

APPENDIX P

*CGL Technical Report on Ammoniacal
Nitrogen*



Providing Ground Solutions

Clark Smith Partnership

Western Access, Southall

*Technical Report on Ammoniacal
Nitrogen*

Revision 2

January, 2020



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1. INTRODUCTION

1.1 Brief

Card Geotechnics Limited (CGL), on behalf of Clark Smith Partnership (CSP) and FM Conway Limited (FMC), has prepared this technical note following concerns raised over increased concentrations of ammoniacal nitrogen encountered within groundwater on the Southall Western Access site. This report follows the issuing of a previous report by Ramboll¹ which investigated the superficial soils and associated groundwater body within the area local to BH3B (CGL borehole) and BH3/BH3R (Ramboll borehole).

It is recommended that both reports be read in conjunction to provide a clear understanding of the ground conditions and the potential risks posed by elevated concentrations of ammoniacal nitrogen present. This report supersedes an earlier version issued in July 2019 and has been updated to include additional information on the construction programme, site activities, and material movements during construction, and ammonia concentrations detected in the site won and imported soils. Further discussion is included on the possibility of pollutant linkages arising from the site works, and the potential risks to surface water in the future.

1.2 Objectives

The objective of this technical note is to present the information obtained during the construction monitoring works and review the ammoniacal nitrogen concentrations in groundwater and assess if there has been a corresponding potential impact to surface water quality. Additionally the monitoring data has been reviewed against the construction programme to determine if a link can be established between on-site activities and the concentrations of ammoniacal nitrogen present in groundwater.

1.3 Background

1.3.1 Site

Prior to the development of the Western Access site, CGL installed groundwater monitoring wells during an intrusive investigation in May 2017. Monitoring of these wells was undertaken by CGL prior to investigation (to establish baseline conditions) and during the construction works from June 2017 up until mid-May 2018. Between May 2018 and July 2018 the monitoring works were paused whilst the responsibilities of involved parties were re-assessed. Monitoring works were recommenced with

¹ Ramboll (November 2018) Report on Ammoniacal Nitrogen Delineation Investigation: Southall Western Access, Minet Tip, Hayes

Socotec undertaking a single round of monitoring at the end of July 2018, followed by CET undertaking all subsequent monthly rounds up until the present time.

Under a separate appointment Ramboll UK Limited (Ramboll) was commissioned by Berkeley Homes West Thames Limited (Berkeleys) to install and monitor additional groundwater at the site from May 2017 on an approximate two monthly basis.

Alongside the sampling and monitoring of groundwater, CGL, Socotech, CET and Ramboll undertook routine surface water monitoring across the controlled waters of the Yeading Brook, the River Crane and Grand Union Canal (GUC). CGL's construction monitoring location plan, CG/28308/ANP/001, showing the Ramboll and CGL monitoring positions, is appended.

Groundwater and surface water monitoring by CET and Ramboll is currently continuing on a regular basis and is subject to ongoing review by the regulators with cessation of works subject to regulatory agreement.

1.3.2 Overview of Ammoniacal Nitrogen Risk

Elevated concentrations of ammoniacal nitrogen were first recorded in May 2018, in the Ramboll replacement monitoring borehole (BH3R), which was drilled following decommissioning of their original borehole (BH3). The replacement hole BH3R is located on the western bank of Yeading Brook, where the River Crane diversion converges with the brook, see appended. Following the re-commencement of monitoring by Socotech and CET in July 2018 elevated concentrations of ammoniacal nitrogen were recorded in CGL's borehole BH3B, nearby.

Ramboll was subsequently commissioned by Berkeleys to delineate the elevated concentrations by installation of additional monitoring wells and analysis of groundwater samples, details of which are given in the Ramboll letter report¹. The findings of their works concluded that the elevated concentrations of ammoniacal nitrogen likely represent a groundwater hotspot and that the concentrations of ammoniacal nitrogen within the nearby Yeading Brook had not notably increased.

Additionally, it is noted that the ground conditions in BH3 and BH3R differ slightly in that the geology at BH3 is predominantly cohesive, with BH3R recording a 0.5m thickness of gravel. The borehole log for BH3R records the gravel as natural ground rather than material relating to the adjacent bridge construction.

A recommendation was made by Ramboll to continue monitoring of both the groundwater and surface waters. Since the issuing of the Ramboll report approximately seven more months of ongoing monitoring data has been collected and is included within the assessment in Section 2.

2. REVIEW OF POTENTIAL POLLUTANT LINKAGES

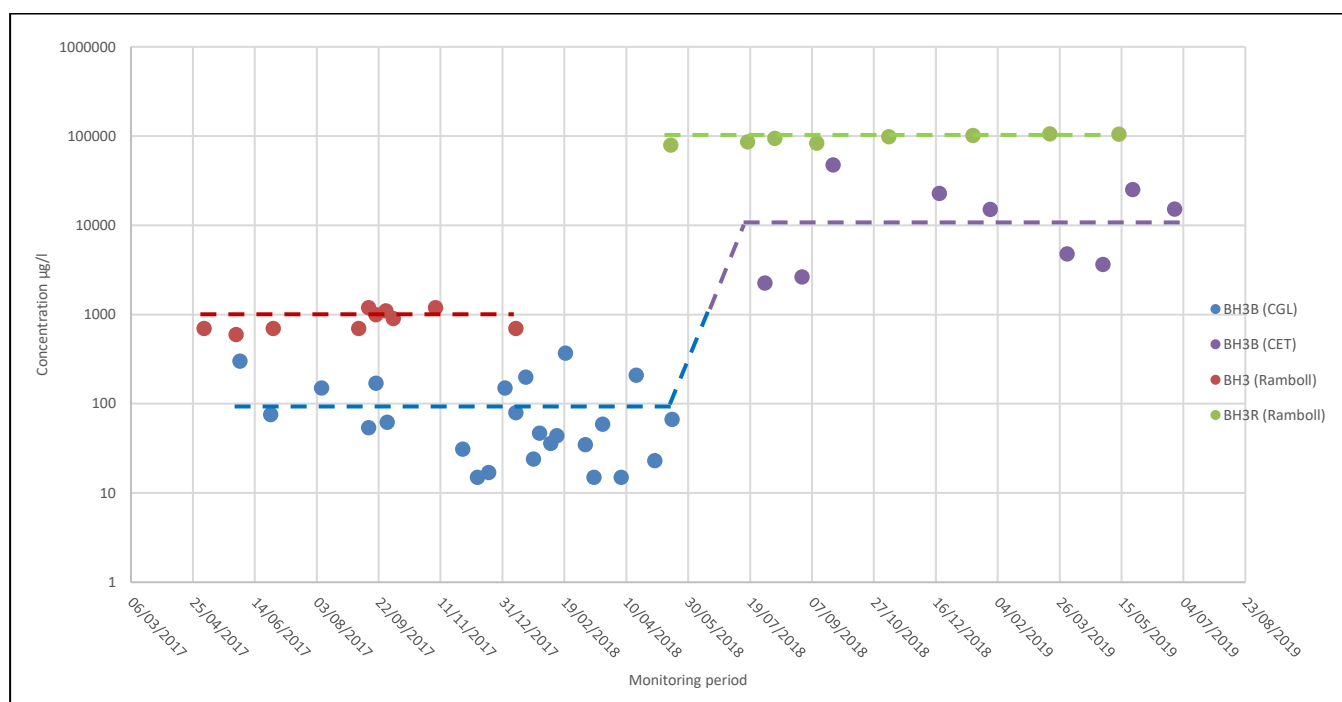
A review of the ongoing construction monitoring data has been undertaken by CGL with information obtained and provided by Ramboll, CGL, CET and Socotec. The review has been split into groundwater and surface water concentrations to establish the dissolved phase concentrations and then review the impact, if any, to the controlled surface water, namely the Yeading Brook.

The monitoring data has been reviewed in relation to construction activities and ammonia test data obtained from pre-construction site investigations and the construction materials, and the potential for pollutant linkages arising from construction materials and site activities are discussed.

2.1 Groundwater Concentrations

Concentrations of ammoniacal nitrogen within groundwater and throughout the monitoring period have been plotted on Plate 1, below.

Plate 1. Concentrations of Ammoniacal Nitrogen as N within the Groundwater around BH3B

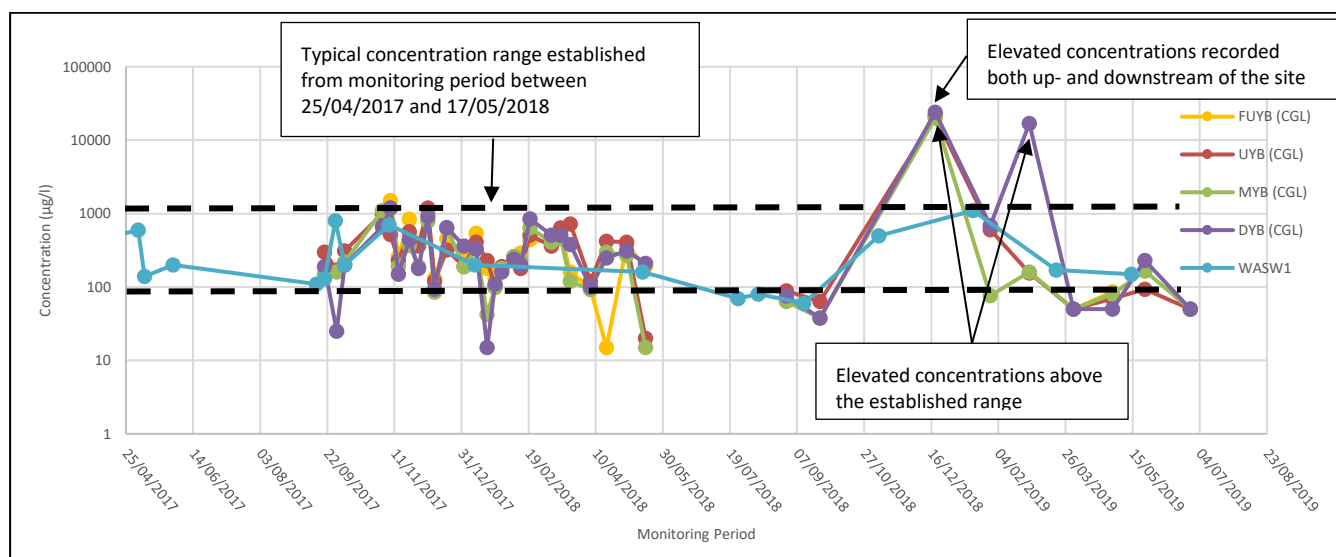


A clear spike in concentration of ammoniacal nitrogen occurred after 17th May 2018 and has been maintained throughout the most recent rounds. The increase in concentration was recorded within both the CGL and Ramboll boreholes. The elevated concentrations of ammoniacal nitrogen appear to have increased by a factor of approximately 100 within their respective boreholes.

2.2 Surface Water Concentrations

The concentrations of ammoniacal nitrogen within Yeading Brook have been plotted on Plate 2, covering the duration of the monitoring period. The data set was compiled from chemical data obtained at five surface water monitoring locations CGL surface water monitoring locations 1 to 4; Further Upstream Yeading Brook (FUYB), Upstream Yeading Brook (UYB), Midstream Yeading Brook (MYB) and Downstream Yeading Brook (DYB), and Ramboll monitoring location WASW1. These monitoring locations are shown on CGL drawing CG/28308-ANP-001. It should be noted that insufficient data exists for the River Crane upstream at monitoring point 5, for it to be included in this review.

Plate 2. Concentrations of Ammoniacal Nitrogen as N within the Yeading Brook

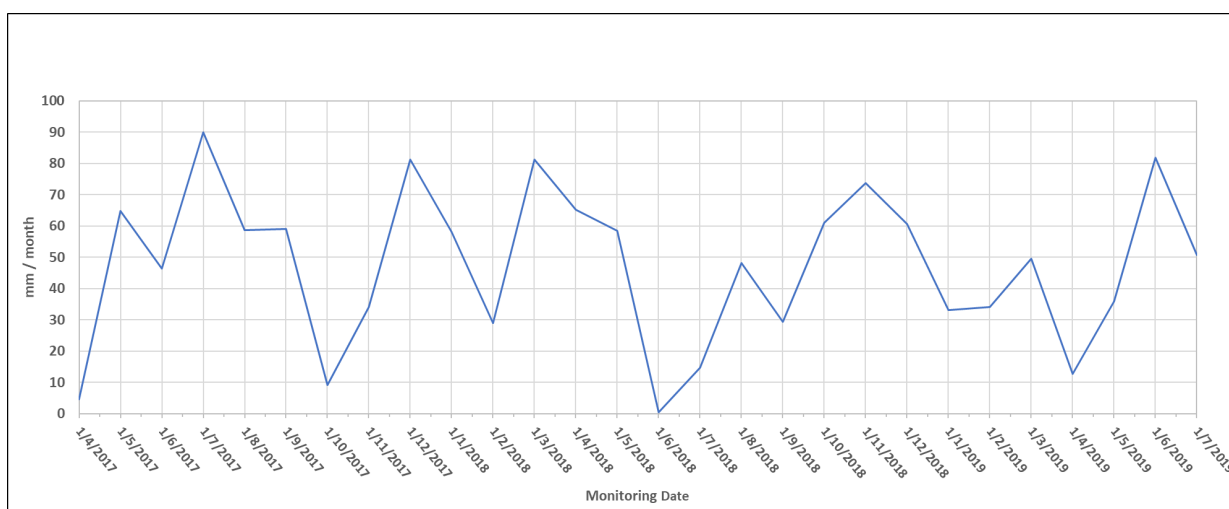


A relatively stable ammoniacal nitrogen concentration range was recorded between 25th April 2017 and 17th May 2018. The average concentration within this range was approximately 350µg/l. On two occasions; namely 16th December 2018 and 27th February 2019, concentrations of ammoniacal nitrogen were shown to be elevated above the upper limit of the established range (1,000µg/l). The first group of elevated readings were recorded at locations UYB, MYB and DYB indicating that the source of higher concentrations was likely located upstream of Western Access and, therefore, off site. The second elevated reading was only identified within the downstream sample, DYB. This isolated exceedance represents an outlier within the greater data range as it was not repeated on any other occasion and may represent a localised incident or influence from the River Crane.

2.3 Rainfall Data

A graphical representation of rainfall monitoring data obtained from Heathrow (London Airport) which is close to the site, is presented in Plate 3. This data shows that precipitation in May 2018 was not abnormally high or low for the time of year but there was a very dry June and July which roughly coincides with the time the initial ammonia peaks were recorded in the groundwater monitoring data. However, rainfall recovered in the following months to normal levels of seasonal fluctuation, and ammonia concentrations remained high. Similarly, there does not appear to be a significant correlation between surface water monitoring and rainfall. Ammonia peaks in surface water samples were recorded in December 2018 when rainfall was high, but during the second peak in March 2018 rainfall was very low.

Plate 3. Rainfall Data for Heathrow Airport



2.4 On Site Activities

The site was sub-divided into zones for construction works, with the key zones relating to this ammonia paper being Zone 4; the embankment between Yeading Brook and the Grand Union Canal, Zone 2; the river diversion from the River Crane upstream of the Western Access alignment to the Yeading Brook bridge, and the lagoon area located on the northern side of Zone 4, adjacent to the Grand Union Canal where site won material was stockpiled prior to treatment and reuse or disposal off site. In relation to the ground conditions, a number of key intrusive / ground disturbing activities have been undertaken in these areas as summarised below:

- Piling works, Yeading Brook and GUC western bridge abutments / wing wall excavations. It is understood that the piling works were completed by approximately 4th October 2017. Excavations for the abutments were completed by the end of October 2017.

- Excavation of the River Crane Diversion in Zone 2 commenced in October 2017 and was completed by the end of December 2017. The River Crane Diversion pipes were in place during this period during the month of October 2017. A second diversion was implemented from around the beginning of May 2018 until mid-May 2018, to allow the dredging of Yeading Brook and installation of reed beds south of Yeading Brook bridge. The brook was diverted from beneath YB bridge and piped around the detention basin to outfall back into the River Crane in the southwest corner of the site.
- Filling of Zone 4 with imported Class 6N (IBBA) was completed during January 2018 and February 2018.
- Filling of Zone 4 with site won Class 2C and Class 7F/9B lime/cement stabilised material and material from the Flood Compensation Area and the lagoon stockpiles 4, 5, 6, 8, 9, 12 and 16 was completed between February 2018 and end of March 2018.
- Zones 3, 4 and 7 placement of imported Class 6F2/6F5 on haul roads and west GUC pile mat was completed between August 2017 and February 2018. Stripping of Class 6F2/6F5 from haul roads and west GUC pile mat, and placement to east YB pile mat in Zone 4 and lagoon access road was completed in February 2018. Stripping of Class 6F2/6F5 from east YB pile mat to Zone 5 west GUC was completed in March 2018.
- Shallow excavation and placement of scour protection rockfill to east and west Yeading Brook occurred between October 2018 and January 2019.
- Tree pit excavations and planting in Zone 4 embankment was carried out during April 2019.
- Segregation and placement of topsoil stockpiles SP1, 3 and 13 occurred site wide between April 2019 and July 2019.
- The lagoon liner was removed and disposed off site between July and September 2019, following removal of stockpiled material from within the lagoon basin.

Drawing No. CG/28308-WGUC-003 (extracted from the CGL Environmental Verification Report²) presents the source, type and volume of material placed within the key zones outlined above and the wider site to the west of the GUC.

² CGL (October 2018). Western Access, Southall: Environmental Verification Report – London Borough of Hillingdon.

The piling works were completed well in advance of the concentration spikes of ammoniacal nitrogen encountered within the groundwater samples, as were the excavations for the bridge abutments and filling to the embankment in Zone 4.

Movement of materials to stockpiles within the lagoon or around the site was predominantly undertaken between May 2017 and December 2017. Prior to stockpiling material in the lagoon, an impermeable membrane was placed across the lagoon base to mitigate the potential risk of leachate infiltrating the ground from the stockpiles. A swale and leachate drainage system were installed within the lagoon basin to contain the leachate, and a layer of imported Class 6F2/6F5 was spread across the top of the liner to provide protection against damage to the liner, and a drainage blanket for potential leachate run off, during the works, as discussed in CGL's appraisal report³. The stockpiled materials were at maximum volumes within the lagoon during November and December 2017, as shown the FMC stockpile survey plans in Appendix A. Although stockpiled material was still present within the lagoon at the time of the initial groundwater ammonia peak in May 2018, the bioremediation treatment of stockpiles by Cognition had been completed in February 2018, and no new stockpiles were formed within the lagoon between December 2017 and the time of the initial peak in ammonia concentrations in May 2018.

2.5 Ammoniacal Nitrogen Testing

2.5.1 Ground Investigation Data

Ground Investigation exploratory hole locations referenced in this section are shown on the CGL construction monitoring locations plan CG/28308-ANP-001.

The ground investigation for the proposed construction of the Western Access was presented in the Arup report dated February 2015⁴. The maximum ammoniacal nitrogen concentration in samples obtained from this ground investigation were from borehole CP04 located in the Minet Tip where ammoniacal nitrogen as N was 57mg/kg in the Made Ground at 3.0m depth, and 62mg/kg in the Head Deposits. A maximum ammoniacal nitrogen concentration of 25mg/l, was recorded in the groundwater in CP06, also located in the Minet Tip at the south west corner of the lagoon bund wall.

CGL undertook two additional ground investigations, one in February and March 2017 to provide a preliminary assessment of material suitability for direct transfer off site or reuse, and a second in May and June 2017⁵ to support geotechnical design works. No chemical test data for ammonia was

³ CGL Southall western Access, Lagoon Temporary Stockpile Appraisal, Revision 2 (June 2017)

⁴ Arup Proposed Pump Lane Access Works for Southall Gas Works Redevelopment, Ground Investigation Report. (February 2015)

⁵ CGL Factual Report on Ground Investigation Works at Wester Access Scheme, CGN/03732E (July 2017)

obtained from either of these CGL investigations. The data assessment following these ground investigations did not record exceedances of the Generic Assessment Criteria (GAC) for a “commercial” land-use for risks to human health, although asbestos was positively identified within the Made Ground. In the lagoon area exceedances were recorded for controlled water GAC, of sulfates, total phenols, metals, and PAHs and fourteen contaminant exceedances of the freshwater EQS criteria (considered to be the more applicable given the potential receptor of the Yeading Brook) were recorded, while six metals / metalloids (arsenic, cadmium, chromium III, lead, nickel and zinc) and one PAH (anthracene) also failed the DWV criteria. Within Zone 4 there were exceedances of sulfate, total phenols, and metals, with eight different contaminants exceeding the freshwater EQS criteria, while two metals (cadmium and lead) failed both the EQS and DWS criteria.

Groundwater monitoring boreholes were installed by Ramboll⁶ in the Minet Tip and adjacent to Yeading Brook in April 2017 to provide baseline data prior to the construction works. The maximum concentration of ammoniacal nitrogen as N obtained from these water samples, was 11.1mg/l from BH1 located close to Arup’s borehole CP04 in the Minet Tip.

2.5.2 Construction Data

Chemical testing of the site won stockpiled materials to assess for reuse as general fill was undertaken between August 2017 and February 2018 by Cognition, with some additional independent verification testing by CGL. Testing on site won topsoil stockpiled in the lagoon was undertaken by CGL at a later date, in January 2019, prior to placement.

The Cognition material chemical testing is presented on the Cognition tracking sheet with the laboratory test results in Appendix B.

Table 1 below summarises the test certificates which relate to chemical testing on each stockpile pre-treatment and the corresponding CGL test certificates can be found in Appendix C.

Table 1. Summary of CGL Testing on Site Won Material Pre-Treatment

Source	Stockpile (SP) Ref. Number	No. of Sample Location and Number Tested	Test Certificate Ref.	Test Certificate Sample Ref’s
Topsoil (site wide)	1,3	13 at stockpile	19-26103	TP1 – TP11
Minet Tip bund	4	2, at source	17-58339	‘BB’ (blue billy) and ‘BG’ (brick gravel)

⁶ Ramboll Environ, Baseline Site Investigation Report, western Access and Minet Tip Country Park Footbridge, Minet Tip, Hayes (May 2017).

Source	Stockpile (SP) Ref. Number	No. of Sample Location and Number Tested	Test Certificate Ref.	Test Certificate Sample Ref's
West GUC pile mat excavation	5&6	5, at source	17-58339-2, 17-57682	DC (dark clay) , GC (granular clay) and TP101
EYB and WYB pile mat arisings and river diversion works prior to separation to stockpile 10	7	7 at source, 3 at stockpile	17-60711, 17-60408, 17-59543	WYBPM arisings, EYBPM1-4 arisings, RD1
Lagoon bund (from reprofiling) and WGUC pile mat excavation	8	None – similar material to stockpile 4	None – combined and treated with stockpile 4 material	N/A
WGUC pile arisings and mat excavation	9 (combined with SP4)	3 at source	17-60711	WGUC arisings
River Diversion and WYB pile mat excavation	10	4 at source, 1 at stockpile	17-61856, 17-65529	WYBPM Cropping, Stockpile 10
Bailey Bridge excavation	11&11A	3 at stockpile	17-61856	RCBBS
WGUC abutment excavation	12	5 at stockpile	17-65049, 17-63010	WGUCPA1-4, Stockpile 12
River Diversion and YB topsoil/subsoil strip	13 (combined with SP1,3)	1 at stockpile	17-65049	Stockpile 13
River Diversion excavation	16	2 at source	17-647261	YBBA 1 and YBBA2

A summary of ammoniacal nitrogen test data on site won material stockpiled in lagoon material movements is presented in Table 2. Stockpiles 4, 5 and 6 were chemically treated by bioremediation to reduce concentrations of hydrocarbons and ammoniacal nitrogen. The post bioremediation test data on Stockpiles 4, 5 and 6 is presented in Table 3. All test results were below the Reuse Criteria limit for total ammonia of 161mg/kg or 100.4mg/l for Level 3 RTC excluding one exceedance of 310mg/kg for a sample taken from Stockpile 5 and 6 prior to bioremediation. Following bioremediation, the maximum ammonia concentration for the combined Stockpiles 4, 5 and 6 was below the reuse criteria with a maximum result 9.9mg/kg - see Table 3. Following treatment, the chemical testing of all stockpiles and the material placed in Zone 4, demonstrated that the material did not exceed the re-use criteria. In addition, no exceedances were recorded on imported material- see test data in Appendix D and summarised in Table 4. A summary of the test results for material placed in Zone 4 is presented in Table 5.

Table 2 Summary of Site Won Material Stockpiled in Lagoon for Reuse (or Prior to Disposal) and Ammoniacal Nitrogen Test Data

Stockpile Ref.	Location of Stockpile	Material and Source	End Location	Ammoniacal Nitrogen as N, NH3 Conversion (max value) (mg/kg) [mg/l]^a	Ammoniacal Nitrogen as N (max value)^a	Date of Movement to Stockpile	Date of Movement from Lagoon (approx.)	Volume (m3)
Stockpiles 1,3,13	Lagoon west	Topsoil in lagoon area from Zones 2, 3, 3A, 4,6, 7 and 8	Zone 2, 3, 3A, 4, 6, 7 and 8	1.65	45.00	Aug 2017 - Sept 2017	Apr 2019 - Jul 2019	4710
Stockpile 2	Lagoon west	Timber from tree/ vegetation removal	Disposed off site	-	-	Aug 2017 - Sept 2017	Sept 2019	920
Stockpiles 4 pre bioremediation	Lagoon east	MG material from west GUC excavation works (SP4). MG Pile west GUC pile mat (SP8)	Zone 4	-	<0.50	Aug 2017 - Sept 2017	Feb 2018	3540
Stockpile 5 & 6 pre bioremediation	Lagoon east	MG arisings from west GUC	Zone 4	-	310.00	Aug 2017 - Sept 2017	Feb - Mar 2018	680
Stockpile 7	Lagoon east	2C arisings from west YB and river diversion works	Zone 4	11.50	-	Aug 2017 - Sept 2017	Feb - Mar 2018	2140
Stockpile 8 (moved to SP4)	Lagoon east	MG material from west GUC pile mat	Zone 4	-	-	Sept 2017	Feb - Mar 2018	250
Stockpile 9	Lagoon east	MG Pile arisings from west GUC and east YB	Zone 4	17.30	-	Aug 2017- Sept 2017	Feb - Mar 2018	1820
Stockpile 10	Pump lane	2C arisings from River Diversion cut and West YB excavation.	Zones 3/3A	<0.42	0.12	Sept 2017	Oct 2017	500
Stockpile 11/11A	Pump lane	2C/1A material from Bailey Bridge 3 excavation	Zone 8		9.60	Sept 2017 - Oct 2017	Oct - Nov 2017	960
Stockpile 12 (moved to SP17)	West GUC	MG from West GUC, stockpiled on plastic lining outside lagoon as lagoon full	Disposed off site	42.80	30.00	Oct 2017	Apr 2018	1350
Stockpile 13 (combined with SP1 & 3)	East YB	Topsoil arisings from east YB	Zone 2, 3, 3A, 4, 6, 7 and 8	0.45	-	Oct 2017	Apr 2019 - Jul 2019	230

Stockpile Ref.	Location of Stockpile	Material and Source	End Location	Ammoniacal Nitrogen as N, NH3 Conversion (max value) (mg/kg) [mg/l]^a	Ammoniacal Nitrogen as N (max value)^a	Date of Movement to Stockpile	Date of Movement from Stockpile (approx)	Volume (m3)
Stockpile 14	Pump Lane	R. Crane concrete liner broken out	Disposed off site	-	-	Apr 2018	Jul 2018	300
Stockpile 15	Pump Lane near Bailey Bridge	Unclassified material from excavation of hoarding works	Disposed off site	-	-	Oct 2017	Unknown	170
Stockpile 16	Lagoon east	2C arisings from east YB	Zone 4	3.79	-	Oct 2017	Feb - Mar 2018	2820
Stockpile 17	Lagoon west	2C material from edge of west GUC and bank reprofiling	Disposed off site	0.43	-	Oct 2017 - Nov 2017	Apr 2019	2260

Notes

a. '-' denotes 'no ammonia test data available'

Table 3 Summary of Ammoniacal Nitrogen Test Data Post-Bioremediation for Stockpiles 4, 5 and 6

Stockpile Ref.	Location of Stockpile	Material and Source	End Location	Ammoniacal Nitrogen as N, NH3 Conversion (max value) (mg/kg) [mg/l]	Ammoniacal Nitrogen as N (max value)^a	Date of Movement to Stockpile	Date of Movement from Stockpile (approx.)	Volume (m3)
Stockpiles 4,5,6 post bioremediation	Lagoon east	MG material from west GUC excavation works (SP4,5,6). MG material from west GUC pile mat (SP8). MG Pile arisings from west GUC and east YB (SP9)	Zone 4	9.9 [0.63]	-	Feb 2018	Feb 2018	4220

Notes

a. '-' denotes 'no ammonia test data available'

Table 4 Summary of Imported Material and Ammoniacal Nitrogen Test Data

Imported Material	Material Use	Import Source	End Location	Ammoniacal Nitrogen as N Conversion from NH₃/NH₄^{a.b.} (max value) (mg/kg)^c	Ammoniacal Nitrogen as N (max value) (mg/kg)^c	Date of Import and Placement	Volume (m³)
6F2/6F5 Crushed concrete	Pile and WGUC crane mats, haul roads	Day Aggregates, Heathrow	Zone 3,3A,4,5,7	-	-	Jan 2018 – May 2018	3720
6N IBAA Incinerated Bottom Ashe Aggregate (IBAA)	Structural backfill to YB and GUC abutments and wingwalls	Day Aggregates, Heathrow	Zones 4,5 and 7	5.4	1.8	Jan 2018 - Feb 2018	6500
6N Incinerated Bottom Ash Aggregate (IBAA)	Structural backfill to YB and GUC abutments and wingwalls	Thorney Wash, London Rock Group (LRG)	Zones 4, 7	-	<0.5	Jan 2018	850
Class 1A Stockpile 111 SW Main Site	Fill to Zone 5	Blackwells, Southall Waterside	Zone 5	5.9	-	Apr - Jun 2018	1400
Stockpile 11 SW Main Site	Fill to Zone 5	Blackwells, Southall Waterside	Zone 5	4.2	-	Apr - Jun 2018	1750
Type 1 Unbound granular subbase	Haul roads, capping to Zone 3,7	Day Aggregates, Heathrow	Zone 3, 4,5,7	-	<0.5	April - Jul 2018	880

Notes

a. Where test results are given as NH₄, conversion to NH₃ = NH₄*(17/18)

b. Ammoniacal nitrogen as N conversion = NH₃*(14/17)

c. '-' denotes 'no ammonia test data available'

Table 5 Summary of Materials and Ammoniacal Nitrogen Test Data for Zone 4

Zone Ref.	Imported/ Site won	Material	Material Use	Ammoniacal Nitrogen as N Conversion from NH ₃ /NH ₄ ^{a,b,c} (mg/kg)	Ammoniacal Nitrogen as N (max value) ^c (mg/kg)	Date of Movement to Zone 4	Zone 4 Fill Volumes (m ³)
Zone 4 - Mainline - East Yeading Brook to West Grand Union Canal	Imported Day Aggregates, Heathrow	6F2/6F5 crushed concrete	Pile and WGUC crane mats, haul roads	-	-	-	700
	Imported Day Aggregates, Heathrow	6N IBAA Incinerated Bottom Ash Aggregate (IBBA)	Structural backfill to YB and GUC abutments and wingwalls	5.5	-	Jan 2018 – Mar 2018	1000
	Imported - Thorney Wash, London Rock Group (LRG)	6N Incinerated Bottom Ash Aggregate (IBBA)	Structural backfill to YB and GUC abutments and wingwalls	-	-	Jan 2018	420
	Site won	7F/9B FCA MG	Embankment general fill	5.1	-	Feb - Mar 2018	2000
	Site won	2C FCA RTG, 7F/9B lagoon treated stockpiles 4, 5, 6, 8 ,9, 12 and 2C Stockpile 16	Embankment general fill	-	2.3	Feb - Mar 2018	12070
	Site won	5A Topsoil Stockpiles 1,3, 13	Topsoil/cover soil	<0.5	-	June 2019	Unknown

Notes

a. Where test results are given as NH₄, conversion to NH₃ = NH₄*(17/18)

b. Ammoniacal nitrogen as N conversion = NH₃*(14/17)

c. '-' denotes 'no ammonia test data available'

3. CONCLUSION

Based on the information available, no direct link has been identified between the elevated concentrations of ammoniacal nitrogen within the groundwater and the concentrations observed within the surface water of the Yeading Brook.

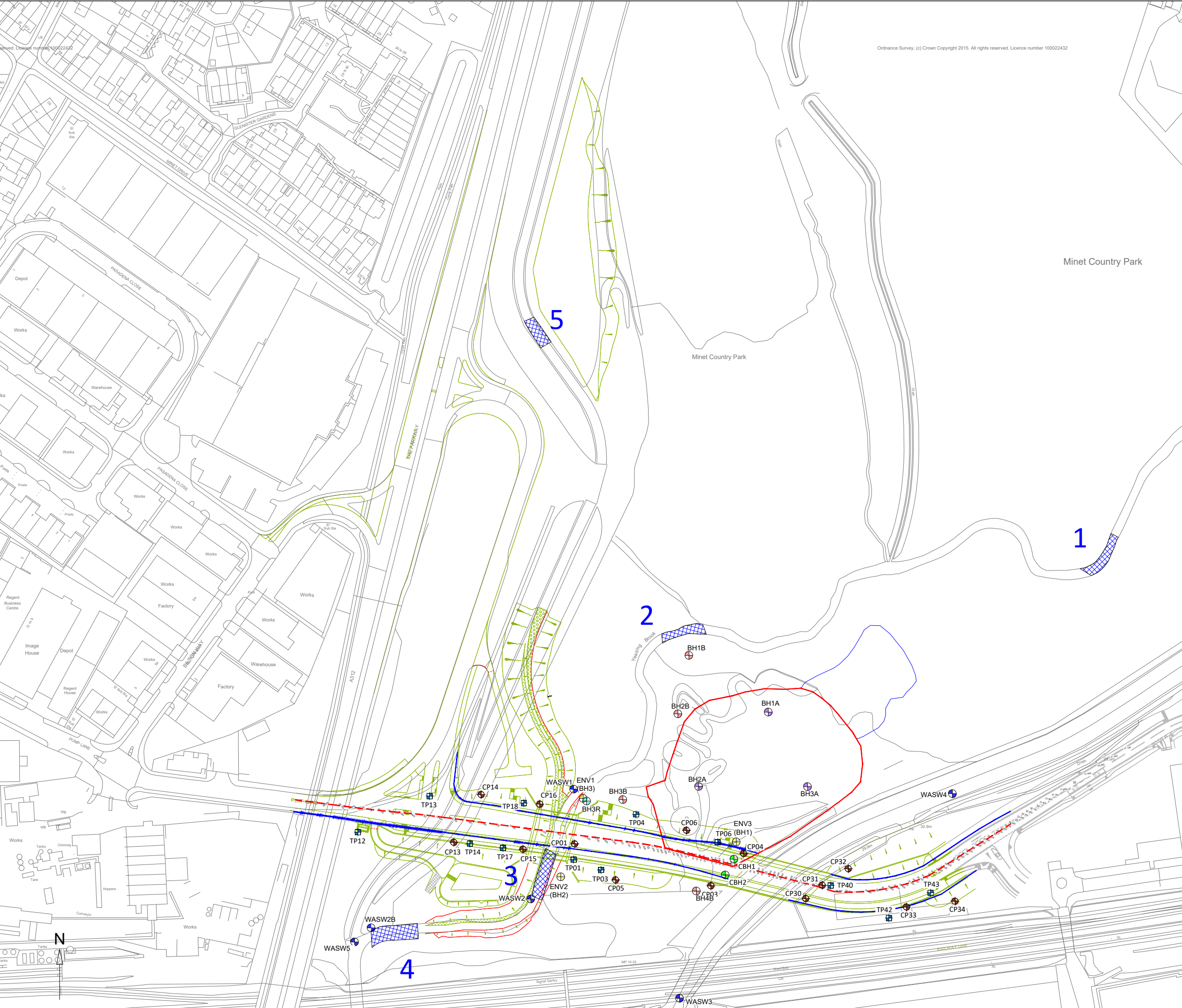
From available data no direct link can be established between the site activities, or from the existing ground conditions at the site prior to construction works, and the elevated concentrations of ammonia recorded within the groundwater. Neither does there appear to be a strong correlation with rainfall data.

It is possible that low permeability soils exist between the brook and Zone 4, which would explain the reason why the peak and continued elevated ammonia concentrations in the groundwater, have not been observed in the surface water. It is unlikely that the elevated ammonia concentrations would be attributable to the Western Access construction as all significant intrusive works were completed by December 2017, some five months before the initial ammonia peak in groundwater in May 2018. Concentrations of ammonia have remained relatively steady in both groundwater and surface water since May 2018. Given that the Western Access construction is now complete and no major intrusive earthworks are planned at the site, it is considered unlikely that the Western Access works would, at this stage, contribute to increases of ammonia in the surface water.

It is recommended that ongoing monitoring be carried out until the completion of the Western Access works to the satisfaction of the Environment Agency. A strategy for post-construction monitoring, is also currently in discussion, for agreement with the regulators.

Subsequent to this assessment one of the Western Access boreholes, BH4B, close to the canal, was decommissioned in error in July 2019, and another, BH2A in the lagoon, was damaged in October 2019. These boreholes were subsequently reinstated, under supervision by CGL, in November 2019.

DRAWINGS



KEY

'Sentinel' groundwater monitoring well positions (CGL 2017)

Lagoon 'source' groundwater monitoring well positions (CGL 2017)

St James' groundwater monitoring well positions (Ramboll Environ 2017) N.B Ramboll Environ reference in brackets

Additional Piling Monitoring Well Location (Ramboll Environ 2017)

Surface Water Sampling Location (Ramboll Environ 2017)

Replacement Groundwater Monitoring Well Location (Ramboll Environ 2018)

Western Access Site boundary

Western Access Road Alignment

Indicative embankment extents

Extent of existing Lagoon Bund

CGL Surface Water Sampling Location

1 Further Upstream (Yeading Brook)

2 Upstream (Yeading Brook)

3 Midstream (Yeading Brook)

4 Downstream (Yeading Brook)

5 Upstream (River Crane)

Drawing produced from: A724-E05-PA-VEC-HW-DR-0001

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Rev	Date	Comments
 Card Geotechnics Ltd 4 Godalming Business Centre Woolsack Way Godalming Surrey GU7 1XW T: 01483 310600		
Project Southall Western Access		
Client FM Conway Limited		
Drawing title Construction Monitoring Locations		
Scale(s) NTS		Job No. CG/28308
Drawn TSB 11/07/19	Dwg No. CG/28308-ANP-001	Rev. 0
Checked RNS 19/07/19		
Approved RNS 19/07/19		

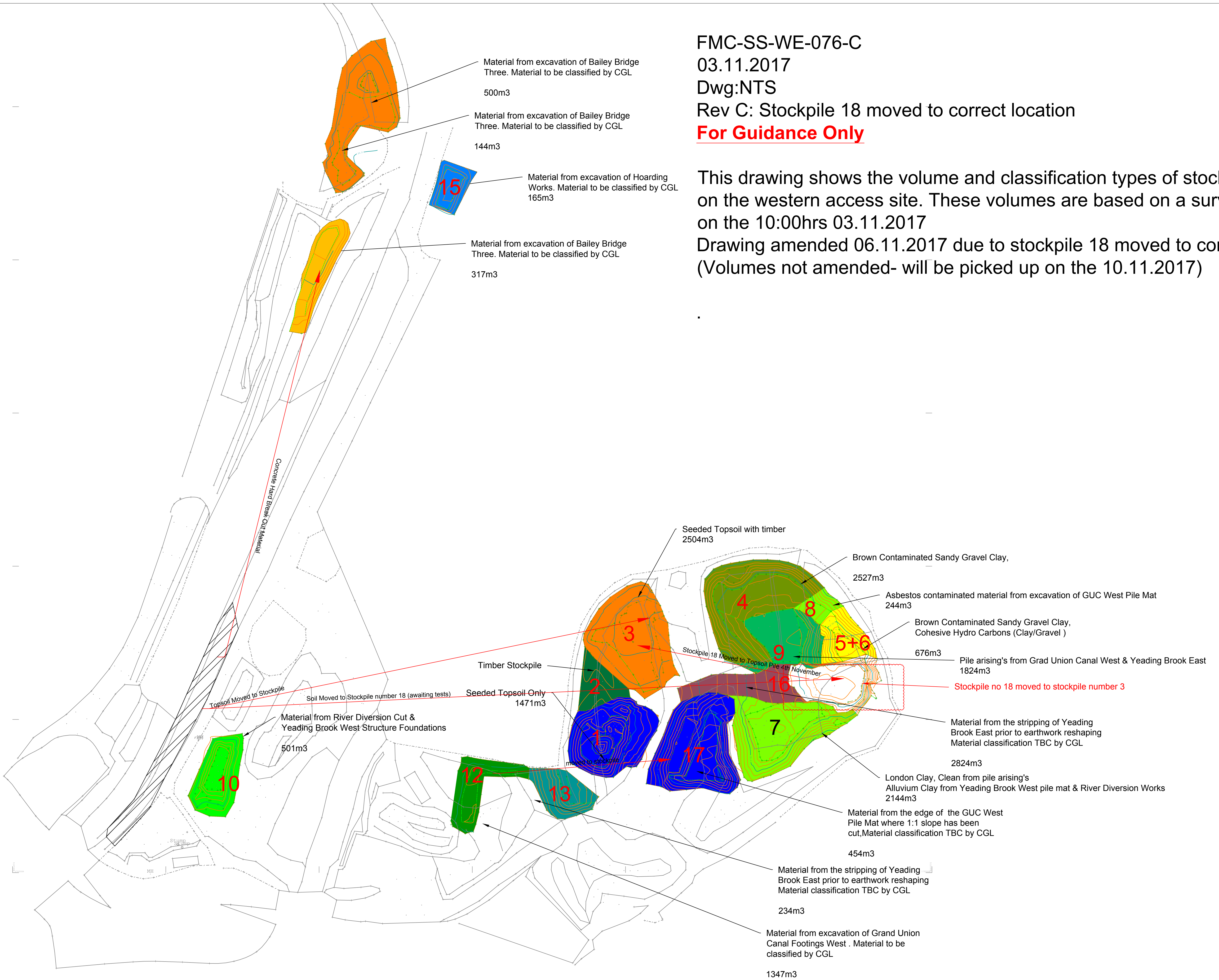
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APPENDIX A

FM Conway Stockpile Survey Plans

FMC-SS-WE-076-C
03.11.2017
Dwg:NTS
Rev C: Stockpile 18 moved to correct location
For Guidance Only

This drawing shows the volume and classification types of stockpiles located on the western access site. These volumes are based on a survey carried out on the 10:00hrs 03.11.2017
Drawing amended 06.11.2017 due to stockpile 18 moved to correct location (Volumes not amended- will be picked up on the 10.11.2017)



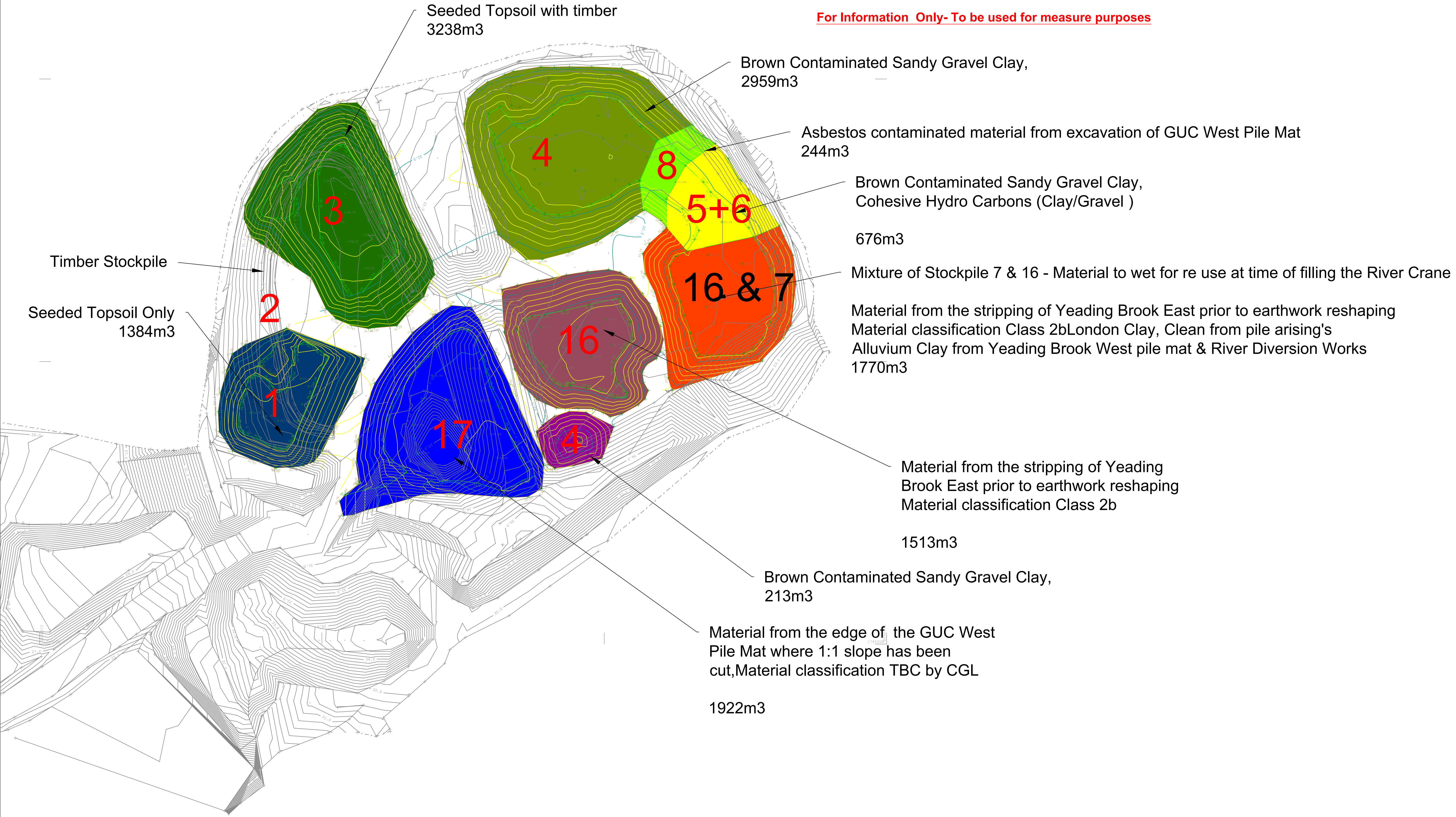
FMC-SS-WE-100-A
06.12.2017
Dwg:NTS

This drawing shows the location and volumes of spoil on the Lagoon area as of 05.12.2017 and is to be used as the basis for volumes with regards to sub contractor works.

The classification of material has been determined by CGL but reports on material types will take preference over notes in drawing

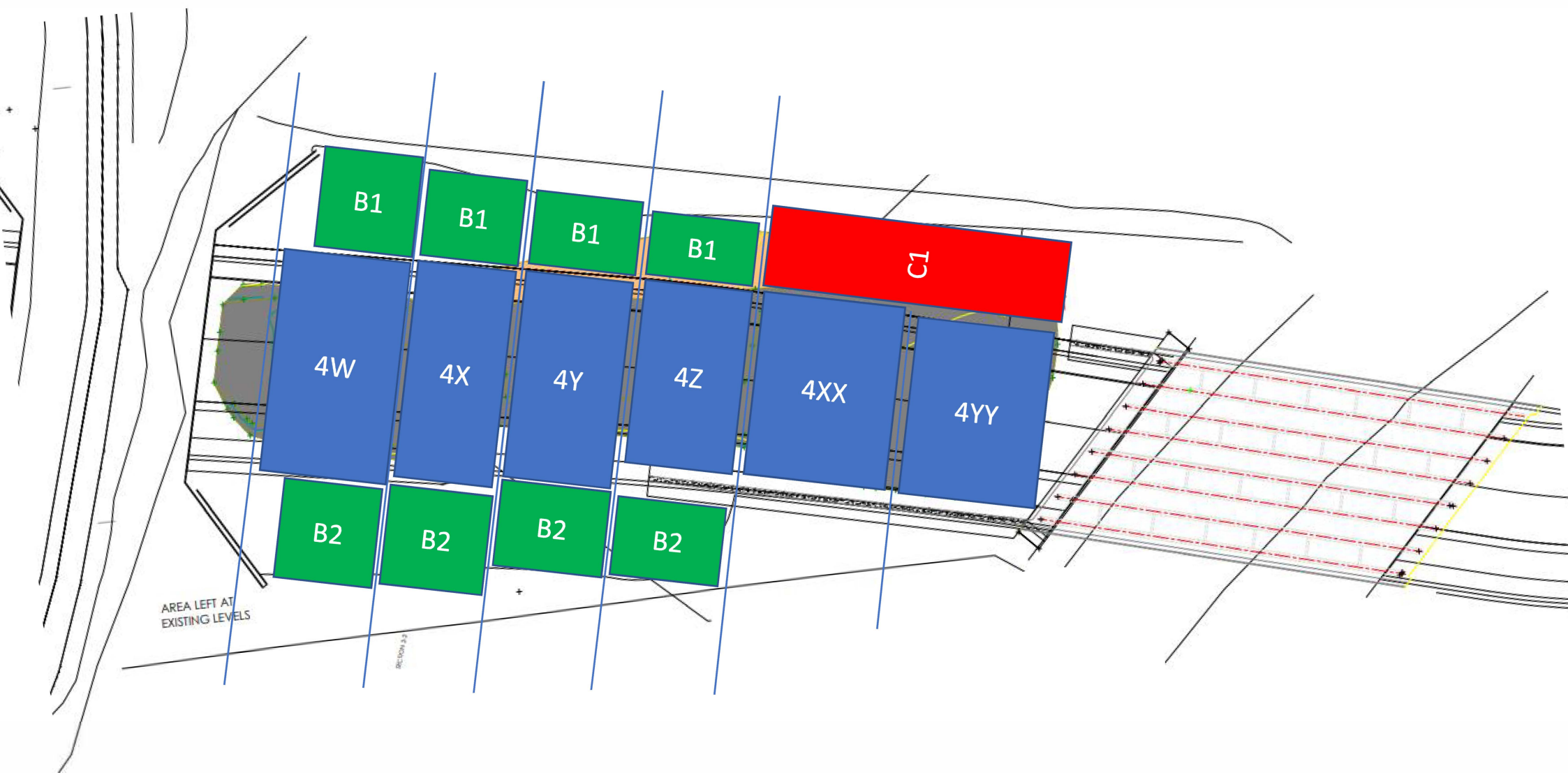
Stockpile number 17 is still to be moved at the east side due to it currently being situated on the main spine separating the two number Lagoons

For Information Only- To be used for measure purposes



APPENDIX B

*Cognition Material Chemical
Test Data*



Material Reference								Contamination Screening/Reporting			Specification
Test Type:	Reuse Zone:	Reference (Grid or Report)	Class	Material Type	Area From	Area To	Quantity	Report Date	Report ID:	Chemical	
Chemical Analysis	Zone 5	Z5SP111XX	RTG	SP111	Blackwell Soil Hospital	Zone 5	~500m3	19/04/2018	18-82248	18-82248	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP111XY	RTG	SP111	Blackwell Soil Hospital	Zone 5	~500m3	19/04/2018	18-82248	18-82248	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP111XZ	RTG	SP111	Blackwell Soil Hospital	Zone 5	~500m3	19/04/2018	18-82248	18-82248	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP111YY	RTG	SP111	Blackwell Soil Hospital	Zone 5	~500m3	19/04/2018	18-82248	18-82248	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP111YZ	RTG	SP111	Blackwell Soil Hospital	Zone 5	~500m3	19/04/2018	18-82248	18-82248	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP11AA	RTG	SP11	Blackwell Soil Hospital	Zone 5	~500m3	30/04/2018	18-83413	18-83413	Within reuse/remedial target criteria
Chemical Analysis	Zone 5	Z5SP11AB	RTG	SP11	Blackwell Soil Hospital	Zone 5	~500m3	30/04/2018	18-83413	18-83413	Within reuse/remedial target criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NXX	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	19/04/2018	18-82248	18-82248	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NXY	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	25/04/2018	18-82864	18-82864	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NXZ	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	25/04/2018	18-82864	18-82864	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NYX	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	25/04/2018	18-82864	18-82864	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NYY	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	25/04/2018	18-82864	18-82864	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NYZ	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	25/04/2018	18-82864	18-82864	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NAA	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	30/04/2018	18-83413	18-83413	Within import criteria
Chemical Analysis	Zone 5, 4, & 7	Z56NAB	Import	6N IBAA	Import	Zone 5, 4, & 7	~500m3	30/04/2018	18-83413	18-83413	Within import criteria
Chemical Analysis	Zone 4	SP7XY	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP16XY	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP16XZ	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP16XY	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP16XZ	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP7XY	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP16YCX	Made Ground	Lagoon 2C	Lagoon SP16	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria

Material Reference								Contamination Screening/Reporting			Specification
Test Type:	Reuse Zone:	Reference (Grid or Report)	Class	Material Type	Area From	Area To	Quantity	Report Date	Report ID:	Chemical	
Chemical Analysis	Zone 4	SP4XW	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XX	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XZ	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YW	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YX	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YY	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YZ	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XX	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XZ	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XW	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YX	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YY	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YZ	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4YW	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XCB	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XCD	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XCX	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP4XCY	Made Ground	Lagoon 2C	Lagoon SP4	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP8XX	Made Ground	Lagoon 2C	Lagoon SP8	Zone 4	~500m3	15/02/2018	18-75590	18-75590	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP8XX	Made Ground	Lagoon 2C	Lagoon SP8	Zone 4	~500m3	19/02/2018	18-76082	18-76082	Within reuse/remedial target criteria
Chemical Analysis	Zone 4	SP8YCY	Made Ground	Lagoon 2C	Lagoon SP8	Zone 4	~500m3	22/02/2018	18-76507	18-76507	Within reuse/remedial target criteria

Material Reference								Contamination Screening/Reporting			Specification
Test Type:	Reuse Zone:	Reference (Grid or Report)	Class	Material Type	Area From	Area To	Quantity	Report Date	Report ID:	Chemical	
Chemical Analysis	Zone 4 & 3	MGFCXXC	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	MGFCYXC	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	MGFCXZC	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	FCAMGR1	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	08/03/2018	18-78096	18-78096	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	FCAMGR2	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	08/03/2018	18-78096	18-78096	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	FCAMGXX	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	20/03/2018	18-78846	18-78846	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	FCAMGY Y	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	20/03/2018	18-78846	18-78846	Within reuse/remedial target criteria
Chemical Analysis	Zone 4 & 3	FCAMG71	Made Ground	FCA MG 2C	Site Won - FCA	Zone 4 & 3	~500m3	23/03/2018	18-79663-B	18-79663-B	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7XX	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7XY	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7XZ	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7YX	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7YY	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7YZ	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7ZX	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7ZY	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7ZZ	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCAZ7WX	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	02/05/2018	18-83240	18-83240	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCA1	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	25/05/2018	18-85602	18-85602	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCA2	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	25/05/2018	18-85602	18-85602	Within reuse/remedial target criteria
Chemical Analysis	Zone 7 & 4	FCA3	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	25/05/2018	18-85602	18-85602	Within reuse/remedial target criteria

Material Reference								Contamination Screening/Reporting			Specification
Test Type:	Reuse Zone:	Reference (Grid or Report)	Class	Material Type	Area From	Area To	Quantity	Report Date	Report ID:	Chemical	
Chemical Analysis	Zone 7 & 4	FCA4	RTG	FCA 2C	Site Won - FCA	Zone 7 & 4	~500m3	25/05/2018	18-85602	18-85602	Within reuse/remedial target criteria
Chemical Analysis	Zone 3	Z7SPXY	Made Ground	Class 2C MG	Site Won - Pump Lane Z3	Zone 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 3	Z7SPYZ	Made Ground	Class 2C MG	Site Won - Pump Lane Z3	Zone 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 3	Z7SPXYC	Made Ground	Class 2C MG	Site Won - Pump Lane Z3	Zone 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria
Chemical Analysis	Zone 3	Z7SPYZC	Made Ground	Class 2C MG	Site Won - Pump Lane Z3	Zone 3	~500m3	02/03/2018	18-77417	18-77417	Within reuse/remedial target criteria

APPENDIX C

CGL Material Chemical Test Data

Stockpiles 1 and 3

**Anne Curtis**

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Analytical Report Number : 19-26103

Project / Site name:	Southall	Samples received on:	23/01/2019
Your job number:	CG-28308	Samples instructed on:	23/01/2019
Your order number:		Analysis completed by:	01/02/2019
Report Issue Number:	1	Report issued on:	01/02/2019
Samples Analysed:	13 soil samples		

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 19-26103

Project / Site name: Southall

Lab Sample Number				1139227	1139228	1139229	1139230	1139231
Sample Reference				TP1	TP2	TP3	TP3	TP4
Sample Number				S1	S1	S1	S2	S1
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				22/01/2019	22/01/2019	22/01/2019	22/01/2019	22/01/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	24	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	19	11	23	12
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.1	1.3	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.7	8.2	7.7	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1	2	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.10	0.49	0.53	0.18	0.60
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	45	15	< 0.5	26	< 0.5
Organic Matter	%	0.1	MCERTS	6.1	4.9	3.0	6.9	3.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.6	3.1	2.0	2.0	1.9
Chrysene	mg/kg	0.05	MCERTS	3.3	2.8	1.6	1.5	1.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.0	4.0	2.4	2.9	2.3
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5	1.4	0.96	0.76	0.92
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.0	3.4	2.0	2.1	2.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.0	1.8	1.1	1.2	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.56	0.47	0.27	0.31	0.29

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	15	12	18	13
Barium (aqua regia extractable)	mg/kg	1	MCERTS	220	170	160	200	190
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.96	1.1	0.92	1.1	0.95
Boron (water soluble)	mg/kg	0.2	MCERTS	3.4	4.4	3.0	4.1	2.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	2.9	1.8	1.2	0.9
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	-	44	38	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	32	44	39	35	35
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	110	120	120	150
Lead (aqua regia extractable)	mg/kg	1	MCERTS	460	250	190	360	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	3.8	1.7	1.0	2.9	1.2
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	27	29	22	25
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	53	54	45	53	52
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	210	240	240	200	170

Analytical Report Number: 19-26103

Project / Site name: Southall

Lab Sample Number	1139227	1139228	1139229	1139230	1139231
Sample Reference	TP1	TP2	TP3	TP3	TP4
Sample Number	S1	S1	S1	S2	S1
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	22/01/2019	22/01/2019	22/01/2019	22/01/2019	22/01/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	12	< 8.0	8.9
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	79	77	84	14	80
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	82	85	97	14	89

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.2	2.4	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	11	4.3	5.0	< 2.0	7.8
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	60	43	30	11	50
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	170	120	85	40	220
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	240	170	120	51	280

TPH (C10 - C25)	mg/kg	10	MCERTS	130	100	86	19	140
TPH (C25 - C40)	mg/kg	10	NONE	240	200	180	67	300

Analytical Report Number: 19-26103

Project / Site name: Southall

Lab Sample Number				1139232	1139233	1139234	1139235	1139236
Sample Reference				TP5	TP5	TP6	TP7	TP8
Sample Number				S1	S2	S1	S1	S1
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				22/01/2019	22/01/2019	22/01/2019	22/01/2019	22/01/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	18
Moisture Content	%	N/A	NONE	13	19	18	12	10
Total mass of sample received	kg	0.001	NONE	1.1	1.2	1.1	1.2	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	7.7	7.8	7.7	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.38	0.14	0.14	0.087	0.93
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	38	21	9.2	< 0.5
Organic Matter	%	0.1	MCERTS	4.7	5.7	4.4	3.1	2.6

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.9	1.8	2.0	0.95	2.8
Chrysene	mg/kg	0.05	MCERTS	1.9	1.6	1.8	1.1	2.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.3	2.4	2.4	1.4	3.6
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.3	0.97	1.1	0.46	2.0
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.2	2.0	2.2	1.1	3.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2	1.1	1.1	0.62	2.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.35	0.28	0.33	< 0.05	0.56

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	13	13	14	22
Barium (aqua regia extractable)	mg/kg	1	MCERTS	180	200	150	120	220
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.97	0.89	0.92	0.91	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	2.8	2.3	2.9	2.1	3.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.2	0.8	1.0	0.5	7.4
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	-	-	-	-	70
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	29	33	31	70
Copper (aqua regia extractable)	mg/kg	1	MCERTS	98	89	83	59	170
Lead (aqua regia extractable)	mg/kg	1	MCERTS	300	290	220	140	190
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	3.0	2.7	2.5	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	22	21	22	41
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	51	50	48	48	57
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	180	160	120	340

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Project / Site name: Southall

Lab Sample Number				1139232	1139233	1139234	1139235	1139236
Sample Reference				TP5	TP5	TP6	TP7	TP8
Sample Number				S1	S2	S1	S1	S1
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				22/01/2019	22/01/2019	22/01/2019	22/01/2019	22/01/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	4.9
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	43
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	59	< 8.0	12	< 8.0	270
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	67	< 10	12	< 10	320
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	11	5.2	4.0	2.3	3.6
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	45	34	31	12	67
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	120	110	110	32	260
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	170	150	150	46	330
TPH (C10 - C25)	mg/kg	10	MCERTS	99	64	61	22	230
TPH (C25 - C40)	mg/kg	10	NONE	180	120	110	25	510

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Project / Site name: Southall

Lab Sample Number				1139237	1139238	1139239		
Sample Reference				TP9	TP10	TP11		
Sample Number				S1	S1	S1		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				22/01/2019	22/01/2019	22/01/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	18	16	12		
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.1		

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile & Crocidolite	-		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected		
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-		
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-		

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	7.9	8.8		
Total Cyanide	mg/kg	1	MCERTS	< 1	2	4		
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.46	0.65	1.5		
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5		
Organic Matter	%	0.1	MCERTS	4.6	5.2	4.7		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.86	< 0.05		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.4	4.6	3.6		
Chrysene	mg/kg	0.05	MCERTS	2.5	3.3	3.6		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.4	5.2	5.5		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	2.5	1.7		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.7	4.9	4.4		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.0	2.9	2.7		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.55	0.56	0.73		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	21	20		
Barium (aqua regia extractable)	mg/kg	1	MCERTS	160	220	210		
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.0	1.1	1.1		
Boron (water soluble)	mg/kg	0.2	MCERTS	3.4	4.7	4.5		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.7	9.2	9.6		
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2		
Chromium (III)	mg/kg	1	NONE	45	76	83		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	45	76	83		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	100	240	240		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	190	270	250		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.8	1.9	1.9		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	40	42		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	55	53	53		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	220	370	430		

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Project / Site name: Southall

Lab Sample Number				1139237	1139238	1139239		
Sample Reference				TP9	TP10	TP11		
Sample Number				S1	S1	S1		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				22/01/2019	22/01/2019	22/01/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.7	2.8		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	4.5	11		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	17	30	48		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	120	210	260		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	140	240	320		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.6	1.3	3.6		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	12	9.7	12		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	38	49	64		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	110	130	270		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	170	190	350		
TPH (C10 - C25)	mg/kg	10	MCERTS	120	160	260		
TPH (C25 - C40)	mg/kg	10	NONE	250	340	480		



Analytical Report Number: 19-26103
Project / Site name: Southall
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1139236	TP8		135	Loose Fibres	Chrysotile	< 0.001	< 0.001
1139238	TP10		134	Loose Fibres	Chrysotile & Crocidolite	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1139227	TP1	S1	None Supplied	3,21.17.18
1139228	TP2	S1	None Supplied	Brown loam and clay with gravel and vegetation.
1139229	TP3	S1	None Supplied	Brown loam and clay with gravel and stones.
1139230	TP3	S2	None Supplied	Brown loam and clay with gravel and vegetation.
1139231	TP4	S1	None Supplied	Brown loam and clay with gravel.
1139232	TP5	S1	None Supplied	Brown loam and sand with gravel.
1139233	TP5	S2	None Supplied	Brown loam and clay with gravel and vegetation.
1139234	TP6	S1	None Supplied	Brown loam and clay with gravel.
1139235	TP7	S1	None Supplied	Brown loam and clay with gravel and vegetation.
1139236	TP8	S1	None Supplied	Brown loam and clay with brick and stones.
1139237	TP9	S1	None Supplied	Brown loam and clay with gravel.
1139238	TP10	S1	None Supplied	Brown loam and sand with gravel and vegetation.
1139239	TP11	S1	None Supplied	Brown loam and clay with gravel and vegetation.

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Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method,10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
DRO C10-28 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

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The results included within the report are representative of the samples submitted for analysis.

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Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH Oils (Soils)	Determination of extractable hydrocarbons in soil by GC-MS/FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Stockpile 4 (including Stockpile 8 material)

**Chris Gordon**

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Analytical Report Number : 17-58339

Replaces Analytical Report Number : 17-58339, issue no. 1

Project / Site name:	Southall Western Access	Samples received on:	24/08/2017
Your job number:	CG-20308	Samples instructed on:	24/08/2017
Your order number:		Analysis completed by:	14/09/2017
Report Issue Number:	2	Report issued on:	14/09/2017
Samples Analysed:	6 soil samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number	804974	804975	804976	804977	804978
Sample Reference	ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.20	2.00	2.00	2.00
Date Sampled	22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	25	35
Total mass of sample received	kg	0.001	NONE	1.4	1.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	Chrysotile & Crocidolite	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.001	< 0.001	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.001	< 0.001	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	8.0	7.7	6.8	7.5
Total Cyanide	mg/kg	1	MCERTS	2	5	1	< 1	3
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	21000	1500	2700	20000	6800
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	310	< 0.5	< 0.5	< 0.5
Organic Matter	%	0.1	MCERTS	3.1	7.2	3.8	1.3	8.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.18	< 0.05	< 0.05	0.58
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.45	< 0.05	< 0.05	0.50
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.72	< 0.05	0.19	0.47
Fluorene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	0.24	0.55
Phenanthrene	mg/kg	0.05	MCERTS	0.55	7.7	0.24	3.3	5.8
Anthracene	mg/kg	0.05	MCERTS	0.10	2.2	< 0.05	0.71	1.4
Fluoranthene	mg/kg	0.05	MCERTS	1.1	15	0.94	5.0	10
Pyrene	mg/kg	0.05	MCERTS	1.0	14	0.81	4.3	9.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.54	5.6	1.6	2.3	6.2
Chrysene	mg/kg	0.05	MCERTS	0.74	7.2	2.0	2.0	5.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.1	5.9	1.6	2.6	7.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.74	6.5	2.0	1.9	4.7
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	6.4	0.93	2.6	6.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.91	4.6	0.91	1.4	3.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.19	1.3	0.41	0.35	1.1
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.2	5.7	1.1	1.8	4.5
Coronene	mg/kg	0.05	NONE	< 0.05	1.2	< 0.05	< 0.05	0.64

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	9.1	85	12	29	69
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	6.6	7.1	24	76	47
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	20	320	170	170
Barium (aqua regia extractable)	mg/kg	1	MCERTS	85	240	810	300	1300
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.40	1.2	2.6	3.7	6.5
Boron (water soluble)	mg/kg	0.2	MCERTS	5.0	6.1	4.4	5.9	7.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	7.2	12	54	11	8.1
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	60	88	350	120	77
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	61	88	350	130	77
Copper (aqua regia extractable)	mg/kg	1	MCERTS	4500	250	800	960	760
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	560	530	7600	1800
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0	< 0.3	< 0.3	2.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	100	60	98	120	70
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	59	83	130	130
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	980	670	1700	1900	2200



Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804974	804975	804976	804977	804978
Sample Reference				ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.20	2.00	2.00	2.00
Date Sampled				22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804974	804975	804976	804977	804978
Sample Reference				ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.20	2.00	2.00	2.00
Date Sampled				22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	45	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	8.6	650	5.7	< 2.0	3.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	43	1300	< 8.0	19	31
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	280	4100	24	130	200
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	330	6100	36	150	240

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	2.8	< 1.0	2.4	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	220	< 2.0	5.3	5.2
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	21	640	< 10	14	54
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	230	1500	19	45	180
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	250	2300	22	67	240



Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	27				
Total mass of sample received	kg	0.001	NONE	1.9				

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile				
Asbestos in Soil	Type	N/A	ISO 17025	Detected				
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.002				
Asbestos Quantification Total	%	0.001	ISO 17025	0.002				

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7				
Total Cyanide	mg/kg	1	MCERTS	44				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	2300				
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	51				
Organic Matter	%	0.1	MCERTS	6.6				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.63				
Acenaphthylene	mg/kg	0.05	MCERTS	0.72				
Acenaphthene	mg/kg	0.05	MCERTS	0.44				
Fluorene	mg/kg	0.05	MCERTS	0.95				
Phenanthrene	mg/kg	0.05	MCERTS	6.6				
Anthracene	mg/kg	0.05	MCERTS	2.2				
Fluoranthene	mg/kg	0.05	MCERTS	13				
Pyrene	mg/kg	0.05	MCERTS	11				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.0				
Chrysene	mg/kg	0.05	MCERTS	10				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	12				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	8.1				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	12				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	7.9				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	2.3				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	8.7				
Coronene	mg/kg	0.05	NONE	< 0.05				

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	100				
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	55				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	890				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2				
Boron (water soluble)	mg/kg	0.2	MCERTS	5.2				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	230				
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2				
Chromium (III)	mg/kg	1	NONE	750				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	750				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	3600				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	680				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	3.4				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	310				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	780				



Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	ug/kg	1	MCERTS	< 1.0				
Ethylbenzene	ug/kg	1	MCERTS	< 1.0				
p & m-xylene	ug/kg	1	MCERTS	< 1.0				
o-xylene	ug/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.2				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	110				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	510				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	3100				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	3800				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	3.8				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	15				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	260				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1600				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1900				



Analytical Report Number: **17-58339**
Project / Site name: **Southall Western Access**
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
804975	ES2 DC	1.20	101	Loose Fibrous Debris	Chrysotile	0.001	0.001
804976	ES3 DC	2.00	112	Loose Fibres	Chrysotile & Crocidolite	< 0.001	< 0.001
804977	ES4 BG	2.00	100	Loose Fibres	Chrysotile	< 0.001	< 0.001
804979	ES6 DC	2.00	116	Loose Fibres	Chrysotile	0.002	0.002

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
804974	ES1 BB	None Supplied	1.20	Grey loam and sand with gravel and vegetation.
804975	ES2 DC	None Supplied	1.20	Brown clay and sand.
804976	ES3 DC	None Supplied	2.00	Brown loam and clay with gravel.
804977	ES4 BG	None Supplied	2.00	Brown loam and clay with gravel.
804978	ES5 GC	None Supplied	2.00	Brown loam and clay with gravel.
804979	ES6 DC	None Supplied	2.00	Brown clay and sand.

Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method,10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in ouse method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

Iss No 17-58339-2 Southall Western Access CG-20308

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 17-60711

Project / Site name:	Southall Western Access	Samples received on:	18/09/2017
Your job number:	CG-28308	Samples instructed on:	18/09/2017
Your order number:	4586	Analysis completed by:	21/09/2017
Report Issue Number:	1	Report issued on:	21/09/2017
Samples Analysed:	6 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number	819189	819190	819191	819192	819193
Sample Reference	RD1	RD1	RD1	WGUC Arisings	WGUC Arisings
Sample Number	ES1	ES2	ES3	ES1	ES2
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	15/09/2017	15/09/2017	15/09/2017	15/09/2017	15/09/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.1	25
Total mass of sample received	kg	0.001	NONE	1.5	1.5

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonia as NH ₃	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	21	15

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.41	< 0.05	0.36	0.31

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	26	31	49	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number				819194				
Sample Reference				WGUC Arisings				
Sample Number				ES3				
Depth (m)				None Supplied				
Date Sampled				15/09/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	1.5				

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5				
Ammonia as NH ₃	mg/kg	0.5	MCERTS	17				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0				
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Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
819189	RD1	ES1	None Supplied	Brown clay with stones.
819190	RD1	ES2	None Supplied	Grey clay.
819191	RD1	ES3	None Supplied	Brown clay with gravel.
819192	WGUC Arisings	ES1	None Supplied	Grey clay and loam.
819193	WGUC Arisings	ES2	None Supplied	Grey clay and loam.
819194	WGUC Arisings	ES3	None Supplied	Grey clay and loam.

Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Stockpiles 5 and 6

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Analytical Report Number : 17-57682

Project / Site name:	Southall Western Access	Samples received on:	17/08/2017
Your job number:	CG-28308	Samples instructed on:	17/08/2017
Your order number:		Analysis completed by:	22/08/2017
Report Issue Number:	1	Report issued on:	22/08/2017
Samples Analysed:	1 soil sample		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-57682

Project / Site name: Southall Western Access

Lab Sample Number				800924				
Sample Reference				TP101				
Sample Number				ES1				
Depth (m)				1.80				
Date Sampled				17/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	35				
Total mass of sample received	kg	0.001	NONE	1.0				

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9				
Total Cyanide	mg/kg	1	MCERTS	3				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1300				
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	220				
Organic Matter	%	0.1	MCERTS	6.7				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.15				
Acenaphthylene	mg/kg	0.05	MCERTS	0.54				
Acenaphthene	mg/kg	0.05	MCERTS	0.80				
Fluorene	mg/kg	0.05	MCERTS	1.3				
Phenanthrene	mg/kg	0.05	MCERTS	6.8				
Anthracene	mg/kg	0.05	MCERTS	1.6				
Fluoranthene	mg/kg	0.05	MCERTS	16				
Pyrene	mg/kg	0.05	MCERTS	15				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.0				
Chrysene	mg/kg	0.05	MCERTS	8.5				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	7.8				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	8.5				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	8.0				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	4.5				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.4				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	5.1				
Coronene	mg/kg	0.05	NONE	< 0.05				

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	93				
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	6.6				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	24				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	230				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3				
Boron (water soluble)	mg/kg	0.2	MCERTS	10				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	8.4				
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2				
Chromium (III)	mg/kg	1	NONE	82				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	83				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	200				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	460				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	60				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	63				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	490				

Analytical Report Number: 17-57682

Project / Site name: Southall Western Access

Lab Sample Number				800924				
Sample Reference				TP101				
Sample Number				ES1				
Depth (m)				1.80				
Date Sampled				17/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	ug/kg	1	MCERTS	< 1.0				
Ethylbenzene	ug/kg	1	MCERTS	< 1.0				
p & m-xylene	ug/kg	1	MCERTS	< 1.0				
o-xylene	ug/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	7.7				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	340				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	1300				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	4100				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	5700				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	170				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	840				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1900				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	2900				



Analytical Report Number : 17-57682

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
800924	TP101	ES1	1.80	Brown clay with vegetation and oil / petroleum.

Analytical Report Number : 17-57682

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method,10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Iss No 17-57682-1 Southall Western Access CG-28308

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The results included within the report are representative of the samples submitted for analysis.

Page 5 of 5

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Analytical Report Number : 17-58339

Replaces Analytical Report Number : 17-58339, issue no. 1

Project / Site name:	Southall Western Access	Samples received on:	24/08/2017
Your job number:	CG-20308	Samples instructed on:	24/08/2017
Your order number:		Analysis completed by:	14/09/2017
Report Issue Number:	2	Report issued on:	14/09/2017
Samples Analysed:	6 soil samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number	804974	804975	804976	804977	804978
Sample Reference	ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.20	2.00	2.00	2.00
Date Sampled	22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	25	35
Total mass of sample received	kg	0.001	NONE	1.4	1.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	Chrysotile & Crocidolite	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.001	< 0.001	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.001	< 0.001	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	8.0	7.7	6.8	7.5
Total Cyanide	mg/kg	1	MCERTS	2	5	1	< 1	3
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	21000	1500	2700	20000	6800
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	310	< 0.5	< 0.5	< 0.5
Organic Matter	%	0.1	MCERTS	3.1	7.2	3.8	1.3	8.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.18	< 0.05	< 0.05	0.58
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.45	< 0.05	< 0.05	0.50
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.72	< 0.05	0.19	0.47
Fluorene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	0.24	0.55
Phenanthrene	mg/kg	0.05	MCERTS	0.55	7.7	0.24	3.3	5.8
Anthracene	mg/kg	0.05	MCERTS	0.10	2.2	< 0.05	0.71	1.4
Fluoranthene	mg/kg	0.05	MCERTS	1.1	15	0.94	5.0	10
Pyrene	mg/kg	0.05	MCERTS	1.0	14	0.81	4.3	9.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.54	5.6	1.6	2.3	6.2
Chrysene	mg/kg	0.05	MCERTS	0.74	7.2	2.0	2.0	5.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.1	5.9	1.6	2.6	7.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.74	6.5	2.0	1.9	4.7
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	6.4	0.93	2.6	6.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.91	4.6	0.91	1.4	3.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.19	1.3	0.41	0.35	1.1
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.2	5.7	1.1	1.8	4.5
Coronene	mg/kg	0.05	NONE	< 0.05	1.2	< 0.05	< 0.05	0.64

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	9.1	85	12	29	69
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	6.6	7.1	24	76	47
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	20	320	170	170
Barium (aqua regia extractable)	mg/kg	1	MCERTS	85	240	810	300	1300
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.40	1.2	2.6	3.7	6.5
Boron (water soluble)	mg/kg	0.2	MCERTS	5.0	6.1	4.4	5.9	7.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	7.2	12	54	11	8.1
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	60	88	350	120	77
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	61	88	350	130	77
Copper (aqua regia extractable)	mg/kg	1	MCERTS	4500	250	800	960	760
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	560	530	7600	1800
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0	< 0.3	< 0.3	2.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	100	60	98	120	70
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	59	83	130	130
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	980	670	1700	1900	2200



Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804974	804975	804976	804977	804978
Sample Reference				ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.20	2.00	2.00	2.00
Date Sampled				22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804974	804975	804976	804977	804978
Sample Reference				ES1 BB	ES2 DC	ES3 DC	ES4 BG	ES5 GC
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.20	2.00	2.00	2.00
Date Sampled				22/08/2017	22/08/2017	23/08/2017	23/08/2017	23/08/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	45	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	8.6	650	5.7	< 2.0	3.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	43	1300	< 8.0	19	31
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	280	4100	24	130	200
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	330	6100	36	150	240

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	2.8	< 1.0	2.4	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	220	< 2.0	5.3	5.2
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	21	640	< 10	14	54
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	230	1500	19	45	180
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	250	2300	22	67	240

Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	27				
Total mass of sample received	kg	0.001	NONE	1.9				

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile				
Asbestos in Soil	Type	N/A	ISO 17025	Detected				
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.002				
Asbestos Quantification Total	%	0.001	ISO 17025	0.002				

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7				
Total Cyanide	mg/kg	1	MCERTS	44				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	2300				
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	51				
Organic Matter	%	0.1	MCERTS	6.6				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.63				
Acenaphthylene	mg/kg	0.05	MCERTS	0.72				
Acenaphthene	mg/kg	0.05	MCERTS	0.44				
Fluorene	mg/kg	0.05	MCERTS	0.95				
Phenanthrene	mg/kg	0.05	MCERTS	6.6				
Anthracene	mg/kg	0.05	MCERTS	2.2				
Fluoranthene	mg/kg	0.05	MCERTS	13				
Pyrene	mg/kg	0.05	MCERTS	11				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.0				
Chrysene	mg/kg	0.05	MCERTS	10				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	12				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	8.1				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	12				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	7.9				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	2.3				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	8.7				
Coronene	mg/kg	0.05	NONE	< 0.05				

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	100				
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	55				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	890				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2				
Boron (water soluble)	mg/kg	0.2	MCERTS	5.2				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	230				
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2				
Chromium (III)	mg/kg	1	NONE	750				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	750				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	3600				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	680				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	3.4				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	310				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	780				



Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Analytical Report Number: 17-58339

Project / Site name: Southall Western Access

Lab Sample Number				804979				
Sample Reference				ES6 DC				
Sample Number				None Supplied				
Depth (m)				2.00				
Date Sampled				23/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	ug/kg	1	MCERTS	< 1.0				
Ethylbenzene	ug/kg	1	MCERTS	< 1.0				
p & m-xylene	ug/kg	1	MCERTS	< 1.0				
o-xylene	ug/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.2				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	110				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	510				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	3100				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	3800				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	3.8				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	15				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	260				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1600				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1900				



Analytical Report Number: **17-58339**
Project / Site name: **Southall Western Access**
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
804975	ES2 DC	1.20	101	Loose Fibrous Debris	Chrysotile	0.001	0.001
804976	ES3 DC	2.00	112	Loose Fibres	Chrysotile & Crocidolite	< 0.001	< 0.001
804977	ES4 BG	2.00	100	Loose Fibres	Chrysotile	< 0.001	< 0.001
804979	ES6 DC	2.00	116	Loose Fibres	Chrysotile	0.002	0.002

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
804974	ES1 BB	None Supplied	1.20	Grey loam and sand with gravel and vegetation.
804975	ES2 DC	None Supplied	1.20	Brown clay and sand.
804976	ES3 DC	None Supplied	2.00	Brown loam and clay with gravel.
804977	ES4 BG	None Supplied	2.00	Brown loam and clay with gravel.
804978	ES5 GC	None Supplied	2.00	Brown loam and clay with gravel.
804979	ES6 DC	None Supplied	2.00	Brown clay and sand.

Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method,10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in ouse method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

Iss No 17-58339-2 Southall Western Access CG-20308

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 17-58339

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Stockpile 7



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Analytical Report Number : 17-59543

Project / Site name:	Southall	Samples received on:	06/09/2017
Your job number:	CG-28308	Samples instructed on:	06/09/2017
Your order number:	4586	Analysis completed by:	11/09/2017
Report Issue Number:	1	Report issued on:	11/09/2017
Samples Analysed:	4 soil samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-59543

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				811760	811761	811762	811763	
Sample Reference				EYBPM1	EYBPM2	EYBPM3	EYBPM4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.30	0.30	None Supplied	None Supplied	
Date Sampled				04/09/2017	04/09/2017	04/09/2017	04/09/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	11	28	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	12	11	20	17	
Total mass of sample received	kg	0.001	NONE	1.6	1.4	1.3	1.5	

General Inorganics

Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Ammonia as NH ₃	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	< 0.5	

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.06	0.08	< 0.05	< 0.05	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.8	3.5	0.23	0.58	

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.2	3.3	1.7	1.4	
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	130	28	46	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.7	< 0.3	< 0.3	< 0.3	

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
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Analytical Report Number : 17-59543

Project / Site name: Southall

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
811760	EYBPM1	None Supplied	0.30	Brown loam and clay with stones and vegetation.
811761	EYBPM2	None Supplied	0.30	Brown clay and loam with stones and vegetation.
811762	EYBPM3	None Supplied	None Supplied	Light brown clay.
811763	EYBPM4	None Supplied	None Supplied	Light brown clay.

Analytical Report Number : 17-59543

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



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Analytical Report Number : 17-60408

Replaces Analytical Report Number : 17-60408, issue no. 1

Project / Site name:	Southall Western Access	Samples received on:	15/09/2017
Your job number:	CG-28308	Samples instructed on:	15/09/2017
Your order number:	4586	Analysis completed by:	21/09/2017
Report Issue Number:	2	Report issued on:	21/09/2017
Samples Analysed:	3 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-60408

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number				816866	816867	816868		
Sample Reference				WYBPM Arisings	WYBPM Arisings	WYBPM Arisings		
Sample Number				ES1	ES2	ES3		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				12/09/2017	12/09/2017	12/09/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	18	38		
Moisture Content	%	N/A	NONE	21	17	8.9		
Total mass of sample received	kg	0.001	NONE	1.8	1.8	1.8		

General Inorganics

Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Ammonia as NH ₃	mg/kg	0.5	MCERTS	14	3.8	11		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.18	< 0.05	< 0.05		

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	23	32		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Analytical Report Number : 17-60408

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
816866	WYBPM Arisings	ES1	None Supplied	Brown clay and loam.
816867	WYBPM Arisings	ES2	None Supplied	Brown clay and loam with stones.
816868	WYBPM Arisings	ES3	None Supplied	Brown loam and gravel with stones.

Analytical Report Number : 17-60408

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 300C.



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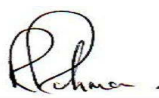
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Analytical Report Number : 17-60711

Project / Site name:	Southall Western Access	Samples received on:	18/09/2017
Your job number:	CG-28308	Samples instructed on:	18/09/2017
Your order number:	4586	Analysis completed by:	21/09/2017
Report Issue Number:	1	Report issued on:	21/09/2017
Samples Analysed:	6 soil samples		

Signed: 

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number	819189	819190	819191	819192	819193
Sample Reference	RD1	RD1	RD1	WGUC Arisings	WGUC Arisings
Sample Number	ES1	ES2	ES3	ES1	ES2
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	15/09/2017	15/09/2017	15/09/2017	15/09/2017	15/09/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.1	25
Total mass of sample received	kg	0.001	NONE	1.5	1.5

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonia as NH ₃	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	21	15

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.41	< 0.05	0.36	0.31

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	26	31	49	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number				819194				
Sample Reference				WGUC Arisings				
Sample Number				ES3				
Depth (m)				None Supplied				
Date Sampled				15/09/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	1.5				

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5				
Ammonia as NH ₃	mg/kg	0.5	MCERTS	17				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0				
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Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
819189	RD1	ES1	None Supplied	Brown clay with stones.
819190	RD1	ES2	None Supplied	Grey clay.
819191	RD1	ES3	None Supplied	Brown clay with gravel.
819192	WGUC Arisings	ES1	None Supplied	Grey clay and loam.
819193	WGUC Arisings	ES2	None Supplied	Grey clay and loam.
819194	WGUC Arisings	ES3	None Supplied	Grey clay and loam.

Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Stockpile 9

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Analytical Report Number : 17-60711

Project / Site name:	Southall Western Access	Samples received on:	18/09/2017
Your job number:	CG-28308	Samples instructed on:	18/09/2017
Your order number:	4586	Analysis completed by:	21/09/2017
Report Issue Number:	1	Report issued on:	21/09/2017
Samples Analysed:	6 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number	819189	819190	819191	819192	819193
Sample Reference	RD1	RD1	RD1	WGUC Arisings	WGUC Arisings
Sample Number	ES1	ES2	ES3	ES1	ES2
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	15/09/2017	15/09/2017	15/09/2017	15/09/2017	15/09/2017
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.1	25
Total mass of sample received	kg	0.001	NONE	1.5	1.5

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonia as NH ₃	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	21	15

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.41	< 0.05	0.36	0.31

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	26	31	49	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Analytical Report Number: 17-60711

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number				819194				
Sample Reference				WGUC Arisings				
Sample Number				ES3				
Depth (m)				None Supplied				
Date Sampled				15/09/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	1.5				

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5				
Ammonia as NH ₃	mg/kg	0.5	MCERTS	17				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0				
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Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
819189	RD1	ES1	None Supplied	Brown clay with stones.
819190	RD1	ES2	None Supplied	Grey clay.
819191	RD1	ES3	None Supplied	Brown clay with gravel.
819192	WGUC Arisings	ES1	None Supplied	Grey clay and loam.
819193	WGUC Arisings	ES2	None Supplied	Grey clay and loam.
819194	WGUC Arisings	ES3	None Supplied	Grey clay and loam.

Analytical Report Number : 17-60711

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Stockpile 10

**Tom Fairweather**

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Analytical Report Number : 17-61856

Project / Site name:	Southall	Samples received on:	28/09/2017
Your job number:	CG-28308	Samples instructed on:	28/09/2017
Your order number:	4586	Analysis completed by:	02/10/2017
Report Issue Number:	1	Report issued on:	02/10/2017
Samples Analysed:	2 leachate samples - 5 soil samples		

Signed: _____

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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4041



Environmental Science

Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825353	825354	825355	825356	825357
Sample Reference				WYBPM Cropping	WYBPM Cropping	WYBPM Cropping	RCBBS	RCBBS
Sample Number				ES2	ES5	ES9	ES2	ES6
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2017	27/09/2017	27/09/2017	27/09/2017	27/09/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	6.3	15	26	11
Moisture Content	%	N/A	NONE	14	7.5	5.5	5.6	5.6
Total mass of sample received	kg	0.001	NONE	1.3	1.1	1.1	1.2	2.0

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.1	7.6	8.0	7.6	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1600	1600	1900	1400	1000
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	9.6	4.8
Organic Matter	%	0.1	MCERTS	0.7	0.8	0.8	0.4	1.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.14	0.20	0.21	0.14	1.2
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.38
Fluoranthene	mg/kg	0.05	MCERTS	0.23	0.46	0.46	0.25	3.4
Pyrene	mg/kg	0.05	MCERTS	0.21	0.41	0.41	0.19	3.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.23	0.23	0.12	2.0
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.19	0.21	0.12	1.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.22	0.23	< 0.05	2.0
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.16	0.14	< 0.05	1.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.23	0.24	< 0.05	2.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.12	< 0.05	< 0.05	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.31
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.13	< 0.05	< 0.05	1.3
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.9	2.4	2.1	< 0.9	20
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	1.2	1.2	3.2	< 1.0	3.1
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	25	15	1.0	21
Barium (aqua regia extractable)	mg/kg	1	MCERTS	140	83	170	59	170
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.2	1.1	0.61	0.82
Boron (water soluble)	mg/kg	0.2	MCERTS	2.8	1.9	3.0	2.1	2.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.7
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	43	40	44	23	27
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	43	40	44	23	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	32	51	90	370	4000
Lead (aqua regia extractable)	mg/kg	1	MCERTS	42	78	80	43	260
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.7	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	37	38	39	15	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	71	72	71	31	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	84	97	110	130	630

Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825353	825354	825355	825356	825357
Sample Reference				WYBPM Cropping	WYBPM Cropping	WYBPM Cropping	RCBBS	RCBBS
Sample Number				ES2	ES5	ES9	ES2	ES6
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2017	27/09/2017	27/09/2017	27/09/2017	27/09/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	37
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	10	10	43

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.1	< 2.0	< 2.0	3.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	18
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	12	< 10	< 10	76
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	19	10	10	97

VOCs

Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825358	825359			
Sample Reference				WYBPM Cropping	RCBBS			
Sample Number				ES2	ES2			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/09/2017	27/09/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.7	7.5			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1			
Sulphate as SO ₄	µg/l	100	ISO 17025	444000	181000			
Ammoniacal Nitrogen as N	µg/l	15	NONE	120	2500			
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	5.72	7.20			

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2			
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Heavy Metals / Metalloids

Antimony (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	< 1.1			
Barium (dissolved)	µg/l	0.05	ISO 17025	25	32			
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Boron (dissolved)	µg/l	10	ISO 17025	96	120			
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08			
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0			
Chromium (III)	µg/l	1	NONE	5.7	< 1.0			
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.7	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	20	20			
Lead (dissolved)	µg/l	1	ISO 17025	2.1	< 1.0			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.2	0.9			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Zinc (dissolved)	µg/l	0.4	ISO 17025	11	9.7			
Calcium (dissolved)	mg/l	0.012	ISO 17025	110	58			



Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825358	825359			
Sample Reference				WYBPM Cropping	RCBBS			
Sample Number				ES2	ES2			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/09/2017	27/09/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

VOCs

Trichloroethene	µg/l	1	NONE	< 1.0	< 1.0			
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Analytical Report Number : 17-61856

Project / Site name: Southall

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
825353	WYBPM Cropping	ES2	None Supplied	Brown clay and loam with gravel.
825354	WYBPM Cropping	ES5	None Supplied	Brown clay and loam with stones and vegetation.
825355	WYBPM Cropping	ES9	None Supplied	Brown clay and loam with stones.
825356	RCBBS	ES2	None Supplied	Brown clay and sand with stones.
825357	RCBBS	ES6	None Supplied	Brown clay with stones.

Analytical Report Number : 17-61856

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Dissolved Organic Carbon in leachate	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L023-PL	W	NONE
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS

Iss No 17-61856-1 Southall CG-28308

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 17-61856

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS
Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA8260	L073B-PL	W	NONE
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Chris Gordon**

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Analytical Report Number : 17-65529

Project / Site name:	Southall	Samples received on:	26/10/2017
Your job number:	CG-28308	Samples instructed on:	27/10/2017
Your order number:	4586	Analysis completed by:	06/11/2017
Report Issue Number:	1	Report issued on:	06/11/2017
Samples Analysed:	1 soil sample		


Signed: _____

Vineetha Meethale Vettil
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-65529

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				845629				
Sample Reference				Stockpile 10				
Sample Number				B104				
Depth (m)				None Supplied				
Date Sampled				25/10/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	20				
Total mass of sample received	kg	0.001	NONE	1.2				

General Inorganics

Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5				
Ammonia as NH ₃	mg/kg	0.5	MCERTS	< 0.5				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				

Heavy Metals / Metalloids

Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0				
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Analytical Report Number : 17-65529

Project / Site name: Southall

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
845629	Stockpile 10	B104	None Supplied	Brown clay.

Analytical Report Number : 17-65529

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 300C.

Stockpiles 11 and 11A

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Analytical Report Number : 17-61856

Project / Site name:	Southall	Samples received on:	28/09/2017
Your job number:	CG-28308	Samples instructed on:	28/09/2017
Your order number:	4586	Analysis completed by:	02/10/2017
Report Issue Number:	1	Report issued on:	02/10/2017
Samples Analysed:	2 leachate samples - 5 soil samples		

Signed: _____

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Environmental Science

Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825353	825354	825355	825356	825357
Sample Reference				WYBPM Cropping	WYBPM Cropping	WYBPM Cropping	RCBBS	RCBBS
Sample Number				ES2	ES5	ES9	ES2	ES6
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2017	27/09/2017	27/09/2017	27/09/2017	27/09/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	6.3	15	26	11
Moisture Content	%	N/A	NONE	14	7.5	5.5	5.6	5.6
Total mass of sample received	kg	0.001	NONE	1.3	1.1	1.1	1.2	2.0

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.1	7.6	8.0	7.6	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1600	1600	1900	1400	1000
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	9.6	4.8
Organic Matter	%	0.1	MCERTS	0.7	0.8	0.8	0.4	1.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.14	0.20	0.21	0.14	1.2
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.38
Fluoranthene	mg/kg	0.05	MCERTS	0.23	0.46	0.46	0.25	3.4
Pyrene	mg/kg	0.05	MCERTS	0.21	0.41	0.41	0.19	3.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.23	0.23	0.12	2.0
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.19	0.21	0.12	1.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.22	0.23	< 0.05	2.0
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.16	0.14	< 0.05	1.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.23	0.24	< 0.05	2.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.12	< 0.05	< 0.05	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.31
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.13	< 0.05	< 0.05	1.3
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.9	2.4	2.1	< 0.9	20
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	1.2	1.2	3.2	< 1.0	3.1
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	25	15	1.0	21
Barium (aqua regia extractable)	mg/kg	1	MCERTS	140	83	170	59	170
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.2	1.1	0.61	0.82
Boron (water soluble)	mg/kg	0.2	MCERTS	2.8	1.9	3.0	2.1	2.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.7
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	43	40	44	23	27
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	43	40	44	23	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	32	51	90	370	4000
Lead (aqua regia extractable)	mg/kg	1	MCERTS	42	78	80	43	260
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.7	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	37	38	39	15	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	71	72	71	31	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	84	97	110	130	630

Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825353	825354	825355	825356	825357
Sample Reference				WYBPM Cropping	WYBPM Cropping	WYBPM Cropping	RCBBS	RCBBS
Sample Number				ES2	ES5	ES9	ES2	ES6
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2017	27/09/2017	27/09/2017	27/09/2017	27/09/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	37
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	10	10	43

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.1	< 2.0	< 2.0	3.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	18
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	12	< 10	< 10	76
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	19	10	10	97

VOCs

Trichloroethene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825358	825359			
Sample Reference				WYBPM Cropping	RCBBS			
Sample Number				ES2	ES2			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/09/2017	27/09/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	7.7	7.5			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0			
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1			
Sulphate as SO ₄	µg/l	100	ISO 17025	444000	181000			
Ammoniacal Nitrogen as N	µg/l	15	NONE	120	2500			
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	5.72	7.20			

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2			
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Heavy Metals / Metalloids

Antimony (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	< 1.1			
Barium (dissolved)	µg/l	0.05	ISO 17025	25	32			
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Boron (dissolved)	µg/l	10	ISO 17025	96	120			
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08			
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0			
Chromium (III)	µg/l	1	NONE	5.7	< 1.0			
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.7	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	20	20			
Lead (dissolved)	µg/l	1	ISO 17025	2.1	< 1.0			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.2	0.9			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Zinc (dissolved)	µg/l	0.4	ISO 17025	11	9.7			
Calcium (dissolved)	mg/l	0.012	ISO 17025	110	58			



Analytical Report Number: 17-61856

Project / Site name: Southall

Your Order No: 4586

Lab Sample Number				825358	825359			
Sample Reference				WYBPM Cropping	RCBBS			
Sample Number				ES2	ES2			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/09/2017	27/09/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

VOCs

Trichloroethene	µg/l	1	NONE	< 1.0	< 1.0			
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Analytical Report Number : 17-61856

Project / Site name: Southall

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
825353	WYBPM Cropping	ES2	None Supplied	Brown clay and loam with gravel.
825354	WYBPM Cropping	ES5	None Supplied	Brown clay and loam with stones and vegetation.
825355	WYBPM Cropping	ES9	None Supplied	Brown clay and loam with stones.
825356	RCBBS	ES2	None Supplied	Brown clay and sand with stones.
825357	RCBBS	ES6	None Supplied	Brown clay with stones.

Analytical Report Number : 17-61856

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Dissolved Organic Carbon in leachate	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L023-PL	W	NONE
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS

Iss No 17-61856-1 Southall CG-28308

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The results included within the report are representative of the samples submitted for analysis.

Page 7 of 8

Analytical Report Number : 17-61856

Project / Site name: Southall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS
Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA8260	L073B-PL	W	NONE
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Stockpile 12

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Analytical Report Number : 17-63010

Project / Site name:	Southall Western Access	Samples received on:	06/10/2017
Your job number:	CG-28308	Samples instructed on:	09/10/2017
Your order number:	4586	Analysis completed by:	11/10/2017
Report Issue Number:	1	Report issued on:	11/10/2017
Samples Analysed:	4 soil samples		


Signed: _____

Vineetha Meethale Vettil
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 17-63010

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number				831644	831645	831646	831647
Sample Reference				WGUCPA1	WGUCPA2	WGUCPA3	WGUCPA4
Sample Number				SP12	SP12	SP12	SP12
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				06/10/2017	06/10/2017	06/10/2017	06/10/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	19	< 0.1
Moisture Content	%	N/A	NONE	26	30	16	19
Total mass of sample received	kg	0.001	NONE	1.8	1.8	1.8	2.0

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	6.9	9.2	9.7
Total Cyanide	mg/kg	1	MCERTS	26	13	3	3
Free Cyanide (low level)	mg/kg	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1400	1400	4300	5500
Ammoniacal Nitrogen as N	mg/kg	0.5	MCERTS	22	30	2.0	5.6
Ammonia as NH ₃	mg/kg	0.5	MCERTS	27	36	2.4	6.9
Organic Matter	%	0.1	MCERTS	8.1	9.7	3.5	4.4

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.7	1.7	0.52	0.47
Acenaphthylene	mg/kg	0.05	MCERTS	2.0	2.6	0.65	0.59
Acenaphthene	mg/kg	0.05	MCERTS	1.2	1.3	0.39	0.40
Fluorene	mg/kg	0.05	MCERTS	1.5	1.6	0.42	0.45
Phenanthrene	mg/kg	0.05	MCERTS	13	14	3.4	3.6
Anthracene	mg/kg	0.05	MCERTS	3.1	3.6	0.93	1.0
Fluoranthene	mg/kg	0.05	MCERTS	28	33	8.6	8.5
Pyrene	mg/kg	0.05	MCERTS	25	29	7.5	7.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	17	20	5.2	6.0
Chrysene	mg/kg	0.05	MCERTS	15	17	4.5	4.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	23	29	8.1	7.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	9.0	9.5	2.4	3.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	19	22	6.0	5.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	15	18	5.1	5.0
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	2.5	3.0	0.91	0.85
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	13	15	4.3	4.4
Coronene	mg/kg	0.05	NONE	13	14	4.3	4.0

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	200	230	63	63
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	11	13	11	13
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	39	46	37	36
Barium (aqua regia extractable)	mg/kg	1	MCERTS	430	510	310	900
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.7	2.0	1.2	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	11	12	2.1	5.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	41	48	9.7	8.6
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	230	260	82	93
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	230	260	83	93
Copper (aqua regia extractable)	mg/kg	1	MCERTS	710	800	310	440
Lead (aqua regia extractable)	mg/kg	1	MCERTS	530	600	350	450
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	2.1	2.1	0.9	1.0
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	93	110	55	68
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	65	74	52	50
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	910	1200	660	740

Analytical Report Number: 17-63010

Project / Site name: Southall Western Access

Your Order No: 4586

Lab Sample Number	831644	831645	831646	831647	
Sample Reference	WGUCPA1	WGUCPA2	WGUCPA3	WGUCPA4	
Sample Number	SP12	SP12	SP12	SP12	
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled	06/10/2017	06/10/2017	06/10/2017	06/10/2017	
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	6.0	14	5.4	12	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	62	110	43	56	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	410	750	240	290	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	480	880	280	360	

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.8	1.9	1.8	2.0	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	20	23	15	18	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	170	210	80	76	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	830	890	390	440	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1000	1100	480	540	



Analytical Report Number : 17-63010

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
831644	WGUCPA1	SP12	None Supplied	Brown clay and loam.
831645	WGUCPA2	SP12	None Supplied	Brown clay and loam.
831646	WGUCPA3	SP12	None Supplied	Brown clay and loam with stones and brick.
831647	WGUCPA4	SP12	None Supplied	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 17-63010

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH ₃ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Ammoniacal Nitrogen as N in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide (Low level) in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests ^{***}	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

Iss No 17-63010-1 Southall Western Access CG-28308

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 17-63010

Project / Site name: Southall Western Access

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 17-63012

Project / Site name:	Southall Western Access	Samples received on:	06/10/2017
Your job number:	CG-28308	Samples instructed on:	09/10/2017
Your order number:	4586	Analysis completed by:	13/10/2017
Report Issue Number:	1	Report issued on:	13/10/2017
Samples Analysed:	1 WAC 10:1 Sample		

Signed: _____

Vineetha Meethale Vettil
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

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Waste Acceptance Criteria Analytical Results							
Report No:	17-63012						
					Client: CARDGEO		
Location	Southall Western Access						
Lab Reference (Sample Number)	831692 / 831693				Landfill Waste Acceptance Criteria		
Sampling Date	06/10/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WGUCPA1						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	5.7				3%	5%	6%
Loss on Ignition (%) **	16.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	1700				500	--	--
Total PAH (WAC-17) (mg/kg)	180				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	6.3				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:01	Limit values for compliance leaching test		
	(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l		mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0166			0.105	0.5	2	25
Barium *	0.107			0.678	20	100	300
Cadmium *	0.0010			0.0064	0.04	1	5
Chromium *	0.0061			0.039	0.5	10	70
Copper *	0.022			0.14	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0531			0.336	0.5	10	30
Nickel *	0.013			0.083	0.4	10	40
Lead *	0.015			0.098	0.5	10	50
Antimony *	0.034			0.21	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.042			0.26	4	50	200
Chloride *	12			76	800	4000	25000
Fluoride	0.66			4.2	10	150	500
Sulphate *	30			190	1000	20000	50000
TDS	190			1200	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	30.2			191	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.8						
Dry Matter (%)	74						
Moisture (%)	26						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



Analytical Report Number : 17-63012

Project / Site name: Southall Western Access

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
831692	WGUCPA1	None Supplied	None Supplied	Brown clay and loam.