as Ca(mg/l)	W044-28-O	0.118	102	72	144
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	254.8	179.8	359.7
Magnesium as Mg(mg/l)*	W044-28-O	0.034	48	16.1	60
Magnesium Hardness as CaCO3(mg/l)	W044-28-O	1	197.6	66.3	246.9
Total Hardness as CaCO3(mg/l)*	W044-45-G	1	452	246	607
Sodium as Na(mg/l)	W044-28-O	0.016	157	86	201
Potassium as K(mg/l)*	W044-28-O	0.093	1.67	1.1	1.1
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	310	248	266
Bicarbonate as HCO3(mg/l)	W044-50-W	1	378	302	324
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	322	78	497
Sulphate as SO4(mg/l)*	W044-50-W	0.2	38	55	29
Ammonia as NH4(mg/l)	W044-50-W	0.1	<0.1	<0.1	1.0
Nitrate as NO3(mg/l)*	W044-50-W	0.1	3.5	<0.1	<0.1
Nitrate as N(mg/l)*	W044-50-W	0.100	0.8	<0.1	<0.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.4	0.3	0.4
Phosphate as PO4(mg/l)*		0.12	<0.12	<0.12	<0.12
Bromide as Br(mg/L)*	W044-50-W	0.10	3.68	2.97	3.46
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	<1	<1
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	<1	8	<1
Sum of Cations as meq/l*	W044-45-G		15.910	8.686	20.893
Sum of Anions as meq/l(meq/l)*	W044-45-G		16.146	8.316	19.960
% Error*			0.736	2.176	2.284
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

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Date : 24/02/2017
Contract No. : 10200772

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Laboratory Number			E000826	E000827	E000828
Sampled Date					
Sample Marks			BH05	BH07	BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.5	7.2	7.3
Conductivity @ 25°C(mS/m)	W044-27-O		205	172	217
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1532	1112	778
Calcium as Ca(mg/l)	W044-28-O	0.118	160	161	178
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	399.6	402.1	444.6
Magnesium as Mg(mg/l)*	W044-28-O	0.034	65	80	75
Magnesium Hardness as CaCO3(mg/l)	W044-28-O	1	267.5	329.3	308.7
Total Hardness as CaCO3(mg/l)*	W044-45-G	1	667	731	753
Sodium as Na(mg/l)	W044-28-O	0.016	130	57	131
Potassium as K(mg/l)*	W044-28-O	0.093	2.3	1.2	5.3
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	279	398	298
Bicarbonate as HCO3(mg/l)	W044-50-W	1	340	485	363
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	503	290	446
Sulphate as SO4(mg/l)*	W044-50-W	0.2	28	31	159
Ammonia as NH4(mg/l)	W044-50-W	0.1	0.8	1.6	<0.1
Nitrate as NO3(mg/l)*	W044-50-W	0.1	<0.1	<0.1	36
Nitrate as N(mg/l)*	W044-50-W	0.100	<0.1	<0.1	8.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	0.3
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.4	0.4	0.5
Phosphate as PO4(mg/l)*		0.12	<0.12	<0.12	<0.12
Bromide as Br(mg/L)*	W044-50-W	0.10	1.50	4.46	2.22
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	<1	<1
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	16	10	18
Sum of Cations as meq/l*	W044-45-G		19.045	17.127	20.887
Sum of Anions as meq/l(meq/l)*	W044-45-G		20.368	16.799	22.453
% Error*			3.357	0.967	3.613
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

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Issued at. : Johannesburg
Date : 24/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
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Laboratory Number			E000829	E000830	E000831
Sampled Date					
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.6	8.0	7.5
Conductivity @ 25°C(mS/m)	W044-27-O		229	56.8	66.4
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1340	348	430
Calcium as Ca(mg/l)	W044-28-O	0.118	143	38	48
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	357.2	94.9	119.9
Magnesium as Mg(mg/l)*	W044-28-O	0.034	43	16.3	14.9
Magnesium Hardness as CaCO3(mg/l)	W044-28-O	1	177.0	67.1	61.3
Total Hardness as CaCO3(mg/l)*	W044-45-G	1	534	162	181
Sodium as Na(mg/l)	W044-28-O	0.016	226	42	52
Potassium as K(mg/l)*	W044-28-O	0.093	3.4	7.0	6.4
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	295	106	46
Bicarbonate as HCO3(mg/l)	W044-50-W	1	360	129	56
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	544	101	91
Sulphate as SO4(mg/l)*	W044-50-W	0.2	68	31	117
Ammonia as NH4(mg/l)	W044-50-W	0.1	0.6	<0.1	<0.1
Nitrate as NO3(mg/l)*	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrate as N(mg/l)*	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.7	0.3	0.2
Phosphate as PO4(mg/l)*		0.12	<0.12	0.14	0.14
Bromide as Br(mg/L)*	W044-50-W	0.10	1.14	1.72	0.10
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	2.2	2.2
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	<1	26	32
Sum of Cations as meq/l*	W044-45-G		20.590	5.243	6.047
Sum of Anions as meq/l(meq/l)*	W044-45-G		22.693	5.628	5.933
% Error*			4.859	3.542	0.952
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

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M&L LABS

Ref. No. : ML-2017-02385-A
Issued at. : Johannesburg
Date : 24/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Amended Certificate Of Analysis

Laboratory Number			E000823	E000824	E000825
Sampled Date					
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.020	0.019	0.014
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.12	0.14	0.12
Barium as Ba(mg/l)*	W044-28-O	0.001	0.22	0.21	0.56
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	<0.001	0.060
Manganese as Mn(mg/l)	W044-28-O	0.001	<0.001	0.15	1.1
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	16.2	8.5	13.1
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.1	0.72	2.7
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

BDL - Below Detection Limit
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Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
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Amended Certificate Of Analysis

Laboratory Number			E000826	E000827	E000828
Sampled Date					
Sample Marks			BH05	BH07	BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.014	0.033	0.037
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.065	0.012	0.080
Barium as Ba(mg/l)*	W044-28-O	0.001	0.68	0.085	0.10
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	<0.001	<0.001
Manganese as Mn(mg/l)	W044-28-O	0.001	2.85	0.13	0.013
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	0.002	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	10.3	17.4	11.1
Strontium as Sr(mg/l)*	W044-28-O	0.001	0.88	1.3	1.99
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

BDL - Below Detection Limit
*** Denotes test method not accredited to ISO 17025**
 # Denotes test method is outsourced

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Ref. No. : ML-2017-02385-A
Issued at. : Johannesburg
Date : 24/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
CONFIDENTIAL
Amended Certificate Of Analysis

Laboratory Number			E000829	E000830	E000831
Sampled Date					
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.007	0.34	0.070
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.26	0.043	0.037
Barium as Ba(mg/l)*	W044-28-O	0.001	0.31	0.088	0.071
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	0.13	<0.001
Manganese as Mn(mg/l)	W044-28-O	0.001	0.45	0.001	0.68
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	5.0	3.8	2.9
Strontium as Sr(mg/l)*	W044-28-O	0.001	2.8	0.28	0.26
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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Printed Date: 24/02/2017

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E: joanne.barton@za.bureauveritas.com
W: www.bureauveritas.com

Certificate/Report

RESULTS REPORTED RELATED ONLY TO ITEMS TESTED

Ref.No. : 10200772
Issued at : Johannesburg
Date : 24/02/2017

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT
ADDRESS	: P.O BOX 2083, PINEGOWRIE
SUBJECT	: ANALYSIS OF 9 SAMPLES OF WATER
MARKED	: AS BELOW
INSTRUCTED BY	: MUSA MAGALA
ORDER NO.	:
DATE RECEIVED	: 08.02.2017
DATE ANALYSED	: 0.02.2017
LAB NO(S)	: E000823 – E000831

The analysis was carried out on a sample as received:

Lab number	Sample marks	Lithium, Li	Rubidium, Rb
E000823	BH01	0.021	0.030
E000824	BH03	0.019	0.011
E000825	BH04	0.061	0.038
E000826	BH05	0.006	0.037
E000827	BH07	0.021	0.036
E000828	BH08	0.057	0.023
E000829	BH09	0.092	0.011
E000830	SW01	0.005	<0.001
E000831	SW02	0.011	<0.001

- The results are expressed in mg/l.
- Method: Quantitative ICP scan (A.P.H.A 3120 B)

All services are rendered in accordance with Bureau Veritas M&L Laboratory Services (Pty) Ltd General Terms and conditions of Business, which has been supplied to you, this certificate cannot be reproduced except in full without the written consent of M and L Laboratory Services.

ALISON ACKERMAN
OPERATIONAL MANAGER

Authorised Signature (original blue ink)

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M&L LABS

Ref. No. : ML-2017-02385
Issued at. : Johannesburg
Date : 22/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505

Consulting Industrial Chemists, Analysts_Samplers

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Certificate/Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE
SUBJECT	: ANALYSIS OF 8 SAMPLES OF WATER
PROJECT REFERENCE	: WATER SAMPLE-1074/WL/SS
INSTRUCTED BY	: SIMONNE SMITH
ORDER NUMBER	:
RECEIVED ON	: 03/02/2017
ANALYSIS COMPLETED	: 22/02/2017
DATE ANALYSED	: 03/2/2017 - 03/02/2017

BDL - Below Detection Limit
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 # Denotes test method is outsourced

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Issued at. : Johannesburg
Date : 22/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
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Laboratory Number			E000823	E000824	E000825
Sampled Date					
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	<1	<1
pH Value @ 25°C	W044-27-O		8.0	7.3	7.8
Conductivity @ 25°C(mS/m)	W044-27-O		170	81.2	207
Total dissolved solids, TDS(mg/l)	W044-03-W	1	996	462	1220
Calcium as Ca(mg/l)	W044-28-O	0.118	102	72	144
Magnesium as Mg(mg/l)*	W044-28-O	0.034	48	16.1	60
Sodium as Na(mg/l)	W044-28-O	0.016	157	86	201
Potassium as K(mg/l)*	W044-28-O	0.093	1.67	1.1	1.1
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	310	248	266
Bicarbonate as HCO3(mg/l)	W044-50-W	1	378	302	324
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	322	78	497
Sulphate as SO4(mg/l)*	W044-50-W	0.2	38	55	29
Ammonia as NH4(mg/l)	W044-50-W	0.1	<0.1	<0.1	1.0
Nitrate as NO3(mg/l)*	W044-50-W	0.1	3.5	<0.1	<0.1
Nitrate as N(mg/l)*	W044-50-W	0.100	0.8	<0.1	<0.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.4	0.3	0.4
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	<1	8	<1
Sum of Cations as meq/l*	W044-45-G		15.910	8.686	20.893
Sum of Anions as meq/l(meq/l)*	W044-45-G		16.146	8.316	19.960
% Error*			0.736	2.176	2.284
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

BDL - Below Detection Limit
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Ref. No. : ML-2017-02385
Issued at. : Johannesburg
Date : 22/02/2017
Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E000826	E000827	E000828
Sampled Date					
Sample Marks			BH05	BH07	BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	<1	<1
pH Value @ 25°C	W044-27-O		7.5	7.2	7.3
Conductivity @ 25°C(mS/m)	W044-27-O		205	172	217
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1532	1112	778
Calcium as Ca(mg/l)	W044-28-O	0.118	160	161	178
Magnesium as Mg(mg/l)*	W044-28-O	0.034	65	80	75
Sodium as Na(mg/l)	W044-28-O	0.016	130	57	131
Potassium as K(mg/l)*	W044-28-O	0.093	2.3	1.2	5.3
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	279	398	298
Bicarbonate as HCO3(mg/l)	W044-50-W	1	340	485	363
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	503	290	446
Sulphate as SO4(mg/l)*	W044-50-W	0.2	28	31	159
Ammonia as NH4(mg/l)	W044-50-W	0.1	0.8	1.6	<0.1
Nitrate as NO3(mg/l)*	W044-50-W	0.1	<0.1	<0.1	36
Nitrate as N(mg/l)*	W044-50-W	0.100	<0.1	<0.1	8.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	0.3
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.4	0.4	0.5
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	16	10	18
Sum of Cations as meq/l*	W044-45-G		19.045	17.127	20.887
Sum of Anions as meq/l(meq/l)*	W044-45-G		20.368	16.799	22.453
% Error*			3.357	0.967	3.613
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

BDL - Below Detection Limit
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Date : 22/02/2017
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Laboratory Number			E000829	E000830	E000831
Sampled Date					
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Dissolved organic carbon as C(mg/l)	Subcontracted	1	<1	2.2	2.2
pH Value @ 25°C	W044-27-O		7.6	8.0	7.5
Conductivity @ 25°C(mS/m)	W044-27-O		229	56.8	66.4
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1340	348	430
Calcium as Ca(mg/l)	W044-28-O	0.118	143	38	48
Magnesium as Mg(mg/l)*	W044-28-O	0.034	43	16.3	14.9
Sodium as Na(mg/l)	W044-28-O	0.016	226	42	52
Potassium as K(mg/l)*	W044-28-O	0.093	3.4	7.0	6.4
Total Alkalinity as CaCO3(mg/l)	W044-50-W	1	295	106	46
Bicarbonate as HCO3(mg/l)	W044-50-W	1	360	129	56
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	544	101	91
Sulphate as SO4(mg/l)*	W044-50-W	0.2	68	31	117
Ammonia as NH4(mg/l)	W044-50-W	0.1	0.6	<0.1	<0.1
Nitrate as NO3(mg/l)*	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrate as N(mg/l)*	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrite as NO2(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Nitrite as N(mg/l)	W044-50-W	0.1	<0.1	<0.1	<0.1
Fluoride as F(mg/l)*	W044-50-W	0.10	0.7	0.3	0.2
Total suspended solids, TSS(mg/l)	A.P.H.A.2540D	1	<1	26	32
Sum of Cations as meq/l*	W044-45-G		20.590	5.243	6.047
Sum of Anions as meq/l(meq/l)*	W044-45-G		22.693	5.628	5.933
% Error*			4.859	3.542	0.952
Chemical Balance*			Balancing	Balancing	Balancing

Edward Khumalo

BDL - Below Detection Limit
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Contract No. : 10200772

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E000823	E000824	E000825
Sampled Date					
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.020	0.019	0.014
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.12	0.14	0.12
Barium as Ba(mg/l)*	W044-28-O	0.001	0.22	0.21	0.56
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	<0.001	0.060
Manganese as Mn(mg/l)	W044-28-O	0.001	<0.001	0.15	1.1
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	16.2	8.5	13.1
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.1	0.72	2.7
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E000826	E000827	E000828
Sampled Date					
Sample Marks			BH05	BH07	BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.014	0.033	0.037
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.065	0.012	0.080
Barium as Ba(mg/l)*	W044-28-O	0.001	0.68	0.085	0.10
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	<0.001	<0.001
Manganese as Mn(mg/l)	W044-28-O	0.001	2.85	0.13	0.013
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	0.002	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	10.3	17.4	11.1
Strontium as Sr(mg/l)*	W044-28-O	0.001	0.88	1.3	1.99
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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Certificate/Report

Laboratory Number			E000829	E000830	E000831
Sampled Date					
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Aluminium as Al(mg/l)	W044-28-O	0.003	0.007	0.34	0.070
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.26	0.043	0.037
Barium as Ba(mg/l)*	W044-28-O	0.001	0.31	0.088	0.071
Iron as Fe(mg/l)	W044-28-O	0.001	<0.001	0.13	<0.001
Manganese as Mn(mg/l)	W044-28-O	0.001	0.45	0.001	0.68
Molybdenum as Mo(mg/l)*	W044-28-O	0.001	<0.001	<0.001	<0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Silicon as Si(mg/l)*	W044-28-O	0.007	5.0	3.8	2.9
Strontium as Sr(mg/l)*	W044-28-O	0.001	2.8	0.28	0.26
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER SW 02

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	5.61
DOC*	16
DIC*	19
TSS*	210.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

Parameters marked " ** "in this report are outsourced results.
Parameters marked " * "in this report are non-accredited results.

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory. The results for soil samples are not accredited.

UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER SW 01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	4.82
DOC*	6
DIC*	29
TSS*	290.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

Parameters marked " ** "in this report are outsourced results.
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UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 09

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	2.28
DOC*	12
DIC*	40
TSS*	290.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 08

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	3.94
DOC*	14
DIC*	44
TSS*	287.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 07

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	4.11
DOC*	12
DIC*	54
TSS*	200.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 05

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	3.67
DOC*	12
DIC*	36
TSS*	290.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 04

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	4.18
DOC*	11
DIC*	40
TSS*	187.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 03

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	5.82
DOC*	11
DIC*	27
TSS*	50.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
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Ferndale

Water Test Report

LABORATORY NUMBER 5316A **DATE RECEIVED** 06/04/2017

SAMPLE NUMBER BH 01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Other Parameters

DO*	9.71
DOC*	16
DIC*	44
TSS*	147.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *10 April 2017*

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UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER SW02

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	5.72
DIC*	9.36
TSS*	165.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER SW01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	5.79
DIC*	12.72
TSS*	125.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH09

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	3.58
DIC*	39.48
TSS*	290.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH08

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	5.56
DIC*	37.32
TSS*	310.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH07

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	5.41
DIC*	55.92
TSS*	230.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH05

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	3.90
DIC*	37.20
TSS*	345.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH04

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	3.60
DIC*	40.32
TSS*	330.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH03

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	4.49
DIC*	30.60
TSS*	205.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5169A **DATE RECEIVED** 07-Feb-17

SAMPLE NUMBER BH01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DO*	6.82
DIC*	43.08
TSS*	245.00

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Thursday, February 9, 2017*

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APPENDIX 1E: APRIL 2017 LABORATORY RESULTS

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
VAT No 4340243221
Unit 3 Carrera House ◦ 17 Sovereign St ◦
Route 21 Office Park ◦ Irene ◦ 0062
Tel. +27 83 3098373
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH01
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinarát Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

2017-04-18

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
VAT No 4340243221
Unit 3 Carrera House ◦ 17 Sovereign St ◦
Route 21 Office Park ◦ Irene ◦ 0062
Tel. +27 83 3098373
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH03
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.818 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

UIS ORGANIC LABORATORY

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Tel. +27 83 3098373
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH04

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

UIS ORGANIC LABORATORY

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH05
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.8256 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH07
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0365 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No BH08
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No **BH09**

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	1.4849 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Crominout

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Results marked "A" - Concentration outside calibration range, estimate only

2017-04-18

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No SW01
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Crominout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 15687A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-07
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

SAMPLE No **SW02**

Project Name

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

2017-04-18

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
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Tel. +27 12 3451004 ◦ Fax. +27 12 3451004
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012

DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water

SAMPLE No BH01 **Project number** 1074/LW/ss

CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0418

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Results marked "A" - Concentration outside calibration range, estimate only

2017-04-18

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH03 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
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Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 DATE ANALYSED 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH04** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
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Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH05 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-04-18

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 DATE ANALYSED 2017-04-11 DATE ISSUED 2017-04-18

SAMPLE INFORMATION
SAMPLE No BH07
CONTAINER TYPE Glass

Matrix: Water
Project number 1074/LW/ss
Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1 µg/liter
Acenaphthene	<0.1 µg/liter
Acenaphthylene	<0.1 µg/liter
Flourene	<0.1 µg/liter
Phenanthrene	<0.1 µg/liter
Anthracene	<0.1 µg/liter
Fluoranthene	<0.1 µg/liter
Pyrene	<0.1 µg/liter
Benzo[a]anthracene	<0.1 µg/liter
Crysene	<0.1 µg/liter
Benzo[k+b]fluoranthene*	<0.1 µg/liter
Benzo[a]pyrene*	<0.1 µg/liter
Benzo[g,h,i]perylene *	<1 µg/liter
Dibenz[a,h]anthracene *	<5 µg/liter
Indeno[123-cd]pyrene *	<1 µg/liter

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-04-18

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CLIENT INFORMATION

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Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH08** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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2017-04-18

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CLIENT INFORMATION

Environmental Impact Management S
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Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH09 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-04-18

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS **METHOD Number:** UISOL-T-012
DATE RECEIVED 2017-04-06 **DATE ANALYSED** 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No SW01 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
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Ferndale

Analysis Report

Lab No : 15687 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-04-06 DATE ANALYSED 2017-04-11 **DATE ISSUED** 2017-04-18

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **SW02** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-04-18

UIS ORGANIC LABORATORY

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CLIENT INFORMATION
Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 15687

DATE RECEIVED 2017-04-06
DATE COMPLETED 2017-04-10

Project number 1074/LW/ss

Matrix Water

Sample Number	Total Oil and Grease	
BH01	<2	mg/liter (ppm)
BH03	<2	mg/liter (ppm)
BH04	<2	mg/liter (ppm)
BH05	<2	mg/liter (ppm)
BH07	<2	mg/liter (ppm)
BH08	<2	mg/liter (ppm)
BH09	<2	mg/liter (ppm)
SW01	<2	mg/liter (ppm)
SW02	<2	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***18 April 2017***

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

Analysis Report

Lab No : 15687 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD: Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017-04-06
DATE ANALYSED 2017-04-10
DATE ISSUED 2017-04-18

SAMPLE INFORMATION

Project Name
Project number 1074/LW/ss
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017-04-18*

Reinardt Cromhout

sanas Testing Laboratory T0419

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M and L Laboratory Services (Pty) Ltd
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W: www.bureauveritas.com

Ref.No. : 10247164

Issued at : Johannesburg

Date : 19/04/2017

Certificate/Report

RESULTS REPORTED RELATED ONLY TO ITEMS TESTED

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT
ADDRESS	: P.O BOX 2083, PINEGOWRIE
SUBJECT	: ANALYSIS OF 9 SAMPLES OF WATER
MARKED	: AS BELOW
INSTRUCTED BY	: SIMMONE SMITH
ORDER NO.	:
DATE RECEIVED	: 05-04-2017
DATE ANALYSED	: 12-04-2017
LAB NO(S)	: E001957-E001965

The analysis was carried out on a sample as received:

Lab number	Sample marks	Lithium, Li	Rubidium, Rb
E001957	BH01	0.033	0.055
E001958	BH03	0.025	0.025
E001959	BH04	0.076	0.070
E001960	BH05	0.006	0.072
E001961	BH07	0.024	0.057
E001962	BH08	0.069	0.075
E001963	BH09	0.11	0.056
E001964	SW01	0.016	0.040
E001965	SW02	0.008	0.010

- The results are expressed in mg/l.
- Method: Quantitative ICP scan (A.P.H.A 3120 B)

ALISON ACKERMAN
OPERATIONAL MANAGER

Authorised Signature (original blue ink)

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M&L LABS

Ref. No. : ML-2017-03329
Issued at. : Johannesburg
Date : 19/04/2017
Contract No. : 10247164

Registration Number 1974/001476/07 VAT Number 4780103505

Consulting Industrial Chemists, Analysts_Samplers

CONFIDENTIAL

Certificate/Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE
SUBJECT	: ANALYSIS OF 9 SAMPLES OF WATER
PROJECT REFERENCE	: 1074/LW/ss
INSTRUCTED BY	: Musa Magala
ORDER NUMBER	: 1074/LW/ss
RECEIVED ON	: 05/04/2017
ANALYSIS COMPLETED	: 19/04/2017
DATE ANALYSED	: 05/4/2017 - 05/04/2017

BDL - Below Detection Limit

*** Denotes test method not accredited to ISO 17025**

 # Denotes test method is outsourced

o Refer to terms and conditions www.bureauveritas.co.za
o This report relates to only test items listed herein and analysis on an as received basis.
o These tests do not apply to any other samples of a similar nature.
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sanas
T0040

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M&L LABS

Ref. No. : ML-2017-03329
Issued at. : Johannesburg
Date : 19/04/2017
Contract No. : 10247164

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E001957	E001958	E001959
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH01 04/04/2017	BH03 04/04/2017	BH04 04/04/2017
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.4	8.2	7.9
Conductivity @ 25°C(mS/m)	W044-27-O		160.9	52.7	192.5
Calcium as Ca(mg/l)	W044-28-O	0.118	88	23	98
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	220	59	245
Sodium as Na(mg/l)	W044-28-O	0.016	190	93	206
Potassium as K(mg/l)	W044-28-O	0.093	1.70	1.00	2.40
Chloride as Cl(mg/l)*	W044-50-W	0.1	298	37	464
Sulphate as SO4(mg/l)*	W044-50-W	0.2	39	15.80	28
Ammonia as NH4(mg/l)*	W044-50-W	0.1	<0.1	0.100	1.00
Bromide as Br(mg/L)*	W044-50-W	0.10	4.70	<0.10	4.21

Edward Khumalo

BDL - Below Detection Limit
*** Denotes test method not accredited to ISO 17025**
 # Denotes test method is outsourced

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M&L LABS

Ref. No. : ML-2017-03329
Issued at. : Johannesburg
Date : 19/04/2017
Contract No. : 10247164

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
CONFIDENTIAL
Certificate/Report

Laboratory Number			E001960	E001961	E001962
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH05 04/04/2017	BH07 04/04/2017	BH08 04/04/2017
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.4	7.0	7.5
Conductivity @ 25°C(mS/m)	W044-27-O		190.7	156.6	210.5
Calcium as Ca(mg/l)	W044-28-O	0.118	128	136	150
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	320	340	375
Sodium as Na(mg/l)	W044-28-O	0.016	135	63	144
Potassium as K(mg/l)	W044-28-O	0.093	2.30	1.20	5.40
Chloride as Cl(mg/l)*	W044-50-W	0.1	481	272	436
Sulphate as SO4(mg/l)*	W044-50-W	0.2	26	40	187
Ammonia as NH4(mg/l)*	W044-50-W	0.1	0.700	0.500	<0.1
Bromide as Br(mg/L)*	W044-50-W	0.10	4.50	2.10	5.00

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Laboratory Number			E001963	E001964	E001965
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH09 04/04/2017	SW01 04/04/2017	SW02 04/04/2017
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.5	8.3	8.8
Conductivity @ 25°C(mS/m)	W044-27-O		210.6	152.9	88.1
Calcium as Ca(mg/l)	W044-28-O	0.118	112	99	56
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	280	247	140
Sodium as Na(mg/l)	W044-28-O	0.016	244	127	79
Potassium as K(mg/l)	W044-28-O	0.093	3.50	9.00	9.60
Chloride as Cl(mg/l)*	W044-50-W	0.1	533	349	147
Sulphate as SO4(mg/l)*	W044-50-W	0.2	54	90	84
Ammonia as NH4(mg/l)*	W044-50-W	0.1	0.700	<0.1	<0.1
Bromide as Br(mg/L)*	W044-50-W	0.10	2.90	2.10	<0.10

Edward Khumalo

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Laboratory Number			E001957	E001958	E001959
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH01 04/04/2017	BH03 04/04/2017	BH04 04/04/2017
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.10	0.14	0.048
Barium as Ba(mg/l)*	W044-28-O	0.001	0.30	0.11	0.51
Manganese as Mn(mg/l)	W044-28-O	0.001	0.079	0.056	1.14
Lead as Pb(mg/l)*	W044-33-C	0.001	0.034	<0.001	0.008
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.63	0.54	3.30
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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Certificate/Report

Laboratory Number			E001960	E001961	E001962
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH05 04/04/2017	BH07 04/04/2017	BH08 04/04/2017
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	<0.006	<0.006	<0.006
Barium as Ba(mg/l)*	W044-28-O	0.001	0.68	0.081	0.098
Manganese as Mn(mg/l)	W044-28-O	0.001	3.00	0.13	0.008
Lead as Pb(mg/l)*	W044-33-C	0.001	0.008	0.004	<0.001
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.07	1.61	2.38
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

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M&L LABS

Ref. No. : ML-2017-03329
Issued at. : Johannesburg
Date : 19/04/2017
Contract No. : 10247164

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
CONFIDENTIAL
Certificate/Report

Laboratory Number			E001963	E001964	E001965
Sampled Date			4/4/2017	4/4/2017	4/4/2017
Sample Marks			BH09 04/04/2017	SW01 04/04/2017	SW02 04/04/2017
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.17	<0.006	<0.006
Barium as Ba(mg/l)*	W044-28-O	0.001	0.28	0.22	0.077
Manganese as Mn(mg/l)	W044-28-O	0.001	0.52	<0.001	0.003
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Strontium as Sr(mg/l)*	W044-28-O	0.001	3.40	1.03	0.53
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

Ndileka Bangani

BDL - Below Detection Limit
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APPENDIX 1F: JUNE 2017 LABORATORY RESULTS

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH01
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

2017/06/23

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willieh@uisol.co.za « http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH03
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0861 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH04
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH05
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.074 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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Results marked "A" - Concentration outside calibration range, estimate only

2017/06/23

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH07
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.1587 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH08
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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CLIENT INFORMATION

Environmental Impact Management Services (
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Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No BH09
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.4061 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No SW01
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/19
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

SAMPLE No SW02
Project Name
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Jan-Daniel Vorster

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Results marked "A" - Concentration outside calibration range, estimate only

2017/06/23

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 16505 B

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2017/06/19
DATE ANALYSED	2017/06/20
DATE ISSUED	2017/06/23

SAMPLE INFORMATION

Matrix: Water

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

CONTAINER TYP Glass

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Sample ID	Results
BH01	<10 µg/liter
BH03	<10 µg/liter
BH04	<10 µg/liter
BH05	<10 µg/liter
BH07	<10 µg/liter
BH08	<10 µg/liter
BH09	<10 µg/liter
SW01	<10 µg/liter
SW02	<10 µg/liter

Authorised Signatory : *2017/06/23*

Jan-Daniel Vorster

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sanas Testing Laboratory T0419

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS **METHOD Number:** UISOL-T-012
DATE RECEIVED 2017/06/19 **DATE ANALYSED** 2017/06/20 **DATE ISSUED** 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **BH01** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Jan-Daniel Vorster

sanas Testing Laboratory T0419

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Parameters marked " * " in this Report are not included in the SANAS Schedule of Accreditation for this laboratory".

Results marked "A" - Concentration outside calibration range, estimate only

2017/06/23

UIS ORGANIC LABORATORY

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Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 **DATE ISSUED** 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **BH03** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Jan-Daniel Vorster

sanas Testing Laboratory T0419

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Results marked "A" - Concentration outside calibration range, estimate only

2017/06/23

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 16505 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017/06/19	DATE ANALYSED	2017/06/20	**DATE ISSUED**	2017/06/23
SAMPLE INFORMATION		**Matrix:**	**Water**		
SAMPLE No	**BH04**	**Project number**	1074/LW/ss		
CONTAINER TYP	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
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Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 **DATE ISSUED** 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **BH05** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

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CLIENT INFORMATION

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Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 DATE ISSUED 2017/06/23

SAMPLE INFORMATION Matrix: **Water**
SAMPLE No **BH07** Project number 1074/LW/ss
CONTAINER TYP Glass Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Jan-Daniel Vorster

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Analysis Report

Lab No : 16505 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017/06/19	**DATE ANALYSED**	2017/06/20	**DATE ISSUED**	2017/06/23
SAMPLE INFORMATION		**Matrix:**	**Water**		
SAMPLE No	**BH08**	**Project number**	1074/LW/ss		
CONTAINER TYP	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

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CLIENT INFORMATION

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Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 **DATE ISSUED** 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **BH09** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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sanas Testing Laboratory T0419

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2017/06/23

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CLIENT INFORMATION

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Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 **DATE ISSUED** 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **SW01** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Jan-Daniel Vorster

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2017/06/23

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 16505 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017/06/19 DATE ANALYSED 2017/06/20 DATE ISSUED 2017/06/23

SAMPLE INFORMATION **Matrix:** **Water**
SAMPLE No **SW02** **Project number** 1074/LW/ss
CONTAINER TYP Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Jan-Daniel Vorster

sanas Testing Laboratory T0419

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2017/06/23

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CLIENT INFORMATION
Environmental Impact Management Services (
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 16505

DATE RECEIVED 2017/06/19
DATE COMPLETED 2017/06/20

Project number 1074/LW/ss

Matrix Water

Sample Number	Total Oil and Grease	
BH01	<1	mg/liter (ppm)
BH03	<1	mg/liter (ppm)
BH04	<1	mg/liter (ppm)
BH05	<1	mg/liter (ppm)
BH07	<1	mg/liter (ppm)
BH08	<1	mg/liter (ppm)
BH09	<1	mg/liter (ppm)
SW01	<1	mg/liter (ppm)
SW02	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determinatio

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***23 June 2017***

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management Services (
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 16505 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:Soil - Solid/liquid Ext. and GC-FI
ANALYTICAL METHOD: Water-Liquid/Liquid Ext. and GC-FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017/06/19
DATE ANALYSED 2017/06/20
DATE ISSUED 2017/06/23

SAMPLE INFORMATION

Project Name
Project number 1074/LW/ss
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017/06/23*

Jan-Daniel Vorster

sanas Testing Laboratory T0419

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M&L LABS

Ref. No. : ML-2017-04313
Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505

Consulting Industrial Chemists, Analysts_Samplers

CONFIDENTIAL

Certificate/Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE
SUBJECT	: ANALYSIS OF 9 WATER SAMPLES
PROJECT REFERENCE	: BI-MONTHLY 1074/LW/ss
INSTRUCTED BY	: SIMMONE SMIT
ORDER NUMBER	: 1074/LW/ss
RECEIVED ON	: 15/06/2017
ANALYSIS COMPLETED	: 06/07/2017
DATE ANALYSED	: 15/6/2017 - 15/06/2017

BDL - Below Detection Limit
*** Denotes test method not accredited to ISO 17025**
 # Denotes test method is outsourced

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M&L LABS

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Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505
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Laboratory Number			E003281	E003282	E003283
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.5	7.5	7.7
Conductivity @ 25°C(mS/m)	W044-27-O		176.7	93	211.3
Total dissolved solids, TDS(mg/l)	W044-03-W	1	974	500	1176
Calcium as Ca(mg/l)	W044-28-O	0.118	121	64	131
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	303	160	327
Sodium as Na(mg/l)	W044-28-O	0.016	188	96	196
Potassium as K(mg/l)	W044-28-O	0.093	1.87	1.29	2.57
Total Alkalinity as CaCO3(mg/l)*	W044-50-W	1	366	259	312
Bicarbonate as HCO3(mg/l)*	W044-50-W	1	446	316	380
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	329	90	489
Sulphate as SO4(mg/l)*	W044-50-W	0.2	30	43	27
Ammonia as NH4(mg/l)*	W044-50-W	0.1	0.48	<0.1	0.61
Bromide as Br(mg/L)*	W044-50-W	0.10	4.30	1.00	4.70
Dissolved organic carbon as C(mg/l)*	Subcontracted	1	11.0	4.9	8.1

Edward Khumalo

BDL - Below Detection Limit
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Printed Date: 07/07/2017

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M&L LABS

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Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505
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Laboratory Number			E003284	E003285	E003286
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH05	BH07	BH08
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.4	7.1	7.4
Conductivity @ 25°C(mS/m)	W044-27-O		215.8	174.1	220
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1256	960	1240
Calcium as Ca(mg/l)	W044-28-O	0.118	186	184	192
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	465	459	479
Sodium as Na(mg/l)	W044-28-O	0.016	140	62	134
Potassium as K(mg/l)	W044-28-O	0.093	7.44	1.29	5.37
Total Alkalinity as CaCO3(mg/l)*	W044-50-W	1	279	383	293
Bicarbonate as HCO3(mg/l)*	W044-50-W	1	340	467	357
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	513	297	407
Sulphate as SO4(mg/l)*	W044-50-W	0.2	32	33	144
Ammonia as NH4(mg/l)*	W044-50-W	0.1	0.63	0.35	<0.1
Bromide as Br(mg/L)*	W044-50-W	0.10	4.60	1.90	2.50
Dissolved organic carbon as C(mg/l)*	Subcontracted	1	8.3	11.0	8.8

Edward Khumalo

BDL - Below Detection Limit
*** Denotes test method not accredited to ISO 17025**
 # Denotes test method is outsourced

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Printed Date: 07/07/2017

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www.bureaveritas.com

M&L LABS

Ref. No. : ML-2017-04313
Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
CONFIDENTIAL
Certificate/Report

Laboratory Number			E003287	E003288	E003289
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
pH Value @ 25°C	W044-27-O		7.6	8.1	8.1
Conductivity @ 25°C(mS/m)	W044-27-O		225.7	138.9	134.4
Total dissolved solids, TDS(mg/l)	W044-03-W	1	1252	796	784
Calcium as Ca(mg/l)	W044-28-O	0.118	144	91	91
Calcium Hardness as CaCO3(mg/l)	W044-28-O	1	360	227	228
Sodium as Na(mg/l)	W044-28-O	0.016	245	116	115
Potassium as K(mg/l)	W044-28-O	0.093	3.94	13.93	13.93
Total Alkalinity as CaCO3(mg/l)*	W044-50-W	1	319	144	146
Bicarbonate as HCO3(mg/l)*	W044-50-W	1	389	176	178
Carbonate as CO3(mg/l)	W044-50-W		0	0	0
Chloride as Cl(mg/l)*	W044-50-W	0.1	520	222	212
Sulphate as SO4(mg/l)*	W044-50-W	0.2	35	162	162
Ammonia as NH4(mg/l)*	W044-50-W	0.1	1.48	0.36	<0.1
Bromide as Br(mg/L)*	W044-50-W	0.10	2.90	<0.10	0.20
Dissolved organic carbon as C(mg/l)*	Subcontracted	1	6.9	8.6	7.2

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Ref. No. : ML-2017-04313
Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E003281	E003282	E003283
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH01	BH03	BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.14	0.19	0.14
Barium as Ba(mg/l)*	W044-28-O	0.001	0.28	0.25	0.56
Manganese as Mn(mg/l)	W044-28-O	0.001	0.64	0.29	0.99
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.77	1.10	3.37
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

BDL - Below Detection Limit
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Registration Number 1974/001476/07 VAT Number 4780103505
Consulting Industrial Chemists, Analysts_Samplers
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Certificate/Report

Laboratory Number			E003284	E003285	E003286
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH05	BH07	BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.11	0.006	0.085
Barium as Ba(mg/l)*	W044-28-O	0.001	0.73	0.18	0.097
Manganese as Mn(mg/l)	W044-28-O	0.001	3.29	0.18	0.007
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Strontium as Sr(mg/l)*	W044-28-O	0.001	1.10	1.70	2.41
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

Edward Khumalo

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M&L LABS

Ref. No. : ML-2017-04313
Issued at. : Johannesburg
Date : 07/07/2017
Contract No. : 10306499

Registration Number 1974/001476/07 VAT Number 4780103505
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Laboratory Number			E003287	E003288	E003289
Sampled Date			6/14/2017	6/14/2017	6/14/2017
Sample Marks			BH09	SW01	SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
Arsenic as As(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Boron as B(mg/l)*	W044-28-O	0.006	0.31	0.091	0.090
Barium as Ba(mg/l)*	W044-28-O	0.001	0.35	0.092	0.094
Manganese as Mn(mg/l)	W044-28-O	0.001	0.56	0.005	0.001
Lead as Pb(mg/l)*	W044-33-C	0.001	<0.001	<0.001	<0.001
Strontium as Sr(mg/l)*	W044-28-O	0.001	3.42	0.68	0.66
Uranium as U(mg/l)*	W044-28-O	0.004	<0.004	<0.004	<0.004

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W: www.bureauveritas.com

Ref.No. : 10306499

Issued at : Johannesburg

Date : 06/07/2017

Certificate/Report

RESULTS REPORTED RELATED ONLY TO ITEMS TESTED

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT
ADDRESS	: P.O BOX 2083, PINEGOWRIE
SUBJECT	: ANALYSIS OF 9 SAMPLES OF WATER
MARKED	: AS BELOW
INSTRUCTED BY	: SIMMONE SMITH
ORDER NO.	:
DATE RECEIVED	: 19-06-2017
DATE ANALYSED	: 22-06-2017
LAB NO(S)	: E003281-E003289

The analysis was carried out on a sample as received:

Lab number	Sample marks	Lithium, Li	Rubidium, Rb
E003281	BH01 14/06/2017	0.034	0.041
E003282	BH03 14/06/2017	0.028	0.007
E003283	BH04 14/06/2017	0.079	0.041
E003284	BH05 14/06/2017	0.008	0.047
E003285	BH07 14/06/2017	0.028	0.045
E003286	BH08 14/06/2017	0.075	0.048
E003287	BH09 14/06/2017	0.12	0.038
E003288	SW01 14/06/2017	0.021	0.024
E003289	SW02 14/06/2017	0.020	0.016

- The results are expressed in mg/l.
- Method: Quantitative ICP scan (A.P.H.A 3120 B)

ALISON ACKERMAN
OPERATIONAL MANAGER

Authorised Signature (original blue ink)

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UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER SW02

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	19.7
DO*	7.7
TSS*	190.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

Parameters marked " ** "in this report are outsourced results.
Parameters marked " * "in this report are non-accredited results.

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory. The results for soil samples are not accredited.

UIS sediba laboratory

CLIENT INFORMATION

Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER SW01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	19.0
DO*	6.8
TSS*	230.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH09

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	40.3
DO*	7.3
TSS*	345.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH08

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	37.7
DO*	12.0
TSS*	330.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH07

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	53.6
DO*	9.1
TSS*	255.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Environmental Impact Management Services (Pty) Ltd
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Ferndale

Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH05

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	34.8
DO*	9.4
TSS*	400.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH04

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	40.5
DO*	9.5
TSS*	400.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH03

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	29.9
DO*	9.9
TSS*	315.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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Water Test Report

LABORATORY NUMBER 5530A **DATE RECEIVED** 19-Jun-17

SAMPLE NUMBER BH01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DIC*	48.1
DO*	10.3
TSS*	225.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Friday, June 23, 2017*

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APPENDIX 1G: AUGUST 2017 LABORATORY RESULTS

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
VAT No 4340243221
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Route 21 Office Park ◦ Irene ◦ 0062
Tel. +27 83 3098373
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No **BH01**
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.19 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

UIS ORGANIC LABORATORY

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH03
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.336 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH04
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.238 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 17372D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH05
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.106 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH07
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.035 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH08
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronjout

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2017-09-07

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No BH09
Project Name 1074/LW/SS
Project number 1074/LW/SS

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	1.13 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No **SW01**
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronjout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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TEST REPORT

Lab No : 17372 D

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28
DATE ISSUED 2017-09-07

SAMPLE INFORMATION

SAMPLE No **SW02**
Project Name 1074/LW/SS
Project number 1074/LW/SS
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronjout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 17372A

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2017-08-25
DATE ANALYSED	2017-08-28
DATE ISSUED	2017-09-06

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass **Project number** 1074/LW/SS

Sample dilution Factor No Dilution

Sample ID	Results
2057	<10 µg/liter
BH01	<10 µg/liter
BH03	<10 µg/liter
BH04	<10 µg/liter
BH05	<10 µg/liter
BH07	19 µg/liter
BH08	<10 µg/liter
BH09	<10 µg/liter
SW01	<10 µg/liter
SW02	<10 µg/liter

Authorised Signatory : *2017-09-06*

Reinardt Cromhout

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sanas Testing Laboratory T0419

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 **DATE ANALYSED** 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH01 **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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2017-09-07

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 **DATE ANALYSED** 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH03 **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 DATE ANALYSED 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH04 **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017-08-25	DATE ANALYSED	2017-08-28	DATE ISSUED	2017-09-07
SAMPLE INFORMATION		**Matrix:**	Water		
SAMPLE No	BH05	**Project number**	1074/LW/SS		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 **DATE ANALYSED** 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No BH07 **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**0.2 µg/liter**
Phenanthrene	**0.4 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 **DATE ANALYSED** 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH08** **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 **DATE ANALYSED** 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **BH09** **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

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2017-09-07

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 DATE ANALYSED 2017-08-28 DATE ISSUED 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No SW01 **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

2017-09-07

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CLIENT INFORMATION

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Analysis Report

Lab No : 17372 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-08-25 DATE ANALYSED 2017-08-28 **DATE ISSUED** 2017-09-07

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **SW02** **Project number** 1074/LW/SS
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

sanas Testing Laboratory T0419

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Parameters marked " * " in this Report are not included in the SANAS Schedule of Accreditation for this laboratory".

Results marked "A" - Concentration outside calibration range, estimate only

2017-09-07

UIS ORGANIC LABORATORY
UIS Organic Laboratory (Pty) Ltd ▪ Reg. No. 2007/001696/07
13 Esdoring Nook ◦ Highveld Technopark ◦ Centurion
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Tel. +27 12 665 5632 ◦ Fax. +27 12 665 4294
organic@uis-as.co.za ◦ http://www.uis-as.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Analysis Certificate Total Oil and Grease

Lab No : 17372

DATE RECEIVED 2017-08-25
DATE COMPLETED 2017-08-28

Project number 1074/LW/SS

Matrix Water

Analytical method: Solvent Extraction and Gravimetric determination

Sample Number	Total Oil and Grease
2057	1.5 mg/liter
BH01	2 mg/liter
BH03	<1 mg/liter
BH04	<1 mg/liter
BH05	2.5 mg/liter
BH07	<1 mg/liter
BH08	2.5 mg/liter
BH09	<1 mg/liter
SW01	1 mg/liter
SW02	<2 mg/liter

Authorised Signatory :

Reinardt Cronhout

Reporting date: *07 September 2017*

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Analysis Report

Lab No : 17372 B

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:Soil - Solid/liquid Ext. and GC-FID
ANALYTICAL METHOD: Water-Liquid/Liquid Ext. and GC-FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017-08-25
DATE ANALYSED 2017-08-28
DATE ISSUED 2017-09-06

SAMPLE INFORMATION

Project Name 1074/LW/SS
Project number 1074/LW/SS
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
2057	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017-09-06*

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

sanas Testing Laboratory T0419

Parameters marked " * " in this Report are not included in the SANAS Schedule of Accreditation for this laboratory".

TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Liam Whitlow	Laboratory	X- Lab Earth Science
Client	EIMS	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 789 7170	Laboratory Manager	Mr Martin Olivier
Facsimile		Lab Reference	JBX17- 0655
Email	liam@eims.co.za	Report Number	0000001836
Project	1074/LW/SS	Date Received	24/08/2017 11:28
Order Number	1074/LW/SS	Date Started	28/08/2017 9:47
Samples	10	Date Reported	30/08/2017 13:55
Sample matrix	WATER		

The document is issued in accordance with SANAS's accreditation requirements. Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory

T0775

SIGNATORIES

Greg Ondrejkovic

Technical Supervisor/Technical Signatory

Martin Olivier

General Manager/Technical Signatory

X-LAB EARTH

JBX17-0655

Report number 0000001836

Client reference: 1074/LW/SS

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name JBX17-0655.001 BH 01	JBX17-0655.002 BH 03	JBX17-0655.003 BH 04	JBX17-0655.004 BH 05	JBX17-0655.005 BH 07
Anion- Cation Balance	%	-100	-4.58	-2.89	-5.61	-2.93	-7.00
Sum of Anion Milliequivalents	meq/l	-	15.9	8.95	19.9	17.9	18.3
Sum of Cation Milliequivalents	meq/l	-	14.5	8.45	17.8	16.9	15.9
Total Alkalinity as CaCO3	mg/l	12	356	285	346	313	439
Methyl Orange (M) Alkalinity as	mg/l	12	356	285	346	313	439
Phenolphthalein (P) Alkalinity as	mg/l	12	<12	<12	<12	<12	<12
Conductivity in mS/m @ 25°C	mS/m	2	144	90	195	187	167
TDS (0.7µm) @ 105°C	mg/l	21	1000	490	1300	1600	1300
TSS (0.7µm) @ 105°C	mg/l	21	<21	326	<21	<21	<21
Calcium	mg/l	0.5	90	55	108	133	145
Iron	mg/l	0.05	<0.05	0.75	0.07	0.14	1.0
Magnesium	mg/l	0.01	35	10	44	59	73
Potassium	mg/l	0.2	2.3	1.9	3.8	4.3	1.3
Silicon	mg/l	1	16	5.8	15	13	20
Sodium	mg/l	0.5	164	110	201	121	60
Aluminium	mg/l	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/l	0.005	0.24	0.20	0.57	0.54	0.17

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0655.001 BH 01	JBX17-0655.002 BH 03	JBX17-0655.003 BH 04	JBX17-0655.004 BH 05	JBX17-0655.005 BH 07
Boron	mg/l	0.002	0.22	0.26	0.18	0.090	0.030
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.030	0.030	0.070	0.010	0.020
Manganese	mg/l	0.002	0.22	0.15	1.3	2.2	0.13
Molybdenum	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	mg/l	0.0006	1.3	1.3	3.4	1.3	1.9
Uranium	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	0.010
Bromide *	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/l	0.05	288	94	444	392	313
Fluoride	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	0.1	4.8	<0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/l	0.03	1.1	<0.03	<0.03	<0.03	<0.03
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite as N	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate	mg/l	0.05	29	29	24	27	36
Orthophosphate (Total Reactive	mg/l	0.25	<0.25	<0.25	0.40	<0.25	<0.25
Orthophosphate as P	mg/l	0.08	<0.080	<0.080	0.13	<0.080	<0.080
pH in water at 25°C	-	1	7.6	7.8	7.7	7.5	7.3
Ammonia	mg/l	0.012	0.11	0.55	1.3	0.80	0.19
Ammonia as N	mg/l	0.01	0.09	0.45	1.1	0.66	0.16

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0655.006 BH 08	JBX17-0655.007 BH 09	JBX17-0655.008 SW 01	JBX17-0655.009 SW 02	JBX17-0655.010 2057
Anion- Cation Balance	%	-100	-5.81	-7.70	-2.05	-5.20	9.93
Sum of Anion Milliequivalents	meq/l	-	29.6	20.8	21.9	16.7	110
Sum of Cation Milliequivalents	meq/l	-	26.3	17.8	21.0	15.0	134
Total Alkalinity as CaCO3	mg/l	12	354	361	167	159	295
Methyl Orange (M) Alkalinity as	mg/l	12	354	361	167	157	295
Phenolphthalein (P) Alkalinity as	mg/l	12	<12	<12	<12	<12	<12
Conductivity in mS/m @ 25°C	mS/m	2	270	199	229	159	1300
TDS (0.7µm) @ 105°C	mg/l	21	2400	1200	1700	1200	7000
TSS (0.7µm) @ 105°C	mg/l	21	22	62	<21	22	80
Calcium	mg/l	0.5	233	118	131	95	54
Iron	mg/l	0.05	0.07	0.17	<0.05	0.06	2.1
Magnesium	mg/l	0.01	88	37	70	45	19
Potassium	mg/l	0.2	9.2	5.2	21	20	33
Silicon	mg/l	1	11	6.8	<1.0	1.4	3.7
Sodium	mg/l	0.5	167	202	187	138	2960
Aluminium	mg/l	0.003	<0.003	0.010	0.010	0.060	0.010
Arsenic	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	0.020
Barium	mg/l	0.005	0.12	0.30	0.14	0.060	5.3

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0655.006 BH 08	JBX17-0655.007 BH 09	JBX17-0655.008 SW 01	JBX17-0655.009 SW 02	JBX17-0655.010 2057
Boron	mg/l	0.002	0.14	0.42	0.28	0.19	1.7
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.090	0.090	0.050	0.030	0.70
Manganese	mg/l	0.002	<0.002	0.31	0.020	0.070	0.12
Molybdenum	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	mg/l	0.0006	4.0	3.3	1.5	0.95	11
Uranium	mg/l	0.0005	0.020	<0.0005	0.010	0.010	<0.0005
Bromide *	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/l	0.05	679	443	554	371	3650
Fluoride	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	0.1	14	<0.1	1.4	7.6	36
Nitrate as N	mg/l	0.03	3.1	<0.03	0.32	1.7	8.2
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite as N	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate	mg/l	0.05	152	54	140	141	11
Orthophosphate (Total Reactive	mg/l	0.25	<0.25	<0.25	0.29	1.1	<0.25
Orthophosphate as P	mg/l	0.08	<0.080	<0.080	0.094	0.35	<0.080
pH in water at 25°C		1	7.4	7.6	8.4	8.4	8.0
Ammonia	mg/l	0.012	0.13	0.92	0.090	0.10	4.0
Ammonia as N	mg/l	0.01	0.11	0.76	0.07	0.09	3.3

METHOD SUMMARY

METHOD	METHOD SUMMARY
Calculation of Anion-	
ME- AN- 016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500- H B.
ME- AN- 007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME- AN- 011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre- weighed container at 105 deg C. The method is based on APHA 2540 C.
ME- AN- 001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME- AN- 009	Total suspended solids (TSS) is determined gravimetrically by filtering an aliquot of well- shaken aqueous sample through a pre- weighed filter which is then dried at 105 deg C. The method is based on APHA 2540 D.
ME- AN- 027	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP- OES). The method is based on EPA 200.7 and APHA 3120.
ME- AN- 026	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma mass spectrometry (ICP- MS). The method is based on EPA 200.8 and APHA 3030 B.
ME- AN- 014	Inorganic anions (Br, Cl, F, NO3, NO2, SO4) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME- AN- 042	The orthophosphate anion reacts with ammonium molybdate and antimony potassium tartrate (catalyst) under acidic conditions to form a 12- molybdophosphoric acid complex. The complex is then reduced with ascorbic acid to form a blue heteropoly compound. The absorbance of this compound is measured spectrophotometrically at wavelength 880 nm. This method is based on: (1) methods for the examination of water and associated materials phosphorous in waters, sewage and effluents 1981. ISBN 011751582.5, and (2) EPA method 365.1 Phosphorous, all forms, colorimetric, automated, ascorbic acid.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
^	Performed by outside laboratory.	-	The sample was not analysed for this analyte
LOR	Limit of Reporting	*	*Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".*

Samples analysed as received.
Solid samples expressed on a dry weight

Unless otherwise indicated, samples were received in containers fit for purpose.

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LAB- QLT- REP- 001

X-LAB EARTH

AMENDED REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Liam Whitlow	Laboratory	X- Lab Earth Science
Client	EIMS	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 789 7170	Laboratory Manager	Mr Martin Olivier
Facsimile		Lab Reference	JBX17- 0655 R1
Email	liam@eims.co.za	Report Number	0000001916
Project	1074/LW/SS	Date Received	24/08/2017 11:28
Order Number	1074/LW/SS	Date Started	28/08/2017 9:47
Samples	10	Date Reported	07/09/2017 11:19
Sample matrix	WATER		

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This report cancels and supersedes the Report No, 0000001836, issued by X- Lab Earth Science on 30/08/2017. The reason for re- issue is that Rubidium Results were omitted from the report.

ilac-MRA

sanas Testing Laboratory

T0775

SIGNATORIES

Greg Ondrejkovic

Technical Supervisor/Technical Signatory

Martin Olivier

General Manager/Technical Signatory

AMENDED REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0655.001 BH 01	JBX17-0655.002 BH 03	JBX17-0655.003 BH 04	JBX17-0655.004 BH 05	JBX17-0655.005 BH 07
Anion- Cation Balance	%	-100	-4.58	-2.89	-5.61	-2.93	-7.00
Sum of Anion Milliequivalents	meq/l	-	15.9	8.95	19.9	17.9	18.3
Sum of Cation Milliequivalents	meq/l	-	14.5	8.45	17.8	16.9	15.9
Total Alkalinity as CaCO3	mg/l	12	356	285	346	313	439
Methyl Orange (M) Alkalinity as	mg/l	12	356	285	346	313	439
Phenolphthalein (P) Alkalinity as	mg/l	12	<12	<12	<12	<12	<12
Conductivity in mS/m @ 25°C	mS/m	2	144	90	195	187	167
TDS (0.7µm) @ 105°C	mg/l	21	1000	490	1300	1600	1300
TSS (0.7µm) @ 105°C	mg/l	21	<21	326	<21	<21	<21
Calcium	mg/l	0.5	90	55	108	133	145
Iron	mg/l	0.05	<0.05	0.75	0.07	0.14	1.0
Magnesium	mg/l	0.01	35	10	44	59	73
Potassium	mg/l	0.2	2.3	1.9	3.8	4.3	1.3
Silicon	mg/l	1	16	5.8	15	13	20
Sodium	mg/l	0.5	164	110	201	121	60
Aluminium	mg/l	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/l	0.005	0.24	0.20	0.57	0.54	0.17

AMENDED REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0655.001 BH 01	JBX17-0655.002 BH 03	JBX17-0655.003 BH 04	JBX17-0655.004 BH 05	JBX17-0655.005 BH 07
Boron	mg/l	0.002	0.22	0.26	0.18	0.090	0.030
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.030	0.030	0.070	0.010	0.020
Manganese	mg/l	0.002	0.22	0.15	1.3	2.2	0.13
Molybdenum	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium *	mg/l	0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Strontium	mg/l	0.0006	1.3	1.3	3.4	1.3	1.9
Uranium	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	0.010
Bromide *	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/l	0.05	288	94	444	392	313
Fluoride	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	0.1	4.8	<0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/l	0.03	1.1	<0.03	<0.03	<0.03	<0.03
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite as N	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate	mg/l	0.05	29	29	24	27	36
Orthophosphate (Total Reactive	mg/l	0.25	<0.25	<0.25	0.40	<0.25	<0.25
Orthophosphate as P	mg/l	0.08	<0.080	<0.080	0.13	<0.080	<0.080
pH in water at 25°C	-	1	7.6	7.8	7.7	7.5	7.3
Ammonia	mg/l	0.012	0.11	0.55	1.3	0.80	0.19
Ammonia as N	mg/l	0.01	0.09	0.45	1.1	0.66	0.16

AMENDED REPORT

Parameter	Units	LOR	Sample Number / Sample Name JBX17-0655.006 BH 08	JBX17-0655.007 BH 09	JBX17-0655.008 SW 01	JBX17-0655.009 SW 02	JBX17-0655.010 2057
Anion-Cation Balance	%	-100	-5.81	-7.70	-2.05	-5.20	9.93
Sum of Anion Milliequivalents	meq/l		29.6	20.8	21.9	16.7	110
Sum of Cation Milliequivalents	meq/l		26.3	17.8	21.0	15.0	134
Total Alkalinity as CaCO3	mg/l	12	354	361	167	159	295
Methyl Orange (M) Alkalinity as	mg/l	12	354	361	167	157	295
Phenolphthalein (P) Alkalinity as	mg/l	12	<12	<12	<12	<12	<12
Conductivity in mS/m @ 25°C	mS/m	2	270	199	229	159	1300
TDS (0.7µm) @ 105°C	mg/l	21	2400	1200	1700	1200	7000
TSS (0.7µm) @ 105°C	mg/l	21	22	62	<21	22	80
Calcium	mg/l	0.5	233	118	131	95	54
Iron	mg/l	0.05	0.07	0.17	<0.05	0.06	2.1
Magnesium	mg/l	0.01	88	37	70	45	19
Potassium	mg/l	0.2	9.2	5.2	21	20	33
Silicon	mg/l	1	11	6.8	<1.0	1.4	3.7
Sodium	mg/l	0.5	167	202	187	138	2960
Aluminium	mg/l	0.003	<0.003	0.010	0.010	0.060	0.010
Arsenic	mg/l	0.0005	0.010	<0.0005	<0.0005	<0.0005	0.020
Barium	mg/l	0.005	0.12	0.30	0.14	0.060	5.3

Parameter	Units	LOR	Sample Number / Sample Name: JBX17- 0655.006 BH 08	JBX17- 0655.007 BH 09	JBX17- 0655.008 SW 01	JBX17- 0655.009 SW 02	JBX17- 0655.010 2057
Boron	mg/l	0.002	0.14	0.42	0.28	0.19	1.7
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.090	0.090	0.050	0.030	0.70
Manganese	mg/l	0.002	<0.002	0.31	0.020	0.070	0.12
Molybdenum	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium *	mg/l	0.004	<0.004	<0.004	<0.004	<0.004	0.040
Strontium	mg/l	0.0006	4.0	3.3	1.5	0.95	11
Uranium	mg/l	0.0005	0.020	<0.0005	0.010	0.010	<0.0005
Bromide *	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/l	0.05	679	443	554	371	3650
Fluoride	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	0.1	14	<0.1	1.4	7.6	36
Nitrate as N	mg/l	0.03	3.1	<0.03	0.32	1.7	8.2
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite as N	mg/l	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate	mg/l	0.05	152	54	140	141	11
Orthophosphate (Total Reactive [illegible])	mg/l	0.25	<0.25	<0.25	0.29	1.1	<0.25
Orthophosphate as P	mg/l	0.08	<0.080	<0.080	0.094	0.35	<0.080
pH in water at 25°C	-	1	7.4	7.6	8.4	8.4	8.0
Ammonia	mg/l	0.012	0.13	0.92	0.090	0.10	4.0
Ammonia as N	mg/l	0.01	0.11	0.76	0.07	0.09	3.3

METHOD SUMMARY

Calculation of Anion-	
ME- AN- 016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500- H B.
ME- AN- 007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME- AN- 011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre- weighed container at 105 deg C. The method is based on APHA 2540 C.
ME- AN- 001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME- AN- 009	Total suspended solids (TSS) is determined gravimetrically by filtering an aliquot of well- shaken aqueous sample through a pre- weighed filter which is then dried at 105 deg C. The method is based on APHA 2540 D.
ME- AN- 027	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP- OES). The method is based on EPA 200.7 and APHA 3120.
ME- AN- 026	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma mass spectrometry (ICP- MS). The method is based on EPA 200.8 and APHA 3030 B.
ME- AN- 014	Inorganic anions (Br, Cl, F, NO3, NO2, SO4) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME- AN- 042	The orthophosphate anion reacts with ammonium molybdate and antimony potassium tartrate (catalyst) under acidic conditions to form a 12- molybdophosphoric acid complex. The complex is then reduced with ascorbic acid to form a blue heteropoly compound. The absorbance of this compound is measured spectrophotometrically at wavelength 880 nm. This method is based on: (1) methods for the examination of water and associated materials phosphorous in waters, sewage and effluents 1981. ISBN 011751582.5, and (2) EPA method 365.1 Phosphorous, all forms, colorimetric, automated, ascorbic acid.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
^	Performed by outside laboratory.
LOR	Limit of Reporting

QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
*	*Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".*

Samples analysed as received.
Solid samples expressed on a dry weight

Unless otherwise indicated, samples were received in containers fit for purpose.

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Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.
WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) draw and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativity of all goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.
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APPENDIX 1H: OCTOBER 2017 LABORATORY RESULTS

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 18251 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No BH01
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0678 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No **BH03**
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.095 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 18251 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED	2017-10-27
DATE COMPLETED	2017-10-27
DATE ISSUED	2017-11-07

SAMPLE INFORMATION

SAMPLE No BH04
Project Name 1074/LW/ss
Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No BH05
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0163 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No BH07
Project Name 1074/LW/ss
Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.0115 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No BH08
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 18251 A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No BH09
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.8432 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No **SW01**
Project Name 1074/LW/ss
Project number 1074/LW/ss

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 18251A

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: Headspace GC-FID

Matrix: Water

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

SAMPLE No SW02
Project Name 1074/LW/ss
Project number 1074/LW/ss
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.007 mg/liter	
Dissolved Ethane	<0.013 mg/liter	

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CLIENT INFORMATION

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Attention: Liam Whitlow

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TEST REPORT

Lab No : 18251 B

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS

METHOD Number: UISOL-T-012

DATE RECEIVED	2017-10-27
DATE ANALYSED	2017-10-27
DATE ISSUED	2017-11-07

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass

Project number 1074/LW/ss

Sample dilution Factor No Dilution

Sample ID	Results
1074 BH01	<10 µg/liter
1074 BH03	<10 µg/liter
1074 BH04	<10 µg/liter
1074 BH05	<10 µg/liter
1074 BH07	<10 µg/liter
1074 BH08	<10 µg/liter
1074 BH09	<10 µg/liter
1074 SW01	<10 µg/liter
1074 SW02	<10 µg/liter

Authorised Signatory : *2017-11-07 03:32:50 PM*

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sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
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Analysis Report

Lab No : 18251 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-10-27 **DATE ANALYSED** 2017-10-31 **DATE ISSUED** 2017-11-07

SAMPLE INFORMATION **Matrix:** WATER
SAMPLE No 1074 BH01 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-10-27 DATE ANALYSED 2017-10-31 DATE ISSUED 2017-11-07

SAMPLE INFORMATION **Matrix:** WATER
SAMPLE No **1074 BH03** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<5 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-10-27 **DATE ANALYSED** 2017-10-31 **DATE ISSUED** 2017-11-07

SAMPLE INFORMATION **Matrix:** WATER
SAMPLE No 1074 BH04 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Crominout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017-10-27	DATE ANALYSED	2017-10-31	**DATE ISSUED**	2017-11-07
SAMPLE INFORMATION		**Matrix:**	WATER		
SAMPLE No	**1074 BH05**	**Project number**	1074/LW/ss		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Crominout

sanas Testing Laboratory T0419

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2017-11-07 03:33:59 PM

Results marked "A" - Concentration outside calibration range, estimate only

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017-10-27	**DATE ANALYSED**	2017-10-31	**DATE ISSUED**	2017-11-07
SAMPLE INFORMATION		**Matrix:**	WATER		
SAMPLE No	1074 BH07	**Project number**	1074/LW/ss		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

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sanas Testing Laboratory T0419

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Liam Whitlow
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Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017-10-27	**DATE ANALYSED**	2017-10-31	**DATE ISSUED**	2017-11-07
SAMPLE INFORMATION		**Matrix:**	WATER		
SAMPLE No	**1074 BH08**	**Project number**	1074/LW/ss		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

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CLIENT INFORMATION

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Liam Whitlow
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Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS **METHOD Number:** UISOL-T-012
DATE RECEIVED 2017-10-27 **DATE ANALYSED** 2017-10-31 **DATE ISSUED** 2017-11-07

SAMPLE INFORMATION **Matrix:** WATER
SAMPLE No 1074 BH09 **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2017-10-27	**DATE ANALYSED**	2017-10-31	**DATE ISSUED**	2017-11-07
SAMPLE INFORMATION		**Matrix:**	WATER		
SAMPLE No	1074 SW01	**Project number**	1074/LW/ss		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 18251 E

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2017-10-27 **DATE ANALYSED** 2017-10-31 **DATE ISSUED** 2017-11-07

SAMPLE INFORMATION **Matrix:** WATER
SAMPLE No **1074 SW02** **Project number** 1074/LW/ss
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<5**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

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CLIENT INFORMATION

Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Analysis Certificate Total Oil and Grease

Lab No : 18251

DATE RECEIVED 2017-10-27
DATE COMPLETED 2017-10-27

Project number 1074/LW/ss

Matrix Water

Analytical method: Solvent Extraction and Gravimetric determination

Sample Number	Total Oil and Grease
1074 BH01	<1 mg/liter
1074 BH03	1.5 mg/liter
1074 BH04	<1 mg/liter
1074 BH05	<1 mg/liter
1074 BH07	<1 mg/liter
1074 BH08	<1 mg/liter
1074 BH09	<1 mg/liter
1074 SW01	<1 mg/liter
1074 SW02	<1 mg/liter

Authorised Signatory :

Reinardt Cromhout

Reporting date: *07 November 2017*

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Analysis Report

Lab No : 18251 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:Soil - Solid/liquid Ext. and GC-FID
ANALYTICAL METHOD: Water-Liquid/Liquid Ext. and GC-FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017-10-27
DATE ANALYSED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

Project Name 1074/LW/ss
Project number 1074/LW/ss
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017-11-07 03:33:11 PM*

Reinardt Cromhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Analysis Report

Lab No : 18251 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:Soil - Solid/liquid Ext. and GC-FID
ANALYTICAL METHOD: Water-Liquid/Liquid Ext. and GC-FID
METHOD Number: UISOL-T-011

DATE RECEIVED 2017-10-27
DATE ANALYSED 2017-10-27
DATE ISSUED 2017-11-07

SAMPLE INFORMATION

Project Name 1074/LW/ss
Project number 1074/LW/ss
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2017-11-07 03:33:11 PM*

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sanas Testing Laboratory T0419

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TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Liam Whitlow	Laboratory	X- Lab Earth Science
Client	EIMS	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 789 7170	Laboratory Manager	Mr Martin Olivier
Facsimile		Lab Reference	JBX17- 0867
Email	liam@eims.co.za	Report Number	0000002599
Project	1074/LW/ss	Date Received	26/10/2017 11:27
Order Number	1074/LW/ss	Date Started	2/11/2017 15:30
Samples	9	Date Reported	13/11/2017 09:47
Sample matrix	WATER		

The document is issued in accordance with SANAS's accreditation requirements. Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory

T0775

SIGNATORIES

Greg Ondrejkovic

Technical Supervisor/Technical Signatory

Martin Olivier

General Manager/Technical Signatory

LAB- QLT- REP- 001

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name JBX17-0867.001 1074 BH01	JBX17-0867.002 1074 BH03	JBX17-0867.003 1074 BH04	JBX17-0867.004 1074 BH05	JBX17-0867.005 1074 BH07
Conductivity in mS/m @ 25°C	mS/m	2	152	300	207	168	161
TSS (0.7µm) @ 105°C	mg/l	21	604	<21	<21	36	<21
Calcium	mg/l	0.5	95	89	116	167	157
Potassium	mg/l	0.2	2.6	1.6	4.4	3.8	1.4
Sodium	mg/l	0.5	167	77	225	146	60
Arsenic	mg/l	0.0005	0.0052	0.0039	0.0074	0.0084	0.0052
Barium	mg/l	0.005	0.35	0.22	0.64	0.79	0.14
Boron	mg/l	0.002	0.18	0.13	0.15	0.089	0.024
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.022	0.015	0.065	0.006	0.023
Manganese	mg/l	0.002	0.43	0.14	0.87	1.3	0.084
Rubidium *	mg/l	0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Strontium	mg/l	0.0006	1.3	0.85	2.9	0.98	1.5
Uranium	mg/l	0.0005	0.0061	0.0033	<0.0005	<0.0005	0.0040
Bromide *	mg/l	0.1	7.0	1.7	1.6	1.7	1.0
Chloride	mg/l	0.05	281	100	570	503	338
Sulphate	mg/l	0.05	29	67	26	32	39
pH in water at 25°C	-	1	7.7	7.5	7.6	7.2	7.1

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17- 0867.001 1074 BH01	JBX17- 0867.002 1074 BH03	JBX17- 0867.003 1074 BH04	JBX17- 0867.004 1074 BH05	JBX17- 0867.005 1074 BH07
Ammonia as water by Discrete Analyser							
Ammonia	mg/l	0.012	0.27	0.012	0.70	0.67	0.089
Ammonia as N	mg/l	0.01	0.23	0.01	0.58	0.55	0.07

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0867.006 1074 BH08	JBX17-0867.007 1074 BH09	JBX17-0867.008 1074 SW01	JBX17-0867.009 1074 SW02
Conductivity in mS/m @ 25°C	mS/m	2	325	195	188	<2.0
TSS (0.7µm) @ 105°C	mg/l	21	<21	<21	98	<21
Calcium	mg/l	0.5	322	126	117	77
Potassium	mg/l	0.2	13	5.5	25	23
Sodium	mg/l	0.5	192	220	173	126
Arsenic	mg/l	0.0005	0.013	0.014	0.014	0.011
Barium	mg/l	0.005	0.16	0.33	0.18	0.057
Boron	mg/l	0.002	0.10	0.42	0.21	0.11
Lead	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium *	mg/l	0.002	0.076	0.095	0.036	0.016
Manganese	mg/l	0.002	0.013	0.11	<0.002	<0.002
Rubidium *	mg/l	0.004	<0.004	<0.004	<0.004	<0.004
Strontium	mg/l	0.0006	3.2	2.7	0.95	0.62
Uranium	mg/l	0.0005	0.024	0.0023	0.0093	0.016
Bromide *	mg/l	0.1	78	2.3	1.4	6.3
Chloride	mg/l	0.05	589	427	522	191
Sulphate	mg/l	0.05	264	51	122	144
pH in water at 25°C	-	1	7.8	8.0	7.6	8.1

TEST REPORT

Parameter	Units	LOR	Sample Number / Sample Name: JBX17-0867.006 1074 BH08	JBX17-0867.007 1074 BH09	JBX17-0867.008 1074 SW01	JBX17-0867.009 1074 SW02
Ammonia	mg/l	0.012	<0.012	0.41	0.82	0.16
Ammonia as N	mg/l	0.01	<0.01	0.34	0.68	0.13

METHOD SUMMARY

ME- AN- 026	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma mass spectrometry (ICP- MS). The method is based on EPA 200.8 and APHA 3030 B.
ME- AN- 016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500- H B.
ME- AN- 007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME- AN- 027	Dissolved metals are determined on a filtered and acidified (to 1% HNO3) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP- OES). The method is based on EPA 200.7 and APHA 3120.
ME- AN- 014	Inorganic anions (Br, Cl, F, NO3, NO2, SO4) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME- AN- 009	Total suspended solids (TSS) is determined gravimetrically by filtering an aliquot of well- shaken aqueous sample through a pre- weighed filter which is then dried at 105 deg C. The method is based on APHA 2540 D.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
*	*Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".*

Samples analysed as received.
Solid samples expressed on a dry weight

Unless otherwise indicated, samples were received in containers fit for purpose.

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LAB- QLT- REP- 001

UIS sediba laboratory

CLIENT INFORMATION
Environmental Impact Management Services (Pty) Ltd
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	45
DO*	9.2

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH03

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	32
DO*	9.0

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH04

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	41
DO*	10.7

Results approved by *WJ Havenga (Technical Manager)*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH05

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	39
DO*	8.1

Results approved by *WJ Havenga (Technical Manager)*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH07

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	56
DO*	6.9

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH08

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	49
DO*	7.7

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 BH09

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	44
DO*	5.0

Results approved by *WJ Havenga (Technical Manager)*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 SW01

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	23
DO*	6.7

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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Water Test Report

LABORATORY NUMBER 6042A **DATE RECEIVED** 27-Oct-17

SAMPLE NUMBER 1074 SW02

REPORTING UNITS mg/l [ppm] **(unless stated elsewhere)**

TASK PO Nr 1074/LW/ss

Parameters

DOC*	<10
DIC*	22
DO*	9.4

Results approved by *WJ Havenga (Technical Manager)*

Reporting date: *Monday, November 6, 2017*

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