QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Methoxychlor	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	160502-31	97 || 101 || RPD: 4	160502-3	107%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-31	20/01/2017 || 20/01/2017	160502-3	20/01/2017
Date analysed	-	160502-31	23/01/2017 || 23/01/2017	160502-3	22/01/2017
Azinphos-methyl (Guthion)	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	160502-31	<0.1 || <0.1	160502-3	108%
Chlorpyriphos-methyl	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	160502-31	<0.1 || <0.1	160502-3	94%
Dimethoate	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	160502-31	<0.1 || <0.1	160502-3	99%
Fenitrothion	mg/kg	160502-31	<0.1 || <0.1	160502-3	102%
Malathion	mg/kg	160502-31	<0.1 || <0.1	160502-3	77%
Parathion	mg/kg	160502-31	<0.1 || <0.1	160502-3	94%
Ronnel	mg/kg	160502-31	<0.1 || <0.1	160502-3	107%
Surrogate TCMX	%	160502-31	97 || 101 || RPD: 4	160502-3	99%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-31	20/01/2017 || 20/01/2017	160502-3	20/01/2017
Date analysed	-	160502-31	23/01/2017 || 23/01/2017	160502-3	22/01/2017
Aroclor 1016	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	160502-31	<0.1 || <0.1	160502-3	123%
Aroclor 1260	mg/kg	160502-31	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	160502-31	97 || 101 || RPD: 4	160502-3	99%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	160502-31	20/01/2017 || 20/01/2017	160502-3	20/01/2017
Date analysed	-	160502-31	23/01/2017 || 23/01/2017	160502-3	23/01/2017
Arsenic	mg/kg	160502-31	6 || 5 || RPD: 18	160502-3	97%
Cadmium	mg/kg	160502-31	<0.4 || <0.4	160502-3	102%
Chromium	mg/kg	160502-31	14 || 17 || RPD: 19	160502-3	105%
Copper	mg/kg	160502-31	16 || 19 || RPD: 17	160502-3	111%
Lead	mg/kg	160502-31	13 || 13 || RPD: 0	160502-3	93%
Mercury	mg/kg	160502-31	<0.1 || <0.1	160502-3	98%
Nickel	mg/kg	160502-31	5 || 6 || RPD: 18	160502-3	101%
Zinc	mg/kg	160502-31	16 || 19 || RPD: 17	160502-3	102%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	23/01/2017 || 23/01/2017	160502-32	23/01/2017
$TRHC_6$ - C_9	mg/kg	160502-46	<25 || <25	160502-32	94%
$TRHC_6$ - C_{10}	mg/kg	160502-46	<25 || <25	160502-32	94%
Benzene	mg/kg	160502-46	<0.2 || <0.2	160502-32	90%
Toluene	mg/kg	160502-46	<0.5 || <0.5	160502-32	90%
Ethylbenzene	mg/kg	160502-46	<1 || <1	160502-32	95%
m+p-xylene	mg/kg	160502-46	<2 || <2	160502-32	98%
o-Xylene	mg/kg	160502-46	<1 || <1	160502-32	96%
naphthalene	mg/kg	160502-46	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	160502-46	93 || 96 || RPD: 3	160502-32	98%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	21/01/2017 || 21/01/2017	160502-32	21/01/2017
$TRHC_{10}$ - C_{14}	mg/kg	160502-46	<50 || <50	160502-32	120%
$TRHC_{15}$ - C_{28}	mg/kg	160502-46	<100 || <100	160502-32	117%
$TRHC_{29}$ - C_{36}	mg/kg	160502-46	<100 || <100	160502-32	87%
$TRH>C_{10}$-C_{16}	mg/kg	160502-46	<50 || <50	160502-32	120%
$TRH>C_{16}$-C_{34}	mg/kg	160502-46	<100 || <100	160502-32	117%
$TRH>C_{34}$-C_{40}	mg/kg	160502-46	<100 || <100	160502-32	87%
Surrogate o-Terphenyl	%	160502-46	89 || 89 || RPD: 0	160502-32	92%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Naphthalene	mg/kg	160502-46	<0.1 || <0.1	160502-32	80%
Acenaphthylene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	160502-46	<0.1 || <0.1	160502-32	83%
Phenanthrene	mg/kg	160502-46	<0.1 || <0.1	160502-32	80%
Anthracene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	160502-46	<0.1 || <0.1	160502-32	81%
Pyrene	mg/kg	160502-46	<0.1 || <0.1	160502-32	85%
Benzo(a)anthracene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	160502-46	<0.1 || <0.1	160502-32	81%
Benzo(b,j+k)fluoranthene	mg/kg	160502-46	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	160502-46	<0.05 || <0.05	160502-32	76%
Indeno(1,2,3-c,d)pyrene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	160502-46	84 || 88 || RPD: 5	160502-32	104%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	21/01/2017 || 21/01/2017	160502-32	23/01/2017
HCB	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	160502-46	<0.1 || <0.1	160502-32	85%
gamma-BHC	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	160502-46	<0.1 || <0.1	160502-32	101%
Heptachlor	mg/kg	160502-46	<0.1 || <0.1	160502-32	104%
delta-BHC	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	160502-46	<0.1 || <0.1	160502-32	98%
Heptachlor Epoxide	mg/kg	160502-46	<0.1 || <0.1	160502-32	109%
gamma-Chlordane	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	160502-46	<0.1 || <0.1	160502-32	112%
Dieldrin	mg/kg	160502-46	<0.1 || <0.1	160502-32	117%
Endrin	mg/kg	160502-46	<0.1 || <0.1	160502-32	105%
pp-DDD	mg/kg	160502-46	<0.1 || <0.1	160502-32	113%
Endosulfan II	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	160502-46	<0.1 || <0.1	160502-32	92%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Methoxychlor	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	160502-46	91 || 93 || RPD: 2	160502-32	100%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	22/01/2017 || 22/01/2017	160502-32	23/01/2017
Azinphos-methyl (Guthion)	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	160502-46	<0.1 || <0.1	160502-32	87%
Chlorpyriphos-methyl	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	160502-46	<0.1 || <0.1	160502-32	81%
Dimethoate	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	160502-46	<0.1 || <0.1	160502-32	81%
Fenitrothion	mg/kg	160502-46	<0.1 || <0.1	160502-32	120%
Malathion	mg/kg	160502-46	<0.1 || <0.1	160502-32	77%
Parathion	mg/kg	160502-46	<0.1 || <0.1	160502-32	79%
Ronnel	mg/kg	160502-46	<0.1 || <0.1	160502-32	92%
Surrogate TCMX	%	160502-46	91 || 93 || RPD: 2	160502-32	92%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	22/01/2017 || 22/01/2017	160502-32	23/01/2017
Aroclor 1016	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	160502-46	<0.1 || <0.1	160502-32	115%
Aroclor 1260	mg/kg	160502-46	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	160502-46	91 || 93 || RPD: 2	160502-32	92%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	160502-46	20/01/2017 || 20/01/2017	160502-32	20/01/2017
Date analysed	-	160502-46	23/01/2017 || 23/01/2017	160502-32	23/01/2017
Arsenic	mg/kg	160502-46	8 || 9 || RPD: 12	160502-32	98%
Cadmium	mg/kg	160502-46	<0.4 || <0.4	160502-32	103%
Chromium	mg/kg	160502-46	19 || 19 || RPD: 0	160502-32	113%
Copper	mg/kg	160502-46	18 || 18 || RPD: 0	160502-32	110%
Lead	mg/kg	160502-46	18 || 20 || RPD: 11	160502-32	97%
Mercury	mg/kg	160502-46	<0.1 || <0.1	160502-32	92%
Nickel	mg/kg	160502-46	10 || 10 || RPD: 0	160502-32	101%
Zinc	mg/kg	160502-46	37 || 33 || RPD: 11	160502-32	99%

Report Comments:

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples requested for asbestos testing were sub-sampled from bags provided by the client.

Asbestos ID was analysed by Approved Identifier: Matt Tang
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
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SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Kati Taylor

Sample Login Details	
Your Reference	E29593K, Oran Park
Envirolab Reference	**160502**
Date Sample Received	19/01/2017
Date Instructions Received	19/01/2017
Date Results Expected to be Reported	**27/01/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	54 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	16.6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*On Hold*
BH101-0-0.2									✓
BH101-0.8-1.0	✓	✓	✓	✓	✓	✓	✓	✓	
BH101-3-3.2	✓	✓	✓	✓	✓	✓	✓		
BH102-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH102-0.8-1.0									✓
BH102-2.5-2.7	✓	✓	✓	✓	✓	✓	✓		
BH103-0-0.2									✓
BH103-0.8-1.0	✓	✓	✓	✓	✓	✓	✓	✓	
BH103-2.7-3.0	✓	✓	✓	✓	✓	✓	✓		
BH104-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH104-0.8-1.0									✓
BH104-3.8-3.0	✓	✓	✓	✓	✓	✓	✓		
BH105-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH105-0.4-0.6									✓
BH105-1.2-1.4	✓	✓	✓	✓	✓	✓	✓		
BH106-0.05-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH106-1.4-1.5									✓
BH106-1.95-2.05	✓	✓	✓	✓	✓	✓	✓		
BH107-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH107-0.4-0.6									✓
BH107-1.3-1.5	✓	✓	✓	✓	✓	✓	✓		
BH108-0.05-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH108-1.0-1.2									✓
BH108-1.6-1.8	✓	✓	✓	✓	✓	✓	✓		
BH108-2.5-2.6	✓	✓	✓	✓	✓	✓	✓		
BH109-0-0.15	✓	✓	✓	✓	✓	✓	✓	✓	
BH109-0.4-0.5									✓
BH109-2-2.15	✓	✓	✓	✓	✓	✓	✓		
BH110-0-0.15									✓
BH110-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	
BH110-1.9-2.0	✓	✓	✓	✓	✓	✓	✓		
BH111-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH111-0.7-0.8									✓
BH111-2.0-2.2	✓	✓	✓	✓	✓	✓	✓		
BH112-0-0.15	✓	✓	✓	✓	✓	✓	✓	✓	
BH112-0.5-0.7									✓
BH112-1.8-2.0	✓	✓	✓	✓	✓	✓	✓		
BH113-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH113-0.8-1.0									✓
BH113-1.9-2.0	✓	✓	✓	✓	✓	✓	✓		
BH114-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH114-0.7-0.85									✓

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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*On Hold*
BH114-2.6-2.8	✓	✓	✓	✓	✓	✓	✓		
BH115-0-0.15									✓
BH115-0.8-0.9	✓	✓	✓	✓	✓	✓	✓	✓	
BH115-2.0-2.1	✓	✓	✓	✓	✓	✓	✓		
BH116-0-0.15	✓	✓	✓	✓	✓	✓	✓	✓	
BH116-0.8-0.9									✓
BH116-2-2.15									✓
BH117-0-0.15	✓	✓	✓	✓	✓	✓	✓	✓	
BH117-0.6-0.75									✓
BH117-1.9-2.05	✓	✓	✓	✓	✓	✓	✓		
DUPKT1	✓	✓	✓	✓	✓	✓	✓		
TB	✓								

The '✓' indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS****.*

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E29593K	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067		MACQUARIE PARK, NSW 2113
P: (02) 99106200	Date Results Required: STANDARD	P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		Attention: ktaylor@jkgroup.net.au
Attention: Aileen	Page: 1 of 3	

Location: Oran Park

Sampler: K.S & K.T

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 6	BTEX
16/1/17	1	BH101	0-0.2	GA	0	Fs,g,sand-			
	2		0.8-1.0	GA		Fsilty clay	X		
	3		3-3.2	G		silty clay.		X	
	4	BH102	0-0.2	GA		Fsilty clay	X		
	5		0.8-1.0	GA		Fsilty clay			
	6		2.5-2.7	G		silty clay		X	
18/1/17	7	BH103	0-0.2	GA		Fsilty clay			
	8		0.8-1.0	GA		Fsilty clay	X		
	9		2.7-3.0	G		silty clay		X	
	10	BH104	0-0.2	GA		Fsilty clay	X		
	11		0.8-1.0	GA		Fsilty clay			
	12		2.8-3.0	G		silty clay		X	
17/1/17	13	BH105	0-0.1	GA		Fsilty sand	X		
	14		0.4-0.6	GA		Fsilty clay			
	15		1.2-1.4	G	0	silty clay		X	
	16	BH106	0.05-0.2	GA		Fs,g sand.	X		
	17		1.4-1.5	GA		Fsilty clay			
	18		1.95-2.05	G		silty clay.		X	
	19	BH107	0-0.2	GA		Fsandy gravel	X		
	20		0.4-0.6	GA		Fsilty clay			
	21		1.3-1.5	G		silty clay		X	
	22	BH108	0.05-0.2	GA		Fsilty sand	X		
	23		1.0-1.2	GA		Fsilty clay			
	24		1.6-1.8	GA		Fsilty clay		X	

ENVIROLAB GROUP

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 160502.

Date Received: 190117.

Time Received: 1500

Received by: ENK

Temp: Cool/Ambient

~~Cooling: Ice/Icepack~~

Security: Intact/~~Broken/None~~

Remarks (comments/detection limits required):

See pg 3.

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
			Elkn Wh. EAS.	190117. 1500.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E29593K	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		Attention: ktaylor@jkgroup.net.au
Attention: Aileen	Page: 2 of 3	

Location:	Oran Park	Sample Preserved in Esky on Ice
Sampler:	K.S & K.T	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 6	BTEX									
17/1/17	25	BH108	2.5-2.6	G	0	silty clay		X										
	26	BH109	0-0.15	GA		FS,sday	X											
	27	↓	0.4-0.5	GA		Fsilty day												
	28	↓	2-2.15	G		silty clay		X										
	29	BH110	0-0.15	GA		FS,silty clay												
	30	↓	0.4-0.5	GA		Fsilty day	X											
	31	↓	1.9-2.0	G		silty clay		X										
	32	BH111	0-0.2	GA		FS,silty clay	X											
	33	↓	0.2-0.8	GA		Fsilty day.												
	34	↓	2.0-2.2	G		silty clay		X										
	35	BH112	0-0.15	GA		FS,silty day	X											
	36	↓	0.5-0.7	GA		Fsilty day												
	37	↓	1.8-2.0	G		silty clay		X										
	38	BH113	0-0.2	GA		FSsilty day	X											
	39	↓	0.8-1.0	GA		FSilty day												
	40	↓	1.9-2.0	G		silty day		X										
	41	BH114	0-0.2	GA		Fsilty day	X											
	42	↓	0.7-0.8	GA		Fsilty day												
	43	↓	2.6-2.8	G		silty day		X										
	44	BH115	0-0.15	GA		FSsilty day												
	45	↓	0.8-0.9	GA		Fsilty day	X											
	46	↓	2.0-2.1	G		silty clay		X										
	47	BH116	0-0.15	GA		FSsilty day	X											
	48	↓	0.8-0.9	GA		Fsilty day												
↓	49	↓	2-2.15	G	↓	silty day												

Remarks (comments/detection limits required):

see pg 3.

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
			Ekm Wi EAS Pty Ltd.	190117. 1200

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E29593K	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201	Page: 3 of 3	Attention: ktaylor@jkgroup.net.au
Attention: Aileen		

Location: Oran Park

Sampler: K.S & K.T

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 6	BTEX
17/1/17	50	BH117	0-0.15	GA	0	F: silty clay	X		
	51	↓	0.6-0.75	GA	↓	F: silty clay			
	52	↓	1.9-2.05	G	↓	Silty clay		X	-
	53	DUP KT1	—	G	—	Fill		X	
		DUP KT2	—	G	—	Fill		X	
↓	54	TB	—	G	—	sand.			X

Remarks (comments/detection limits required):
Please send DUPKT2 to Melb Envirolab

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
			Ellen WG EIS	190117 1500

16-18 Hayden Court, Myaree, Western Australia 6154
PO Box 4023 Myaree BC, Western Australia 6960
tel: +61 8 9317 2505
email: lab@mpl.com.au
envirolab.com.au
Envirolab Services (WA) Pty Ltd trading as
MPL Laboratories | ABN 53 140 099 207

CERTIFICATE OF ANALYSIS 191231

Client:
Environmental Investigation Services
115 Wicks Road
MACQUARIE PARK
NSW 2113

Attention: K Taylor

Sample log in details:

Your Reference:	**E29593K**
No. of samples:	1 soil
Date/Time samples received:	24/01/2017 / 14:00
Date completed instructions received:	24/01/2017
Location:	Oran Park

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last pages of this report for any comments relating to the results.

Report Details:

Date results requested by:	31/01/17
Date of Preliminary Report:	Not issued
Issue Date:	31/01/17

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing
Tests not covered by NATA are denoted with *.

Results Approved By:

Todd Lee
Laboratory Manager

vTRH(C6-C10)/MBTEXN in soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	28/01/2017
$TRHC_6$ - C_9	mg/kg	<25
$TRHC_6$ - C_{10}	mg/kg	<25
$TRHC_6$-C_{10} less BTEX (F1)	mg/kg	<25
MTBE	mg/kg	<0.5
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	82

svTRH(C10-C36) in soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	27/01/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100
TRH>C$_{10}$ - C$_{16}$	mg/kg	<50
TRH>C$_{10}$-C$_{16}$ less N (F2)	mg/kg	<50
TRH>C$_{16}$ - C$_{34}$	mg/kg	<100
TRH>C$_{34}$ - C$_{40}$	mg/kg	<100
Surrogate o-Terphenyl	%	88

PAHs in Soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	28/01/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	NO +VE PAHS
p-Terphenyl-D_{14}	%	104

Organochlorine Pesticides in soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	28/01/2017
Hexachlorobenzene (HCB)	mg/kg	<0.1
a-BHC	mg/kg	<0.1
b-BHC	mg/kg	<0.1
Lindane (g-BHC)	mg/kg	<0.1
d-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
a-Chlordane	mg/kg	<0.1
g-Chlordane	mg/kg	<0.1
a-Endosulphan	mg/kg	<0.1
p,p'-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
p,p'-DDD	mg/kg	<0.1
b-Endosulphan	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
p,p'-DDT	mg/kg	<0.1
Endrin Ketone	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
p-Terphenyl-D_{14}	%	104

Organophosphorus Pesticides		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	28/01/2017
Diazinon (Dimpylate)	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion (Maldison)	mg/kg	<0.1
Chlorpyrifos (ethyl)	mg/kg	<0.1
Parathion (ethyl)	mg/kg	<0.1
Ethion	mg/kg	<0.1
Bromophos Ethyl	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Azinphos Methyl (Guthion)	mg/kg	<0.1
p-Terphenyl-D_{14}	%	104

PCBs in Soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date extracted	-	27/01/2017
Date analysed	-	28/01/2017
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1

Acid Extractable metals in soil		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date digested	-	27/01/2017
Date analysed	-	30/01/2017
Arsenic	mg/kg	4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	30
Lead	mg/kg	17
Mercury	mg/kg	0.2
Nickel	mg/kg	16
Zinc	mg/kg	57

Moisture		
Our Reference:	UNITS	191231-1
Your Reference	----------	DUPKT2
Date Sampled	----------	17/01/2017
Type of sample		soil
Date prepared	-	27/01/2017
Date analysed	-	30/01/2017
Moisture	%	8.4

Method ID	Methodology Summary
ORG-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
ORG-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
ORG-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
ORG-012	For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-004	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
ORG-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
ORG-008/015	Organophosphorus Pesticides in soil by DCM:Acetone extraction and water by DCM extraction with determination by GC-ECD/GC-MS.
ORG-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
ORG-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
METALS-020	Metals in soil and water by ICP-OES.
METALS-021	Determination of Mercury by Cold Vapour AAS.
INORG-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/MBTEXN in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			28/01/2017	191231-1	28/01/2017 || 28/01/2017	LCS-1	28/01/2017
TRHC$_6$ - C$_9$	mg/kg	25	ORG-016	<25	191231-1	<25 || <25	LCS-1	85%
TRHC$_6$ - C$_{10}$	mg/kg	25	ORG-016	<25	191231-1	<25 || <25	LCS-1	85%
MTBE	mg/kg	0.5	ORG-016	<0.5	191231-1	<0.5 || <0.5	[NR]	[NR]
Benzene	mg/kg	0.2	ORG-016	<0.2	191231-1	<0.2 || <0.2	LCS-1	87%
Toluene	mg/kg	0.5	ORG-016	<0.5	191231-1	<0.5 || <0.5	LCS-1	85%
Ethylbenzene	mg/kg	1	ORG-016	<1	191231-1	<1 || <1	LCS-1	84%
m+p-xylene	mg/kg	2	ORG-016	<2	191231-1	<2 || <2	LCS-1	84%
o-xylene	mg/kg	1	ORG-016	<1	191231-1	<1 || <1	LCS-1	80%
Naphthalene	mg/kg	1	ORG-016	<1	191231-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		ORG-016	79	191231-1	82 || 84 || RPD: 2	LCS-1	88%

QUALITY CONTROL svTRH(C10-C36) in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	ORG-003	<50	191231-1	<50 || <50	LCS-1	107%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	ORG-003	<100	191231-1	<100 || <100	LCS-1	95%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	ORG-003	<100	191231-1	<100 || <100	LCS-1	88%
TRH>C$_{10}$ - C$_{16}$	mg/kg	50	ORG-003	<50	191231-1	<50 || <50	LCS-1	98%
TRH>C$_{16}$ - C$_{34}$	mg/kg	100	ORG-003	<100	191231-1	<100 || <100	LCS-1	96%
TRH>C$_{34}$ - C$_{40}$	mg/kg	100	ORG-003	<100	191231-1	<100 || <100	LCS-1	89%
Surrogate o-Terphenyl	%		ORG-003	90	191231-1	88 || 89 || RPD: 1	LCS-1	80%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			28/01/2017	191231-1	28/01/2017 || 28/01/2017	LCS-1	28/01/2017
Naphthalene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	95%
Acenaphthylene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	94%
Phenanthrene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	93%
Anthracene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	98%
Pyrene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	97%
Benzo(a)anthracene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Chrysene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	115%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	ORG-012	<0.2	191231-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	ORG-012	<0.05	191231-1	<0.05 || <0.05	LCS-1	100%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
p-Terphenyl-D_{14}	%		ORG-012	99	191231-1	104 || 102 || RPD: 2	LCS-1	108%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			28/01/2017	191231-1	28/01/2017 || 28/01/2017	LCS-1	28/01/2017
Hexachlorobenzene (HCB)	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
a-BHC	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	92%
b-BHC	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	96%
Lindane (g-BHC)	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
d-BHC	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Heptachlor	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	82%
Aldrin	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	95%
Heptachlor Epoxide	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	89%
a-Chlordane	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
g-Chlordane	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
a-Endosulphan	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
p,p'-DDE	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	95%
Dieldrin	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	90%
Endrin	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	78%
p,p'-DDD	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	107%
b-Endosulphan	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	LCS-1	100%
p,p'-DDT	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Endrin Ketone	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Methoxychlor	mg/kg	0.1	ORG-012	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
p-Terphenyl-D_{14}	%		ORG-008/015	99	191231-1	104 || 102 || RPD: 2	LCS-1	108%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			28/01/2017	191231-1	28/01/2017 || 28/01/2017	LCS-1	28/01/2017
Diazinon (Dimpylate)	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	LCS-1	97%
Ronnel	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Fenitrothion	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	LCS-1	84%
Malathion (Maldison)	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyrifos (ethyl)	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	LCS-1	99%
Parathion (ethyl)	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	LCS-1	111%
Bromophos Ethyl	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	ORG-008/015	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	ORG-008	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Azinphos Methyl (Guthion)	mg/kg	0.1	ORG-008	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
p-Terphenyl-D_{14}	%		ORG-008/015	99	191231-1	104 || 102 || RPD: 2	LCS-1	108%

Client Reference: E29593K

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			28/01/2017	191231-1	28/01/2017 || 28/01/2017	LCS-1	28/01/2017
Arochlor 1016	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	LCS-1	102%
Arochlor 1260	mg/kg	0.1	ORG-006	<0.1	191231-1	<0.1 || <0.1	[NR]	[NR]
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			27/01/2017	191231-1	27/01/2017 || 27/01/2017	LCS-1	27/01/2017
Date analysed	-			30/01/2017	191231-1	30/01/2017 || 30/01/2017	LCS-1	30/01/2017
Arsenic	mg/kg	2	METALS-020	<2	191231-1	4 || 4 || RPD: 0	LCS-1	99%
Cadmium	mg/kg	0.4	METALS-020	<0.4	191231-1	<0.4 || <0.4	LCS-1	98%
Chromium	mg/kg	1	METALS-020	<1	191231-1	13 || 14 || RPD: 7	LCS-1	101%
Copper	mg/kg	1	METALS-020	<1	191231-1	30 || 26 || RPD: 14	LCS-1	101%
Lead	mg/kg	1	METALS-020	<1	191231-1	17 || 16 || RPD: 6	LCS-1	101%
Mercury	mg/kg	0.1	METALS-021	<0.1	191231-1	0.2 || 0.1 || RPD: 67	LCS-1	109%
Nickel	mg/kg	1	METALS-020	<1	191231-1	16 || 14 || RPD: 13	LCS-1	104%
Zinc	mg/kg	1	METALS-020	<1	191231-1	57 || 51 || RPD: 11	LCS-1	99%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			27/01/2017
Date analysed	-			30/01/2017
Moisture	%	0.1	INORG-008	<0.10

Report Comments:

Asbestos Signatories:

Asbestos was analysed by Approved Identifier: Not applicable for this job
Airborne fibres were analysed by Approved Counter: Not applicable for this job

Definitions:

NT: Not tested NA: Test not required INS: Insufficient sample for this test PQL: Practical Quantitation Limit
<: Less than >: Greater than RPD: Relative Percent Difference LCS: Laboratory Control Sample
NS: Not Specified NEPM: National Environmental Protection Measure NR: Not Reported

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

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Envirolab Services (WA) Pty Ltd ABN 53 140 099 207

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	K Taylor

Sample Login Details	
Your Reference	E29593K
Envirolab Reference	**191231**
Date Sample Received	24/01/2017
Date Instructions Received	24/01/2017
Date Results Expected to be Reported	**31/01/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 soil
Turnaround Time Requested	Standard
Temperature on receipt (°C)	28
Cooling Method	Ice Pack
Sampling Date Provided	Yes

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Joshua Lim	Meredith Conroy
Phone: 08 9317 2505	Phone: 08 9317 2505
Fax: 08 9317 4163	Fax: 08 9317 4163
Email: jlim@mpl.com.au	Email: mconroy@mpl.com.au

Sample and Testing Details on following page

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Envirolab Services (WA) Pty Ltd ABN 53 140 099 207

Sample Id	***vTRH(C6-C10)/MBTEXN in soil***	***svTRH(C10-C36) in soil***	***PAHs in Soil***	***Organochlorine Pesticides in soil***	***Organophosphorus Pesticides***	***PCBs in Soil***	***Acid Extractable metals in soil***
DUPKT2	✓	✓	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS****.*

Appendix C: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS.

The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993[17].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.

[17] Standards Australia, (1993), *Geotechnical Site Investigations.* (AS1726-1993)

- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
    - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
    - Filter paper for Micropore filtration system; Bucket with volume increments;
    - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
    - Bucket with volume increments;
    - Flow cell;
    - pH/EC/Eh/T meters;
    - Plastic drums used for transportation of purged water;
    - Esky and ice;
    - Nitrile gloves;
    - Distilled water (for cleaning);
    - Electronic dip meter;

- Low flow pump pack and associated tubing; and
- Groundwater sampling forms.

- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994[18]) methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991[19]).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.

"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" Keith 1991.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

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[18] US EPA, (1994), *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[19] Keith., H, (1991), *Environmental Sampling and Analysis, A Practical Guide.*

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms; Sample receipt form;
- All sample results reported; All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix D: Calculation Sheets

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation	3/02/2017 3:45:46 PM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	**Nickel**											
12												
13	**General Statistics**											
14	Total Number of Observations	34					Number of Distinct Observations	13				
15							Number of Missing Observations	0				
16	Minimum	6					Mean	11.5				
17	Maximum	40					Median	9				
18	SD	6.21					Std. Error of Mean	1.065				
19	Coefficient of Variation	0.54					Skewness	3.244				
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic	0.668					**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value	0.933					Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic	0.238					**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value	0.152					Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL	13.3					95% Adjusted-CLT UCL (Chen-1995)	13.88				
31							95% Modified-t UCL (Johnson-1978)	13.4				
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic	1.662					**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value	0.749					Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic	0.196					**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value	0.151					Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)	5.873					k star (bias corrected MLE)	5.375				
42	Theta hat (MLE)	1.958					Theta star (bias corrected MLE)	2.14				
43	nu hat (MLE)	399.4					nu star (bias corrected)	365.5				
44	MLE Mean (bias corrected)	11.5					MLE Sd (bias corrected)	4.96				
45							Approximate Chi Square Value (0.05)	322.2				
46	Adjusted Level of Significance	0.0422					Adjusted Chi Square Value	320.2				
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))	13.05					95% Adjusted Gamma UCL (use when n<50)	13.13				
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic	0.889					**Shapiro Wilk Lognormal GOF Test**					
53	5% Shapiro Wilk Critical Value	0.933					Data Not Lognormal at 5% Significance Level					

54	Lilliefors Test Statistic					0.188	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.152	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					1.792	Mean of logged Data					2.355
60	Maximum of Logged Data					3.689	SD of logged Data					0.386
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					12.86	90% Chebyshev (MVUE) UCL					13.64
64	95% Chebyshev (MVUE) UCL					14.69	97.5% Chebyshev (MVUE) UCL					16.14
65	99% Chebyshev (MVUE) UCL					19						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					13.25	95% Jackknife UCL					13.3
72	95% Standard Bootstrap UCL					13.2	95% Bootstrap-t UCL					14.69
73	95% Hall's Bootstrap UCL					21.29	95% Percentile Bootstrap UCL					13.38
74	95% BCA Bootstrap UCL					14.26						
75	90% Chebyshev(Mean, Sd) UCL					14.69	95% Chebyshev(Mean, Sd) UCL					16.14
76	97.5% Chebyshev(Mean, Sd) UCL					18.15	99% Chebyshev(Mean, Sd) UCL					22.1
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					13.3	or 95% Modified-t UCL					13.4
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation	3/02/2017 3:49:58 PM										
5	From File	WorkSheet_a.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	**Zinc**											
12												
13	**General Statistics**											
14	Total Number of Observations	34					Number of Distinct Observations	29				
15							Number of Missing Observations	0				
16	Minimum	19					Mean	43.53				
17	Maximum	120					Median	39.5				
18	SD	20.4					Std. Error of Mean	3.498				
19	Coefficient of Variation	0.469					Skewness	1.962				
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic	0.84					**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value	0.933					Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic	0.157					**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value	0.152					Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL	49.45					95% Adjusted-CLT UCL (Chen-1995)	50.54				
31							95% Modified-t UCL (Johnson-1978)	49.65				
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic	0.414					**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value	0.749					Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic	0.101					**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value	0.151					Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)	5.983					k star (bias corrected MLE)	5.474				
42	Theta hat (MLE)	7.276					Theta star (bias corrected MLE)	7.952				
43	nu hat (MLE)	406.8					nu star (bias corrected)	372.3				
44	MLE Mean (bias corrected)	43.53					MLE Sd (bias corrected)	18.6				
45							Approximate Chi Square Value (0.05)	328.5				
46	Adjusted Level of Significance	0.0422					Adjusted Chi Square Value	326.5				
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50)	49.32					95% Adjusted Gamma UCL (use when n<50)	49.63				
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic	0.978					**Shapiro Wilk Lognormal GOF Test**					
53	5% Shapiro Wilk Critical Value	0.933					Data appear Lognormal at 5% Significance Level					

54	Lilliefors Test Statistic					0.0828	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.152	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					2.944	Mean of logged Data					3.688
60	Maximum of Logged Data					4.787	SD of logged Data					0.408
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					49.57	90% Chebyshev (MVUE) UCL					52.66
64	95% Chebyshev (MVUE) UCL					56.9	97.5% Chebyshev (MVUE) UCL					62.79
65	99% Chebyshev (MVUE) UCL					74.35						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					49.28	95% Jackknife UCL					49.45
72	95% Standard Bootstrap UCL					49.07	95% Bootstrap-t UCL					51.01
73	95% Hall's Bootstrap UCL					53.95	95% Percentile Bootstrap UCL					49.5
74	95% BCA Bootstrap UCL					50.03						
75	90% Chebyshev(Mean, Sd) UCL					54.02	95% Chebyshev(Mean, Sd) UCL					58.78
76	97.5% Chebyshev(Mean, Sd) UCL					65.38	99% Chebyshev(Mean, Sd) UCL					78.34
77												
78	**Suggested UCL to Use**											
79	95% Adjusted Gamma UCL					49.63						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												