



North Lanarkshire Council
via email

Our Ref: 70062270/004

18 November 2019

CONFIDENTIAL

Dear [REDACTED]

Validation of Remediation of HP10 Lead Hotspot at St Ambrose

BACKGROUND

North Lanarkshire Council (NLC) requested that WSP UK Ltd (WSP) provide a remedial strategy, oversight of remediation, and validation works following the identification of a localised soil sample recording elevated lead concentrations at the Buchanan and St Ambrose Campus site.

RSK completed ground investigations in support of the Scottish Government independent review (report titled "*Buchanan And St Ambrose High School Campus Independent Review*" dated 9th August 2019). RSK's interpretive reporting was published on 9th August 2019, though interim updates and data were received by WSP prior to this date, for the purposes of independent assessment.

RSK considered that the lead concentrations in the soil sample at hand pit (HP) HP10 posed a low risk to site users and did not require intervention. WSP's independent assessments noted a potential risk due to the scale of exceedance, and that this required further consideration. In lieu of further risk assessment works, NLC committed to completing precautionary remediation this area with a view to ensuring that the local community, and specifically the staff, pupils and parents/guardians of pupils, can have confidence that the school remains a safe environment.

WSP previously provided a remedial strategy for the HP10 lead hotspot in our memorandum dated 09 October 2019. This letter summarises the remedial works undertaken and provides validation that the mitigation works were successful.

SUMMARY OF PREVIOUS WORKS

Assessment of HP10 Lead Risks

HP10 is located in the south-east of the site, in a landscaped area north-east of the football pitches and south-east of an area of hardstanding. The National Grid reference given by RSK is 271736.5 665700.2.

RSK collected two samples from HP10, the first from 0.2 – 0.3m depth and the second from 0.5 – 0.6m depth. The results from the laboratory reported a lead concentration of 3,820 mg/kg at 0.2 – 0.3m depth. The sample taken at 0.5 – 0.6m depth reported a lead concentration of 372 mg/kg.

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WSP did not take a duplicate sample of either sample at this location. The lead concentrations in surrounding locations (HP09, HP11, HP12, and HP13) ranged from 129 to 418 mg/kg.

Based on the previous reports, there is no obvious source for the lead hotspot at this location. The lead exceedance in this area is considered an isolated hotspot with no other lead hotspots within the site boundary. There are also no other visual or olfactory evidence of any impacts of lead on the surrounding made ground or environment based on site observations.

The RSK assessment used a site-specific assessment criteria (SSAC) for lead of 3,590 mg/kg. The RSK (2019) report carried out statistical analysis (using Grubb's test) for a normal and log-normal distribution but noted there was no justifiable reason to exclude these exceedances from the data. The resulting Upper Confidence Limit (UCL) calculated by RSK was 685 mg/kg, which is below the GAC of 3,590 mg/kg. They concluded that the single exceedance of the GAC was '*not considered to pose a significant risk to secondary school site users*' with '*the linkage therefore not considered to exist in relation to soil borne lead present in shallow soils in the soft landscaped areas*'.

The WSP SSAC for lead was 2,170 mg/kg. The sample at HP10 was not considered by WSP to constitute a significant risk (i.e. SPOSH) in terms of human health given the overall number of samples recovered, with the remaining samples below the screening criteria and the resulting low potential for significant exposure overall across the site. However, due to the noted uncertainties and public sensitivity, NLC wished to proceed with remediation the lead hotspot within the site boundary at HP10 on a precautionary basis.

Delineation of Source

Additional details of delineation works are provided in WSP's memorandum dated 9th October 2019. A summary is presented below.

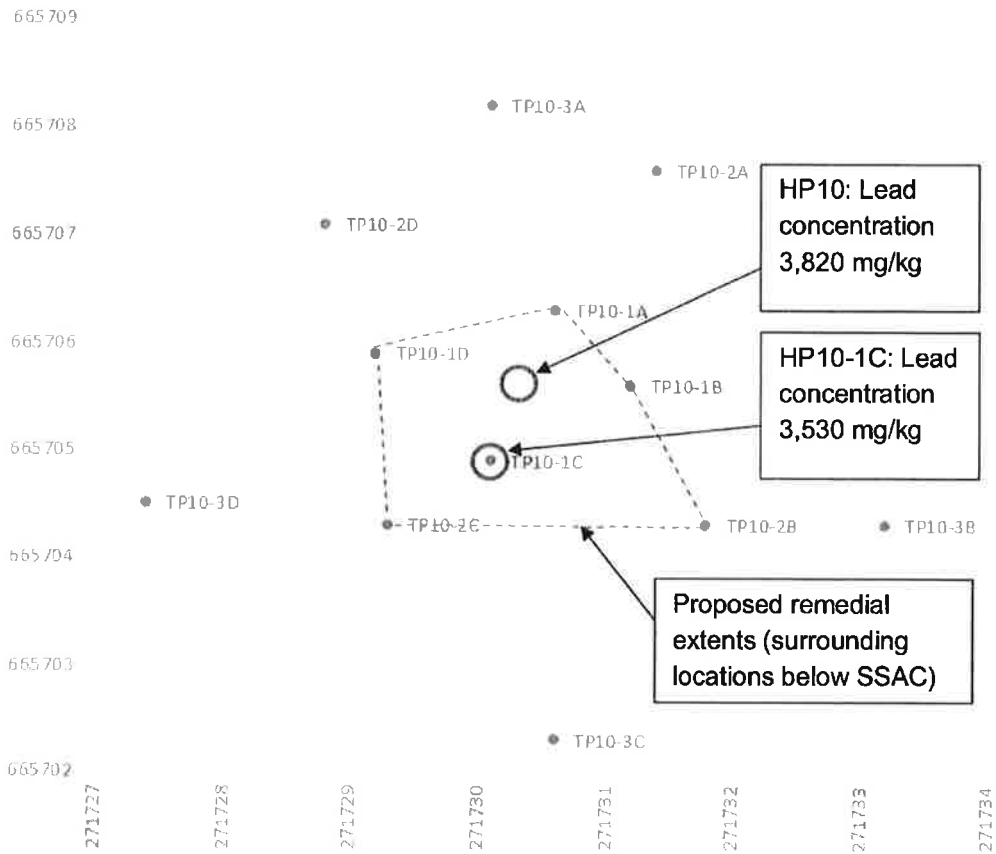
Following NLC's request to remediate the lead hotspot identified at HP10 in the south-east of the site, further sampling was carried out within the vicinity of HP10 to delineate the lead source.

WSP attended the site on Saturday 14th September 2019. Hand pitting works were delivered by Amey under their method statements and health and safety plan, with WSP attending to target and retrieve samples. Twelve delineation locations were undertaken, working radially outward from HP10.

The results showed that lead concentrations from the delineation samples are generally low relative to SSAC (242 mg/kg to 543 mg/kg), with the exception of HP10-1C (adjacent to the original HP10 handpit location) where a concentration of 3,530 mg/kg was recorded. All the remaining delineation hand pit samples are below the WSP SSAC.

The elevated lead concentration was therefore deemed isolated, and was delineated in depth, as there were no exceedances reported below 0.3m depth at HP10 during the previous round of sampling. The elevated lead concentration was delineated laterally by points TP10-1A, TP10-1B, TP10-2B, TP10-2C and TP10-2D across an area that is circa 4-5m² in area. This is shown on Figure 1 below.

Figure 1 – Delineation of lead around handpit TP10-1C (marked by dashed red line)



Summary of Remedial Strategy

The preferred remedial option at site was excavation and off-site disposal of soils, comprising removal of soils to 500mm depth to eliminate the source, and replacement with certified inert soils. A separating geotextile layer was not deemed necessary as full source removal of the identified hotspot was anticipated, so the residual underlying soils would not pose a risk even with deeper digging.

SUMMARY OF REMEDIAL WORKS

Remedial works at HP10 were carried out on 12th October 2019 by Amey, who acted as the Principal Contractor for the works, with WSP advising, observing works, and collecting validation samples. Amey completed a health and safety plan and method statements for these works, including a provision for utility clearance prior to excavation.

Prior to remedial works, WSP staked and marked the delineation locations shown in Figure 1, to define the required extents of excavations. Amey isolated the area of works from the public by use of cones and barrier tape.



Excavation of the area identified in Figure 1 was completed by Amey, commencing with manual excavation and followed by use of excavator. WSP was present to confirm the lateral extents and depth (0.5m) excavated were in line with the remedial strategy. Excavated soils were loaded directly onto wagons to prevent cross-contamination of surrounding soils. The duty of care for off-site disposal of soils was managed by Amey.

WSP obtained four sidewall samples (TP10-VAL01 through TP10-VAL04) and one base sample (TP10-VAL05) from the completed excavation, which were sent to ALS laboratories for lead analysis. Backfill materials were provided by Amey, and comprised sand sub-base and topsoil. Validation samples of the imported materials denoted SD01 (sand) and TS01 (topsoil) were collected by WSP and analysed by ALS for a general contaminant suite comprising metals, cyanide, pH, asbestos screen, soil organic matter, speciated polyaromatic hydrocarbons (PAH), speciated hydrocarbons (TPH-CWG), polychlorinated biphenyls (PCB7 and PCB WHO12), and BTEX compounds (benzene, toluene, ethylbenzene, and xylenes).

Backfilling was completed to bring the excavation level to match that of surrounding areas, and turf patches were placed at surface.

WSP logs of the excavation, selected photos, and laboratory reports are appended to this letter. WSP has not received to date validation records from Amey (e.g. waste disposal notes); it is assumed these will be provided to NLC directly from Amey.

UPDATED RISK ASSESSMENT

Recorded lead concentrations of WSP's sidewall and base validation samples ranged from 165 mg/kg to 348 mg/kg, below WSP's SSAC for lead of 2,170 mg/kg. As such, WSP deems the lead source has been effectively removed with the residual lead concentrations considered low risk.

In review of imported material contaminant results, no BTEX, PCB, or cyanide compounds were recorded above laboratory minimum detection limits. Similarly, asbestos was not detected in the samples. The recorded concentrations of metals and hydrocarbons (TPH and PAH) in the samples fall below WSP's in-house GAC for residential end use, which is noted to be more sensitive than the current school use. As such, the imported materials are considered suitable for use.

CLOSING

WSP confirms that Amey's remedial works at HP10 were completed in line with the remedial strategy. Validation sampling has confirmed successful removal of the previously-identified lead hotspot. As such, no further works are required for lead issues at St. Ambrose.

Yours sincerely


2019.11.18
17:35:58 Z


Associate

Encl. Excavation Logs; Selected Photos; Laboratory Reports, Screening Sheets

Selected Photos



Setting out of stakes to mark HP10 delineation locations prior to remedial works



Hand excavation of topsoil in remedial area surrounding HP10.

wsp



Machine excavation in progress

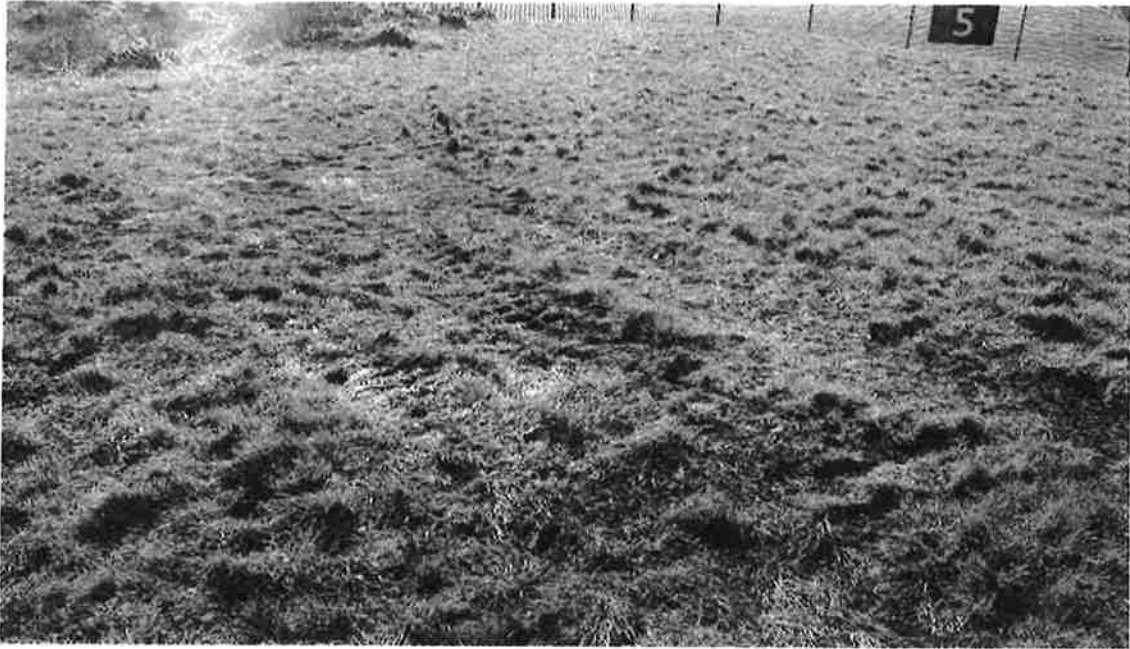


Validation sample collection

WSP



Backfill with sand subbase



Final surface conditions post-excavation



TP10 Excavation Strata depth and description

Depth (m)	Description
0 – 0.2	MADE GROUND: Grass over dark brown slightly gravelly slightly clayey fine to medium SAND with frequent rootlets. Gravel is angular fine to medium of mixed lithologies including occasional fragments of brick and mudstone (TOPSOIL).
0.20 – 0.5	MADE GROUND: Black slightly gravelly slightly clayey fine to medium SAND of mixed lithologies including black ash with occasional fragments of glass. Gravel is angular to sub-angular fine to medium of mixed lithologies including brick, coal and occasional clinker. Rare angular cobbles of concrete and brick, fragments of cloth, plastic, tin and timber.

Soil Analytical Results Screening Sheet

Site Name: St Ambrose

Job Number: 70062270

Screening Criteria: Res HC Veg 1% SOM GAC for all contaminants except lead, where SSAC is applied

Determinant	No. Samples	Min mg/kg	Mean mg/kg	Max mg/kg	GAC/SSAC mg/kg	# Exceeds	SD01 0.00-0.00	TS01 0.00-0.00	TP10-VAL01 0.20-0.30	TP10-VAL02 0.20-0.30	TP10-VAL03 0.20-0.30	TP10-VAL04 0.20-0.30	TP10-VAL05 0.50-
Soil Organic Matter (SOM)	2	< 0.35	3.63	6.91	No GAC	0	< 0.35	6.91					
pH	2	6.67	7.56	8.44	No GAC	0	8.44	6.67					
Asbestos Screen	2	N/A	N/A	N/A	Detection	0	ND	ND					
Cyanide, Total	2	< 1	< 1	< 1	15	0	< 1	< 1					
Cyanide (Free)	2	< 1	< 1	< 1	15	0	< 1	< 1					
Arsenic	2	3.11	5.80	8.49	32	0	3.11	8.49					
Cadmium	2	< 0.02	0.38	0.741	12	0	< 0.02	0.741					
Chromium	2	10.3	12.30	14.3	No GAC	0	10.3	14.3					
Copper	2	5.7	24.60	43.5	2490	0	5.7	43.5					
Lead	7	9.24	215.85	442	2170	0	9.24	104	234	209	165	442	348
Mercury	2	< 0.14	< 0.14	< 0.14	39	0	< 0.14	< 0.14					
Nickel	2	18.6	26.00	37.4	126	0	18.6	37.4					
Selenium	2	< 1	1.13	1.26	258	0	< 1	1.26					
Zinc	2	42.9	137.55	233	9860	0	42.9	233					
Aliphatics >C5-C6	2	< 0.01	< 0.01	< 0.01	42	0	< 0.01	< 0.01					
Aliphatics >C6-C8	2	< 0.01	< 0.01	< 0.01	103	0	< 0.01	< 0.01					
Aliphatics >C8-C10	2	< 0.01	< 0.01	< 0.01	27	0	< 0.01	< 0.01					
Aliphatics >C10-C12	2	< 1	< 1	< 1	152	0	< 1	< 1					
Aliphatics >C12-C16	2	< 1	1.66	2.36	1039	0	< 1	2.32					
Aliphatics >C16-C35	2	< 1	18.10	35.2	88400	0	< 1	35.2					
Aliphatics >C35-C44	2	< 1	3.74	6.48	88400	0	< 1	6.48					
Aromatics >EC5-EC7	2	< 0.01	< 0.01	< 0.01	72	0	< 0.01	< 0.01					
Aromatics >EC7-EC8	2	< 0.01	< 0.01	< 0.01	130	0	< 0.01	< 0.01					
Aromatics >EC8-EC10	2	< 0.01	< 0.01	< 0.01	34	0	< 0.01	< 0.01					
Aromatics >EC10-EC12	2	< 1	< 1	< 1	74	0	< 1	< 1					
Aromatics >EC12-EC16	2	< 1	1.02	1.04	141	0	< 1	1.04					
Aromatics >EC16-EC21	2	< 1	4.20	7.4	249	0	< 1	7.4					
Aromatics >EC21-EC35	2	< 1	22.20	43.4	873	0	< 1	43.4					
Aromatics >EC35-EC44	2	< 1	1.59	2.17	873	0	< 1	2.17					
Methyl tertiary butyl ether (MTBE)	2	< 0.1	< 0.1	< 0.1	62	0	< 0.1	< 0.1					
Benzene	2	< 0.09	< 0.09	< 0.09	0.089	0	< 0.09	< 0.09					
Toluene	2	< 0.07	< 0.07	< 0.07	131	0	< 0.07	< 0.07					
Ethylbenzene	2	< 0.04	< 0.04	< 0.04	47	0	< 0.04	< 0.04					
p,m-Xylene	2	< 0.1	< 0.1	< 0.1	57	0	< 0.1	< 0.1					
o-Xylene	2	< 0.1	< 0.1	< 0.1	57	0	< 0.1	< 0.1					
Tert-amyl methyl ether	2	< 0.1	< 0.1	< 0.1	No GAC	0	< 0.1	< 0.1					
Naphthalene	2	< 0.009	< 0.009	< 0.009	2.3	0	< 0.009	< 0.009					
Acenaphthylene	2	< 0.012	< 0.012	< 0.012	Biop-S-A	0	< 0.012	< 0.012					
Acenaphthene	2	< 0.008	0.01	0.0162	Biop-S-A	0	< 0.008	0.0162					
Fluorene	2	< 0.01	0.01	0.0172	Biop-S-A	0	< 0.01	0.0172					
Phenanthrene	2	< 0.015	0.11	0.269	Biop-S-A	0	< 0.015	0.209					
Anthracene	2	< 0.016	0.03	0.0518	Biop-S-A	0	< 0.016	0.0518					
Fluoranthene	2	< 0.017	0.21	0.398	Biop-S-A	0	< 0.017	0.366					
Pyrene	2	< 0.015	0.19	0.372	Biop-S-A	0	< 0.015	0.372					
Benz(a)anthracene	2	< 0.014	0.12	0.224	Biop-S-A	0	< 0.014	0.224					
Chrysene	2	< 0.01	0.10	0.199	Biop-S-A	0	< 0.01	0.199					
Benz(b)fluoranthene	2	< 0.015	0.17	0.331	Biop-S-A	0	< 0.015	0.331					
Benz(k)fluoranthene	2	< 0.014	0.06	0.1	Biop-S-A	0	< 0.014	0.1					
Benz(a)pyrene	2	< 0.015	0.13	0.244	1.6	0	< 0.015	0.244					
Indeno(1,2,3-cd)pyrene	2	0.0201	0.10	0.172	Biop-S-A	0	0.0201	0.172					
Dibenz(a,h)anthracene	2	< 0.023	0.03	0.03	Biop-S-A	0	< 0.023	0.03					
Benz(g,h,i)perylene	2	< 0.024	0.11	0.19	Biop-S-A	0	< 0.024	0.19					
PAH, Total Detected USEPA 16	2	< 0.118	1.33	2.65	No GAC	0	< 0.118	2.55					
Sum of detected PCB 7 Congeners	2	< 0.021	< 0.021	< 0.021	0.19	0	< 0.021	< 0.021					
Sum of detected WHO 12 PCBs	2	< 0.036	< 0.036	< 0.036	No GAC	0	< 0.036	< 0.036					



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CERTIFICATE OF ANALYSIS

Date of report Generation: 23 October 2019
Customer: WSP PB SCOTLAND
Sample Delivery Group (SDG): 191015-79
Your Reference: 70062270- st ambrose
Location: St Ambrose
Report No: 526681

This report has been revised and directly supersedes 526352 in its entirety.

We received 37 samples on Tuesday October 15, 2019 and 37 of these samples were scheduled for analysis which was completed on Wednesday October 23, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

[REDACTED SIGNATURE]

Operations Manager



ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

Version: 2.3 Version Issued: 23/10/2019



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79	Client Reference: 70062270- st ambrose	Report Number: 526681
Location: St Ambrose	Order Number: 70062270-07S	Superseded Report: 526352

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20941939	SD01	ES	0.00 - 0.00	12/10/2019
20941825	SHP-01	ES	0.10 - 0.30	12/10/2019
20941851	SHP-01	ES	0.40 - 0.50	12/10/2019
20941904	SHP-02	ES	0.10 - 0.30	12/10/2019
20941963	SHP-02	ES	0.40 - 0.50	12/10/2019
20941968	SHP-03	ES	0.10 - 0.30	12/10/2019
20941973	SHP-03	ES	0.40 - 0.50	12/10/2019
20941980	SHP-04	ES	0.10 - 0.30	12/10/2019
20941985	SHP-04	ES	0.40 - 0.50	12/10/2019
20941990	SHP-05	ES	0.10 - 0.30	12/10/2019
20941828	SHP-05	ES	0.40 - 0.50	12/10/2019
20941830	SHP-06	ES	0.10 - 0.30	12/10/2019
20941832	SHP-06	ES	0.40 - 0.50	12/10/2019
20941834	SHP-07	ES	0.10 - 0.30	12/10/2019
20941837	SHP-07	ES	0.40 - 0.50	12/10/2019
20941839	SHP-08	ES	0.10 - 0.30	12/10/2019
20941841	SHP-08	ES	0.40 - 0.50	12/10/2019
20941843	SHP-09	ES	0.10 - 0.30	12/10/2019
20941845	SHP-09	ES	0.40 - 0.50	12/10/2019
20941848	SHP-10	ES	0.10 - 0.30	12/10/2019
20941856	SHP-10	ES	0.40 - 0.50	12/10/2019
20941861	SHP-11	ES	0.10 - 0.30	12/10/2019
20941866	SHP-11	ES	0.40 - 0.50	12/10/2019
20941871	SHP-12	ES	0.10 - 0.30	12/10/2019
20941875	SHP-12	ES	0.40 - 0.50	12/10/2019
20941882	SHP-13	ES	0.10 - 0.30	12/10/2019
20941887	SHP-13	ES	0.40 - 0.50	12/10/2019
20941892	SHP-14	ES	0.10 - 0.30	12/10/2019
20941894	SHP-14	ES	0.40 - 0.50	12/10/2019
20941898	SHP-15	ES	0.10 - 0.30	12/10/2019
20941908	SHP-15	ES	0.40 - 0.50	12/10/2019
20941913	TP10-VAL01	ES	0.20 - 0.30	12/10/2019
20941919	TP10-VAL02	ES	0.20 - 0.30	12/10/2019
20941925	TP10-VAL03	ES	0.20 - 0.30	12/10/2019
20941930	TP10-VAL04	ES	0.20 - 0.30	12/10/2019
20941934	TP10-VAL05	ES	0.50	12/10/2019
20941950	TS01	ES	0.00 - 0.00	12/10/2019

Maximum Sample/Coolbox Temperature (°C) :

16.6

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG:	191015-79	Client Reference:	70082270- st ambrose	Report Number:	526881
Location:	St Ambrose	Order Number:	70082270-07S	Superseded Report:	526352

Results Legend <input checked="" type="checkbox"/> Test <input type="checkbox"/> No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)		20041960
	Customer Sample Reference		TS01
	AGS Reference		ES
	Depth (m)		0.00 - 0.00
	Container		60g VOC (ALE215)
	Sample Type		S
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	X
VOC MS (S)	All	NDPs: 0 Tests: 2	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79
Location: St Ambrose

Client Reference: 70062270- st ambrose
Order Number: 70062270-07S

Report Number: 526681
Superseded Report: 526352

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
20941939	SD01	0.00 - 0.00	Dark Brown	Loamy Sand	Crushed Brick	Stones
20941825	SHP-01	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Vegetation	Stones
20941851	SHP-01	0.40 - 0.50	Dark Brown	Silty Clay Loam	Crushed Brick	Stones
20941904	SHP-02	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941963	SHP-02	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941968	SHP-03	0.10 - 0.30	Dark Brown	Silty Clay Loam	Brick	Stones
20941973	SHP-03	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941980	SHP-04	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941985	SHP-04	0.40 - 0.50	Dark Brown	Silty Clay Loam	Crushed Brick	Plastic
20941828	SHP-05	0.40 - 0.50	Dark Brown	Silty Clay Loam	Crushed Brick	Glass
20941990	SHP-05	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941830	SHP-06	0.10 - 0.30	Dark Brown	Silt Loam	Stones	Vegetation
20941832	SHP-06	0.40 - 0.50	Dark Brown	Silt Loam	Crushed Brick	Stones
20941834	SHP-07	0.10 - 0.30	Dark Brown	Silt Loam	Brick	Vegetation
20941837	SHP-07	0.40 - 0.50	Dark Brown	Silty Clay Loam	Crushed Brick	Glass
20941839	SHP-08	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Crushed Brick	Vegetation
20941841	SHP-08	0.40 - 0.50	Dark Brown	Silty Clay Loam	Glass	Crushed Brick
20941843	SHP-09	0.10 - 0.30	Dark Brown	Silty Clay Loam	Stones	Vegetation
20941845	SHP-09	0.40 - 0.50	Dark Brown	Silty Clay Loam	Crushed Brick	Glass
20941848	SHP-10	0.10 - 0.30	Dark Brown	Silty Clay Loam	Crushed Brick	Stones
20941956	SHP-10	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941861	SHP-11	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941866	SHP-11	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941871	SHP-12	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	None
20941875	SHP-12	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941882	SHP-13	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941887	SHP-13	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941892	SHP-14	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941894	SHP-14	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941898	SHP-15	0.10 - 0.30	Dark Brown	Sandy Silt Loam	Stones	None
20941908	SHP-15	0.40 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation
20941913	TP10-VAL01	0.20 - 0.30	Dark Brown	Silty Clay Loam	Stones	Crushed Brick
20941919	TP10-VAL02	0.20 - 0.30	Dark Brown	Silty Clay Loam	Stones	Vegetation
20941925	TP10-VAL03	0.20 - 0.30	Black	Silty Clay Loam	Crushed Brick	Vegetation
20941930	TP10-VAL04	0.20 - 0.30	Black	Silty Clay Loam	Crushed Brick	Concrete/Aggregate
20941934	TP10-VAL05	0.50	Black	Sandy Clay Loam	Crushed Brick	Glass
20941950	TS01	0.00 - 0.00	Dark Brown	Loamy Sand	Vegetation	Stones



CERTIFICATE OF ANALYSIS

Validated

SDG:	191015-79	Client Reference:	70062270- st ambrose	Report Number:	526681
Location:	St Ambrose	Order Number:	70062270-07S	Superseded Report:	528352

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79 Client Reference: 70062270- st ambrose Report Number: 526681
 Location: St Ambrose Order Number: 70062270-07S Superwed Report: 526352

Results Legend			Customer Sample Ref	SD01	SHP-01	SHP-01	SHP-02	SHP-02	SHP-03		
#	ISO17025 accredited		Depth (m)	0 00 - 0 00	0 10 - 0 30	0 40 - 0 50	0 10 - 0 30	0 40 - 0 50	0 10 - 0 30		
#	mCERT16 accredited		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
#	Aqueous / filtered sample		Date Sampled	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019		
#	Dry solvent / filtered sample		Sample Time								
#	Total / unfiltered sample		Date Received	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019		
#	Subcontracted - refer to subcontractor report for accreditation status		SDG Ref	191015-79	191015-79	191015-79	191015-79	191015-79	191015-79		
#	% recovery of this storage standard to check the efficiency of this method. (The results of this check compare with the samples aren't considered for the recovery)		Lab Sample No (s)	20941939	20941025	20941851	20941904	20941953	20941968		
#	Tiger brand certified		AGS Reference	ES	ES	ES	ES	ES	ES		
#	Sample details (see appendix)										
Component	LOD/Units	Method									
Moisture Content Ratio (% of as received sample)	%	PM024	4.1		19		21		18		24
Soil Organic Matter (SOM)	<0.35 %	TM132	<0.35	#			18.6	#			18.3
pH	1 pH Units	TM133	8.44								
Cyanide, Total	<1 mg/kg	TM153	<1								
Cyanide, Free	<1 mg/kg	TM153	<1								
PCB congener 28	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 52	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 101	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 118	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 138	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 153	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 180	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	0.00664	M	<0.003
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021		<0.021		<0.021		<0.021		<0.021
PCB congener 81	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 77	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 123	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 114	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 105	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 126	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 167	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 156	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 157	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 169	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
PCB congener 189	<0.003 mg/kg	TM168	<0.003	M	<0.003	M	<0.003	M	<0.003	M	<0.003
Sum of detected WHO 12 PCBs	<0.036 mg/kg	TM168	<0.036		<0.036		<0.036		<0.036		<0.036
Arsenic	<0.6 mg/kg	TM181	3.11	M							
Cadmium	<0.02 mg/kg	TM181	<0.02	M							
Chromium	<0.9 mg/kg	TM181	10.3	M							
Copper	<1.4 mg/kg	TM181	5.7	M							
Lead	<0.7 mg/kg	TM181	9.24	M							
Mercury	<0.14 mg/kg	TM181	<0.14	M							
Nickel	<0.2 mg/kg	TM181	18.6	M							
Selenium	<1 mg/kg	TM181	<1	#							



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79 **Client Reference:** 70062270- st ambrose **Report Number:** 526681
Location: St Ambrose **Order Number:** 70062270-07S **Superseded Report:** 526352

Results Legend			Customer Sample Ref	SHP-03	SHP-04	SHP-04	SHP-05	SHP-05	SHP-06
A	ISO 17025 accredited		Depth (m)	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30
M	ISO 17025 accredited		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / filtered sample		Date Sampled	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019
dis	Dissolved / filtered sample		Sample Time						
tot	Total / unfiltered sample		Date Received	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019
+	Subcontracted - refer to subcontractor report for accreditation details		SDG Ref	191015-79	191015-79	191015-79	191015-79	191015-79	191015-79
-	% recovery of the surrogate standard to check the efficiency of the method. The results of individual components within samples aren't corrected for the recovery		Lab Sample No (s)	20941973	20941980	20941985	20941990	20941928	20941830
(F)	Trigger breach confirm of Sample deviation (see spreadsheet)		AGB Reference	ES	ES	ES	ES	ES	ES
1-3-18									
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	16	18	22	25	28	22	
Soil Organic Matter (SOM)	<0.35 %	TM132			6.24	18.3			
PCB congener 28	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 52	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 101	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 118	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 138	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 153	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 180	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	0.0123	<0.003	<0.003	<0.003
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021	<0.021	<0.021	<0.021	<0.021	<0.021	<0.021
PCB congener 81	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 77	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 123	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 114	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 105	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 126	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 167	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 156	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 157	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 169	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
PCB congener 189	<0.003 mg/kg	TM168	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Sum of detected WHO 12 PCBs	<0.036 mg/kg	TM168	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79
Location: St Ambrose

Client Reference: 70062270- st ambrose
Order Number: 70062270-07S

Report Number: 526681
Superseded Report: 526352

Table with columns: Results Legend, Customer Sample Ref, SHP-06, SHP-07, SHP-07, SHP-08, SHP-08, SHP-09. Rows include Component, LOD/Units, Method, and various PCB congeners (28, 52, 101, 118, 138, 153, 180, 81, 77, 123, 114, 105, 126, 167, 156, 157, 169, 189) and Moisture Content Ratio.



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79 Client Reference: 70062270- st ambrose Report Number: 526681
 Location: St Ambrose Order Number: 70062270-075 Superseded Report: 526352

Results Legend			Customer Sample Ref		SHP-09	SHP-10	SHP-10	SHP-11	SHP-11	SHP-12
#	ISO 17020 accredited		Depth (m)		0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30
M	mCERIS accredited		Sample Type		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
mg	Aqueous filtered sample		Date Sampled		12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019
data list	Drained / filtered sample		Sample Time							
data list	Total / unfiltered sample		Date Received		15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019
	Subcontracted - refer to e-beam/contract report for accreditation on status		SDG Ref		191015-79	191015-79	191015-79	191015-79	191015-79	191015-79
	% recovery of the sample standard to check the proficiency of the method. The results of individual compounds within sample aren't corrected for the recovery		Lab Sample No (s)		20941845	20941846	20941855	20941861	20941866	20941871
(F)	Trigger breach confirmed		AGS Reference		ES	ES	ES	ES	ES	ES
1-30 kg	Sample deviation (see appendix)									
Component	LODI/Units	Method								
Moisture Content Ratio (% of as received sample)	%	PM024	19	20	19	27	28	24		
Soil Organic Matter (SOM)	<0.35 %	TM132		13.8	#					
PCB congener 28	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 52	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 101	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 118	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 138	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	0.0256 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 153	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	0.0462 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 180	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	0.103 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021 M	<0.021 M	<0.021 M	0.175 M	<0.021 M	<0.021 M	<0.021 M	<0.021 M
PCB congener 81	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 77	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 123	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 114	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 105	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 126	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 167	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 156	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 157	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 169	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
PCB congener 189	<0.003 mg/kg	TM168	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M	<0.003 M
Sum of detected WHO 12 PCBs	<0.036 mg/kg	TM168	<0.036 M	<0.036 M	<0.036 M	<0.036 M	<0.036 M	<0.036 M	<0.036 M	<0.036 M



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79 **Client Reference:** 70062270- st ambrose **Report Number:** 526881
Location: St Ambrose **Order Number:** 70062270-07S **Superseded Report:** 526352

Results Legend			Customer Sample Ref	SHP-16	TP10-VAL01	TP10-VAL02	TP10-VAL03	TP10-VAL04	TP10-VAL05
#	IS01725 accredited		Depth (m)	0.40 - 0.50	0.20 - 0.30	0.20 - 0.30	0.20 - 0.30	0.20 - 0.30	0.50
01	mCERT accredited		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
02	Aquatic / feedlot sample		Date Sampled	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019	12/10/2019
03	Detected / filtered sample		Sample Time						
04	Field / unfiltered sample		Date Received	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019	15/10/2019
05	Subcontracted - refer to subcontractor report for accreditation status		SDG Ref	191015-79	191015-79	191015-79	191015-79	191015-79	191015-79
06	% recovery of the surrogate standard to check the efficiency of the method. The results of individual components will be sample mean if contracted for the recovery		Lab Sample No (s)	20941908	20941913	20941919	20941925	20941930	20941934
07	Trigger breach confirmed		AGS Reference	ES	ES	ES	ES	ES	ES
08	Sample evaluation (see appendix)								
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	28	37	32	26	35	21	
PCB congener 28	<0.003 mg/kg	TM168	<0.003						
PCB congener 52	<0.003 mg/kg	TM168	<0.003						
PCB congener 101	<0.003 mg/kg	TM168	<0.003						
PCB congener 118	<0.003 mg/kg	TM168	<0.003						
PCB congener 138	<0.003 mg/kg	TM168	<0.003						
PCB congener 153	<0.003 mg/kg	TM168	<0.003						
PCB congener 180	<0.003 mg/kg	TM168	<0.003						
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021						
PCB congener 81	<0.003 mg/kg	TM168	<0.003						
PCB congener 77	<0.003 mg/kg	TM168	<0.003						
PCB congener 123	<0.003 mg/kg	TM168	<0.003						
PCB congener 114	<0.003 mg/kg	TM168	<0.003						
PCB congener 105	<0.003 mg/kg	TM168	<0.003						
PCB congener 126	<0.003 mg/kg	TM168	<0.003						
PCB congener 167	<0.003 mg/kg	TM168	<0.003						
PCB congener 156	<0.003 mg/kg	TM168	<0.003						
PCB congener 157	<0.003 mg/kg	TM168	<0.003						
PCB congener 169	<0.003 mg/kg	TM168	<0.003						
PCB congener 189	<0.003 mg/kg	TM168	<0.003						
Sum of detected WHO 12 PCBs	<0.036 mg/kg	TM168	<0.036						
Lead	<0.7 mg/kg	TM181		234	209	165	442	348	



CERTIFICATE OF ANALYSIS

Validated

SDG: 191015-79 **Client Reference:** 70062270- st ambrose **Report Number:** 526681
Location: St Ambrose **Order Number:** 70062270-07S **Superseded Report:** 526352

Results Legend		Customer Sample Ref	TS01				
(M) ISO 17025 accredited (M) MCERTS accredited (M) Aquacore / tested sample (M) On-slab / filtered sample (M) Total / unfiltered sample (M) Subcontracted, refer to subcontractor report for accreditation status (M) % recovery of the surrogate standard to check the efficiency of the method. The results of individual components within samples aren't contacted for the recovery (M) Trigger breach confirmed (M) Sample deletion (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No (s) AGS Reference	0.00 - 0.00 Soil/Solid (S) 12/10/2019 15/10/2019 191015-79 20941850 ES				
Component	LOD/Units	Method					
Moisture Content Ratio (% of as received sample)	%	PM024	20				
Soil Organic Matter (SOM)	<0.35 %	TM132	6.91	#			
pH	1 pH Units	TM133	6.67	M			
Cyanide, Total	<1 mg/kg	TM153	<1	M			
Cyanide, Free	<1 mg/kg	TM153	<1	M			
PCB congener 28	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 52	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 101	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 118	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 138	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 153	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 180	<0.003 mg/kg	TM168	<0.003	M			
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021				
PCB congener 81	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 77	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 123	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 114	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 105	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 126	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 167	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 156	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 157	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 169	<0.003 mg/kg	TM168	<0.003	M			
PCB congener 189	<0.003 mg/kg	TM168	<0.003	M			
Sum of detected WHO 12 PCBs	<0.036 mg/kg	TM168	<0.036				
Arsenic	<0.5 mg/kg	TM181	8.49	M			
Cadmium	<0.02 mg/kg	TM181	0.741	M			
Chromium	<0.9 mg/kg	TM181	14.3	M			
Copper	<1.4 mg/kg	TM181	43.5	M			
Lead	<0.7 mg/kg	TM181	104	M			
Mercury	<0.14 mg/kg	TM181	<0.14	M			
Nickel	<0.2 mg/kg	TM181	37.4	M			
Selenium	<1 mg/kg	TM181	1.26	#			

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 Location: St Ambrose Order Number: 70062270-07S Superseded Report: 526352

PAH by GCMS

Results Legend		Customer Sample Ref		SD01	TS01		
#	ISO17225 accredited						
#	ISO17225 accredited						
d 19 114	Aqueous / filtered sample	Depth (m)	0.00 - 0.00	0.00 - 0.00			
14 10 114	Dissolved / filtered sample	Sample Type	Soil/Solid (S)	Soil/Solid (S)			
14 10 114	Total / unfiltered sample	Date Sampled	12/10/2019	12/10/2019			
	Subcontracted - refer to subcontractor report for accreditation status	Sample Time					
	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds of this sample aren't corrected for the recovery	Date Received	15/10/2019	15/10/2019			
(F)	Trigler branch confirmed	SDG Ref	191015-79	191015-79			
1. 10 114	Sample deviation (see appendix)	Lab Sample No (k)	20941939	20941950			
		AGS Reference	ES	ES			
Component	LOD/Units	Method					
Naphthalene-d8 % recovery**	%	TM218	88.2	86.5			
Acenaphthene-d10 % recovery**	%	TM218	91.1	91.1			
Phenanthrene-d10 % recovery**	%	TM218	90.3	90.2			
Chrysene-d12 % recovery**	%	TM218	85.4	85.3			
Perylene-d12 % recovery**	%	TM218	107	103			
Naphthalene	<0.009 mg/kg	TM218	<0.009	<0.009	M	M	
Acenaphthylene	<0.012 mg/kg	TM218	<0.012	<0.012	M	M	
Acenaphthene	<0.008 mg/kg	TM218	<0.008	0.0162	M	M	
Fluorene	<0.01 mg/kg	TM218	<0.01	0.0172	M	M	
Phenanthrene	<0.015 mg/kg	TM218	<0.015	0.209	M	M	
Anthracene	<0.016 mg/kg	TM218	<0.016	0.0518	M	M	
Fluoranthene	<0.017 mg/kg	TM218	<0.017	0.396	M	M	
Pyrene	<0.015 mg/kg	TM218	<0.015	0.372	M	M	
Benzo(a)anthracene	<0.014 mg/kg	TM218	<0.014	0.224	M	M	
Chrysene	<0.01 mg/kg	TM218	<0.01	0.199	M	M	
Benzo(b)fluoranthene	<0.015 mg/kg	TM218	<0.015	0.331	M	M	
Benzo(k)fluoranthene	<0.014 mg/kg	TM218	<0.014	0.1	M	M	
Benzo(a)pyrene	<0.015 mg/kg	TM218	<0.015	0.244	M	M	
Indeno(1,2,3-cd)pyrene	<0.018 mg/kg	TM218	0.0201	0.172	M	M	
Dibenzo(a,h)anthracene	<0.023 mg/kg	TM218	<0.023	0.03	M	M	
Benzo(g,h,i)perylene	<0.024 mg/kg	TM218	<0.024	0.19	M	M	
PAH, Total Detected USEPA 16	<0.118 mg/kg	TM218	<0.118	2.55			



CERTIFICATE OF ANALYSIS

Validated

SDG:	191015-79	Client Reference:	70062270- st ambrose	Report Number:	526681
Location:	St Ambrose	Order Number:	70062270-07S	Superseded Report:	526352

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited
 M mCERTS accredited
 * Subcontracted test
 (F) Trigger breach confirmed
 † Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	SD01ES 0.00 - 0.00 SOLID 12/10/2019 00:00:00 15/10/2019 19:04:00 191015-79 20941939 TM048	18/10/2019	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TS01ES 0.00 - 0.00 SOLID 12/10/2019 00:00:00 15/10/2019 19:04:00 191015-79 20941950 TM048	18/10/2019	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected



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Validated

SDG: 191015-79 **Client Reference:** 70062270- st ambrose **Report Number:** 526681
Location: St Ambrose **Order Number:** 70062270-07S **Superseded Report:** 526352

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM166	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546	The determination of PAH in soil samples by GC-MS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media - Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S)



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Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	20941939	20941825	20941851	20941904	20941963	20941968	20941973	20941980	20941985	20941828
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.00 - 0.00	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.40 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	18-Oct-2019									
Cyanide Comp/Free/Total/Thiocyanate	18-Oct-2019									
EPH CWG GC (S)	17-Oct-2019									
GRO by GC-FID (S)	21-Oct-2019									
Metals in solid samples by CES	17-Oct-2019									
PAH by GCMS	21-Oct-2019									
PCBs by GCMS	22-Oct-2019	22-Oct-2019	23-Oct-2019	22-Oct-2019	22-Oct-2019	23-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	23-Oct-2019
pH	22-Oct-2019									
Sample description	18-Oct-2019	18-Oct-2019	18-Oct-2019	18-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	18-Oct-2019	18-Oct-2019	16-Oct-2019
Total Organic Carbon	18-Oct-2019		21-Oct-2019			21-Oct-2019			21-Oct-2019	
TPH CWG GC (S)	21-Oct-2019									
VOC MS (S)	22-Oct-2019									

Lab Sample No(s) Customer Sample Ref.	20941990	20941830	20941832	20941834	20941837	20941839	20941841	20941843	20941845	20941848
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.10 - 0.30	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PCBs by GCMS	22-Oct-2019	22-Oct-2019	22-Oct-2019	23-Oct-2019	22-Oct-2019	22-Oct-2019	23-Oct-2019	23-Oct-2019	23-Oct-2019	23-Oct-2019
Sample description	18-Oct-2019	18-Oct-2019	18-Oct-2019	18-Oct-2019	18-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019
Total Organic Carbon	18-Oct-2019				21-Oct-2019					21-Oct-2019

Lab Sample No(s) Customer Sample Ref.	20941856	20941861	20941866	20941871	20941875	20941882	20941887	20941892	20941894	20941898
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30	0.40 - 0.50	0.10 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PCBs by GCMS	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019	22-Oct-2019
Sample description	16-Oct-2019	18-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	18-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019
Total Organic Carbon							18-Oct-2019			18-Oct-2019

Lab Sample No(s) Customer Sample Ref.	20941908	20941913	20941919	20941925	20941930	20941934	20941950
AGS Ref.	ES	ES	ES	ES	ES	ES	ES
Depth	0.40 - 0.50	0.20 - 0.30	0.20 - 0.30	0.20 - 0.30	0.20 - 0.30	0.50	0.00 - 0.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples							18-Oct-2019
Cyanide Comp/Free/Total/Thiocyanate							18-Oct-2019
EPH CWG GC (S)							18-Oct-2019
GRO by GC-FID (S)							21-Oct-2019
Metals in solid samples by CES		21-Oct-2019	21-Oct-2019	18-Oct-2019	18-Oct-2019	17-Oct-2019	21-Oct-2019
PAH by GCMS							21-Oct-2019
PCBs by GCMS	22-Oct-2019						22-Oct-2019
pH							22-Oct-2019
Sample description	16-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	16-Oct-2019	18-Oct-2019	15-Oct-2019
Total Organic Carbon							21-Oct-2019
TPH CWG GC (S)							21-Oct-2019
VOC MS (S)							22-Oct-2019



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Appendix

General

1 Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs

2 If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3 With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4 We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5 If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6 NDP - No determination possible due to insufficient/unsuitable sample

7 Results relate only to the items tested

8 LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9 **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix effect.

10 Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11 In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12 Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13 For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14 For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GC/FID/GCMS and all subcontracted analysis.

15 Analysis and identification of specific compounds using GC/FID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16 We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18 Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
S	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	
Fibrous Anthophyllite	
Fibrous Tremolite	

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2107)*.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.