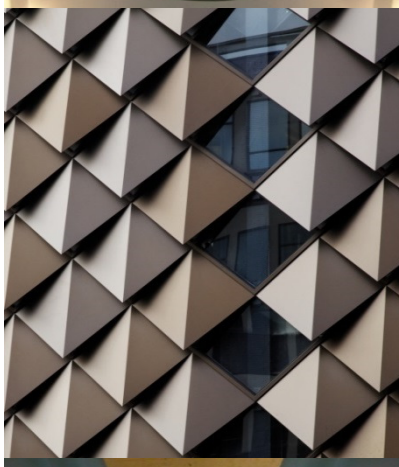
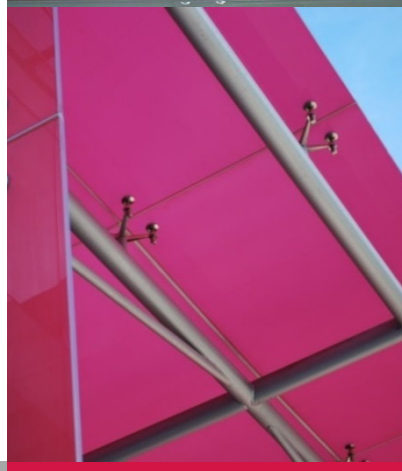








Granville Academy

Phase 2 Site Investigation

Curtins Ref: 064491-CUR-00-XX-RP-GE-00001

Revision: -

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Executive Summary

Appointment	In November 2017 Curtins were instructed by Kier Construction Ltd to undertake a Phase 2 Intrusive Investigation at the Granville Academy site in Swadlincote. The site is centred on NGR 431424, 319878, and covers an area of approximately 6.03 Ha. This investigation addresses recommendations as in the Watermans Geo-Environmental Assessment report (ref. 18), with the aim of the Phase 2 works to characterise geo-environmental conditions prior construction of a new school building.
Current Site Status	The existing site area is occupied by Granville Academy comprising several buildings and associated hardstanding, soft landscaping and car parking. The proposed plans are to build an additional school building.
Summary of Watermans Geo-Environmental Assessment	Site Soils – CP101 identified asbestos free fibres within the made ground soils which will require further delineation to identify the lateral and vertical extent. Groundwater – Minor exceedances for a few metals and one TPH(C8-C37), however the metals are consistent with background levels and the quality of the surrounding area. TPH was higher but was thought to be due to the tarmac surface at the sampling position rather than a consistent and ongoing source of contamination. Ground Gas – CO2 has been recorded between 0.3-4.4%, no methane has been recorded over the course of the monitoring period. No flow was recorded. CS1 classification as a preliminary assessment. Coal Mining – Not considered an issue for the site, however, should development be undertaken however further works specific to the development should be undertaken to ensure no evidence of workings.
Fieldworks Undertaken	Fieldworks were undertaken between 29th of October and the 3rd November 2017. The site investigation consisted of three open hole rotary boreholes with staggered rotary coring to determine the coal mining risk to a maximum depth of 30.00m bgl, all to be installed with standpipes to monitor groundwater and ground gas. Twelve window sample boreholes to a maximum depth of 4.00m bgl with five being installed with standpipes to monitor groundwater and gas. Twenty-one hand pits to delineate contamination identified previously, collect Waste Assessment Criteria (WAC) samples and identify extent of existing foundations.
Encountered Ground Conditions	Topsoil was encountered in six of the exploratory holes from ground level to a maximum depth of 0.50m bgl. Made ground was encountered at ground level as asphalt and soil or immediately below the topsoil. Asphalt was encountered in twenty-five of the exploratory holes from ground level to maximum depth of 0.15m bgl. Made ground was encountered at surface to directly beneath the Asphalt or Topsoil to a maximum depth of 1.40m bgl in WS03/WAC05. Immediately below the made ground deposits highly weathered bedrock deposits of the Lower Pennie Coal Measures Formation were encountered to a maximum depth of 4.00m bgl in WS07. The highly weathered bedrock was generally described as Initially a firm orange brown sandy gravelly CLAY. becoming stiff grey silty CLAY or SILT with occasional pockets of black carbonaceous material. Gravel was generally fine to coarse and angular to rounded consisting of mudstone and quartzite. Immediately below, bedrock of the Lower Pennie Coal Measures Formation was encountered to a maximum depth of 30.00m in RH01-RH03. The material was generally described as a Grey MUDSTONE/SILTSTONE with bands of COAL and clay.
Environmental Laboratory Testing and Land Gas Monitoring Results	No suspected asbestos containing materials were identified and testing confirmed asbestos absence in tested soil samples. Comparison to tier one thresholds for a 'residential without home grown produce' end use indicated elevated TPH's and PAH's are present within asphalt and made ground soils. Delineations of WS102 and CP102 identified contamination exceedance in all locations in

	relation to PAH's, Beryllium, Lead and PAH's. Delineation of CP101 did not identify any further Beryllium contamination or visible asbestos fibres. During land gas monitoring, a maximum concentration of 12.3% v/v carbon dioxide (CO_2) was recorded in RH101 on the first visit. During Watermans gas monitoring a value of 4.4 CO_2 was recorded. Flow was recorded between -5.4 and 1.6l/hr during Curtins monitoring period. Waterman recorded no flow above the instrument limit of detection. Concentrations of methane (CH4) have been recorded at a maximum concentration of 6.4% v/v during Curtins monitoring visits. Watermans gas monitoring a value of 0.2%. Carbon monoxide (CO) was recorded at a maximum concentration of 3ppm in WS05 and hydrogen sulphide (H2S) at a maximum of 1ppm in RH03. Results produce a worst credible scenario gas screening value of 0.1353l/hr for carbon dioxide and 0.0704/hr for methane. Results produce a worst possible scenario gas screening value of 0.6519l/hr for carbon dioxide and 0.3456l/hr for methane.
Ground Contamination and Ground Gas Assessment	Asbestos fibres and beryllium originally identified by Waterman within CP101 has been delineated with no visible evidence of asbestos in any of the delineation holes or from a repeat of the original location requiring no further action. Delineation of CP102 and WS102 for PAH's, TPH's, lead and beryllium indicated all locations to contain contamination exceedances. PAH, TPH within HP05/WAC11 and WS02/WAC04 within asphalt made ground. Further exceedance of PAH's are present in made ground soils within WS01/WAC12, WS05 and WS08 with a single species of TPH exceedance in WS08 made ground. Asphalt exceedance are bound within the asphalt materials unlikely to be released to adjacent ground. Baring CP102 and delineation locations all areas are set to remain as hardstanding or lie within the current building footprint. This breaks the source receptor pathway mitigating risk to end users. Risk to construction and maintenance workers is to be mitigated with the correct use of PPE and standard health and safety precautions. The development plans indicate and area of soft landscaping planned within he area of contamination highlighted by CP102 and subsequent delineation locations. This area will require 300mm of clean inert capping to break the source receptor pathway. With reference to Situation A non-traditional construction as defined by the NHBC and the modified Wilson & Card classification as contained within CIRIA C665, the maximum carbon dioxide concentrations and respective gas screening values indicate a Gas Characterisation Situation 2 (CS2) gas regime with appropriate gas protection measures required within the new developments.
Preliminary Material Classification and Soils Reuse	Two of the ten samples have exceeded the inert thresholds. One of the tarmac samples returned as hazardous waste for off-site disposal purposes. The remaining made ground sample returned as stable non-reactive (non-hazardous) waste for off-site disposal purposes. Tarmac hazardous classification is due to an exceedance of total organic carbon (TOC) value marginally exceeds the inert value of 3% and mineral oil well above the 500mg/kg limit of inert classification however with no clear exceedance values for further classification. As such a higher Hazardous classification is deemed necessary. Made ground stable non-reactive (non-hazardous) classification is due to an exceedance of Poly Aromatic Hydrocarbons (PAH) marginally exceeding the inert value of 100 mg/kg. The remaining two asphalt, seven made ground and three natural samples returned as inert waste for off-site disposal purposes.
Geotechnical Assessment	It is considered that shallow spread foundations could be adopted at the site founding within the high strength clays at minimum depth of 0.9m bgl. Pad foundations could be considered with an estimated allowable bearing capacity of 150kN/m^2 for 2.5m^2 pads with total settlements in the order of 30mm, however, an allowance may be required to ensure serviceability of the building. The exposed formation should be inspected and any soft zones should be removed and replaced with suitable compacted granular fill or lean mix concrete. Given the thickness of made ground generally observed and distance of existing trees to the development it is considered that suspended ground floor slabs in accordance with NHBC Standards. Laboratory test results indicate a Design Sulphate Class for concrete may be taken as DS-3 and ACEC class of AC-3Z would be appropriate.

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Ground Contamination Recommendations	Overall the site is deemed suitable for use as new school buildings, with specific mitigation measures being implemented. The following recommendation are made; 1. It is recommended that construction workers are provided with appropriate PPE and sanitary facilities regarding the environmental testing results presented herein and within Appendix A3. 2. The presence of elevated concentrations of; PAH, TPH, Heavy Metals and Asbestos in the made ground soils presents a potential risk to site end users. It is therefore recommended that current site plans within areas of identified contamination remain planed as building foot print and hardstanding within areas of current hardstanding in order to break the SPR linkage. 3. The development plans indicate an area of soft landscaping planned within the location of contamination highlighted by CP102 and subsequent delineation locations. This area will require 300mm of clean inert capping to break the source receptor pathway. 4. Should imported topsoil be required for the proposed soft landscaping, chemical testing will be required to prove the material is suitable for use. 5. It is recommended that construction workers are provided with appropriate PPE and sanitary facilities with reference to the environmental testing results presented herein and within Appendix A3. 6. Developments will need to incorporate CS2 grade gas protection measures due to the levels of CO2 and CH4 present. 7. New water supply pipes will be required to be upgraded to barrier pipe. 8. Allowance for a Remediation Strategy of the site to detail gas protection measures. Allowance for a Verification Report will be required to record the installation of gas protection measures and independent verification works 9. If ground conditions differ significantly during construction works from those encountered during the ground investigation, Curtins should be contacted to review the nature of the issue identified.

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Appendices

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Appendix A2 - Exploratory Hole Logs

Appendix A3 - Chemical Laboratory Testing Results

Appendix A4 - Geotechnical Laboratory Testing Results

Appendix A5 - Land Gas and Groundwater Monitoring Results

Appendix A6 - Tier 1 Screening Thresholds

Appendix A7 - Risk Assessment Methodology

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1.0 Introduction

1.1 Project Background

In November 2017 Curtins were instructed by Kier Construction Ltd to undertake a Phase 2 Intrusive Investigation at the Granville Academy in Swadlincote. The site is centred on NGR 431424, 319878, and covers an area of approximately 6.03 Ha. A site location plan is presented as *Figure 2.1*.

1.2 Scope of Services

This investigation addresses recommendations as presented in the Watermans Geo-Environmental Assessment report (ref. 18), with the aim of the Phase 2 works to characterise geo-environmental conditions prior to redevelopment as an additional school building. The current development plans for which can be referred to within *Appendix A1* of this report.

Specifically, the Phase 2 report is intended to determine:

a) If there is a risk of the proposed end user being adversely impacted upon by potential contamination in shallow site soils that may be present on the site due to its known current, recent and historical use;
b) If there is a risk of groundwater and/or surface water being adversely impacted upon by potential contamination that may be present on the site due to its known current, recent and historical use;
c) If there is a risk to the end user from soil gases including methane, carbon dioxide, oxygen and hydrogen sulphide;
d) Recommendations for the design of foundations and building ground floor slabs; and
e) Recommendations for the specification of sub-structure concrete and water supply pipes.

Consideration of detailed flood risk, ecology and archaeological issues are outside of the scope of this report.

2.0 Watermans Geo-Environmental Assessment Summary

This section presents a summary of the findings, as presented in the Watermans Geo-Environmental Assessment Phase 2 report (ref. 18). It is not the intention of this report to duplicate the Phase 2, with the information below providing the background information to support the revised post Phase 2 site works Conceptual Site Model (CSM), as presented in Section 8.

2.1 Current Setting

The site is located off Burton road as illustrated in Figure 2.1 below. The site currently comprises ten separate school buildings of varied ages and conditions with associated hardstanding, playgrounds and tennis courts. Centred on Ordnance Survey (OS) Grid Reference 431424, 319878 and extends to an area of approximately 6.03 hectares. The site is bound by Burton Road and residential properties to the west, by residential properties to the south and north and by agricultural land to the north east and east. The site is currently accessed via Burton Road.



Fig 2.1 – Site Location Plan.

2.2 Previous Site Use

A review of the available historical mapping information for the site (as presented within Watermans Geo-Environmental Assessment Phase 2 report) (Ref.18) has been undertaken with specific reference to potential sources of contamination.

The earliest available historical map (1883) recorded the site as woodland and farm land. A railway runs along the north-east site boundary within a cutting. By 1923 the woodland was replaced by allotment gardens until 1937 when the site was shown as open land and the railway dismantled. During the late 1960s the site is shown as being re-profiled and the Swadlincote Granville County Secondary School is shown as occupying the site. School blocks were added in 1980 when the school was named The Granville School with a further block added in 1985.

2.3 Ground Conditions

As part of the Watermans site investigation undertaken in September 2016, two cable percussive holes and four window sample boreholes were undertaken to maximum depths of 8.00m and 5.45m bgl, respectively.

Made ground was encountered up to 1.70m comprising topsoil in areas of soft landscaping and black and greyish brown sandy gravel within the areas of the tennis courts.

Directly below the made ground was the Pennine Lower Coal Measures was recorded to a maximum depth of 7.70m bgl and was generally recorded as gravelly clay followed by mudstone gravels at depth.

2.4 Site Soils

The site investigation compared the chemical analysis against a Residential without homegrown produce end use scenario. Six samples of made ground recorded significantly elevated concentrations of beryllium, lead and PAH's, together with TPH. One sample of natural soil did not record any exceedances against a commercial GAC.

Significantly elevated concentrations of metals, PAHs and TPH were recorded within the site soils. The exceedances were located beneath the hardstanding of the tennis courts which will either be retained or built upon indicating that direct contact with the underlying soils will not be present following development. The low volatility of the chemical exceedances coupled with the presence of a physical barrier to the underlying soils indicates the risk from the site soils is Low.

2.5 Groundwater

One round of groundwater sampling was undertaken within the installed boreholes. The groundwater results were compared against Environmental Quality Standards (EQS) for freshwater.

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Concentrations of nickel, sulphur, ammoniacal nitrogen and TPH (C8-C37) were all recorded to exceed the thresholds of the EQS. It was considered likely that the TPH is a result of the overlying bitumen bound asphalt at each location rather than an ongoing source of contamination.
A significant thickness of clay was recorded between made ground and the underlying mudstone indicating the potential for vertical migration into the Secondary A Aquifer to be Low. The risk of contamination within the shallow groundwater impacting upon nearby sensitive receptors is was not considered significant.

2.6 Ground Gas Monitoring

Gas monitoring was undertaken on three occasions at the time of the Watermans report being written. At the time of monitoring barometric pressure was recorded between 1006mb and 1010mb. No positive gas flows were recorded as part of the monitoring. Carbon dioxide was recorded between 0.3 – 4.4% $^{v}/_{v.}$ Oxygen was recorded between 18.2 – 20.4%. No concentrations of methane were recorded for the site. This gives a gas screening value of 0.0044 l/hr for carbon dioxide. Which would be classed as a Characteristic Situation 1 (CS1). This assessment should be regarded as preliminary ground gas assessment only.

2.7 Mining Risk Assessment

A number of shallow seams are identified on the BGS geological maps being present within the Coal Measures strata in the area of the site. The Joyce's Coal, Stanhope Coal and Well Coal are identified to sub-crop beneath the site. The seams below these are the Clod Coal and the Kilburn Coal.

The Wingfield Flags (Sandstone) are identified to be present beneath the Kilburn Coal. Due to the presence of the Wingfield Flags and the depths of seams below, the potential impact of workings within deeper seams was considered to be negligible.

Coal Authority records do not identify workings within the shallow seams beneath the Site, however further unrecorded shallow mining may have occurred beneath the site in the more distant past, when detailed mining records were not made.

The Coal Authority report identifies no former mine shafts to be present at the site, however, the potential for unrecorded shafts to be present cannot be discounted.

The exploratory hole records did not identify any workings or shallow coal seams. It was considered that there is still a potential for workings to be present at greater depth. It was recommended that supplementary ground investigation is undertaken, upon selection of a preferred development option, to confirm that the shallow coal seams have not been exploited at depths greater than those proven by the Watermans ground investigation.

Should workings be identified during the supplementary ground investigation, it was recommended that these seams should be drilled and grouted beneath the proposed building footprints to ensure that former workings do not collapse beneath the proposed foundations.

2.8 Geotechnical Assessment

Weathered Pennine Lower Coal Measures were identified as a suitable bearing stratum, with design bearing resistance of approximately 150kPa. This stratum was encountered at depths of less than 2.5m below proposed ground level across the site and as such it was recommended that shallow foundations (strip / pad foundations) could be adopted.

Foundations placed on shrinkable soils should be deepened where necessary to accommodate the effects of trees and hedgerows.

The Design Sulphate (DS) and Aggressive Chemical Environment for Concrete (ACEC) classifications were considered to be:

- Concrete in contact with Made Ground: DS-1, AC-1;
- Concrete in contact with weathered Pennine Lower Coal Measures; DS-3, AC-3;

Dynamic Cone Penetration tests (DCPs)indicated that, where Made Ground is present at subgrade level, the subgrade generally has a CBR value of at least 5%. It was recommended that a value of 5% is used for the purposes of pavement design and temporary works design.

The ground conditions encountered in the investigation suggested that ground bearing floor slabs are potentially viable for the proposed development. The suitability of the subgrade should be confirmed following site strip.

No instability was recorded on the exploratory hole logs and it was considered that shallow excavations (<1.2m) are likely to be stable in the short term. However, some instability in the water bearing made ground identified during the ground investigation would be anticipated, and shoring and de-watering measures may be required.

Consideration should be given to the re-use of arisings from foundation trenches / drainage runs etc. Where contamination was encountered, it may be possible to re-use foundation arisings subject to risk assessment however certainty of use and volume should be confirmed in accordance with the requirements of CLAIRE guidance.

2.9 Watermans Initial Recommendations

- Asbestos encountered in CP101 should be delineated to determine the vertical and lateral extent of the contaminant.

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- Supplementary ground investigation should be undertaken following confirmation of a preferred development option to allow for an assessment of the potential for mine workings within shallow coal seams at the site.
- Further ground gas monitoring should be undertaken to comply with CIRI C665 and confirm the preliminary classification of the site as CS1 based on three rounds of monitoring.
- A copy of the Watermans report should be provided to any personal completing excavation works at the site to make them aware of the risks of buried asbestos fibres in the location of CP101. A suitable Risk Assessment and Method Statement must be produced in advance of works commencing, based on the findings of the Watermans report, to ensure the risk to workers is minimised and to ensure any exposed asbestos fibres do not become airborne and impact onsite and offsite users.

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3.0 Phase 2 Investigation Scope of Works

Site investigation works were undertaken between the 29th November and 3rd December 2018.

The scope of the ground investigation was designed in general accordance with current UK guidance including CLR11 (Ref.1), British Standard (BS) 10175 (Ref.2), BS5930:2010 (Ref.3) and Eurocode 7 (Ref.4). A summary of the scope and rationale are summarised in Table 3.0 below.

Table 3.0 - Scope and Rationale of Fieldwork Undertaken

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depth (m bgl)	Rationale
Hand Dug Pits	**CP101C, N, E, S & W** **CP102C, N, E, S & W** **WS102C, N, W, S & W** **HP101 to HP106**	**Max 1.20**	*Confirm shallow ground conditions.* *Expose and confirm existing foundations / services.* *Delineate contamination identified from the previous Phase 2 site investigation completed by Watermans.* *Collect waste assessment criteria (WAC) samples.*
Window Sample holes	**WS01 – WS12**	**Max 4.00**	*Confirm ground conditions.* *Collect soil samples for chemical and geotechnical analysis.* *Undertake in-situ testing.* *Gas and groundwater monitoring.* *Determine geotechnical parameters.*
Open Hole Rotary Boreholes	**RH01 – RH03**	**Max 30.00**	*Confirm deep ground conditions including presence of voids.* *Collect rock samples for geotechnical analysis.* *Gas and groundwater monitoring* *Determine geotechnical parameters*

Curtins drawing ref. 064491-CUR-00-XX-DR-GE-00001-V04 records the locations of the exploratory holes, a copy of which is contained within *Appendix A1*.

3.1 Soil Logging and Sampling

Hand excavated trial pits, window sample borehole and open hole rotary boreholes were logged on site by a qualified Engineer in accordance with the requirements of BS5930 (Ref.3), including recording observed visual and olfactory indications of contamination. Exploratory hole logs are provided in *Appendix A2*.

3.2 Monitoring Well Installations

Ground gas and groundwater monitoring installations (50 mm diameter) were installed within five window sample boreholes and all three open hole rotary boreholes. A bentonite seal was placed above and below the screened section of the borehole to minimise potential for downward migration of contaminants and the creation of a preferential migratory pathway. A gravel surround was installed in the annulus between the sides of the borehole and the slotted sections of pipe.

The 50 mm diameter monitoring wells were primarily designed to assess the potential for ground gas and strata likely to have the highest permeability and as such the screened section focussed on made ground where sufficient depth was encountered or the underlying natural strata to monitor groundwater levels.

A summary of the response zones is presented in Table 3.2 below.

Table 3.2 - Monitoring Well Response Zones

Borehole Reference	Response Zone(s) (m bgl)	Strata Description(s)
WS01	1.00 – 2.00	CLAY
WS03	1.00 – 1.50	MADE GROUND
WS05	1.00 – 1.50	SILT
WS07	1.00 – 2.00	CLAY
WS11	0.50 – 1.00	GRAVEL & SAND
RH01	1.00 – 7.00	CLAY & MUDSTONE/SILTSTONE
RH02	12.00 – 18.00	MUDSTONE/SILTSTONE
RH03	6.00 – 12.00	MUDSTONE/SILTSTONE

Copies of borehole logs can be referred to in *Appendix A2* of this report.

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3.3 Post-Investigation Monitoring

3.3.1 Ground Gas Monitoring

An initial programme of three gas monitoring visits over three weeks was proposed to assess ground gas conditions to add to the three visits already completed by Watermans (Ref. 18). The gas monitoring schedule has now been completed.

3.3.2 Groundwater Sampling

Groundwater sampling is not included within the scope of this site investigation and report. Watermans deemed a low risk to groundwater receptors.

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4.0 Laboratory Analysis

Representative soil samples were selected for laboratory chemical analysis, based on field observations and to provide a characterisation of the made ground and natural strata encountered. Selected soil samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the nominated laboratory under the laboratory's chain of custody documentation. The laboratory selected by Curtins for chemical & geotechnical analysis was i2 Analytical UK Ltd, a UKAS and MCERTS accredited laboratory.

Given the potential site wide source of contamination (made ground) the sampling positions (boreholes) were generally located in a non-targeted, systematic array to give adequate and representative coverage of the site accounting for the historical site use, proposed end use and the immediate environmental setting.

4.1 Soil Analysis

The contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils), heavy metals and asbestos the extent of which is captured by the broad environmental testing suite listed in Table 4.1 below.

Table 4.1 - **Environmental Chemistry Analysis Suite : Soils**

Suite Ref.	Analyte	LOD
Soils Suite 1B	Asbestos Screen	Type
	pH	0.1 pH units
	Soil Organic Matter (SOM)	0.1 %
	Arsenic, Chromium, Chromium VI, Copper, Lead, Selenium, Zinc, Nickel	1 mg/kg
	Boron (water soluble)	0.2 mg/kg
	Cadmium	0.2 mg/kg
	Mercury	0.3 mg/kg
	Cyanide (total)	1 mg/kg
	Sulphate (total)	1.25 mg/l
	Phenols (screen)	1 mg/kg
	Poly Aromatic Hydrocarbons (PAHs) (USEPA 16)	0.05 – 0.1 mg/kg
	Total Petroleum Hydrocarbons (TPH) (Aromatic/Aliphatic split)	0.1 – 10 mg/kg

Soil samples were taken from the top 600mm incorporating made ground where possible or topsoil or natural soil deposits depending on the ground conditions encountered at these depths. from each exploratory hole location and tested for Suite 1B.

Waste assessment criteria (WAC) testing was also undertaken, to assist with classifying material as inert, stable non-reactive (non-hazardous) or hazardous waste for off-site disposal purposes to a

suitably licensed waste disposal facility. Results of the WAC testing are discussed further in section 6.4.2. Copies of the WAC testing certificates are also presented within *Appendix A3*.

4.2 QA/QC

No samples were classed as deviating.

4.3 Geotechnical Analysis

Soil samples for testing were prepared in accordance with BS1377: Part One: 1990 and representative sub-samples were taken for testing. The following tests were carried out:

- 12 No. Atterberg Limits
- 12 No. Moisture content
- 12 No. Water soluble sulphate
- 12 No. pH value
- 13 No. Point Load Tests
- 8 No. Uniaxial Compression Tests
- 4 No. Particle Size Distribution
- 4 No. California Bearing Ration by remoulded specimen

Copies of the geotechnical testing certificates are presented in *Appendix A4*.

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5.0 Encountered Ground Conditions

5.1 General

A summary of the ground conditions encountered during the site investigation works is presented below, with detailed information presented in the exploratory hole logs included in *Appendix A2* and a summary of each strata presented in subsequent sections.

Table 5.1 - Summary of Ground Conditions Encountered

Stratum	Depth to top of strata m bgl	Thickness (m)		Description
		Min	Max	
MADE GROUND (TOPSOIL)	0.00	0.10	0.50	Grass over variance of brown sandy silt/clay or silty sand topsoil.
MADE GROUND (ASPHALT)	0.00	0.05	0.15	MADE GROUND: Asphalt.
MADE GROUND	0.00 – 0.15	0.10	1.10*	MADE GROUND: Black brown gravelly sand.
Pennine Lower Coal Measures Formation (HIGHLY WEATHERED)	0.30 – 4.00	0.1*	3.20*	Initially a firm orange brown sandy gravelly CLAY. becoming stiff grey silty CLAY or SILT with occasional pockets of black carbonaceous material. Gravel was generally fine to coarse and angular to rounded consisting of mudstone and quartzite.
Weathered Pennine Lower Coal Measures Formation (BEDROCK)	2.80 – 3.00	27.00*	27.20 *	Grey MUDSTONE/SILTSTONE with bands of COAL.

* - Thickness not proved

5.2 Topsoil & Made Ground

Exploratory holes began with one of three surface strata, either topsoil, asphalt or made ground.

Topsoil was recorded in six exploratory holes over the site. This deposit was encountered in HP01/WC01, HP01/WAC02, WS07, WS09, WS10 and WS11 to a maximum depth of 0.50m bgl in WS12. The material was generally described as a sandy gravelly silt.

Asphalt was recorded in twenty-five exploratory holes over the site. This deposit was encountered in CP101, CP102 and WS102 delineations, HP01/WAC01, HP04/WAC04, HP05/WAC11, WS01/WAC12 – WS06 and WS08 to a maximum depth of 0.15m bgl in WS05 and WS06. The material is described as asphalt.

Made ground was recorded in all the exploratory holes conducted as part of the site investigation works. This was recorded to a maximum depth of 1.40m bgl in WS03/WAC05.

The made ground was generally described as either clay silt of sand with variable sandy silt and gravel component depending on the primary component. These deposits generally under the previously mentioned topsoil or asphalt with only two locations HP03/WAC03 and HP06/WAC10 deviating from this. Typically described as sandy gravelly silt, sandy gravelly clay or silt gravelly sand. Gravel was recorded as fine to coarse grained and angular to sub-rounded and generally consisted of brick, ash, concrete and clicker.

5.3 Highly Weathered Bedrock (Highly Weathered Pennine Lower Coal Measures Formation)

Highly Weathered Bedrock was encountered directly below the made ground in many of the exploratory hole positions. Only where the full depth of the made ground deposits were not proved were the superficial deposits not encountered. The deposit encountered is interpreted to be highly weathered Pennine Lower Coal Measures Formation. These deposits were recorded to a maximum depth of 4.00m bgl in WS07 and WS09 and in all rotary borehole locations RC01 – RC03.

These deposits were generally described as orange brown to grey variably sandy variably gravelly CLAY / SILT. The gravel was generally recorded as fine to coarse grained and sub-angular to sub-rounded in nature, consisting of mudstone. The full depth of these weathered deposits was proved in the rotary boreholes.

Based on published relationships, undrained shear strengths (Cu) may be estimated from SPT 'N' values where full penetration was achieved. Using a factor of 5.4 estimated Cu values range between 35.2kPa to 367.2kPa. Considering the in-situ and laboratory testing and descriptions of the clay, the clay is likely to be of low strength at the top of the deposit progressing to very high strength with depth.

Plasticity testing undertaken in the highly weathered Pennine Lower Coal Measures recorded clay to generally be of intermediate to high plasticity. In accordance with NHBC Standards Part 4 Chapter 4.2 building near trees, the clay can be described as having medium volume change potential.

Table 5.3 - Summary of geotechnical test results – superficial deposits

Parameter	No. of tests	Minimum	Maximum	Average
Moisture Content (%)	12	11	22	13.17
Liquid Limit (%)	12	39	63	48.5
Plastic Limit (%)	12	17	26	22
Plasticity Index (%)	12	19	39	23.1

Parameter	No. of tests	Minimum	Maximum	Average
pH	12	7.3	5.4	6.3
Water Soluble Sulphate (g/l)	12	0.016	0.21	0.07
SPT 'N' Value	29	9	68	34.14
PSD (%)				
Cobbles		0	0	0
Gravel	2	0	2.9	1.45
Sand		12.7	14.7	13.7
Silt/Clay		84.3	85.3	84.8
Undrained Shear Strength Cu (kPa) (1)	12	35.2	367.2	149.5
Coefficient of volume compressibility mv (MN/m^2) (2)	12	0.02	0.43	0.14

(1) Cu estimated from SPT N value correlation with average Plasticity Index using a Factor of 5.4 (Stroud and Butler, 1975).
(2) mv estimated from SPT N value correlation with average Plasticity Index using a Factor of 0.54 (Stroud and Butler, 1975).

5.4 Bedrock Deposits (Pennine Lower Coal Measures Formation)

Bedrock deposits were only encountered in the rotary boreholes at a maximum unproved depth of 30.00m bgl. Boreholes were mostly advanced using open hole methods. The technique used destroys most of the deposit, limiting the amount of description available to the engineers on site. Coring techniques were employed within each rotary hole at varied depths to provide detailed descriptions. Rotary coring techniques were employed within RC01 from 3.00 – 7.50m bgl, RC02 from 6.00 – 10.50m bgl and RC03 from 3.00 – 9.00mbgl.

The material was generally described in open holed sections as a grey MUDSTONE/SILTSTONE or COAL, which was recovered as a clayey GRAVEL. The gravel was recorded to be fine to coarse and sub-rounded to sub-angular. Coal was encountered in RC01 at depths 11.0-11.9m, 18.3-18.6m and 21.4-21.6m bgl respectively. In RC02 coal was recorded at depths 18.1-18.5m bgl and in RC03 at depths 6.48-6.53m and 8.6-9.0m bgl respectively. Where coring techniques were employed the Mudstone was recovered as extremely weak to medium strong, thinly laminated to thinly bedded, slightly weathered to highly weathered with sub-horizontal and sub-vertical fractures. Recovered Siltstone core was described as weak to moderately strong thinly laminated to thinly bedded, slightly weathered with very closely to closely spaced horizontal to vertical fractures.

Table 5.4 - Summary of geotechnical test results – Lower Pennine Coal Measures

Parameter	No. of tests	Minimum	Maximum	Average
Point Load Test (PLT) (MPa)				
-Mudstone	6	0.10	0.50	0.23
-Siltstone	7	0.17	0.70	0.39
Uniaxial Compressive Strength (UCS) (Is50*Factor) (1) (MPa)				
-Mudstone	6	2.00	10.0	4.6
-Siltstone	7	3.40	14.0	7.8
Uniaxial Compressive Strength (UCS) (MPa)				
-Mudstone	5	0.8	13.0	4.6
-Siltstone	3	3.6	6.1	5.2

(1) Conversion factor of 20.

From the Point Load Tests (PLT), the Uniaxial Compressive Strength (UCS) of the siltstone and mudstone has been estimated (based on PLT $I_{s(50)}$ x 20 = UCS) which indicates that the mudstone and the siltstone can be described as very weak to weak rock. These strength descriptions are also confirmed by the UCS test results for the siltstone and mudstone samples tested.

5.5 Observed Potential Contamination

Soils which exhibited potential contamination were noted during the site works and detailed in Table 5.5 as follows:

Table 5.5 - Observed Potential Contamination

Location Number	Observed Contamination	Depth (m bgl)
CP101C	Clinker and Slag	0.10 – 0.50
CP101E	Clinker and Slag	0.10 – 0.40
CP101N	Clinker and Slag	0.10 – 0.40
CP101S	Clinker and Slag	0.10 – 0.50
CP101W	Clinker and Slag	0.10 – 0.30
CP102C	Clinker, Ash and Slag	0.10 – 0.25

CP102E	Clinker, Ash and Slag	0.10 – 0.25
CP102N	Clinker, Ash and Slag	0.10 – 0.25
CP102S	Clinker, Ash and Slag	0.10 – 0.25
CP102W	Clinker, Ash and Slag	0.10 – 0.25
HP05/WAC11	Clinker, Ash and Slag Slag	0.10 – 0.40 0.40 – 1.10
WS01/WAC12	Ash and Clinker	0.10 – 0.60
WS02/WAC04	Ash and Slag	0.20 – 0.80 0.80 – 1.00 1.00 – 1.10
WS03/WAC05	Ash and Clinker	0.90 – 1.40
WS05	Clinker and Metal	0.25 – 0.50
WS06	Ash and Slag	0.15 – 0.30
WS102C	Clinker, Ash and Slag	0.10 – 0.20
WS102E	Clinker, Ash and Slag	0.10 – 0.20
WS102N	Clinker, Ash and Slag	0.10 – 0.20
WS102S	Clinker, Ash and Slag	0.10 – 0.20
WS102W	Clinker, Ash and Slag	0.10 – 0.20
WS12	Ash	0.0 – 0.50

5.6 Obstructions Encountered

No obstructions were encountered as part of the site investigation works.

5.7 Groundwater

A summary of the groundwater levels recorded during the site works, and subsequent monitoring, is presented in Table 5.7. Full details of the water strikes recorded during progression of the investigation positions are presented on the exploratory hole logs included in *Appendix A2* and full details of the water levels recorded during the monitoring visits are presented in *Appendix A5*.

Table 5.7 - Groundwater Noted During Site Investigation

Exploratory Hole Location Ref.	Water Strikes		Monitored Water Levels	
	Strike Depth (m bgl)	Strata	Installation Strata	Monitored Levels (m bgl)
WS11	1.00	SAND	GRAVEL / SAND	0.35 – 0.51
WS102W	0.20	M.G sand	N/A	N/A
WS102S	0.20	M.G sand	N/A	N/A
WS102N	0.20	M.G sand	N/A	N/A
WS102E	0.20	M.G sand	N/A	N/A
WS102C	0.20	M.G sand	N/A	N/A
WS09	2.00	CLAY	N/A	N/A
WS08	0.50	M.G sand	N/A	N/A
WS07	1.00	CLAY	CLAY	0.00
HP01/WAC10	1.00	CLAY	N/A	N/A
WS01/WAC12	N/A	N/A	CLAY	Dry
WS03/WAC05	N/A	N/A	M.G clay	Dry
WS05	N/A	N/A	SILT	0.24 – 6.89
RH01	15.50 25.30	COAL MUDSOTNE / SILTSTONE	CLAY / MUDSTONE	2.39 – 2.57
RH02	24.50	MUDSOTNE / SILTSTONE	CLAY / MUDSTONE / SILTSTONE / COAL	6.61
RH03	21.00	COAL	CLAY / MUDSTONE / SILTSTONE	3.60 – 6.28

Groundwater was encountered at depth within the bedrock or as shallow perched water within sandy horizons in the made ground and occasionally in the clay. Monitored groundwater levels were recorded in the bedrock or silt horizons.

5.8 Aggressive Ground Conditions

The classification of the site in terms of concrete in aggressive ground is based on the guidance provided in Table C2 of the Building Research Establishment (BRE) Special Digest 1, third edition of 2005. Table 5.8 details the classification.

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Table 5.8 - Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	ACEC Class (1)
Curtins Results Pennine Lower Coal Measures	DS-1	AC-3Z
Watermans Results Pennine Lower Coal Measures	DS-3	AC-3

(1) ACEC assessment was based on the static groundwater condition for the scheme area

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6.0 Ground and Groundwater Contamination Assessment

This section of the report includes the assessment of the potential contamination, solid, liquid and gas, identified on the subject site which may present a risk to the proposed end users, associated utilities and the wider environment.

In guidance published by the Environment Agency, the risk to human health or controlled waters is determined through an assessment of pollutant linkages between a source of contamination (within the ground or groundwater either on or off site) and a sensitive receptor such as end users of the site, building materials, edible plants grown in gardens or groundwater abstracted for drinking. This is termed a source-pathway-receptor relationship. The same model is applied to the assessment of risk arising from ground gases as detailed within BS8576:2013 (Ref. 5).

These models have a common approach, which is one of a tiered assessment. At each stage of the assessment further detail can be applied to the conceptual site model to provide a detailed interpretation on a site by site basis. As part of the planning process this approach is adopted to establish either if the site is 'suitable for use' or whether additional work or else remedial work is required for the site to be deemed so.

The sub-sections hereafter therefore incorporate the first tier (Tier 1) of this approach otherwise referred to as the Generic Quantitative Risk Assessment (GQRA). The GQRA builds on the previous Phase 2 investigation completed by Watermans in conjunction with observations made during the ground investigation and is based solely on the results of the chemical and other testing data obtained as part of Curtins ground investigation. The GQRA is used to build/refine the Conceptual Site Model (CSM) for the site as detailed and presented in Section 8.0 of this report.

The following sections present more detail on the risk assessment methodology rationale for the main receptors.

6.1 Human Health GQRA

Detailed guidance on human health risk assessment is available within several documents, published by both the Environment Agency and Defra. Guidance includes Contaminated Land Exposure Assessment (CLEA) v1.071 model (Ref. 6), Science Report 2 (Ref. 7) and Science Report 3 (Ref. 8).

A generic quantitative risk assessment (GQRA) has been carried out for the Potential Contaminant Linkages (PCLs) investigated by screening of soil contamination data against relevant Generic Assessment Criteria (GAC) where available, including:

i) **Soil Guideline Values (SGVs):** These have been published by the Environment Agency and are trigger values for screening out low risk areas of land contamination. SGV's give an indication of representative average concentrations of chemicals in soil, below which long-term health risks are likely to be minimal. SGVs have been published for several contaminants including arsenic, cadmium, mercury, nickel, selenium, BTEX, phenols and dioxins, furans and

dioxin-like PCB substances for land uses including residential, allotments and commercial. The SGVs have been developed for a sandy loam soil with 6% soil organic matter (SOM) content;

ii) **Supplementary Screening Values (SSVs):** In addition to the SGVs developed by the EA, other third-party organisations have derived SSVs for a wider range of contaminants and land uses using the CLEA Model. Curtins have adopted these numbers where applicable, including those developed by Atkins AtriskSoil™, the LQM/CIEH Suitable for Use Levels (S4UL) and EIC/AGS/CL: AIRE published thresholds;

iii) **Category 4 Screening Levels (C4SLs):** In March 2014 Defra published C4SLs for arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead. These values were derived to support the revised Part 2A Statutory Guidance issued in 2012 (Ref. 9) in which four categories of contaminated land are included, ranging from Category 1 (significant/high risk) to Category 4 (low risk). C4SLs are not representative of significant possibility of significant harm (SPoSH) and are low risk levels which, and therefore where the C4SLs are not exceeded, land can be demonstrated to be in Category 4 and cannot be determined as contaminated land.

6.1.1 Adopted Soil Human Health GACs Screening Methodology

The proposed use of the site, noted as demolition of two main buildings and construction of a new sports hall and teaching block with associated hardstanding and soft landscaping; is most analogous with a *Residential with home grown produce* end-use scenario as a conservative assessment and so assessment has been undertaken against the following GACs, in order of preference:

1. Environment Agency Soil Guideline Values,
2. CL: AIRE, AGS, EIC. Soil Generic Assessment Criteria for Human Health Risk Assessments,
3. LQM/CIEH 2015 S4ULs for Human Health Risk Assessment, and
4. DEFRA Category 4 Screening Levels.

The soil organic matter (SOM) content has an influence on the volatilisation of organic contaminants (i.e. the higher the SOM, the lower the volatilisation rate and therefore inhalation exposure risk). Soil organic matter (SOM) values for the site soils ranged from 0.32 to 6.4%. The high organic content encountered in several soils is representative of the made ground features.

With consideration for a calculated geometric average, the made ground soil features determine an SOM of 1%. As such, a comparison against Tier 1 thresholds for a conservative SOM of 1% for a '*Residential with home grown produce'* end use has been adopted for the made ground and natural soil features.

The adopted GAC's are listed in *Appendix A6*.

Many of the exposure pathways considered in the CLEA model assume that the adult or child is in contact with the contaminated ground or that such contamination is easily mobilised from the surface. However, plant uptake of chemicals and the release of soil vapour may occur from greater depths. Although, the highest density of roots occurs in the top 80 cm, many crop plant root depths are between one and two metres. Although the transport potential degreases, vapours have the potential of migrating to the surface over distances of tens of metres (Updated technical background to the CLEA model - SC050021/SR3).

6.1.2 Generic Assessment Criteria Screening of Soil Laboratory Results

The results of the environmental testing can be referred to in *Appendix A3*.

With respect to the proposed end use of the site, several exceedances are noted within recovered soil samples as detailed below.

Table 6.1.2 - Soil Tier 1 Exceedances for a Residential with homegrown produce End Use

Exploratory Hole ID	Depth (m bgl)	Stratum	Determinant	Concentration (mg/kg)	GAC (mg/kg)
HP05 / WAC11	0.10	MADE GROUND (Asphalt)	Benzo(b)Fluoranthene Benzo(a)Pyrene TPH Aromatic EC16-EC21 TPH Aromatic EC21-EC35	3.9 3.2 420 1100	2.6 2.2 260 5100
WS02 / WAC04	0.10	MADE GROUND (Asphalt)	Benzo(b)Fluoranthene Benzo(a)Pyrene Dibenzo(a,h) Anthracene	3.9 3.5 0.36	2.6 2.2 0.24
	0.50	MADE GROUND	Benzo(b)Fluoranthene Benzo(a)Pyrene Dibenzo(a,h) Anthracene	3.9 3.5 0.36	2.6 2.2 0.24
WS01 / WAC12	0.50	MADE GROUND	Benzo(b)Fluoranthene Benzo(a)Pyrene	4.7 3.9	2.6 2.2
WS05	0.30	MADE GROUND	Chrysene Benzo(b)Fluoranthene Benzo(a)Pyrene	11 10 10	15 2.6 2.2

			Dibenzo(ah)Anthracene	1.1	0.24
WS08	0.50	MADE GROUND	TPH Aromatic EC16-EC21	380	260
WS102C	0.20	MADE GROUND	Benzo(a)Anthracene	38	7.2
			Chrysene	33	15
			Benzo(b)Fluoranthene	40	2.6
			Benzo(a)Pyrene	33	2.2
			Dibenzo(a,h)Anthracene	4.2	0.24
			Beryllium	4.4	1.7
			Lead	210	200
WS102E	0.20	MADE GROUND	Naphthalene	2.8	2.3
			Phenanthrene	150	95
			Benzo(a)Anthracene	87	7.2
			Chrysene	92	15
			Benzo(b)Fluoranthene	84	2.6
			Benzo(a)Pyrene	82	2.2
			Indeno(1,2,3-cd) Pyrene	44	27
			Dibenzo(a,h)Anthracene	12	0.24
			Beryllium	3.2	1.7
			Lead	280	200
WS102W	0.20	MADE GROUND	Naphthalene	4.9	2.3
			Benzo(a)Anthracene	32	7.2
			Chrysene	28	15
			Benzo(b)Fluoranthene	34	2.6
			Benzo(a)Pyrene	28	2.2
			Dibenzo(a,h)Anthracene	3.8	0.24
			Beryllium	5.5	1.7
			Lead	400	200
WS102S	0.20	MADE GROUND	Naphthalene	3	2.3
			Benzo(a)Anthracene	47	7.2
			Chrysene	49	15
			Benzo(b)Fluoranthene	48	2.6
			Benzo(a)Pyrene	43	2.2
			Dibenzo(a,h)Anthracene	6.8	0.24
			Beryllium	4.4	1.7

			Lead	290	200
WS102N	0.20	MADE GROUND	Naphthalene	3.7	2.3
			Benzo(a)Anthracene	25	7.2
			Chrysene	28	15
			Benzo(b)Fluoranthene	25	2.6
			Benzo(a)Pyrene	24	2.2
			Dibenzo(a,h)Anthracene	3.7	0.24
			Beryllium	4.7	1.7
			Lead	440	200
CP102E	0.25	MADE GROUND	Phenanthrene	260	95
			Fluoranthene	380	280
			Benzo(a)Anthracene	120	7.2
			Chrysene	140	15
			Benzo(b)Fluoranthene	120	2.6
			Benzo(a)Pyrene	110	2.2
			Indeno(1,2,3-cd) Pyrene	56	27
			Dibenzo(a,h)Anthracene	18	0.24
			Lead	760	200
			TPH Aromatic EC12-EC16	240	140
			TPH Aromatic EC16-EC21	2700	260
			TPH Aromatic EC21-EC35	2700	1100
CP102W	0.25	MADE GROUND	Phenanthrene	130	95
			Benzo(a)Anthracene	62	7.2
			Chrysene	60	15
			Benzo(b)Fluoranthene	59	2.6
			Benzo(a)Pyrene	53	2.2
			Indeno(1,2,3-cd) Pyrene	27	27
			Dibenzo(a,h)Anthracene	8.2	0.24
			Lead	2300	200
			TPH Aromatic EC16-EC21	1400	260
			TPH Aromatic EC21-EC35	1200	1100
CP102S	0.25	MADE GROUND	Phenanthrene	100	95

			Benzo(a)Anthracene	41	7.2
			Chrysene	37	15
			Benzo(b)Fluoranthene	37	2.6
			Benzo(a)Pyrene	34	2.2
			Dibenzo(a,h)Anthracene	5.1	0.24
			Lead	1300	200
			TPH Aromatic EC16-EC21	1100	260
			TPH Aromatic EC21-EC35	1100	1100
CP102N	0.25	MADE GROUND	Benzo(a)Anthracene	13	7.2
			Benzo(b)Fluoranthene	11	2.6
			Benzo(a)Pyrene	11	2.2
			Dibenzo(a,h)Anthracene	1.2	0.24
			Lead	1400	200
CP102C	0.25	MADE GROUND	Phenanthrene	230	95
			Benzo(a)Anthracene	85	7.2
			Chrysene	90	15
			Benzo(b)Fluoranthene	78	2.6
			Benzo(a)Pyrene	68	2.2
			Indeno(1,2,3-cd) Pyrene	36	27
			Dibenzo(a,h)Anthracene	11	0.24
			Lead	550	200
			TPH Aromatic EC12-EC16	170	140
			TPH Aromatic EC16-EC21	1600	260
			TPH Aromatic EC21-EC35	1500	1100

Selected soil samples were screened for asbestos. No suspected asbestos containing materials (ACMs) were identified in the exploratory hole logs and laboratory screening confirmed that asbestos was absent in the soil samples tested.

The above results table indicates elevated PAHs within the asphalt and made ground soils as well as total petroleum hydrocarbons (TPHs). It should be noted, that exceedances recorded within HP05 / WAC11 at 0.10m and WS02 / WAC04 at 0.10m were of the existing asphalt and these contaminants are unlikely to be released as they are bound in with the asphalt. The remaining window sample exceedances (WS01 / WAC12, WS05 and WS08) were all within the

made ground soils with PAHs and one species of TPH in WS08 recorded to exceed the thresholds.

The additional delineation holes (WS102C, E, S, W and N, CP102E, C, S, W and N) all identified for contamination which exceeds the end use thresholds. This is in relation to PAHs, Beryllium, Lead and a few species of TPHs which extend laterally from the original exploratory hole positions which were undertaken by Watermans. Delineation of Watermans CP101 did not identify any further contamination of Beryllium that exceeded the thresholds.

6.2 Controlled Waters GQRA

Controlled waters were assessed as having a Low risk by Watermans and recommended that no further action is required for the groundwater receptors. Therefore, no further groundwater risk assessment has been conducted.

6.3 Water Supply Pipe Assessment

A hand excavated trial pit was completed to record the depth and composition of the existing water supply pipe as indicated on the exploratory hole location plan contained within *Appendix A1*. A 5 inch cast iron pipe was encountered at 0.68m and was orientated correctly on the service plans provided for the site.

With reference to the UKWIR publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' document refence 10/WM/03/21 advice is given on the appropriate materials for these ground conditions.

Due to the concentrations observed within the site shallow soils it is recommended that barrier pipe (AL/PE/AL) would be suitable materials for the water supply pipes. The exact requirements are to be confirmed with the relevant utility supplier.

6.4 Materials Management

6.4.1 Re-use of Site Soils

Based on the geochemical testing results presented as part of this investigation it is considered that there is no specific requirement to remove soils from site because of them presenting an unacceptable risk to human health or the environment.

The re-use of site-won soils may therefore be undertaken if the following principles are met: i) the geotechnical suitability of the material needs to be confirmed; ii) the re-use of the material needs to be covered as part of the planning approval, e.g. site levels maintained within agreed limits; iii) the volume of the material being re-used needs to be confirmed and traceable and iv) regulatory approval from the relevant authorities has been sought. These principles are outlined

within the CL: AIRE Definition of Waste Code of Practice (v2) and if and where the re-use of site-won soils is proposed as part of the development works it is recommended that a Materials Management Plan is produced in line with the Definition of Waste Code of Practice to detail and document the process.

6.4.2 Material Classification

Where any site soils are to be disposed of off-site guidance on the disposal of contaminated soils is provided within the following document published by the Environment Agency, the Guidance on the classification and Assessment of Waste Technical Guidance WM3 (1st Edition 2015) (Ref.17).

Guidance states that the principal contractor (or any other sub-contractor undertaking excavations) should, in conjunction with the proposed disposal facility, use where possible the relevant environmental chemistry analyses results to classify any surplus material identified for off-site disposal. However, it should be noted that this information is for guidance only and material identified for disposal will have to be tested and assessed in accordance with WM3 to enable classification during the works.

An initial assessment for the waste classification of the shallow and deeper made ground soils encountered on site has been carried out through a comparison of the soil testing results against the Tier 1 Thresholds and using the Waste Soils Characterisation Assessment Tool, Cat-WasteSoil, developed by McArdle and Atkins. This online tool gives a rapid assessment of contaminated soils and their classification as either hazardous or non-hazardous (stable non-reactive hazardous waste) waste, it should be noted that this tool does not classify inert waste. Persistent Organic Pollutants (POP's) were not tested for as part of the investigation, however based on the Conceptual Site Model the risk of these being present on the site is considered low.

The initial assessment revealed that of the fourteen made ground soils tested, one sample is indicated to be hazardous waste. The other thirteen samples are indicated to be non-hazardous with respect to Environment Agency waste classes, using the guidance given in WM3.

The initial assessment of the ten natural soil sample tested may be considered non-hazardous waste for off-site disposal. Where natural soils are being considered for off-site disposal as inert waste, Waste Acceptance Criteria (WAC) testing should first be undertaken with confirmation of acceptability from the receiving landfill.

As discussed, preliminary waste classification is undertaken to offer indicative advice with respect to disposal requirements. Landfill operators are not obliged to accept waste and, if they were to do so, may have specific requirements beyond those outlined above prior to

acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise.

6.4.3 Waste Acceptance Criteria (WAC) Testing

As part of the site investigation works, WAC testing has been undertaken. 14 samples were taken in total with three samples of the asphalt hardstanding, eight samples of the made ground and three samples of the natural soils.

Table 6.4.2 - Waste Assessment Criteria (WAC) analysis with non-hazardous or hazardous samples reported.

Exploratory Hole	Depth (m bgl)	Strata	Waste Assessment Classification	Determinand
WS05	0.30	MADE GROUND	Stable Non-reactive (Non-Hazardous)	Poly Aromatic Hydrocarbons (PAH)
HP05/WAC11	0.10	MADE GROUND (Asphalt)	Hazardous Waste	Mineral Oils

Two of the ten samples have exceeded the inert thresholds. One of the asphalt samples returned as hazardous waste for off-site disposal purposes. The remaining made ground sample returned as stable non-reactive (non-hazardous) waste for off-site disposal purposes.

Asphalt hazardous classification is due to an exceedance of total organic carbon (TOC) value marginally exceeds the inert value of 3% and mineral oil well above the 500mg/kg limit of inert classification however with no clear exceedance values for further classification. As such a higher Hazardous classification is deemed necessary. Made ground stable non-reactive (non-hazardous) classification is due to an exceedance of Poly Aromatic Hydrocarbons (PAH) marginally exceeding the inert value of 100 mg/kg.

The remaining two asphalt, seven made ground and three natural samples returned as inert waste for off-site disposal purposes.

Landfill operators are not obliged to accept waste and, if they were to do so, may have specific requirements beyond those outlined above prior to acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise.

7.0 Ground Gas Assessment

The assessment of risk presented by ground gases is assessed with reference to guidance published by CIRIA (Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665 (Ref.10), BSI Publication (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings BS8485:2015 (Ref.11) and other broadly accepted references such as the Ground Gas Handbook 2009 (Ref.12).

The gas risk assessment adopts a tiered approach. In the first instance, this involves a re-evaluation of the Conceptual Site Model and, thereafter, validating this conceptual model with the ground gas data, the semi-quantitative risk assessment.

7.1 Land Gas Monitoring Results

To characterise the site's ground gas regime and validate the qualitative assessment of ground gas risk standpipe installations were incorporated within five window sample boreholes and three open hole rotary borehole locations as detailed in Section 3.2. This is in addition to the three initial visits completed by Watermans as part of their assessment.

An initial programme of three gas monitoring visits over three months was proposed to comply with the recommendations of CIRIA C665. The gas monitoring schedule has now been completed with visits undertaken by Watermans between September and October 2016 and the Curtins visits between December 2017 and February 2018, with barometric pressure recorded between 970 and 1017mb. The results log sheets are contained within *Appendix A5* and summarised in Table 7.1 below*:*

Table 7.1 - Summary of Ground Gas Monitoring Results

Location	Maximum Methane Concentration %	Maximum Carbon Dioxide Concentration %	Minimum steady reading (Oxygen) %	Maximum gas flow l/hr
WS03/WAC 05	6.0	8.1	19.8	0.1*
WS01/WAC 12	0.0	1.6	18.2	0.1
WS05	0.0	1.1	14.3	0.1*
WS07	-	-	-	-
WS11	0.0	5.4	11.4	0.1*
RH01	6.4	12.3	0	0.1*
RH02	0.0	1.5	0	1.6[1]
RH03	0.4	8.4	19.7	-5.4[2]

Location	Maximum Methane Concentration %	Maximum Carbon Dioxide Concentration %	Minimum steady reading (Oxygen) %	Maximum gas flow l/hr
CP101	0.1	4.4	15.8	0.1*
CP102	0.2	0.9	19.9	0.1
WS101	0.1	0.5	19.8	0.1*
WS102	0.1	0.9	19.7	0.1*
WS103	0.1	1.9	19.2	0.1*
WS104	0.1	3.3	16.3	0.1*

* Results are the detection limit of the gas monitor which is 0.1l/hr.
- Boreholes were flooded and/or no readings could be taken.
[1] Flow reduced to 0 in 120 seconds.
[2] Flow reduced to -1.1 in 6 seconds.

Carbon monoxide (CO) was recorded at a maximum concentration of 3ppm in WS05. Hydrogen sulphide (H2S) was recorded at maximum 1ppm in RH03 on one occasion. Carbon Dioxide was recorded in peak concentrations between 0.5% and 12.3%. Methane was recorded in peak concentrations between 0.1 and 6.4%. Maximum gas flow was recorded between -5.4 and 1.6 l/hr, however, these peak flows reduced quickly below the gas monitors detection limit on most cases with steady state flows only recorded as -1.1l/hr in RH03.

7.2 Land Gas Assessment

The Conceptual Site Model identified possible made ground deposits as a potential source of Ground Gas generation both on-site and off-site resulting from historical development and land use. The report suggests no records of organic rich drift deposits (e.g. peat) being present. Additionally, no worked coal deposits were encountered during the investigation. Noxious and asphyxiate gases were attributed to include, but not limited to, carbon dioxide, carbon monoxide, methane and hydrogen sulphide.

Made Ground soils were encountered from ground level to a depth of 1.40m bgl but, with limited putrescible content generally. Natural deposits were generally sandy gravelly and clay with no significant putrescible/organic content.

Consideration of the recorded soil gas flow rates, presented above, enables hazardous gas flow rates to be evaluated. Q_{hg} can be derived for both 'worst credible' and 'worst possible' scenarios and a comparison made in support of an appropriate assessment of ground gas risk. For a 'worst credible' scenario steady state flow rates are adopted, whilst for a 'worst possible' scenario peak flows are adopted.

Evaluation of the 'worst credible scenario' (highest hazardous gas flow rate that is realistically possible, i.e. in a single borehole) records a maximum Q_{hg} of 0.1353 l/hr for carbon dioxide and 0.0704 l/hr for methane.

Evaluation of the 'worst possible scenario' (highest Q_{hg} across the entire dataset irrespective of location and discrete monitoring events) records a maximum Q_{hg} of 0.6519 l/hr for carbon dioxide and 0.3456 l/hr for methane.

This worst possible scenario has been adopted as the sites Gas Screening Value (GSV) and in accordance with an assessment by CIRIA C665, as the carbon dioxide concentrations and GSV are below the recommended limits the site should be classified as Characteristic Situation 2 (CS2) meaning that gas protection measures are required within the new developments.

The potential risks from ground gases to the excavations are to be dealt with by the Contractor, in accordance with the Confined Space Regulations, during construction. Appropriate ground gas monitoring and safety measures should be in place during the works, as the potential presence of ground gases could pose a risk in any confined spaces of deep excavations.

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8.0 Revised Conceptual Site Model

The Conceptual Site Model (CSM) is summarised in the table overleaf and diagrammatically presented within *Appendix A1.* Drawing reference: 064491-CUR-00-XX-DR-GE-00002-V01_Diagrammatic Conceptual Model.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified as relevant for the site. The GQRA details the associated level of risk relating to these potential pollutant linkages.

The CSM follows the framework outlined within CIRIA C552 which is summarised within *Appendix A7*.

The 'risk rating' within the CSM refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

Risks presented by Unexploded Ordnance is not considered further due to being in a low risk region.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements and therefore construction workers involved in the building works at the site have been discounted as a human receptor in the conceptual site model. Reference should be given to the environmental testing results discussed within Section 6.0 and presented within *Appendix A3*.

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- The table below represents the Second stage in the land quality risk assessment process; the Revised Conceptual Site Model following the Quantitative Risk Assessment.
- For a development site to be deemed 'suitable for use' the level of risk needs to be brought down to acceptable levels, i.e. low to negligible risk. The purpose of each stage of risk assessment is ultimately to establish if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.

Conceptual Site Model			Generic Qualitative Risk Assessment			Comments	Action
Identified Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating		
Exceedances for PAHs and TPHS within HP05 / WAC11, WS02 / WAC04, WS01 / WAC12, WS05 and WS05.	Direct contact and dermal uptake, soil and dust ingestion, dust and migration inhalation (indoor & outdoor air)	School children (Assessed as residential with homegrown produce)	Medium	Unlikely	Low	WS01/WAC12 and HP5/WAC11 are not proposed to be altered as part of the development. WS02/WAC04 and WS08 soils will be situated below proposed hardstanding. WS05 will be situated below the proposed building footprint. All the scenarios described above break the source-pathway-receptor link to the end users.	No further action required.
	Direct contact and dermal uptake, soil and dust ingestion, dust & migration inhalation (outdoor air)	Construction and maintenance workers	Mild	Likely	Moderate / Low	Locations of WS02/WAC04, WS05 and WS08 will be encountered by groundworkers, during redevelopment.	Standard Health & Safety precautions to be used by workers.
	Soil dust ingestion/inhalation produced during construction (indoor and outdoor air)	Adjacent residents	Medium	Unlikely	Low	Contaminants will have volatilised prior to reaching adjacent residents. Where soils are exposed, they are likely to be sprayed with water to reduce generation dust.	No further action required.
	Vertical Migration through the superficial deposits	Water Environment (Groundwater)	Medium	Unlikely	Low	Groundwater has been recorded within the installed boreholes. However, the ground conditions are recorded as clay which is largely impermeable and prevents migration of any contamination present within the site soils.	No further action required.
	Horizontal Migration over and through the residual soils	Water Environment (Surface Water)	Mild	Unlikely	Very Low	Presence of clay soils which is largely impermeable will prevent migration of contamination present. No sensitive surface water receptors are present near the site.	No further action required.
Delineation of Watermans WS102, CP101 and CP102 identifying further contamination of PAHs, Beryllium, Lead and TPHs laterally from the existing locations.	Direct contact and dermal uptake, soil and dust ingestion, dust and migration inhalation (indoor & outdoor air)	School children (Assessed as residential with homegrown produce)	Medium	Low	Moderate / Low	WS102 and CP101 is located below the proposed new building which is a sufficient break to the source-pathway-receptor link to the end users of the site. Should soft landscaping design be considered for the location of CP102 delineation locations, a 300mm clean and inert cover layer should be allowed for to	Allowance for a 300mm clean and inert cover layer for any soft landscaping near CP102. The proposed development plan shows soft landscaping.

Conceptual Site Model			Generic Qualitative Risk Assessment			Comments	Action
Identified Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating		
						break the source-pathway-receptor link to the end users of the site.	
	Direct contact and dermal uptake, soil and dust ingestion, dust & migration inhalation (outdoor air)	Construction and maintenance workers	Mild	Likely	Moderate / Low	Groundworks are likely to encounter these deposits below the proposed teaching block during development.	Standard Health & Safety precautions to be used by workers.
	Soil dust ingestion/inhalation produced during construction (indoor and outdoor air)	Adjacent residents	Medium	Unlikely	Low	Localities are situated below the proposed building footprint. Soils are likely to be sprayed with water to prevent the generation of dust.	No further action required.
	Vertical Migration through the residual soils	Water Environment (Groundwater)	Medium	Unlikely	Low	Groundwater has been recorded within the installed boreholes. However, the ground conditions are recorded as clay which is largely impermeable and prevents migration of any contamination present within the site soils.	No further action required.
	Horizontal Migration over and through the residual soils	Water Environment (Surface Water)	Mild	Unlikely	Very Low	Presence of clay soils which is largely impermeable will prevent migration of contamination present. No sensitive surface water receptors are present near the site.	No further action required.
Organic matter and/or contamination as source material for the generation of ground gas in remaining parts of the site.	(Ground gas & vapour) migration and inhalation	School children (Assessed as residential with homegrown produce)	Medium	Likely	Moderate	Methane has been recorded at 6.4%$^{v}/_{v}$. Carbon dioxide has been recorded at 12.3% $^{v}/_{v}$.	CS2 grade gas protection measures should be incorporated within the proposed building development.
		Construction and maintenance workers	Medium	Likely	Moderate	Methane has been recorded at 6.4%$^{v}/_{v}$. Carbon dioxide has been recorded at 12.3% $^{v}/_{v}$.	Standard Health & Safety precautions to be used by workers.

8.1 Summary of Significant Pollutant Linkages

The identified exceedances from the delineation holes and the new exploratory holes. Most locations are situated with existing hardstanding which is to be left untouched as part of the development, being re-surfaced with new hardstanding or the proposed building will break the source-pathway-receptor links and have been assessed as a low risk. Should soft landscaping be considered for the location of CP102 delineation locations, an allowance should be made for a 300mm clean and inert cover layer to break the source-pathway-receptor links. This is currently assessed as a Moderate / Low risk. Ground gas has been assessed as a Moderate risk due to the concentrations of carbon dioxide and methane.

9.0 Engineering Assessment and Recommendations

9.1 Introduction

This section will assess the relevant geotechnical issues for the proposed new school building, car parking and outdoor sports facilities. The proposed development plan is contained within Appendix A1. The engineering assessment considers foundation design, excavations, ground floor slabs and chemical attack on buried concrete for the site. Structural details and loadings have not yet been provided. It should be noted that detail may change in the development of designs beyond the issue of this Phase 2 Report and the Construction designer should satisfy themselves regarding the adequacy of their design and proposed approach to construction by reference to the on-going project design proposals, the site investigation information and their own examination of the site.

9.2 Summary of Ground Conditions

The ground conditions at the site generally comprised a layer of Made Ground up to 1.4m thick overlying Pennine Lower Coal Measures Formation proved to a maximum depth of 30m. Groundwater conditions are generally considered to be perched near existing ground surface.

The geotechnical parameters recommended for use in the design based on the ground conditions encountered are summarised in Table 9.2 below.

Table 9.2 - Geotechnical Parameters

Parameter	Highly Weathered Pennine Lower Coal Measures	Weathered Pennine Lower Coal Measures
Unit Weight, γ (kN/m^3) (1)	20	24
Undrained Shear Strength Cu (kPa) (2)	80	-
Unconfined Compressive Strength UCS (MPa) (2)	-	5
Coefficient of volume compressibility mv (m2/MN) (3)	0.267	-

(1) *From published sources (BS8002).*
(2) *Based on material descriptions, laboratory and in-situ testing.*
(3) *Based on oedometer testing from Watermans report over pressure range 0-160kPa.*

9.3 Foundation Design

It is understood that the proposed development of the site is to consist of a new school building. Loadings are unknown at present and are likely to pre-determine the suitability of the foundations to be adopted at the site.

Foundations should be placed beneath the made ground and outside the zone of influence of trees at the minimum founding depth of 0.9m based on medium volume change potential of the clay in accordance with the NHBC guidance.

It is considered that shallow spread foundations would be suitable to support the proposed development founding within the high strength clays at minimum depth of 0.9m bgl. Pad foundations could be considered with an estimated allowable bearing capacity of 150kN/m^2 for 2.5m^2 pads with total settlements in the order of 30mm, however, an allowance may be required to ensure serviceability of the building.

The exposed formations should be inspected and any soft zones should be removed and replaced with suitable compacted granular fill or lean mix concrete.

If the proposed structure requires greater design bearing values or is sensitive to settlement then it is considered that the structural loads could be transferred to the bedrock utilising a piled foundation. The carrying capacity of piles depends not only on their size and the ground conditions but also on their method of installation. Therefore, it is recommended that specialist Piling Contractors be contacted as to the suitability and carrying capacity of their piles in the ground conditions pertaining to the site.

9.4 Excavations

Based on observations on site and with reference to CIRIA report 97 Trenching Practice it is considered that excavations to less than 1.2 m depth from current ground levels should generally stand unsupported in the short term (1-14 days). Excavated side slope angles in wet made ground and highly weathered Pennine Lower Coal Measures of 10-20 degrees is likely to be suitable increasing to 20-30 degrees when dry.

Side support for safety purposes should of course be provided to all excavations which appear unstable, and those more than 1.20m deep, in accordance with Health and Safety Regulations. Groundwater may be encountered as seepages in shallow excavations for foundations or services. It is considered that groundwater inflows, if encountered, may be controlled by pumping from sumps.

Excavation through layers of Made Ground and highly weathered Pennine Lower Coal Measures encountered across the site should be feasible using conventional site plant. Following periods of heavy rainfall, the use of a tracked excavator may be required to prevent plant subsidence.

9.5 Mining Risks

The Coal Authority records show development high risk areas to the west of Burton Road. To investigate whether shallow coal seams have been worked historically but remain unrecorded, it was proposed to advance three rotary boreholes by open hole method to a maximum depth of 30m bgl.

Two of the rotary boreholes was positioned on the western half of the proposed school building, the remaining rotary borehole was positioned below the north-eastern corner of the of the proposed building.

As part of the site investigation works, no worked coal seams were encountered within any of the boreholes. No loss of flush was recorded which, could indicate the presence of a void. Broken ground was noted in RC02 between 24.7m-25.1m bgl and no recovery was recorded in RC03 between 8.6m-9.0m bgl. However, it is likely that the broken ground and no recovery is due to the drilling technique employed and not indicative of worked coal seams particularly due to the limited thickness (0.4m) recorded. The bedrock geology encountered below the site is considered to be the Pennine Lower Coal Measures Formation which is recorded to dip east by 10˚. Therefore, in accordance with the findings of the site investigation there is considered to be a low risk from coal mining at shallow depths and it is not considered any further action is required.

9.6 Ground Floor slabs

Given the thickness of made ground generally observed and distance of existing trees to the development it is considered that suspended ground floor slabs in accordance with NHBC Standards.

9.7 Chemical Attack on Buried Concrete

The classification of the site in terms of concrete in aggressive ground is based on the guidance provided in Table C2 of the Building Research Establishment (BRE) Special Digest: 3rd Edition: 2005. Based on the laboratory test results it is considered that a Design Sulphate Class for the soils at this site may be taken as DS-3. The site conditions would suggest that an ACEC class for the site of AC-3Z would be appropriate.

Table 9.7 - Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	ACEC Class (1)
Curtins results Pennine Lower Coal Measures	DS-1	AC-3Z
Watermans results Pennine Lower Coal Measures	DS3	AC-3

(1) ACEC assessment was based on the static groundwater condition for the scheme area

9.8 Pavement Assessment

On the basis of laboratory classification tests and descriptions of the material encountered it is recommended that for formation prepared in the Pennine Lower Coal Measures, a subgrade CBR value of 3% be adopted for pavement construction increasing to 5% once proof rolled.

Any areas of soft or deleterious material found should be excavated and replaced with a properly compacted granular fill.

It is recommended that in-situ CBR testing is carried out to give a more detailed picture of CBR values once formation levels are determined.

9.9 Soakaway Assessment

Given that Lower Pennine Coal Measures were encountered below made ground across the site and return visits encountered groundwater levels at or close to the surface it is considered that infiltration would not be a viable option for this development.

10.0 Conclusions & Recommendations

10.1 Conclusions

A tabulated Conceptual Site Model has been derived following the findings on the Generic Quantitative Risk Assessment risk assessment and is presented in Section 8.0.

10.1.1 Geotechnical Assessment

It is considered that shallow spread foundations could be adopted at the site founding within the high strength clays at 0.9m bgl. Pad foundations could be considered with an estimated allowable bearing capacity of 150kN/m^2 for 2.5m^2 pads with total settlements in the order of 30mm, however, an allowance may be required to ensure serviceability of the building.

The exposed formation should be inspected and any soft zones should be removed and replaced with suitable compacted granular fill or lean mix concrete.

Given the thickness of made ground generally observed and distance of existing trees to the development it is considered that suspended ground floor slabs in accordance with NHBC Standards.

Laboratory test results indicate a Design Sulphate Class for concrete may be taken as DS-3 and ACEC class of AC-3Z would be appropriate.

10.1.2 Ground Contamination

The environmental chemistry soil results have been compared with the Tier 1 criteria for soils with respect to human health against '*Residential with home grown produce'* thresholds as a conservative assessment for the pupils.

With respect to the proposed end use of the site, Tier 1 thresholds have been exceeded with regards to PAHs, Beryllium, Lead and TPHs within five new locations and laterally from the existing locations which were completed previously by Watermans. Most locations are situated beneath existing hardstanding which is to remain, new hardstanding and situated below the building footprint removing the source-pathway-receptor links. The locations of CP102 and associated delineation locations appear to be situated close to proposed soft landscaping. Therefore, a 300mm clean and inert cover layer should be allowed for near CP102 and the associated delineation locations to break the source-pathway-receptor link.

10.1.3 Waste Assessment Criteria Analysis

Two of the fourteen samples have exceeded the inert thresholds. One of the asphalt samples returned as hazardous waste for off-site disposal purposes. The remaining asphalt sample

returned as inert waste for off-site disposal purposes. One of the made ground materials returned as stable non-reactive (non hazardous) waste. The three natural soils all returned as inert waste for off-site disposal purposes.

10.1.4 Ground Gas Assessment

Six gas monitoring visits have been undertaken, with maximum carbon dioxide concentration of 12.3% v/v, maximum methane concentration of 6.4% and a maximum flow of 1.1l/hr. The risk to the end user the development site from soil gases is therefore considered to be Moderate. The gas regime for the site is classified as CS2, requiring gas protection measures.

The BGS Radon Mapping confirms the site is situated in an area where less than 1% of homes are above the radon action level. Radon protection measures are therefore not considered necessary within the proposed development. However, where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

10.2 Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

1) It is recommended that construction workers are provided with appropriate PPE and sanitary facilities regarding the environmental testing results presented herein and within *Appendix A3*.

2) The presence of elevated concentrations of; PAH, TPH, Heavy Metals and Asbestos in the made ground soils presents a potential risk to site end users. It is therefore recommended that current site plans within areas of identified contamination remain planed as building foot print and hardstanding within areas of current hardstanding in order to break the SPR linkage.

3) The development plans indicate an area of soft landscaping planned within the location of contamination highlighted by CP102 and subsequent delineation locations. This area will require 300mm of clean inert capping to break the source receptor pathway.

4) Should imported topsoil be required for the proposed soft landscaping, chemical testing will be required to prove the material is suitable for use.

5) It is recommended that construction workers are provided with appropriate PPE and sanitary facilities with reference to the environmental testing results presented herein and within *Appendix A3*.

6) Developments will need to incorporate CS2 grade gas protection measures due to the levels of CO2 and CH4 present.

7) New water supply pipes will be required to be upgraded to barrier pipe.

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8) Allowance for a Remediation Strategy of the site to detail gas protection measures. Allowance for a Verification Report will be required to record the installation of gas protection measures and independent verification works.

9) If ground conditions differ significantly during construction works from those encountered during the ground investigation, Curtins should be contacted to review the nature of the issue identified.

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11.0 References

1 Environment Agency (2004) Model *Procedures for the management of land Contamination Contaminated Land Report 11* (CLR11).

2 British Standards Institution (2011) *Investigation of Potentially Contaminated Sites* (report no. BS10175).

3 British Standards Institution BSI (2010) *Code of Practice for Site Investigations* (report no.BS5930).

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5 British Standards Institution (2013) *Guidance on Investigations for Ground Gas, Permanent Gas and Volatile Organic Compounds (VOCs)* (report no.BS8576:2013).

6 Environment Agency (2014) *Contaminated Land Exposure (CLEA) Tool* (version 1.06).

7 Environment Agency (2009) *Human Health Toxicological Assessment of Contaminants in Soil* (report no. SC050021/SR2)

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9 Department of Environment Food and Rural Affairs (DEFRA) (2012) *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (report no. PB13735).*

10 CIRIA (2007) *Assessing Risks Posed by Hazardous Ground Gases to Buildings* (report no. C665)

11 British Standards Institution (2015) *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (report no.BS8485).

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14 Environment Agency (2006) Remedial *Targets Methodology - Hydrogeological Risk Assessment for Land Contamination* (report no.ea/br/e/std/vr10thanni)

15 Water, England and Wales (2000) *The Water Supply (Water Quality) Regulations 2000* (report no. 3184)

16 Water quality standards as per Water Framework Directive Regulations 2015.

17 Environment Agency (2015) *Guidance on the Classification and Assessment of Waste Technical Guidance WM3* (1st Edition 2015)

18 Watermans Geo-Environmental Assessment Report ref: WIE10720-102-18-2-1-Geo-Env dated January 2017.

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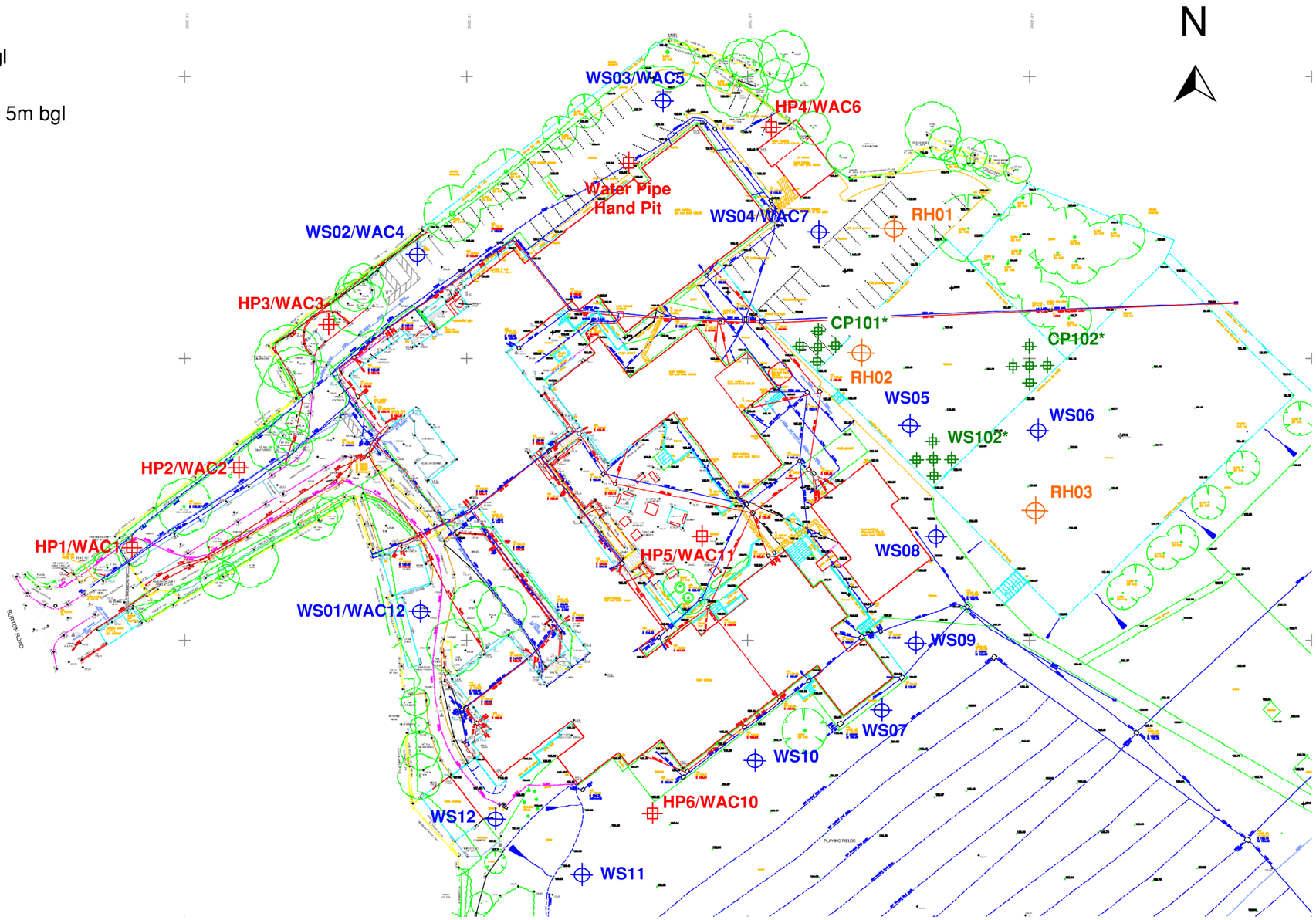
Appendix A1 – Drawings

- Curtins drawing ref. 064491-CUR-00-XX-DR-GE-00001-V04_Exploratory Hole Location Plan
- Curtins drawing ref. 064491-CUR-00-XX-DR-GE-00002-V01_Diagrammatic Conceptual Model
- Development Plan

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- Rotary Open Hole up to maximum 30m bgl
- Window Sample Borehole up to maximum 5m bgl
- Hand Excavated Trial Pits
- Hand Excavated Delineation Trial Pits

* Denotes that five hand pits are required at each previous exploratory hole. One at the original position then north, east, south and west respectively.



GENERAL NOTES:

Rev:	Description:	Date:	By:
---	DRAFT Proposed Plan	23/11/17	RS

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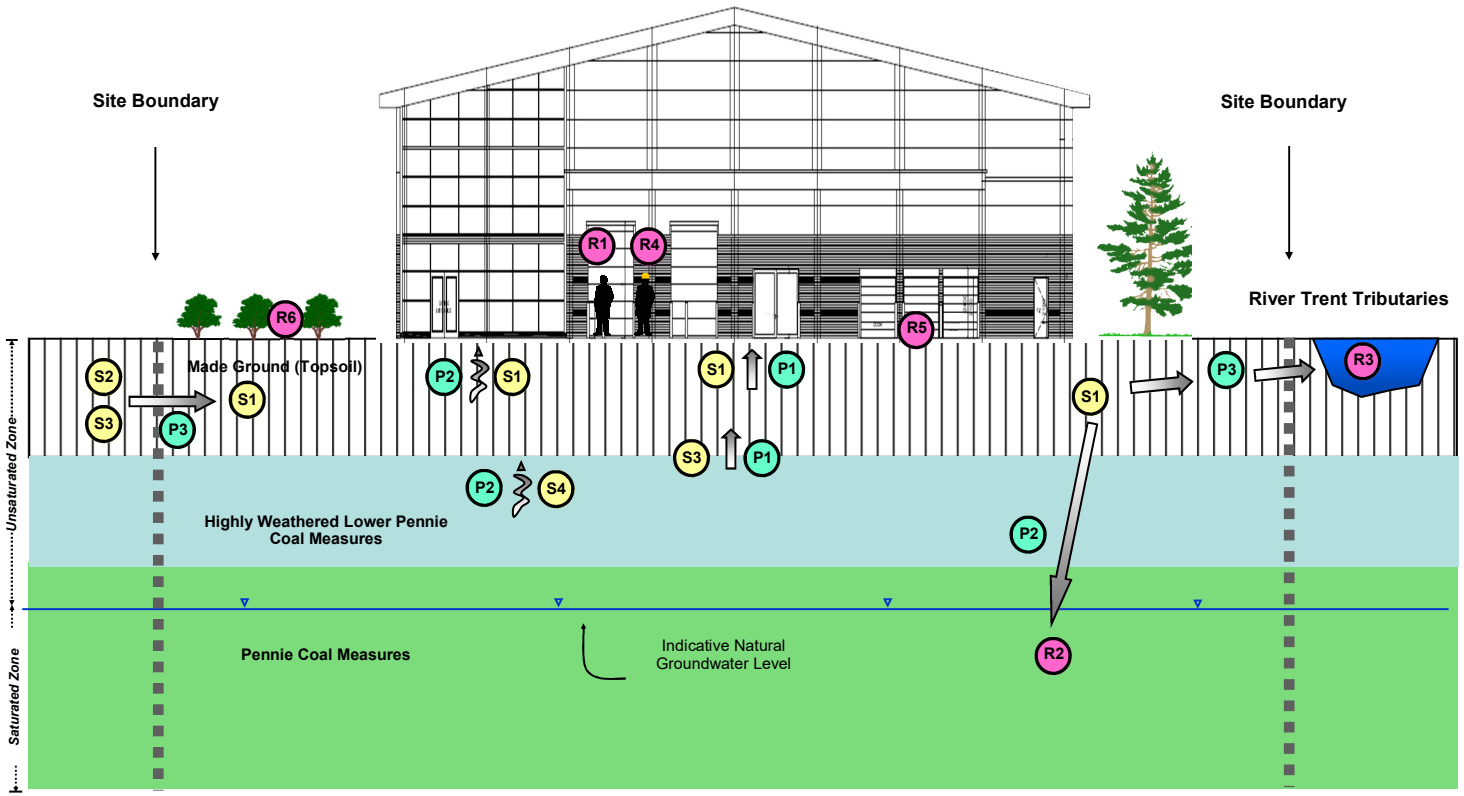
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Status: ISSUE

Drawn By:	RS	Checked By:	RS
Designed By:	RA	Date:	03/11/2017
Scale:	NTS		

Project No:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
064491	CUR	00	XX	DR	GE	00001	V04

Granville Community College



Sources

- S1 Made-ground (On site)
- S2 Made-ground (Off site)
- S3 Natural soils (On & off site)
- S4 Ground gas sources

Pathways

- P1 Direct contact, ingestion and or inhalation
- P2 Vertical migration
- P3 Horizontal migration

Receptors

- R1 End users
- R2 Groundwater
- R3 Surface water
- R4 Construction workers
- R5 Construction materials
- R6 Local ecology

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Project	Job Reference	Author	Client
Granville Community College	064491	ST	Kier Construction Ltd
Drawing Title	**Date**	**Checked**	**Scale**
Diagrammatic Conceptual Model	05.02.2018	RA	Not to scale

2 N° PARKING SPACES RE-LINED HERE @ 5.5 x 2.4m

EXISTING PARKING SPACES RE-LINED HERE FOLLOWING COMPLETION OF CONSTRUCTION WORKS; SIZE TO MATCH EXISTING

EXISTING TREES REMOVED DUE TO DEMOLITION OF ADJACENT EXISTING BUILDINGS

AREA NOT SURVEYED

NEW CAR PARK (75 N° SPACES TOTAL ACROSS SITE INC. 4 ACCESSIBLE & 1 MINIBUS)

MINOR REINSTATEMENT WORKS TO EXISTING SURFACE AROUND NEW BASE TO NEW BIN STORE AREA

NEW STEPS & RAMP

NEW STEPS INSIDE ENTRANCE PORCH TO ARCHITECT DETAIL

EX FFL 125.64 TBC

EX FFL 124.71 TBC

EX FFL 124.71 TBC FIRE ESCAPE

MINOR KERB REALIGNMENT WORKS TO ASSIST WITH SITE LOGISTICS DURING CONSTRUCTION PHASE. TO BE RETAINED IN FINAL LAYOUT

EXISTING LAMP-POST TO BE RELOCATED

NEW KERB INSTALLED TIGHT TO FACE OF EXISTING TELEGRAPH POLE

CONDITION OF EXISTING ROAD SURFACE TO BE INSPECTED & PATCHED WHERE NECESSARY FOLLOWING COMPLETION OF MAIN WORKS

A

REINSTATEMENT WORKS REQUIRED TO EXISTING STEPS & SURFACE INCLUDING HAND-RAIL

REINSTATEMENT WORKS REQUIRED TO EXISTING STEPS & SURFACE. INCLUDING HAND-RAIL

NEW TARMAC MAINTENANCE MARGIN TO EXISTING FACADE

MINOR REINSTATEMENT WORKS TO PLAYING FIELD FOLLOWING REMOVAL OF TEMPORARY PARKING SPACES

POROUS TARMAC MUGA WITH COURT MARKINGS AND NEW FENCE TO PERIMETER

EXISTING TREE REMOVED TO FACILITATE CONSTRUCTION OF NEW MUGA

NEW PEDESTRIAN RAMP TO MUGA & VEHICLE ACCESS RAMP FOR OVERFLOW PARKING

AREA OF SOIL RETENTION MATTING WHERE BANK EXCEEDS 1:3 GRADIENT

NEW FOOTPATH TO TIE INTO EXISTING

MAX 1:3 BANK TIE INTO EXISTING

EXISTING TREES REMOVED TO FACILITATE CONSTRUCTION OF NEW BUILD

SCOPE OF POSSIBLE FUTURE SPORTS HALL EXTENSION

EXISTING HARD OUTDOOR PLANCA RESURFACED WITH NON-POROUS TARMAC TO CONSISTENT FALLS RESULTING IN MINOR CHANGES TO EXISTING LEVELS

AREA LINED WITH COURT MARKINGS AND NEW FENCE INSTALLED TO PERIMETER WHERE EXISTING DAMAGED DUE TO RESURFACING WORKS & ADJACENT CONSTRUCTION WORKS

EXISTING HARD INFORMAL PLAY AREA LINED WITH COURT MARKINGS & FENCE ADDED TO PERIMETER

NO WORKS TO EXISTING SURFACE EXCEPT FOR MINOR REINSTATEMENT WORKS TO EDGE WHERE NEW FENCE INSTALLED

PCC KERB / EDGE; REFER TO Q10

WALL TYPE 1 - INSITU CONCRETE; REFER TO E41 & ENGINEERS DETAIL

PROPOSED ASPHALT TO ENGINEERS SPECIFICATION

POROUS ASPHALT TO ENGINEERS SPECIFICATION

EXISTING ASPHALT TO BE RESURFACED TO ENGINEERS SPECIFICATION

INSITU CONCRETE BASE; REFER TO E41 & ENGINEERS DETAIL

HAZARD WARNING TACTILE - CORDUROY; REFER TO Q25

HAND-RAIL; REFER TO L37

BALUSTRADE; REFER TO L37

INSITU CONCRETE STEPS; REFER TO E41 & ENGINEERS DETAIL WITH STEP NOSING; REFER TO L37

CHANNEL DRAIN / DISHED CHANNEL; REFER TO Q10 & TO ENGINEERS DETAIL (DETAILED DRAINAGE DESIGN BY ENGINEER)

WHITE LINING; REFER TO Q10

YELLOW LINING; REFER TO Q10

EXISTING TREE TO BE RETAINED REFER TO DETAIL DRAWING

EXISTING TREE TO BE REMOVED REFER TO DETAIL DRAWING

PROPOSED TREE; EHS TO MAIN SITE, STD TO BOUNDARY; REFER TO Q31

AMENITY GRASS SEED; REFER TO Q30

SHRUB PLANTING; REFER TO Q31

NATIVE WOODLAND MATRIX PLANTING; REFER TO Q31

BOUNDARY FENCE TO MATCH EXISTING; GATES TO MATCH; HEIGHT 2.4m; REFER TO Q40

SPORTS WELDMESH FENCE; GATES TO MATCH; HEIGHT 3.0m; REFER TO Q40

VEHICLE BARRIER; REFER TO Q40

DOOR BARRIER; REFER TO Q41

COURT LINE-MARKINGS; TENNIS

COURT LINE-MARKINGS; NETBALL

COURT LINE-MARKINGS; BASKETBALL

COURT LINE-MARKINGS; 5-A-SIDE FOOTBALL

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ITEM N°	RISK REGISTER DETAILS

REV	DESCRIPTION	DRAWN	CHECK	DATE
07	STAGE 03 UPDATED FOLLOWING CEM 09 - ISSUED FOR COMMENT. A) NOTE ADDED REGARDING INSPECTION OF EXISTING ROAD SURFACE.	SPR	AA	25/01/18
06	STAGE 03 UPDATED FOLLOWING CEM 09 - ISSUED FOR COMMENT. A) REMOVE EXISTING TREES REMOVED DUE TO ADDITIONAL EXISTING TREE SHOWN FOR REMOVAL AS A RESULT. B) RAMP WIDTH ADJUSTED TO ENSURE PART M COMPLIANCE. C) ADDITIONAL STEPS ADDED TO ENSURE PART M COMPLIANCE. D) ADDITIONAL SIGNS LISTED AS NEEDED TO IMPROVE PEDESTRIAN ACCESS E) ADDITIONAL HANDRAILS ADDED TO STEPS F) ADJUSTED LAYOUT TO TEMPORARY PARKING AMENDED TO ALLOW FOR 1 HV ACCESS G) ADDITIONAL PROPOSED TREE ADDED TO COMPENSATE FOR LOSS UNDER A. H) ADDITIONAL TREE ADDED TO COMPENSATE FOR LOSS UNDER A. I) SCOPE OF TARMAC REINSTATEMENT AMENDED TO TIE INTO LOT LOSS OF EXISTING BUILDING. J) NOTE ADDED REGARDING MINOR REINSTATEMENT WORKS TO PLAYING FIELD FOLLOWING REMOVAL OF TEMPORARY PARKING K) TARMAC MARGIN AROUND ENTRY DOOR AMENDED TO IMPROVE ACCESS - WALLSTRIKE ADDED TO ENSURE PEDESTRIAN ACCESS IS NOT COMPROMISED L) NOTE LINING ADDED TO DOWNHILL FOOT VEHICLE ACCESS M) 2 N° BOLLARDS ADDED TO CONTROL MEWP ACCESS AROUND NEW BUILD N) NOTE ADDED REGARDING STAGE WORKS NEEDED IN ORDER TO ALLOW BRIEL TO BE SECURED TO	SPR	AA	24/01/18
05	STAGE 02 UPDATED FOLLOWING DTM - ISSUED FOR COMMENT. A) NOTE ADDED TO SHOW EXISTING BALUSTRADE TO BE RETAINED B) ADDITIONAL STEPS ADDED TO ENSURE PART M COMPLIANCE ACCESS C) LOWERED LOWER RAMP AMENDED TO SUIT LEVELS D) ADDITIONAL HANDRAILS ADDED TO ENSURE PART M COMPLIANCE E) NOTE ADDED REGARDING TEMPORARY PARKING SPACES	SPR	AA	22/01/18
04	STAGE 02 UPDATED FOLLOWING DTM - ISSUED FOR COMMENT. A) ADDITIONAL PROPOSED TREE ADDED B) EXISTING TREES TO BE REMOVED NOW SHOWN AS RETAINED C) NOTE ADDED REGARDING TREE TO MAINTAIN T1 REPLACEMENT STRATEGY D) DRAINAGE LAYOUT AMENDED E) SAMPLE PLANTING & SOIL RETENTION MATTING ADDED	SPR	AA	19/01/18
03	STAGE 02 UPDATED FOLLOWING CEM 05 PART 02 - ISSUED FOR COMMENT. A) ADDITIONAL PROPOSED TREE ADDED B) RAMP ADDED TO PROVIDE PEDESTRIAN ACCESS C) RAMP ADDED TO PROVIDE ACCESS TO MUGA AND RAMP STRATEGY FOLLOWING ENGINEER COMMENT D) STEP / RAMP ACCESS REALIGNED FOLLOWING CLIENT COMMENT E) ADDITIONAL HANDRAILS ADDED TO ENSURE PART M COMPLIANCE FOLLOWING CLIENT COMMENT F) SOFT LANDSCAPE BED AMENDED TO ALLOW FOR LEVEL CHANGE G) DRAINAGE LAYOUT TO CAR PARK AMENDED FOLLOWING ENGINEER COMMENT H) NOTE ADDED REGARDING TEMPORARY PARKING SPACES FOLLOWING CLIENT COMMENT I) DOWNHILL GATES TO MEN BOUNDARIES DELETED FOLLOWING CLIENT COMMENT	SPR	AA	15/01/18
02	STAGE 02 FIRST ISSUE - FOR INFORMATION ONLY & DISCUSSION AT CEM 05 PART 02	SPR	AA	15/01/18
01	STAGE 02 FIRST ISSUE - FOR INFORMATION ONLY & DISCUSSION AT CEM 05	SPR	AA	09/01/18

KEY PLAN

CLIENT

KIER | Education & Skills Funding Agency

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PROJECT TITLE
GRANVILLE SPORTS COLLEGE

DRAWING TITLE
OVERALL SITE PLAN - WORK IN PROGRESS

SCALE @ A0
1:200

DATE
JAN_18

PROJECT No.
0450

DRAWING No.
0450-PLI-00-ZZ-SK-L-0977

REVISION
07

SCALE BAR @ 1:200
0 2 4 10 18m

Appendix A2 – Exploratory Hole Logs

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Borehole Log

Borehole No.
CP101C
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
								MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subangular clinker and slag. With rare angular to subangular clinker cobbles.
					0.50			Firm brown mottled grey silty CLAY.
		0.60	ES		0.60			Delineation depth reached.
					0.60			End of borehole at 0.60 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
CP101E
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
								MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subangular clinker and slag. With rare angular to subangular clinker cobbles.
					0.40			Firm brown mottled grey silty CLAY.
		0.60	ES		0.60			Delineation depth reached.
					0.60			End of borehole at 0.60 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **CP101N**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
								MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subangular clinker and slag. With rare angular to subangular clinker cobbles.
					0.40			Firm brown mottled grey silty CLAY.
		0.60	ES		0.60			Delineation depth reached.
					0.60			End of borehole at 0.60 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
CP101S
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
								MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subangular clinker and slag. With rare angular to subangular clinker cobbles.
					0.50			Firm brown mottled grey silty CLAY.
		0.60	ES		0.60			Delineation depth reached.
					0.60			End of borehole at 0.60 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **CP101W**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
					0.30			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subangular clinker and slag. With rare angular to subangular clinker cobbles.
		0.60	ES		0.60			Firm brown mottled grey silty CLAY.
					0.60			Delineation depth reached. End of borehole at 0.60 m

1

2

3

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No.
CP102C
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
		0.25	ES		0.25			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, slag, clinker, concrete and limestone.
					0.25			Delineation depth reached.
								End of borehole at 0.25 m

1
2
3

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **CP102E**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
		0.25	ES		0.25			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, slag, clinker, concrete and limestone.
					0.25			Delineation depth reached.
								End of borehole at 0.25 m

1

2

3

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
CP102N
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
		0.25	ES		0.25			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, slag, clinker, concrete and limestone.
					0.25			Delineation depth reached.
								End of borehole at 0.25 m

1
2
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Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No.
CP102S
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
		0.25	ES		0.25			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, slag, clinker, concrete and limestone.
					0.25			Delineation depth reached.
								End of borehole at 0.25 m

1
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Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **CP102W**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
		0.25	ES		0.25			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, slag, clinker, concrete and limestone.
					0.25			Delineation depth reached.
								End of borehole at 0.25 m

1

2

3

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **HP01/WAC01**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 04/12/2107 - 04/12/2107	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Grass over soft slightly sandy clay topsoil.
		0.30	ES & D		0.40			MADE GROUND: Firm brown sandy gravelly silt. Gravel is fine to coarse, angular to subrounded brick, sandstone, concrete and mudstone.
					0.60			Stiff to very stiff gravelly SILT. Gravel is fine to coarse, angular to subrounded mudstone.
					0.60			Refusal. End of borehole at 0.60 m

1

2

3

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No.
HP02/WAC02
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 04/12/2107 - 04/12/2107	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40 0.40 0.40	D ES ES & D		0.30			MADE GROUND: Firm brown sandy silt topsoil.
					1.20			Firm to stiff brown mottled grey silty CLAY. End of borehole at 1.20 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
HP03/WAC03
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 04/12/2107 - 04/12/2107	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30 0.30	D ES		0.10			MADE GROUND: Brown mottled black silty gravelly fine to coarse sand. Gravel is fine to coarse, angular to rounded quartzite, mudstone, brick, concrete and siltstone. MADE GROUND: Firm brown sandy silt.
					0.50			Firm brown sandy SILT.
					1.20			End of borehole at 1.20 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
HP04/WAC06
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 04/12/2107 - 04/12/2107	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05			MADE GROUND: Asphalt.
					0.20			MADE GROUND: Red brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded brick, concrete and mudstone. With rare angular to subangular brick cobbles.
		0.50 0.50	D ES					MADE GROUND: Soft to firm green grey sandy gravelly clay. Gravel is fine to coarse, angular to subrounded brick.
					0.80			Soft to firm greensih brown silty CLAY.
					1.20			End of borehole at 1.20 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **HP05/WAC11**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 0.10	D ES		0.10			MADE GROUND: Asphalt.
					0.40			MADE GROUND: Soft to firm brown mottled yellow and black sandy gravelly clay. Gravel is fine to coarse, angular to subrounded mudstone, ash, clinker and quartzite. With rare angular to subangular slag cobbles.
		0.50 0.50	D ES					MADE GROUND: Soft to firm brown mottled yellow and black sandy silty clay. With occasional angular to subangular slag cobbles.
					1.10			MADE GROUND: Pea Gravel.
					1.20			End of borehole at 1.20 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No.
HP06/WAC10
Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grass over soft brown sandy clay.
					0.30			Firm brown mottled orange sandy rarely gravelly CLAY. Gravel is fine to medium, subangular to subrounded mudstone.
	▼	1.00 1.00 1.00	B D ES		0.80			Stiff brown mottled grey silty CLAY. With occasional pockets of black carbonaceous material.
					1.20			End of borehole at 1.20 m

1
2
3

Remarks

AGS

Rotary Core Log

Borehole No.
RC01
Sheet 1 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										MADE GROUND: Asphalt
							0.10			MADE GROUND: Brick / Gravel
							0.40			Firm brown CLAY
										Continued on next sheet

1

2

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC01**

Sheet 2 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							2.10			Grey/Brown MUDSTONE
		3.00 - 3.60	NI	580	90	90	3.00			Soft brown gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone.
			5				3.50			Extremely Weak greyish brown, fissured MUDSTONE. Highly weathered.
		3.60 - 4.20	50	240	0	0				

3

4

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC01**

Sheet 3 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		4.20 - 4.80	50	420	0	0				
							4.80			Very weak thinly laminated grey MUDSTONE. Pennie Lower Coal Measures) Moderately weathered.
		4.80 - 6.30	34	1400	590	1390				

5

6

Continued on next sheet

Remarks

No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC01**

Sheet 4 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							6.30			Weak thinly laminated black carbonaceous MUDSTONE. (Coal). Moderately weathered with frequent coal inclusions.
							6.37			Extremely Weak, fissured greyish brown MUDSTONE. Highly weathered.
		6.30 - 7.20		1460	740	43				
							6.80			Weak thinly laminated grey MUDSTONE. (Pennie Lower Coal Measures). Moderately weathered with close bedding fractures.
										7
										8

Continued on next sheet

Remarks

No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC01
Sheet 5 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

9

10

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC01**

Sheet 6 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description	
							11.00			COAL	11
							11.90			Grey MUDSTONE/SILTSTONE	12
										Continued on next sheet	

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC01
Sheet 7 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

13

14

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC01
Sheet 8 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

15

16

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC01
Sheet 9 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

17

18

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC01**

Sheet 10 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							18.30			COAL
							18.60			Grey MUDSTONE/SILTSTONE
										Continued on next sheet

19

20

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC01**

Sheet 11 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							21.40			COAL
							21.60			Grey MUDSTONE/SILTSTONE
										Continued on next sheet

21

22

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC01
Sheet 12 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

23

24

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC01**

Sheet 13 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
	▼						25.30			Grey SANDSTONE
							25.80			Grey MUDSTONE/SILTSTONE
										Continued on next sheet

25

26

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC01
Sheet 14 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

27

28

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC01
Sheet 15 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 30/11/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
										29
							30.00			End of borehole at 30.00 m 30

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC02**

Sheet 1 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							0.10			MADE GROUND: Asphalt
										MADE GROUND: Crushed subbase stone.
							0.30			Stiff brown CLAY.
							1.50			Grey MUDSTONE
										Continued on next sheet

1

2

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC02**

Sheet 2 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							2.80			Grey MUDSTONE.
							3.10			Grey MUDSTONE / SILTSTONE.
										Continued on next sheet

3

4

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC02**

Sheet 3 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
							6.00			Continued on next sheet

5

6

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC02**

Sheet 4 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		6.00 - 7.50	25	148	34	20				Light grey unweathered very fine grained intensely laminated SILTSTONE. Thinly bedded with sub-horizontal fractures which are smooth and infilled with clay.
							7.50			Medium hard, thinly laminated, black, very fine grained MUDSTONE (MUDSTONE) (Pennie Lower Coal Measures). Highly weathered, thinly bedded with rare pyrite.

7

8

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC02**

Sheet 5 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
			50							
		8.40 - 8.53	C							
		7.50 - 9.00		128	36	28				
		8.55 - 8.72	C							
			50							
							9.20			Very weak, light grey, fissured, very fine grained MUDSTONE. (Pennie Lower Coal Measures). Highly weathered, thinly bedded.
			3				9.34			Recovered as Soft to firm Light grey very gravelly CLAY. Gravel is fine to coarse angular to subangular mudstone.
		9.00 - 10.50	50	76	34	13				
							9.60			Very weak, fissured, light grey, very fine grained MUDSTONE. (Pennie Lower Coal Measures). Highly weathered thinly bedded.
			7				9.76			Recovered as Soft to firm Light grey very gravelly CLAY. Gravel is fine to coarse angular to subangular mudstone.
										Continued on next sheet

9

10

Remarks

No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC02**

Sheet 6 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
			50							
							10.50			Becomes Medium Strong
			20							
		11.00 - 11.11	C							
		11.14 - 11.26	C							
		10.50 - 12.00		146	110	88				
		11.34 - 11.46	C							
							11.40			Medium Strong, thinly laminated, light grey, fine grained SILTSTONE. (Pennie Lower Coal Measures). Fractures are narrow clean smooth and horizontal.
		11.53 - 11.67	C							
		11.67 - 11.90	C 5							
							12.00			Continued on next sheet

11

12

Remarks

No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 7 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Grey MUDSTONE/SILTSTONE
										13
										14
										Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 8 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

15

16

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 9 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

17

18

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC02**

Sheet 10 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							18.10			COAL
							18.50			Grey MUDSTONE/SILTSTONE
										Continued on next sheet

19

20

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 11 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

21

22

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC02
Sheet 12 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

23

24

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC02**

Sheet 13 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
	▼						24.70			Broken Ground
							25.10			Grey MUDSTONE/SILTSTONE
										Continued on next sheet

25

26

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 14 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

27

28

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC02
Sheet 15 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 01/12/2017 - 04/12/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
										29
							30.00			End of borehole at 30.00 m 30

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC03**

Sheet 1 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							0.15			MADE GROUND: Asphalt
										MADE GROUND: Firm greyish brown gravelly CLAY.
							0.50			Stiff brown CLAY
							1.50			Stiff grey CLAY
										Continued on next sheet

1

2

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC03**

Sheet 2 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description	
							3.00			Firm to stiff greyish brown gravelly CLAY. Gravel is fine to coarse grained and angular of mudstone and ironstone.	3
			NI				3.25			Extremely weak thinly laminated brownish grey MUDSTONE. Completely weathered recovered as a gravel with clay infill.	
		3.33 - 3.39	NI C				3.33			Medium strong with localised areas of strong brownish grey MUDSTONE. Slightly weathered with iron oxide staining along bedding planes. Small plant fossils also present.	
		3.00 - 4.50		100	57	36				*Sub-vertical fracture with iron oxide staining on surface. Stepped and rough.*	
										Sub-horizontal fracture with iron oxide staining on surface. Planar and smooth.	
										Sub-horizontal fracture with iron oxide staining present. Planar and smooth.	
			4							*Vertical fracture with small area of iron oxide staining on surface. Planar and smooth.*	
		3.80 - 3.94	C							*Drilling induced fractures, horizontal.*	
										Continued on next sheet	4

Remarks

No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC03**

Sheet 3 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							4.22			
			NI							Stiff to very stiff brownish grey slightly sandy CLAY. 4.30 - 4.40 recovered as fine to medium grained and angular gravel.
							4.40			
										Medium strong thinly laminated brownish grey sandy MUDSTONE. Slightly weathered with extremely closely spaced discontinuities.
			0							
							4.77			
		4.83 - 4.89	C				4.83			Fine to coarse grained and angular GRAVEL of completely weathered mudstone.
			4							Weak to medium strong thinly laminated brownish grey slightly sandy SILTSTONE. Slightly weathered with thin banding of dark and light grey material which occurs more often with depth. Closely spaced discontinuites.
			0							*Vertical fracture with iron oxide staining. Planar and smooth. Horizontal fractures planar and smooth. Bedding planes with iron oxide staining.*
			5							
		5.16 - 5.30	C							
		4.50 - 6.00		100	80	7				
			0				5.28			Fine to coarse grained and angular GRAVEL of sandy mudstone with infilling of grey clay.
							5.37			Medium strong thinly laminated dark and light grey slightly sandy SILTSTONE. Slightly weathered very closely to closely spaced discontinuities.
			9							*Horizontal and vertical fractures with minor iron oxide staining. Undulating smooth and partly open.*
			0							
										Horizontal and sub-horizontal fractures with strong iron oxide staining. Undulating planar and tight.
		5.77 - 5.84	C 13							
		6.00 - 6.09	C				6.00			

Continued on next sheet

Remarks

No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC03**

Sheet 4 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
			0							Weak to medium strong thinly laminated dark and light grey slightly sandy MUDSTONE. Slightly weathered with extremely closely to closely spaced discontinuities. One sub-vertical fracture.
		6.22 - 6.32	C							*Sub-vertical fracture with iron oxide stained face. Extremely closely spaced, undulating and smooth.*
			0							
			4							*Vertical fracture with iron oxide stained face. Closely spaced, planar and smooth.*
			0				6.48			Weak thinly laminated black COAL with thin white bands.
							6.53			Extremely weak with localised areas of weak, thinly laminated dark and light grey MUDSTONE with occasional thin bands of coal. Highly weathered.
		6.00 - 7.50		100	83	54				
		6.85 - 7.00	C							
			0							
		7.10 - 7.18	C							
							7.37			Initially firm becoming stiff grey CLAY with occasional gravel of mudstone.
			NI							
			0				7.67			Weak thinly laminated dark grey MUDSTONE. Slightly weathered, extremely closely spaced discontinuities. Plant fossils are present.
			NI							*Vertical and horizontal fractures recovered as gravel.*
							7.90			Medium strong thinly laminated dark grey MUDSTONE. Fresh with closely to medium spaced fractures. Plant fossils present.

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No. **RC03**

Sheet 5 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		8.17 - 8.22	C							
			0							
		8.40 - 8.52	C							
		7.50 - 9.00		73	55	30				
							8.60			No recovery.
			NR							
							9.00			Grey MUDSTONE / SILSTONE.
										Continued on next sheet

9

10

Remarks

No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC03
Sheet 6 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

11

12

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC03
Sheet 7 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
										13
										14
										Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No. **RC03**

Sheet 8 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							14.80			COAL.
							15.30			Grey MUDSTONE / SILTSTONE.
										Continued on next sheet

15

16

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC03
Sheet 9 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

17

18

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC03
Sheet 10 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

19

20

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC03
Sheet 11 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
	▼									21
										22
										Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC03
Sheet 12 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

23

24

Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC03
Sheet 13 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
										25
										26
										Continued on next sheet

Remarks
No flush loss or significant evidence of ground workings.

AGS

Rotary Core Log

Borehole No.
RC03
Sheet 14 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
							27.80			Dark grey MUDSTONE.
										Continued on next sheet

27

28

Remarks
No flush loss or significant evidence of ground workings.

Rotary Core Log

Borehole No.
RC03
Sheet 15 of 15

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type RC
Location: Granville Community College		Level:	Scale 1:10
Client: Kier Construction Ltd		Dates: 29/01/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										29
							30.00			End of borehole at 30.00 m 30

Remarks
No flush loss or significant evidence of ground workings.

AGS

Borehole Log

Borehole No. **WS01/WAC12**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 29/11/2017 - 29/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 0.10	D ES		0.10			MADE GROUND: Asphalt.
		0.50 0.50	D ES		0.60			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to rounded limestone, mudstone, ash, clinker, quartzite, siltstone and concrete.
		1.20 1.20	D	N=8 (1,1/2,2,2,2)	1.00			Firm green grey slightly sandy, slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded quartzite and mudstone.
		2.00		N=25 (3,4/6,6,6,7)	1.90			Firm blue grey mottled brown CLAY. With occasional old decaying rootlets (no odour).
		2.70 2.70	D	N=62 (10,10/12,15,18,17)	2.70 2.70			Stiff blue grey mottled brown rarely gravelly CLAY. Gravel is With occasional old decaying rootlets (no odour).
								Refusal on possible SILTSTONE. End of borehole at 2.70 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **WS02/WAC04**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 29/11/2017 - 29/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	D		0.10			MADE GROUND: Aspahlt.
		0.10	ES		0.20			MADE GROUND: Light yellow brown sandy gravel of fine to coarse, subangualr to subrounded limestone. (Road Stone).
		0.50	ES					MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded brick, ash, slag and concrete. With frequent angular brick cobbles.
					0.80			MADE GROUND: Black brown clayey gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded brick, ash, slag and concrete. With frequent angular brick cobbles.
					1.00			
					1.10			MADE GROUND: Firm brown mottled black sandy gravelly clay. Gravel is fine to coarse, angular to subrounded ash, slag, brick and clinker.
		1.20	D					
		1.20		N=9 (2,2/2,2,2,3)				Firm to stiff brown sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to subrounded mudstone.
		2.00		N=26 (3,3/4,7,7,8)				
		2.50	D					
		2.50		N=58 (10,12/12,12,16,18)				
					3.00			Refusal on possible SILTSTONE.
					3.00			End of borehole at 1.10 m

1 2 3 4 5

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS03/WAC05**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 29/11/2017 - 29/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
		0.50 0.50	D ES					MADE GROUND: Soft sandy gravelly clay. Gravel is fine to coarse, subangular to subrounded brick, sandstone, mudstone, quartzite and concrete.
					0.90			MADE GROUND: Soft green grey sandy gravelly clay. Gravel is fine to coarse, angular to subrounded carbonaceous mudstone, brick, ash and clinker. (Reworked clay).
		1.20		N=7 (1,1/1,2,2,2)				
					1.40			Firm brown slightly sandy slightly gravelly CLAY. Gravel is fine, subrounded to rounded mudstone and quartzite.
		1.50 1.50	D ES					
		2.00 2.00	D	N=14 (2,2/3,3,3,5)	2.10			Firm brown mottled multicoloured silty CLAY.
					2.80			Very stiff brown mottled multicoloured silty CLAY.
		3.00 3.00	D	N=51 (5,8/8,12,15,16)	3.00 3.00			Refusal on possible MUDSTONE. End of borehole at 3.00 m

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS04/WAC07**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 30/11/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.13			MADE GROUND: Asphalt.
					0.25			MADE GROUND: Red brown very gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded brick, concrete, limestone, mudstone and quartzite.
		0.50	D					MADE GROUND: Light grey brown clayey, very gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded brick, concrete, limestone, mudstone and quartzite.
		0.50	ES					
					0.80			Firm green grey slightly gravelly CLAY. Gravel is fine to medium, subrounded to rounded mudstone. With ocasional pocket sof black carbonaceous material.
		1.00	B					
		1.20	D					
		1.20		N=7 (2,1/1,2,2,2)				
					1.40			Firm brown mottled grey silty CLAY.
		2.00		N=21 (2,3/3,5,5,8)				
					2.70			Stiff orange brown mottle grey slightly gravelly SILT. Gravel is fine to medium, subangualr to subrounded mudstone and siltstone.
		2.90		N=59 (9,10/15,14,15,15)				
		3.00	D		3.00			Refusal on possible SILTSTONE.
					3.00			End of borehole at 3.00 m

1 2 3 4 5

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 30/11/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Aspahlt.
		0.30	D					MADE GROUND: Black Gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular ash, clinker, wood, metal, concrete and brick. With occasional angualr to subangular brick and concrete cobbles.
		0.30	ES		0.50			
		0.60	ES					Firm orange brown mottled grey sandy gravelly SILT. Gravel is fine to medium, subangular to subrouded mudstone, siltstone and sandstone.
					1.00			Stiff orange brown mottled grey sandy gravelly SILT. Gravel is fine to medium, subangular to subrouded mudstone, siltstone and sandstone.
		1.20	D					
		1.20		N=46 (2,3/6,8,15,17)				
		1.40	D		1.40			Refusal on possible SILTSTONE.
		1.40		N=68 (6,10/12,16,20,20)	1.40			End of borehole at 1.40 m

1 2 3 4 5

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 30/11/2017 - 30/11/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Asphalt.
		0.20	B		0.30			MADE GROUND: Black brown gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, brick, cermaic, concrete and rare slag.
		0.50	ES		0.50			Soft to firm green grey slightly sandy CLAY.
		1.20	D					Firm red brown mottled grey silty CLAY. With thin layering.
		1.20		N=14 (2,1/3,3,4,4)				
		1.70		50 (25 for 135mm/50 for 200mm)	1.70			Firm red brown mottled grey silty gravelly CLAY. Gravel is fine to coarse, angualr to subangular mudstone and sandstone. With thin layering.
		2.00	D		2.00			Refusal on possible sandstone bedrock.
					2.00			End of borehole at 2.00 m

Remarks

AGS

Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GRUND: Grass over soft brown sandy silt topsoil.
		0.50	ES					MADE GROUND: Soft to firm brown sandy gravelly clay. Gravel is fine to coarse, angular to subangular asphalt, mudstone and quartzite.
					0.80			Firm light grey silty CLAY.
		1.20		N=17 (4,4/5,5,3,4)				
					1.30			Firm brown mottled grey silty gravelly CLAY. Gravel is fine to coarse, angular to subangular mudstone and siltstone.
		2.00 2.00	D	N=22 (4,3/4,5,6,7)				
					2.40			Stiff grey gravelly SILT. Gravel is fine to coarse, angular to subangular siltstone.
		3.00		N=31 (4,4/7,6,7,11)				
		4.00 4.00	D	N=68 (7,8/11,20,17,20)	4.00			End of borehole at 4.00 m

Remarks

AGS

Borehole Log

Borehole No. **WS08**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Asphalt.
								MADE GROUND: Grey silty sandy gravel of fine to coarse, angular to subrounded concrete, limestone and quartzite.
	▼	0.50	ES		0.50			Soft brown sandy CLAY.
					1.10			Firm orange brown mottled grey silty CLAY.
		1.20 1.20	D	N=12 (1,0/2,2,5,3)				
		2.00		N=36 (5,5/8,8,9,11)	2.00			Stiff slightly gravelly SILT. Gravel is fine to medium, angular to subangular siltstone and mudstone.
		3.00 3.00	D	N=49 (6,6/9,12,17,11)	3.00 3.00			Refusal on possible SILTSTONE. End of borehole at 3.00 m

Remarks

AGS

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Grass over soft brown sandy silt topsoil.
		0.50 0.50	B ES					MADE GROUND: Light brown clayey sandy gravel of fine to coarse, angular to subangular limestone, mudstone and quartzite.
					1.00			Firm brown sandy slightly gravelly CLAY. Gravel is fine subangular to subrounded mudstone and quartzite. With old decaying rootlets. (no odour).
		1.20 1.20	D	N=16 (2,3/3,3,4,6)				
					1.40			Firm grey mottled blue silty CLAY. With occasional old decaying rootlets. (mild odour of natural decay).
	▼	2.00		N=12 (3,2/3,3,3,3)				
					2.60			Stiff brown mottled grey silty CLAY. With occasional old decaying rootlets. (mild odour of natural decay).
		3.00		N=26 (3,2/5,5,9,7)				
		4.00 4.00	D	N=52 (5,7/10,11,13,18)	4.00 4.00			Refusal. End of borehole at 4.00 m

Remarks

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			MADE GROUND: Grass over soft slightly sandy silt topsoil.
		0.50	ES					Firm brown mottled grey silty CLAY.
		1.20	D					
		1.20		N=20 (3,3/4,5,5,6)				
					1.40			Grey mottled brown SILTSTONE.
		1.50	D		1.50			Refusal on SILTSTONE.
		1.50		N=51 (9,6/10,10,15,16)	1.50			End of borehole at 1.50 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **WS102C**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
	▼	0.20	ES		0.20			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, clinker, slag, concrete, brick and limestone. With occasional subangular slag and clinker cobbles.
					0.20			Delineation depth reached.
								End of borehole at 0.20 m

1

2

3

Remarks

AGS

Borehole Log

Borehole No. **WS102E**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
	▼	0.20	ES		0.20			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, clinker, slag, concrete, brick and limestone. With occasional subangular slag and clinker cobbles.
					0.20			Delineation depth reached.
								End of borehole at 0.20 m

1

2

3

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS102N**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
	▼	0.20	ES		0.20			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, clinker, slag, concrete, brick and limestone. With occasional subangular slag and clinker cobbles.
					0.20			Delineation depth reached.
								End of borehole at 0.20 m

1

2

3

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS102S**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:15
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Aspahlt.
	▼	0.20	ES		0.20			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, clinker, slag, concrete, brick and limestone. With occasional subangular slag and clinker cobbles.
					0.20			Delineation depth reached.
								End of borehole at 0.20 m

1

2

3

Remarks
No Groundwater Encountered

AGS

Borehole Log

Borehole No. **WS102W**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type HP
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
	▼	0.20	ES		0.10			MADE GROUND: Aspahlt.
					0.20			MADE GROUND: Black gravelly fine to coarse sand. Gravel is fine to coarse, angular to subrounded ash, clinker, slag, concrete, brick and limestone. With occasional subangular slag and clinker cobbles.
					0.20			Delineation depth reached.
								End of borehole at 0.20 m

Remarks
No Groundwater Encountered

Borehole Log

Borehole No. **WS11**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 02/12/2017 - 02/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND: Grass over soft brown sandy silt topsoil.
					0.60			Grey black clayey sandy GRAVEL of fine to medium, subangular to subrounded mudstone and coal.
		1.20 1.20	D	N=57 (6,4/6,14,13,24)	1.20			Black gravelly fine to coarse SAND. Gravel is fine to coarse, angular to subangular coal and carbonaceous mudstone. End of borehole at 1.20 m

Remarks

AGS

Borehole Log

Borehole No. **WS12**

Sheet 1 of 1

Project Name: Granville Community College	Project No. 064491	Co-ords: -	Hole Type WS
Location: Granville Community College		Level:	Scale 1:25
Client: Kier Construction Ltd		Dates: 01/12/2017 - 01/12/2017	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES		0.50			MADE GROUND: Grass over soft brown sandy gravelly silt topsoil. Gravel is ash, mudstone, quartzite, concrete, brick and siltstone.
		0.80	ES		1.00			Firm brown mottled grey silty CLAY. With rare old decaying rootlets. (No Odour).
		1.20 1.20	D	N=16 (2,2/2,4,4,6)				Stiff grey silty CLAY. With rare old decaying rootlets. (No Odour).
		2.00		N=32 (10,5/7,6,9,10)	2.00			Stiff grey SILT. With relict layering.
		2.80 2.80	D	N=50 (8,8/50 for 270mm)	2.80 2.80			Refusal on posssible SILTSTONE End of borehole at 2.80 m

Remarks
No Groundwater Encountered

Appendix A3 – Chemical laboratory Testing Results

- Environmental Chemistry Analysis Results (Soil)
  - I2 Analytical Ltd Certificate No. 17-70053
- WAC Analysis (Soil)
  - I2 Analytical Ltd Certificate No. 17-70048

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Analytical Report Number : 17-70053

Project / Site name:	Granville Community College	**Samples received on:**	06/12/2017
Your job number:	063504	**Samples instructed on:**	06/12/2017
Your order number:	EBBI167	**Analysis completed by:**	18/12/2017
Report Issue Number:	1	**Report issued on:**	18/12/2017
Samples Analysed:	39 soil samples		

Signed:

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

Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871752	871753	871754	871755	871756
Sample Reference				WS02/WAC04	WS03/WAC05	WS01/WAC12	HP05/WAC11	WS03/WAC05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	0.50	0.50	0.10	0.50
Date Sampled				29/11/2017	29/11/2017	29/11/2017	02/12/2017	29/11/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	15	5.5	0.29	15
Total mass of sample received	kg	0.001	NONE	0.45	2.0	2.0	1.6	2.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	10.1	7.6	9.0	6.9	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.25	0.21	0.17	0.023	0.10
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	247	212	168	23.0	102
Organic Matter	%	0.1	MCERTS	1.8	2.1	1.8	6.4	2.1
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.38	0.22	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.44	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.54	0.76	3.7	1.4	0.91
Anthracene	mg/kg	0.05	MCERTS	0.16	< 0.05	0.99	0.75	0.18
Fluoranthene	mg/kg	0.05	MCERTS	4.9	1.1	4.8	6.3	1.2
Pyrene	mg/kg	0.05	MCERTS	5.2	0.98	4.2	9.2	1.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.5	0.58	2.2	4.0	0.59
Chrysene	mg/kg	0.05	MCERTS	2.8	0.47	1.8	3.1	0.45
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.9	0.48	1.7	3.9	0.63
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	0.32	1.3	1.9	0.21
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.5	0.55	1.8	3.2	0.50
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7	0.22	0.87	1.4	0.26
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.36	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.9	0.30	1.0	1.7	0.29
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	29.8	5.79	25.2	37.0	6.30
Total WAC-17 PAHs	mg/kg	0.85	NONE	30	5.8	25	37	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.9	7.8	3.7	1.4	6.9
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	2.0	1.3	0.2	2.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	3.1	10	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	17	11	2.3	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	21	12	7.4	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	34	36	71	33
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	13	8.5	3.2	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	68	69	160	69

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871752	871753	871754	871755	871756
Sample Reference				WS02/WAC04	WS03/WAC05	WS01/WAC12	HP05/WAC11	WS03/WAC05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	0.50	0.50	0.10	0.50
Date Sampled				29/11/2017	29/11/2017	29/11/2017	02/12/2017	29/11/2017
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	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	5.0	47	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	12	150	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	110	< 8.0	380	2100	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	110	< 10	390	2300	< 10
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	1.2	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	6.3	< 2.0	20	120	2.4
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	37	12	100	420	15
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	390	< 10	920	5100	16
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	440	21	1000	5700	33

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871757	871758	871759	871760	871761
Sample Reference				WS03/WAC05	WS01/WAC12	WS04/WAC07	WS05	HP05/WAC11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.50	0.50	0.30	0.50
Date Sampled				29/11/2017	29/11/2017	30/11/2017	30/11/2017	02/12/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	5.5	9.6	21	0.31
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	2.0	0.86
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.2	9.0	8.3	8.0	8.6
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.23	0.19	0.078	0.28	0.049
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	233	186	77.5	284	48.8
Organic Matter	%	0.1	MCERTS	3.8	1.8	2.1	3.5	11
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.26	< 0.05	< 0.05	0.61
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.19	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.77	0.36	1.0	0.53
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.88	0.28	0.79	0.54
Phenanthrene	mg/kg	0.05	MCERTS	0.74	6.9	5.4	14	7.7
Anthracene	mg/kg	0.05	MCERTS	0.14	1.9	1.4	3.9	3.8
Fluoranthene	mg/kg	0.05	MCERTS	1.1	9.5	9.0	24	20
Pyrene	mg/kg	0.05	MCERTS	0.90	8.2	8.0	23	18
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.52	4.4	3.3	11	8.2
Chrysene	mg/kg	0.05	MCERTS	0.46	4.0	2.3	11	5.9
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.49	4.7	2.0	10	7.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.33	1.7	0.93	5.7	4.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.44	3.9	1.6	10	6.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.23	2.0	0.56	5.0	3.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.25	2.2	0.56	5.3	4.1
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.58	51.4	35.7	126	91.7
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	3.4	10	17	4.0
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	3.5	1.2	0.6	2.4	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	3.6	0.4	0.7	14
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	11	12	21	6.3
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	22	33	55	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	49	33	31	47	220
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	9.3	13	61	9.9
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	67	59	110	490

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871757	871758	871759	871760	871761
Sample Reference				WS03/WAC05	WS01/WAC12	WS04/WAC07	WS05	HP05/WAC11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.50	0.50	0.30	0.50
Date Sampled				29/11/2017	29/11/2017	30/11/2017	30/11/2017	02/12/2017
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	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	38	4.8	3.5
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	8.5	100	9.0	130
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	370	280	55	3500
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	380	420	69	3600
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	1.2	1.3
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	24	51	13	120
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	110	190	110	860
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	30	1100	500	150	7700
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	36	1200	740	270	8700

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871762	871763	871764	871765	871766
Sample Reference				HP06/WAC10	HP01/WAC01	HP02/WAC02	HP03/WAC03	HP04/WAC06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.30	0.30	0.50	0.50
Date Sampled				02/12/2017	04/12/2017	04/12/2017	04/12/2017	04/12/2017
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	9.6	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	14	19	14	21
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	2.0	2.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.4	7.8	8.1	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.060	0.028	0.071	0.045	0.15
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	59.6	27.9	70.5	44.6	151
Organic Matter	%	0.1	MCERTS	1.4	4.3	1.5	3.3	2.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	< 0.05	1.2	< 0.05	0.46	0.43
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.35	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.9	< 0.05	0.89	0.54
Pyrene	mg/kg	0.05	MCERTS	< 0.05	1.6	< 0.05	0.78	0.57
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	0.46	0.36
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.89	< 0.05	0.52	0.35
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	0.67	0.34
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.48	< 0.05	0.28	0.12
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.93	< 0.05	0.53	0.29
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.48	< 0.05	0.29	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.52	< 0.05	0.35	< 0.05
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	10.7	< 0.80	5.23	3.00
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.1	13	12	12	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	1.9	1.0	1.2	4.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	0.4	< 0.2	0.5	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	22	22	17	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	31	28	42	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	67	39	100	49
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	53	25	24	20	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	66	150	110	150	100

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871762	871763	871764	871765	871766
Sample Reference				HP06/WAC10	HP01/WAC01	HP02/WAC02	HP03/WAC03	HP04/WAC06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.30	0.30	0.50	0.50
Date Sampled				02/12/2017	04/12/2017	04/12/2017	04/12/2017	04/12/2017
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	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	5.1
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	14
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	42	95
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	43	120
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	4.3	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	17
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	26	< 10	78	53
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	41	< 10	84	72

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871767	871768	871769	871770	871771
Sample Reference				WS02/WAC04	WS06	WS05	WS12	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.60	0.40	0.80
Date Sampled				29/11/2017	30/11/2017	30/11/2017	01/12/2017	01/12/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	19	16	13	25
Total mass of sample received	kg	0.001	NONE	0.45	0.51	0.52	0.46	0.45
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	10.1	6.5	6.2	7.2	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.25	0.028	0.063	0.020	0.098
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	247	28.0	63.2	20.2	97.7
Organic Matter	%	0.1	MCERTS	1.8	0.8	0.2	1.7	0.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.54	< 0.05	< 0.05	0.17	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.16	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	4.9	< 0.05	< 0.05	0.28	< 0.05
Pyrene	mg/kg	0.05	MCERTS	5.2	< 0.05	< 0.05	0.24	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.5	< 0.05	< 0.05	0.16	< 0.05
Chrysene	mg/kg	0.05	MCERTS	2.8	< 0.05	< 0.05	0.19	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.9	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.5	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.36	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.9	< 0.05	< 0.05	< 0.05	< 0.05
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	29.8	< 0.80	< 0.80	1.04	< 0.80
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.4	7.0	5.6	11	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	0.9	0.5	1.3	2.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.3	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	16	19	18	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	6.6	9.3	22	44
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	12	7.3	35	22
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	13	27	19	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	33	54	69	81

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871767	871768	871769	871770	871771
Sample Reference				WS02/WAC04	WS06	WS05	WS12	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.60	0.40	0.80
Date Sampled				29/11/2017	30/11/2017	30/11/2017	01/12/2017	01/12/2017
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	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	4.6	< 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	110	< 8.0	< 8.0	25	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	110	< 10	< 10	35	< 10
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	6.3	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	37	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	390	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	440	< 10	< 10	< 10	< 10

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871772	871773	871774	871775	871776
Sample Reference				WS09	WS07	WS10	WS08	CP101C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.50	0.60
Date Sampled				02/12/2017	02/12/2017	02/12/2017	02/12/2017	01/12/2017
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	46	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	5.7	19	19	5.5	14
Total mass of sample received	kg	0.001	NONE	0.51	0.43	1.3	1.4	0.42
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	7.6	6.9	8.4	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.016	0.020	0.15	0.060	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	16.0	20.1	145	59.7	-
Organic Matter	%	0.1	MCERTS	0.5	3.3	0.5	1.2	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	5.0	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	4.5	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.83	< 0.05	16	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.19	< 0.05	3.7	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.4	< 0.05	9.1	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	6.9	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.80	< 0.05	3.2	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.82	< 0.05	2.4	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.80	< 0.05	1.3	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.57	< 0.05	0.69	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	1.3	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.39	< 0.05	0.27	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.48	< 0.05	0.50	-
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	8.16	< 0.80	55.3	-
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.7	12	10	6.8	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	0.85
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.5	0.8	0.4	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	1.4	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6.5	23	33	9.9	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	23	49	19	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	58	36	90	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	8.1	16	32	9.6	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	25	66	100	57	-

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871772	871773	871774	871775	871776
Sample Reference				WS09	WS07	WS10	WS08	CP101C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.50	0.60
Date Sampled				02/12/2017	02/12/2017	02/12/2017	02/12/2017	01/12/2017
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	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 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	-
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	< 2.0	< 2.0	< 2.0	5.7	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	55	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	180	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	240	-
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	< 1.0	< 1.0	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	4.1	< 2.0	100	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	13	< 10	380	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	12	< 10	600	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	30	< 10	1100	-

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871777	871778	871779	871780	871781
Sample Reference				CP101E	CP101W	CP101S	CP101N	WS102C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.60	0.60	0.60	0.20
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	01/12/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	16	13	14	15
Total mass of sample received	kg	0.001	NONE	0.46	0.45	0.47	0.45	0.45
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	0.49
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	3.1
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	2.7
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	45
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	14
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	93
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	84
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	38
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	33
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	40
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	33
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	17
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	4.2
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	21
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	-	442
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.84	0.71	0.73	0.90	4.4
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	210
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871777	871778	871779	871780	871781
Sample Reference				CP101E	CP101W	CP101S	CP101N	WS102C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.60	0.60	0.60	0.20
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	01/12/2017
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	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871782	871783	871784	871785	871786
Sample Reference				WS102E	WS102W	WS102S	WS102N	CP102C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	0.20	0.20	0.25
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	01/12/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.0	11	11	14	13
Total mass of sample received	kg	0.001	NONE	0.45	0.44	0.43	0.46	0.47
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	2.8	4.9	3.0	3.7	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	1.6	0.95	0.97	0.88	1.2
Acenaphthene	mg/kg	0.05	MCERTS	11	4.7	4.5	4.1	18
Fluorene	mg/kg	0.05	MCERTS	8.4	4.1	4.1	3.3	18
Phenanthrene	mg/kg	0.05	MCERTS	150	51	75	52	230
Anthracene	mg/kg	0.05	MCERTS	42	15	21	13	80
Fluoranthene	mg/kg	0.05	MCERTS	230	76	120	72	270
Pyrene	mg/kg	0.05	MCERTS	200	69	100	63	230
Benzo(a)anthracene	mg/kg	0.05	MCERTS	87	32	47	25	85
Chrysene	mg/kg	0.05	MCERTS	92	28	49	28	90
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	84	34	48	25	78
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	51	10	23	13	33
Benzo(a)pyrene	mg/kg	0.05	MCERTS	82	28	43	24	68
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	44	14	24	13	36
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	12	3.8	6.8	3.7	11
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	53	16	29	16	43
Coronene	mg/kg	0.05	NONE	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1150	391	602	360	1290
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	3.2	5.5	4.4	4.7	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	280	400	290	440	550
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871782	871783	871784	871785	871786
Sample Reference				WS102E	WS102W	WS102S	WS102N	CP102C
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	0.20	0.20	0.25
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	01/12/2017
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
Toluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/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	-	-	-	-	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	9.1
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	12
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	11
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	33
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	-	-	-	-	2.5
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	170
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	1600
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	1500
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	3300

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871787	871788	871789	871790	
Sample Reference				CP102E	CP102W	CP102S	CP102N	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.25	0.25	0.25	0.25	
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	
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	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	8.6	12	4.1	5.8	
Total mass of sample received	kg	0.001	NONE	0.46	0.42	0.50	0.48	
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	
Organic Matter	%	0.1	MCERTS	-	-	-	-	
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	1.8	0.62	0.55	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	23	9.0	5.8	1.4	
Fluorene	mg/kg	0.05	MCERTS	18	7.1	6.1	1.2	
Phenanthrene	mg/kg	0.05	MCERTS	260	130	100	17	
Anthracene	mg/kg	0.05	MCERTS	79	36	29	5.3	
Fluoranthene	mg/kg	0.05	MCERTS	380	170	120	26	
Pyrene	mg/kg	0.05	MCERTS	340	150	100	24	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	120	62	41	13	
Chrysene	mg/kg	0.05	MCERTS	140	60	37	10	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	120	59	37	11	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	53	25	18	5.9	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	110	53	34	11	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	56	27	17	5.1	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	18	8.2	5.1	1.2	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	66	32	20	5.6	
Coronene	mg/kg	0.05	NONE	-	-	-	-	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1790	824	572	137	
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-	-	-	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	-	-	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	760	2300	1300	1400	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	

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Analytical Report Number: 17-70053

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871787	871788	871789	871790	
Sample Reference				CP102E	CP102W	CP102S	CP102N	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.25	0.25	0.25	0.25	
Date Sampled				01/12/2017	01/12/2017	01/12/2017	01/12/2017	
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	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/kg	1	MCERTS	< 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	
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	1.3	< 1.0	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	2.2	4.4	8.4	< 2.0	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	12	21	27	< 8.0	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	14	77	94	< 8.0	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	28	100	130	< 10	
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	10	6.4	3.6	< 1.0	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	240	130	79	19	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	2700	1400	1100	190	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	2700	1200	1100	220	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	5700	2800	2300	440	

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Analytical Report Number : 17-70053

Project / Site name: Granville Community College

* 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 *
871752	WS02/WAC04	None Supplied	None Supplied	Brown sandy loam with gravel and brick.
871753	WS03/WAC05	None Supplied	0.50	Brown clay and sand with rubble.
871754	WS01/WAC12	None Supplied	0.50	Brown sandy clay with rubble and tar.
871755	HP05/WAC11	None Supplied	0.10	Black tar with gravel. **
871756	WS03/WAC05	None Supplied	0.50	Brown clay and sand with rubble.
871757	WS03/WAC05	None Supplied	1.50	Brown clay and sand.
871758	WS01/WAC12	None Supplied	0.50	Brown sandy clay with rubble and tar.
871759	WS04/WAC07	None Supplied	0.50	Brown clay and sand with rubble and gravel
871760	WS05	None Supplied	0.30	Brown clay and sand.
871761	HP05/WAC11	None Supplied	0.50	Black tar. **
871762	HP06/WAC10	None Supplied	1.00	Brown clay.
871763	HP01/WAC01	None Supplied	0.30	Brown loam with stones and vegetation.
871764	HP02/WAC02	None Supplied	0.30	Brown clay with vegetation.
871765	HP03/WAC03	None Supplied	0.50	Brown clay and loam with gravel.
871766	HP04/WAC06	None Supplied	0.50	Brown clay and sand with brick.
871767	WS02/WAC04	None Supplied	0.50	Brown sandy loam with brick and gravel
871768	WS06	None Supplied	0.50	Brown clay.
871769	WS05	None Supplied	0.60	Brown clay with gravel.
871770	WS12	None Supplied	0.40	Brown clay and sand with gravel.
871771	WS12	None Supplied	0.80	Light brown clay.
871772	WS09	None Supplied	0.50	Brown clay and sand with gravel and stones.
871773	WS07	None Supplied	0.50	Brown clay and loam.
871774	WS10	None Supplied	0.50	Brown clay.
871775	WS08	None Supplied	0.50	Brown clay and sand with gravel and rubble.
871776	CP101C	None Supplied	0.60	Brown clay with gravel.
871777	CP101E	None Supplied	0.60	Brown clay.
871778	CP101W	None Supplied	0.60	Brown clay and sand.
871779	CP101S	None Supplied	0.60	Brown clay and sand.
871780	CP101N	None Supplied	0.60	Brown clay and sand.
871781	WS102C	None Supplied	0.20	Black clay and sand with rubble and brick.
871782	WS102E	None Supplied	0.20	Black tar with gravel. **
871783	WS102W	None Supplied	0.20	Brown tar with gravel. **
871784	WS102S	None Supplied	0.20	Brown tar with gravel. **
871785	WS102N	None Supplied	0.20	Brown tar with gravel. **
871786	CP102C	None Supplied	0.25	Brown clay and sand with gravel.
871787	CP102E	None Supplied	0.25	Brown clay and sand with gravel.
871788	CP102W	None Supplied	0.25	Brown clay and sand with gravel.
871789	CP102S	None Supplied	0.25	Brown gravelly clay with rubble.
871790	CP102N	None Supplied	0.25	Brown clay and sand with rubble.

** Non MCERTS matrix.

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Analytical Report Number : 17-70053

Project / Site name: Granville Community College

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
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
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
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 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
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
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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Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP102E		S	17-70053	871787	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
CP102E		S	17-70053	871787	b	TPHCWG (Soil)	L088/76-PL	b
WS05		S	17-70053	871769	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS05		S	17-70053	871769	b	TPHCWG (Soil)	L088/76-PL	b
WS06		S	17-70053	871768	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS06		S	17-70053	871768	b	TPHCWG (Soil)	L088/76-PL	b
WS07		S	17-70053	871773	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS07		S	17-70053	871773	b	TPHCWG (Soil)	L088/76-PL	b
WS08		S	17-70053	871775	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS08		S	17-70053	871775	b	TPHCWG (Soil)	L088/76-PL	b
WS09		S	17-70053	871772	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS09		S	17-70053	871772	b	TPHCWG (Soil)	L088/76-PL	b
WS10		S	17-70053	871774	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS10		S	17-70053	871774	b	TPHCWG (Soil)	L088/76-PL	b
WS12		S	17-70053	871770	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS12		S	17-70053	871770	b	TPHCWG (Soil)	L088/76-PL	b
WS12		S	17-70053	871771	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS12		S	17-70053	871771	b	TPHCWG (Soil)	L088/76-PL	b

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

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Analytical Report Number : 17-70048

Project / Site name:	Granville Community College	**Samples received on:**	06/12/2017
Your job number:	063504	**Samples instructed on:**	06/12/2017
Your order number:	EBBI167	**Analysis completed by:**	15/12/2017
Report Issue Number:	1	**Report issued on:**	15/12/2017
Samples Analysed:	11 WAC 10:1 Samples		

Signed:

Jordan Hill
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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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client:	**CURTINS**	
Location	**Granville Community College**						
Lab Reference (Sample Number)	871720 / 871721				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	29/11/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS03/WAC05						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.2				3%	5%	6%
Loss on Ignition (%) **	3.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	6.2				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	4.6				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0039			0.0282	0.5	2	25
Barium *	0.0531			0.388	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.021			0.16	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0084			0.0614	0.5	10	30
Nickel *	0.0010			0.0076	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.012			0.091	4	50	200
Chloride *	5.0			36	800	4000	25000
Fluoride	0.59			4.3	10	150	500
Sulphate *	19			140	1000	20000	50000
TDS	120			850	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	16.7			122	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	85						
Moisture (%)	15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = 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.

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client:	**CURTINS**	
Location	**Granville Community College**						
Lab Reference (Sample Number)	871722 / 871723				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	29/11/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS03/WAC05						
Depth (m)	1.50						
Solid Waste Analysis							
TOC (%)**	2.2				3%	5%	6%
Loss on Ignition (%) **	4.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	12				100	--	--
pH (units)**	7.0				--	>6	--
Acid Neutralisation Capacity (mol / kg)	0.0000				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0082			0.0469	0.5	2	25
Barium *	0.0420			0.239	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0020			0.011	0.5	10	70
Copper *	0.038			0.22	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0165			0.0939	0.5	10	30
Nickel *	0.0038			0.022	0.4	10	40
Lead *	0.0060			0.034	0.5	10	50
Antimony *	0.0028			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0089			0.051	4	50	200
Chloride *	7.0			40	800	4000	25000
Fluoride	0.80			4.6	10	150	500
Sulphate *	23			130	1000	20000	50000
TDS	79			450	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	30.9			176	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	80						
Moisture (%)	20						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accrediited

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871724 / 871725				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	29/11/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS01/WAC12						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.5				3%	5%	6%
Loss on Ignition (%) **	3.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	470				500	--	--
Total PAH (WAC-17) (mg/kg)	28				100	--	--
pH (units)**	8.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	16				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	< 0.0011			< 0.0110	0.5	2	25
Barium *	0.127			1.10	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0014			0.012	0.5	10	70
Copper *	0.0051			0.044	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0012			0.0103	0.5	10	30
Nickel *	0.0071			0.062	0.4	10	40
Lead *	0.0052			0.045	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.013			0.11	4	50	200
Chloride *	0.98			8.5	800	4000	25000
Fluoride	0.25			2.2	10	150	500
Sulphate *	12			100	1000	20000	50000
TDS	50			430	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.85			50.7	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	95						
Moisture (%)	5.5						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
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** = MCERTS accrediited

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871726 / 871727				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	30/11/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS04/WAC07						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.2				3%	5%	6%
Loss on Ignition (%) **	2.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	480				500	--	--
Total PAH (WAC-17) (mg/kg)	35				100	--	--
pH (units)**	8.3				--	>6	--
Acid Neutralisation Capacity (mol / kg)	12				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0040			0.0331	0.5	2	25
Barium *	0.0388			0.321	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0018			0.015	0.5	10	70
Copper *	0.0043			0.035	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0019			0.0155	0.5	10	30
Nickel *	0.0005			0.0042	0.4	10	40
Lead *	0.0029			0.024	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0062			0.052	4	50	200
Chloride *	1.6			13	800	4000	25000
Fluoride	0.16			1.3	10	150	500
Sulphate *	9.1			75	1000	20000	50000
TDS	47			390	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.18			51.2	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	90						
Moisture (%)	9.6						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871728 / 871729				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	30/11/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS05						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	2.0				3%	5%	6%
Loss on Ignition (%) **	5.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	75				500	--	--
Total PAH (WAC-17) (mg/kg)	110				100	--	--
pH (units)**	8.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.6				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0039			0.0345	0.5	2	25
Barium *	0.0254			0.226	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0039			0.035	0.5	10	70
Copper *	0.0074			0.065	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0044			0.0393	0.5	10	30
Nickel *	0.0021			0.019	0.4	10	40
Lead *	0.0031			0.027	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0057			0.051	4	50	200
Chloride *	1.3			12	800	4000	25000
Fluoride	1.1			9.4	10	150	500
Sulphate *	30			270	1000	20000	50000
TDS	76			670	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.41			56.9	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	79						
Moisture (%)	21						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871730 / 871731				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	02/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP05/WAC11						
Depth (m)	0.10						
Solid Waste Analysis							
TOC (%)**	3.7				3%	5%	6%
Loss on Ignition (%) **	5.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	3100				500	--	--
Total PAH (WAC-17) (mg/kg)	29				100	--	--
pH (units)**	7.8				--	>6	--
Acid Neutralisation Capacity (mol / kg)	2.0				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0017			0.0153	0.5	2	25
Barium *	0.0529			0.469	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0005			0.0042	0.5	10	70
Copper *	0.0054			0.048	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0004			0.0038	0.4	10	40
Lead *	0.0035			0.031	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.015			0.14	4	50	200
Chloride *	0.88			7.8	800	4000	25000
Fluoride	< 0.050			< 0.50	10	150	500
Sulphate *	1.8			16	1000	20000	50000
TDS	28			250	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.79			51.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.6						
Dry Matter (%)	100						
Moisture (%)	0.29						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871732 / 871733				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	02/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP06/WAC10						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.8				3%	5%	6%
Loss on Ignition (%) **	2.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.9				100	--	--
pH (units)**	7.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	2.4				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0012			< 0.0110	0.5	2	25
Barium *	0.0089			0.0497	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0012			0.0068	0.5	10	70
Copper *	0.0092			0.051	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0009			0.0048	0.5	10	30
Nickel *	0.0011			0.0060	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0078			0.043	4	50	200
Chloride *	1.2			6.9	800	4000	25000
Fluoride	0.96			5.3	10	150	500
Sulphate *	7.9			44	1000	20000	50000
TDS	25			140	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	8.32			46.4	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	80						
Moisture (%)	20						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871734 / 871735				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	04/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP01/WAC01						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	2.5				3%	5%	6%
Loss on Ignition (%) **	6.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	5.3				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.1				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0021			0.0146	0.5	2	25
Barium *	0.0107			0.0751	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0020			0.014	0.5	10	70
Copper *	0.017			0.12	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0017			0.0116	0.5	10	30
Nickel *	0.0025			0.017	0.4	10	40
Lead *	0.0040			0.028	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.020			0.14	4	50	200
Chloride *	0.83			5.8	800	4000	25000
Fluoride	1.4			9.7	10	150	500
Sulphate *	2.9			21	1000	20000	50000
TDS	30			210	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	9.51			66.5	500	800	1000
Leach Test Information							
Stone Content (%)	9.6						
Sample Mass (kg)	2.0						
Dry Matter (%)	86						
Moisture (%)	14						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871736 / 871737				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	04/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP02/WAC02						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	0.8				3%	5%	6%
Loss on Ignition (%) **	2.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.9				100	--	--
pH (units)**	7.7				--	>6	--
Acid Neutralisation Capacity (mol / kg)	2.3				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	< 0.0011			< 0.0110	0.5	2	25
Barium *	0.0123			0.0686	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0016			0.0091	0.5	10	70
Copper *	0.023			0.13	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0009			0.0048	0.5	10	30
Nickel *	0.0011			0.0064	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0078			0.044	4	50	200
Chloride *	3.1			17	800	4000	25000
Fluoride	0.41			2.3	10	150	500
Sulphate *	8.3			47	1000	20000	50000
TDS	44			240	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.87			38.4	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	81						
Moisture (%)	19						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871738 / 871739				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	04/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP03/WAC03						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.9				3%	5%	6%
Loss on Ignition (%) **	4.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	41				500	--	--
Total PAH (WAC-17) (mg/kg)	5.1				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	2.3				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	< 0.0011			< 0.0110	0.5	2	25
Barium *	0.0743			0.533	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.013			0.096	0.5	10	70
Copper *	0.011			0.077	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0073			0.0525	0.5	10	30
Nickel *	0.0012			0.0088	0.4	10	40
Lead *	0.0026			0.019	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0084			0.060	4	50	200
Chloride *	1.5			11	800	4000	25000
Fluoride	0.97			7.0	10	150	500
Sulphate *	7.0			50	1000	20000	50000
TDS	68			490	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.92			56.8	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	86						
Moisture (%)	14						

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Waste Acceptance Criteria Analytical Results

Report No:	**17-70048**						
					Client: CURTINS		
Location	**Granville Community College**						
Lab Reference (Sample Number)	871740 / 871741				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	04/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP04/WAC06						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.5				3%	5%	6%
Loss on Ignition (%) **	5.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	70				500	--	--
Total PAH (WAC-17) (mg/kg)	5.7				100	--	--
pH (units)**	7.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.6				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	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 *	0.0033			0.0216	0.5	2	25
Barium *	0.0549			0.363	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0069			0.046	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0135			0.0894	0.5	10	30
Nickel *	0.0015			0.010	0.4	10	40
Lead *	0.0023			0.015	0.5	10	50
Antimony *	0.0024			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0089			0.059	4	50	200
Chloride *	2.0			14	800	4000	25000
Fluoride	1.2			8.1	10	150	500
Sulphate *	30			200	1000	20000	50000
TDS	150			1000	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	16.4			108	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	79						
Moisture (%)	21						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accrediited

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.

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

Analytical Report Number : 17-70048

Project / Site name: Granville Community College

* 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 *
871720	WS03/WAC05	None Supplied	0.50	Brown clay and sand with rubble.
871722	WS03/WAC05	None Supplied	1.50	Brown clay and sand.
871724	WS01/WAC12	None Supplied	0.50	Brown clay and sand with rubble and tar.
871726	WS04/WAC07	None Supplied	0.50	Brown clay and sand with rubble and gravel
871728	WS05	None Supplied	0.30	Brown clay and sand.
871730	HP05/WAC11	None Supplied	0.10	Black tar with gravel. **
871732	HP06/WAC10	None Supplied	1.00	Brown clay.
871734	HP01/WAC01	None Supplied	0.30	Brown loam with stones and vegetation.
871736	HP02/WAC02	None Supplied	0.30	Brown clay with vegetation.
871738	HP03/WAC03	None Supplied	0.50	Brown clay and loam with gravel.
871740	HP04/WAC06	None Supplied	0.50	Brown clay and sand with brick.

**Non MCERTS matrix.

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Analytical Report Number : 17-70048

Project / Site name: Granville Community College

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
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-UK	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	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
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	in-house method	L076-PL	D	NONE
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 10:1 WAC	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	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	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
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

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Analytical Report Number : 17-70048

Project / Site name: Granville Community College

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

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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Appendix A4 – Geotechnical Laboratory Testing Results

- Geotechnical Analysis Results
  - I2 Analytical Ltd Certificate No. 17-70055
  - I2 Analytical Ltd Certificate No. 17-69972
  - I2 Analytical Ltd Certificate No. 17-71440

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t: 01923 225404
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Analytical Report Number : 17-70055

Project / Site name:	Granville Community College	**Samples received on:**	06/12/2017
Your job number:	063504	**Samples instructed on:**	06/12/2017
Your order number:	EBBI167	**Analysis completed by:**	20/12/2017
Report Issue Number:	1	**Report issued on:**	20/12/2017
Samples Analysed:	12 soil samples		

Signed:

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

Analytical Report Number: 17-70055

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871793	871794	871795	871796	871797
Sample Reference				WS02/WAC04	WS03/WAC05	WS01/WAC12	WA04/WAC07	WS06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	2.00	1.20	3.00	1.20
Date Sampled				29/11/2017	29/11/2017	29/11/2017	30/11/2017	30/11/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	17	22	12	16
Total mass of sample received	kg	0.001	NONE	0.44	0.37	0.36	0.39	0.41
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.3	7.4	6.3	6.4	6.9
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.14	0.019	0.095	0.21	0.035
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	141	18.6	95.2	210	35.1
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	100	20	22	9.6	5.8
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	15	9.7	40	58	27
Magnesium (leachate equivalent)	mg/l	2.5	NONE	7.7	4.8	20	29	14

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

Analytical Report Number: 17-70055

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871798	871799	871800	871801	871802
Sample Reference				WS05	WS09	WS07	WS07	WS10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.40	1.20	2.00	4.00	1.20
Date Sampled				30/11/2017	01/12/2017	02/12/2017	02/12/2017	02/12/2017
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	15	20	13	11	16
Total mass of sample received	kg	0.001	NONE	0.42	0.42	0.39	0.41	0.41
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.9	6.7	7.3	8.0	6.7
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.030	0.079	0.047	0.017	0.084
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	30.0	79.3	47.0	17.3	84.0
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3.6	8.5	10	29	4.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	15	14	17	39	22
Magnesium (leachate equivalent)	mg/l	2.5	NONE	7.6	7.0	8.7	20	11

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Analytical Report Number: 17-70055

Project / Site name: Granville Community College
Your Order No: EBBI167

Lab Sample Number				871803	871804			
Sample Reference				WS08	WS08			
Sample Number				None Supplied	None Supplied			
Depth (m)				1.20	3.00			
Date Sampled				02/12/2017	02/12/2017			
Time Taken				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	21	14			
Total mass of sample received	kg	0.001	NONE	0.40	0.42			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	5.4	7.3			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.016	0.019			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	16.2	18.6			
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	9.7	8.6			
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0			
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	23			
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	11			

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Analytical Report Number : 17-70055

Project / Site name: Granville Community College

* 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 *
871793	WS02/WAC04	None Supplied	1.20	Brown clay and sand.
871794	WS03/WAC05	None Supplied	2.00	Brown clay.
871795	WS01/WAC12	None Supplied	1.20	Brown clay.
871796	WA04/WAC07	None Supplied	3.00	Brown clay and sand.
871797	WS06	None Supplied	1.20	Brown clay.
871798	WS05	None Supplied	1.40	Brown clay and sand.
871799	WS09	None Supplied	1.20	Brown clay.
871800	WS07	None Supplied	2.00	Brown clay.
871801	WS07	None Supplied	4.00	Brown clay.
871802	WS10	None Supplied	1.20	Brown clay.
871803	WS08	None Supplied	1.20	Light brown clay.
871804	WS08	None Supplied	3.00	Grey clay.

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Analytical Report Number : 17-70055

Project / Site name: Granville Community College

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
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
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
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, 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
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	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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TEST CERTIFICATE

Point Load Strength Index Tests Summary of Results

Tested in Accordance with ISRM : 2007, pages 125-132

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Watford Herts WD18 8YS

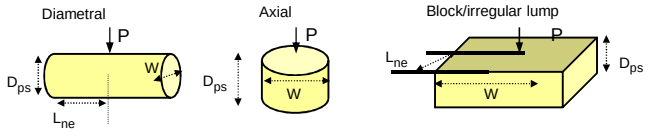
Client: CURTINS
Client Address: 2 The Wharf
Bridge Street
Birmingham
B1 2JS
Contact: Rob Swinnerton
Site Name: Granville Community College
Site Address: Not Given

Client Reference: 64491
Job Number: 17-71440
Date Sampled: 15/12/2017
Date Received: 18/12/2017
Date Tested: 04/01/2018
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Specimen		Description	Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
		Reference	Depth Top [m]	Depth Base [m]	Type	Reference	Depth [m]			Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa	
880568	RC02	Not Given	6.66	6.77	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	70.8	30.0	25.0	1.5	47.5	0.67	0.65	w = 7.4%
880569	RC02	Not Given	6.79	6.89	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	70.9	25.0	20.0	1.4	42.5	0.75	0.70	w = 7.3%
880560	RC02	Not Given	11.00	11.11	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	70.5	32.0	26.0	0.6	48.3	0.24	0.24	w = 6.8%
880562	RC02	Not Given	11.34	11.46	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	71.3	36.0	34.0	1.6	55.6	0.52	0.55	w = 5.0%
880563	RC02	Not Given	11.53	11.67	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	72.2	39.0	38.0	0.6	59.1	0.16	0.17	w = 4.9%
880570	RC02 A	Not Given	8.55	8.72	C			Grey MUDSTONE	MUDSTONE	A	U	YES	_	72.6	30.0	24.0	1.1	47.1	0.51	0.50	w = 7.2%
880564	RC03	Not Given	3.33	3.39	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	71.4	54.0	53.0	0.4	69.4	0.08	0.10	w = 9.2%
880566	RC03	Not Given	4.83	4.89	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	70.3	46.0	40.0	0.8	59.8	0.23	0.25	w = 10.5%
880572	RC03	Not Given	5.77	5.84	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	71.3	48.0	43.0	0.8	62.5	0.19	0.22	w = 7.4%
880573	RC03	Not Given	6.00	6.09	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	71.9	30.0	26.0	0.7	48.8	0.28	0.27	w = 7.7%

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Detailed legend for test and dimensions, based on ISRM, is shown above.
Size factor, F = (De/50)0.45 for all tests.

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section
Date Reported: 09/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."

GF 134.4

TEST CERTIFICATE

Point Load Strength Index Tests Summary of Results

Tested in Accordance with ISRM : 2007, pages 125-132

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

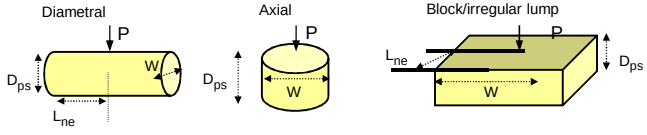
Client: CURTINS
Client Address: 2 The Wharf
Bridge Street
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B1 2JS
Contact: Rob Swinnerton
Site Name: Granville Community College
Site Address: Not Given

Client Reference: 64491
Job Number: 17-71440
Date Sampled: 15/12/2017
Date Received: 18/12/2017
Date Tested: 04/01/2018
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Specimen		Description	Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
		Reference	Depth Top [m]	Depth Base [m]	Type	Reference	Depth [m]			Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa	
880574	RC03	Not Given	6.22	6.32	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	71.6	38.0	33.0	0.6	54.8	0.19	0.20	w = 6.9%
880576	RC03	Not Given	7.10	7.18	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	72.5	35.0	27.0	0.5	49.9	0.19	0.19	w = 9.6%
880577	RC03	Not Given	8.17	8.22	C			Brownish grey MUDSTONE	MUDSTONE	A	U	YES	_	71.3	41.0	34.0	0.4	55.6	0.13	0.14	w = 7.5%

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Detailed legend for test and dimensions, based on ISRM, is shown above.
Size factor, F = (De/50)0.45 for all tests.

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section
Date Reported: 09/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."

GF 134.4

TEST CERTIFICATE

Determination of uniaxial compression test on rock - summary of results

Tested in Accordance with International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client: CURTINS
Client Address: 2 The Wharf
Bridge Street
Birmingham
B1 2JS
Contact: Rob Swinnerton
Site Name: Granville Community College
Site Address: Not Given

Client Reference: 64491
Job Number: 17-71440
Date Sampled: 15/12/2017
Date Received: 18/12/2017
Date Tested: 08/01/2018
Sampled By: Not Given

Test Results

Laboratory Reference	Hole No.	Sample				Description	Specimen Dimensions2			Bulk Density2	Water Content1	Uniaxial Compression3				Remarks
		Reference	Depth Top [m]	Depth Base [m]	Type		Dia. mm	Length mm	H/D	Mg/m3	%	Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
880567	RC02	Not Given	6.16	6.29	C	Grey MUDSTONE	71.2	74.8	1.1	2.37	7.2	as received	0.2513	AC	6.1	
880558	RC02	Not Given	8.55	8.72	C	Grey MUDSTONE	71.4	100.4	1.4	2.39	5.6	as received	0.2498	AC	13.0	
880559	RC02	Not Given	9.63	9.76	C	Grey MUDSTONE	71.7	107.0	1.5	2.38	7	as received	0.2480	F	1.3	
880561	RC02	Not Given	11.14	11.26	C	Grey MUDSTONE	71.6	53.4	0.7	2.38	7.9	as received	0.2487	AC	3.6	
880565	RC03	Not Given	3.80	3.94	C	Brownish grey MUDSTONE	71.6	99.2	1.4	2.28	8.1	as received	0.2487	AC	6.5	
880571	RC03	Not Given	5.16	5.30	C	Brownish grey MUDSTONE	70.1	70.4	1.0	2.26	7.8	as received	0.2594	AC	6.0	
880575	RC03	Not Given	6.85	7.00	C	Grey MUDSTONE	71.3	69.7	1.0	2.22	11.7	as received	0.2502	S	0.8	
880578	RC03	Not Given	8.40	8.52	C	Grey MUDSTONE	71.4	54.4	0.8	2.34	8	as received	0.2496	F	1.4	

Notes: 1 - ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks

Mode of failure : S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 09/01/2018

Signed:

Mark Beastall
Geotechnical
Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

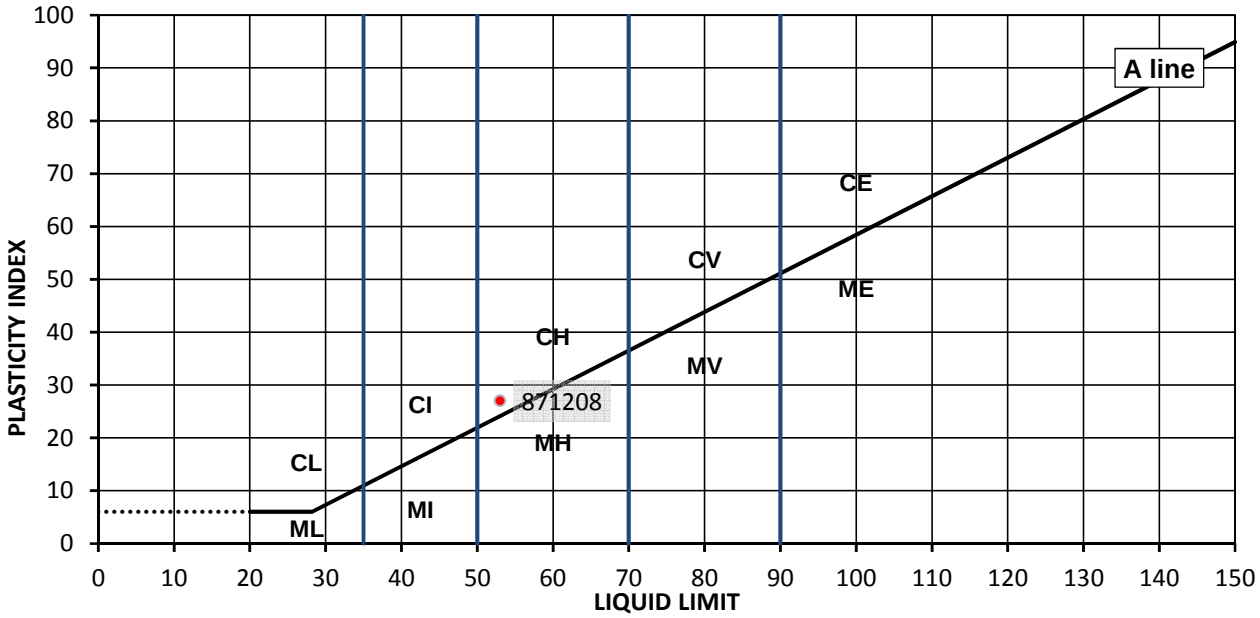
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	29/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871208
Sample Reference: WAC04

Description:	Light brown slightly gravelly slightly sandy CLAY	Sample Type:	D
Location:	WS02	Depth Top [m]:	1.20
Sample Preparation:	Tested after washing to remove >425um	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	53	26	27	74



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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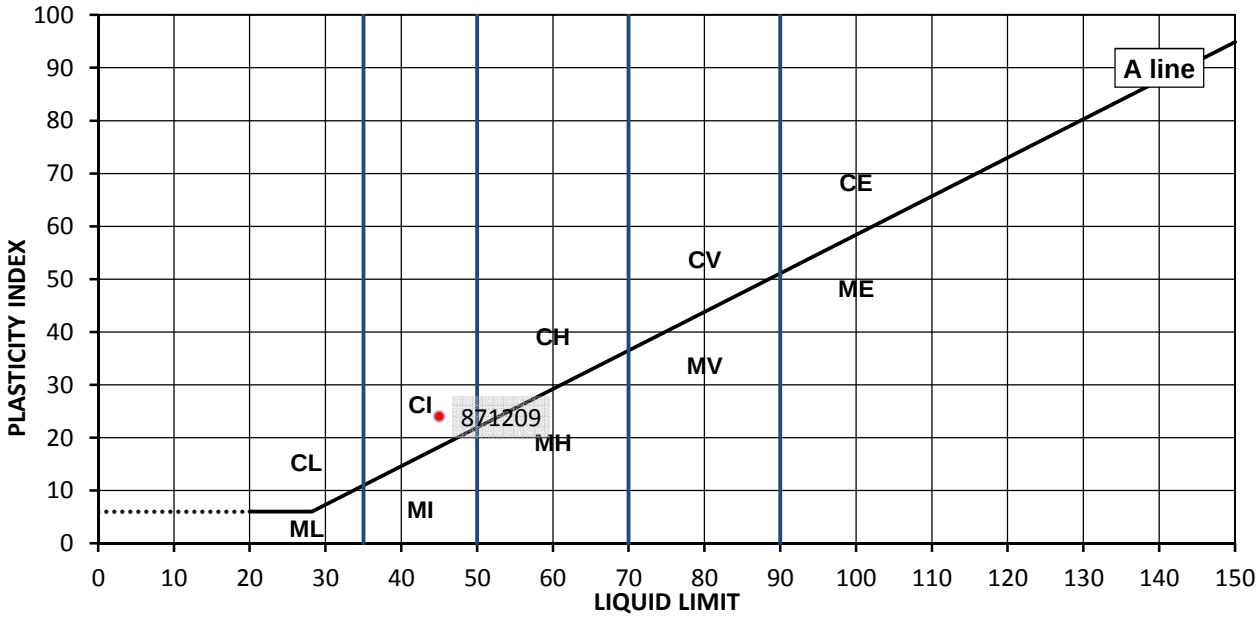
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	29/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871209
Sample Reference: WAC05

Description:	Multicolor slightly sandy CLAY	Sample Type:	D
Location:	WS03	Depth Top [m]:	2.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	45	21	24	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Date Reported: 21/12/2017

Signed:

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Geotechnical Commercial Manager

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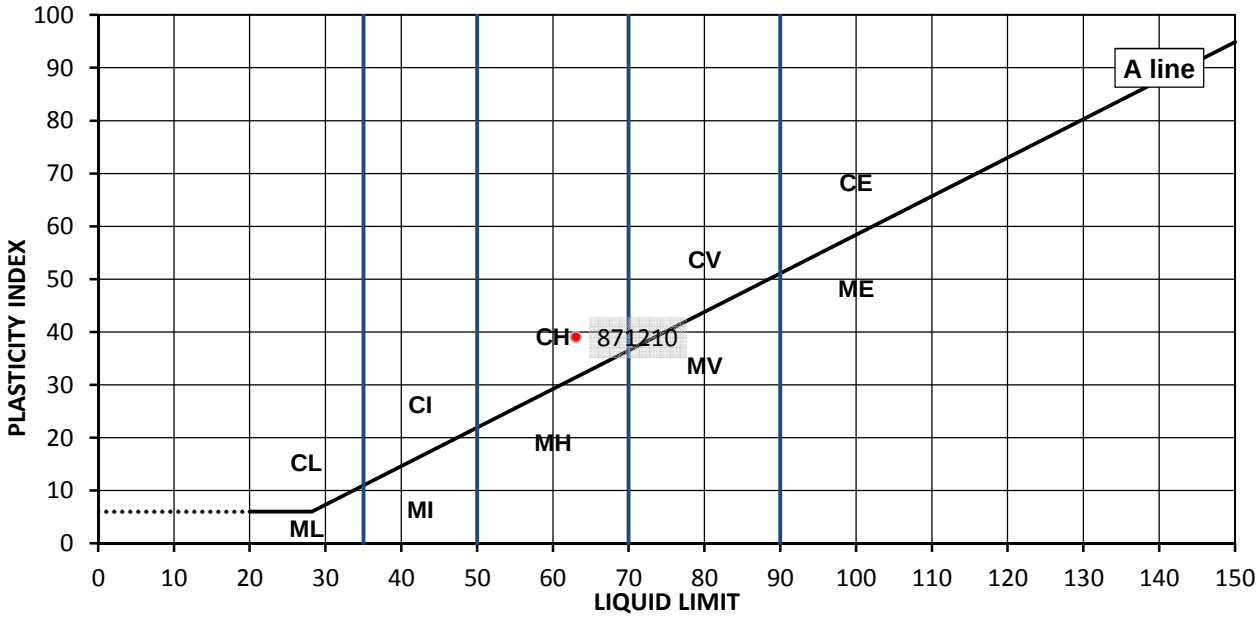
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Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	29/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	13/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871210
Sample Reference: WAC12

Description:	Light brown to grey CLAY	Sample Type:	D
Location:	WS01	Depth Top [m]:	1.20
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
30	63	24	39	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

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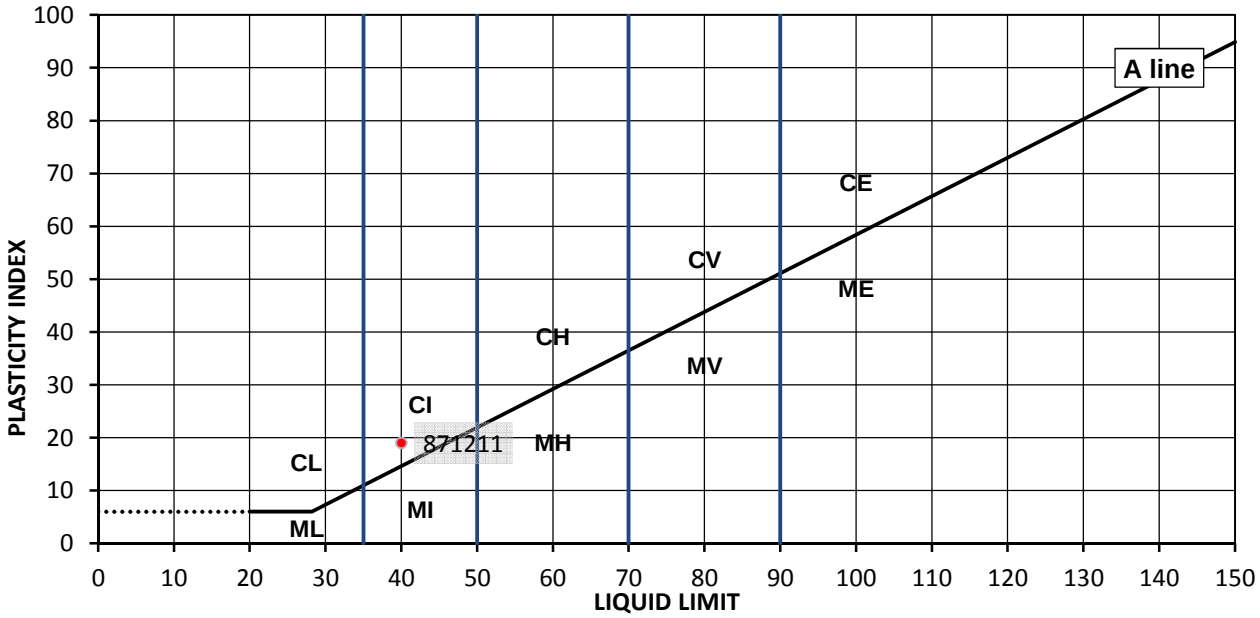
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871211
Sample Reference: WAC07

Description:	Light brown slightly gravelly sandy CLAY	Sample Type:	D
Location:	WS04	Depth Top [m]:	3.00
Sample Preparation:	Tested after washing to remove >425um	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
16	40	21	19	95



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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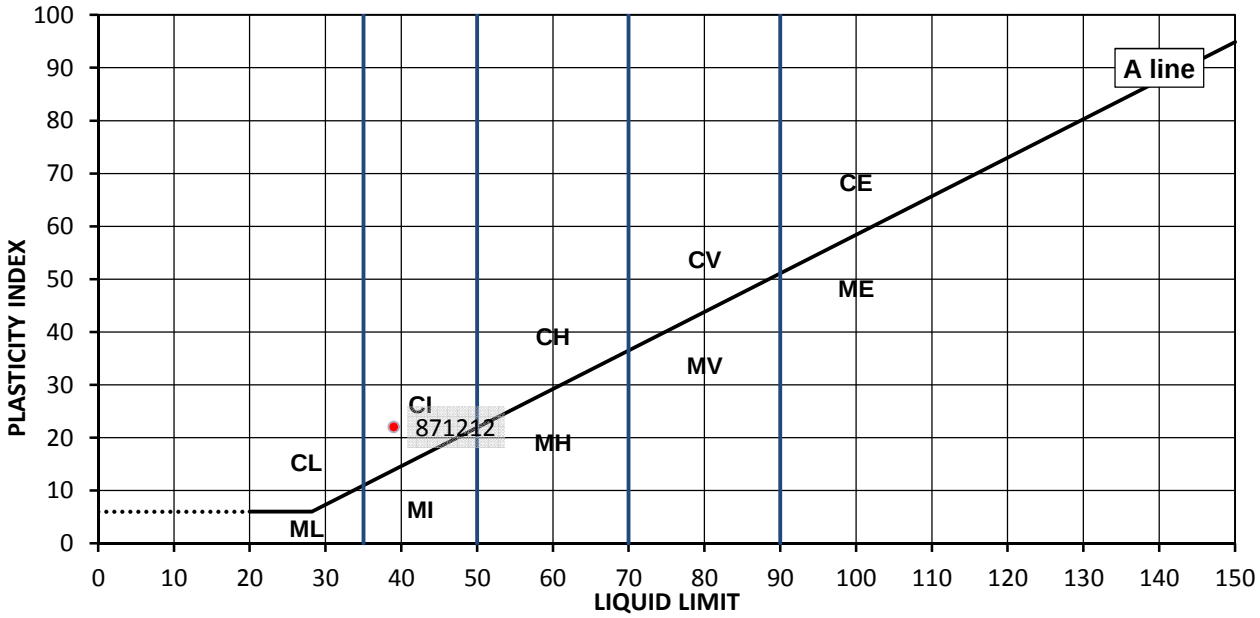
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871212
Sample Reference: Not Given

Description:	Reddish to grey sandy CLAY	Sample Type:	D
Location:	WS06	Depth Top [m]:	1.20
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	39	17	22	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Date Reported: 21/12/2017

Signed:

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Determination of Liquid and Plastic Limits

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Croxley Green Business Park
Watford Herts WD18 8YS

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Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

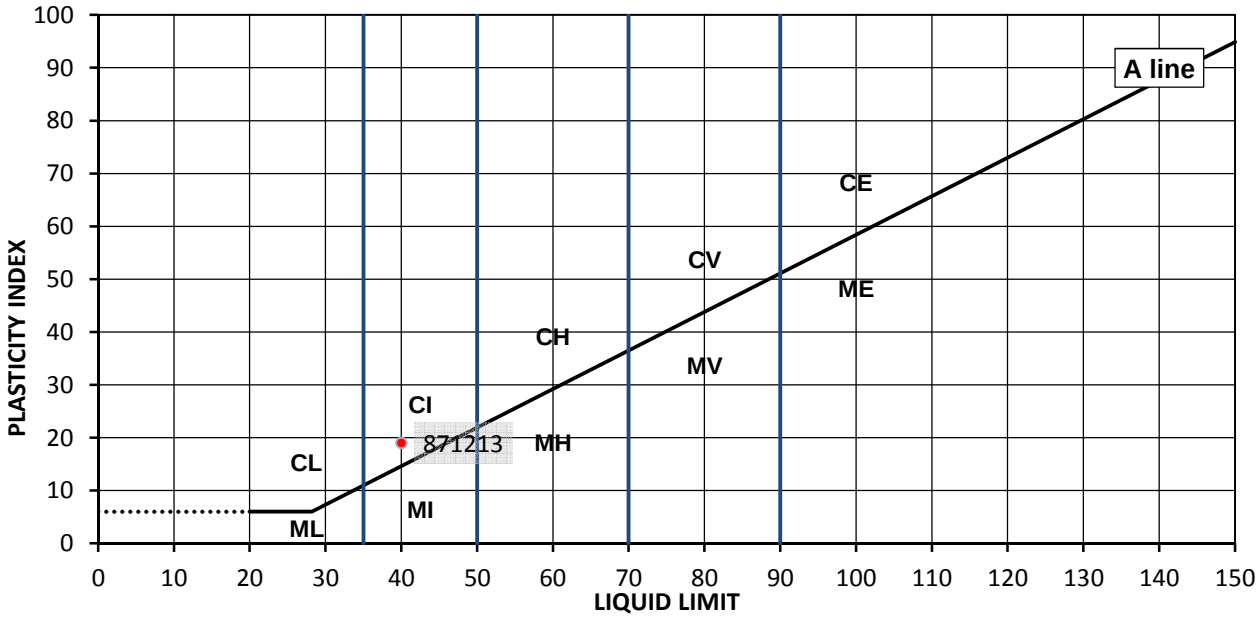
TEST RESULTS

Laboratory Reference: 871213
Sample Reference: Not Given

Description: Light brown slightly gravelly sandy CLAY
Location: WS05
Sample Preparation: Tested after washing to remove >425um

Sample Type: D
Depth Top [m]: 1.40
Depth Base [m]: Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
18	40	21	19	96



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/12/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

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7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

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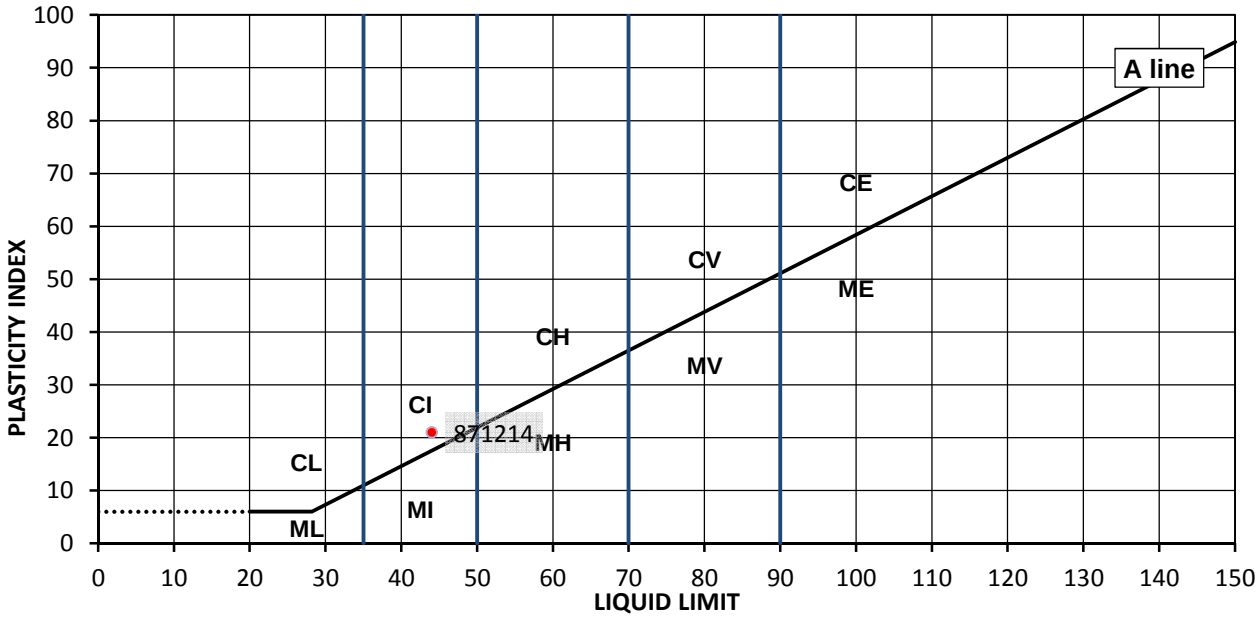
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Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	01/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871214
Sample Reference: Not Given

Description:	Dark grey slightly gravelly sandy CLAY	Sample Type:	D
Location:	WS09	Depth Top [m]:	1.20
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	44	23	21	98



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

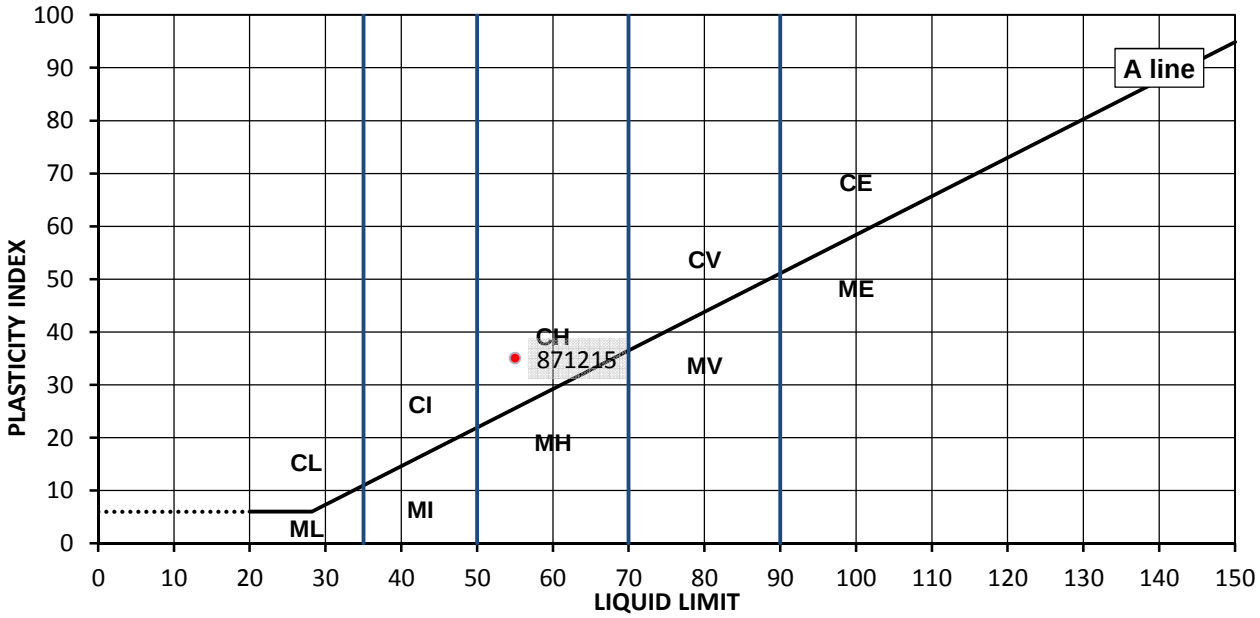
TEST RESULTS

Laboratory Reference: 871215
Sample Reference: Not Given

Description: Purple to grey slightly sandy CLAY
Location: WS07
Sample Preparation: Tested in natural condition

Sample Type: D
Depth Top [m]: 2.00
Depth Base [m]: Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
18	55	20	35	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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PL Laboratory Manager Geotechnical Section
Date Reported: 21/12/2017

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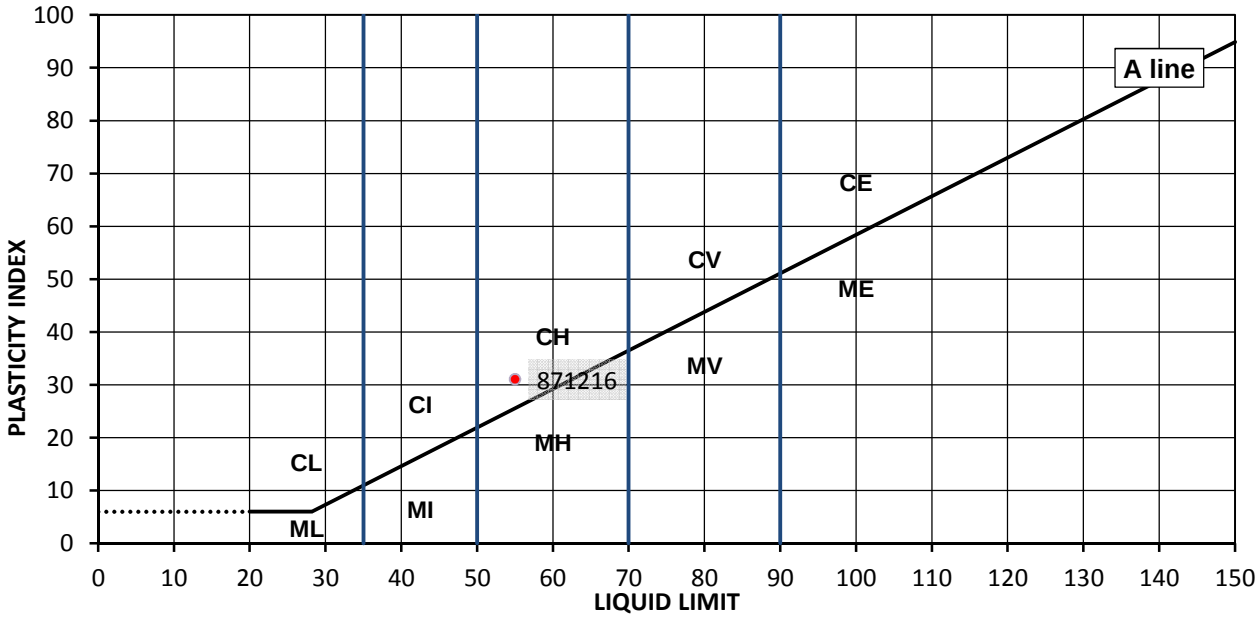
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Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871216
Sample Reference: Not Given

Description:	Grey slightly sandy CLAY	Sample Type:	D
Location:	WS07	Depth Top [m]:	4.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
15	55	24	31	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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Date Reported: 21/12/2017

Signed:

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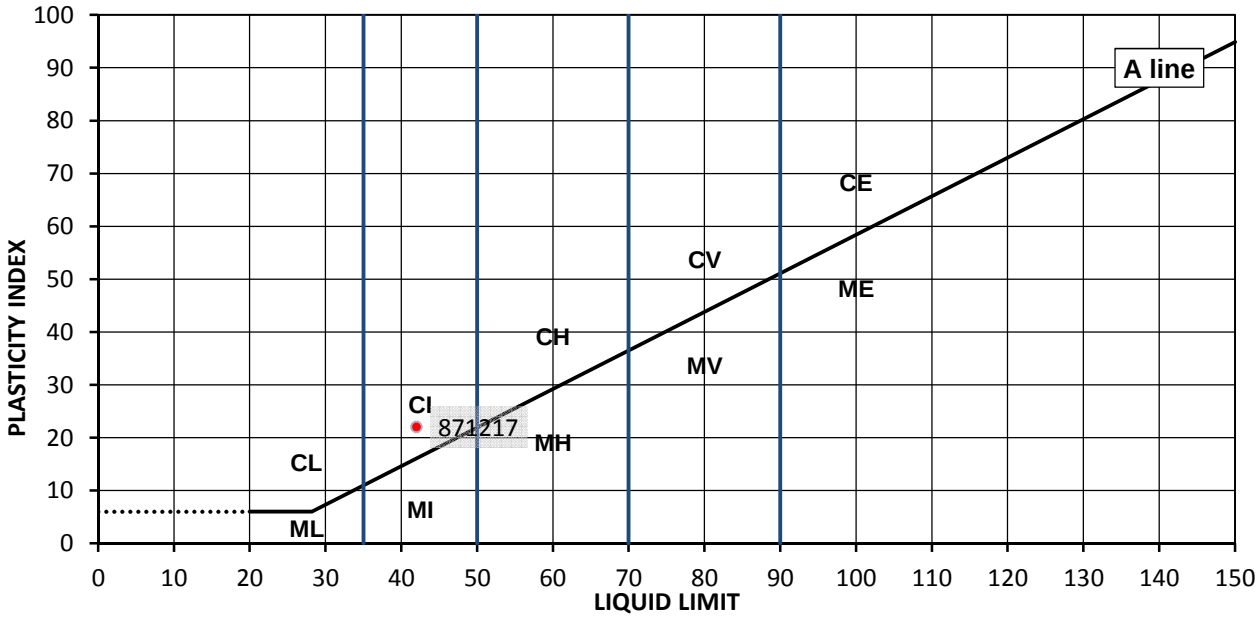
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871217
Sample Reference: Not Given

Description:	Reddish brown slightly gravelly sandy CLAY	Sample Type:	D
Location:	WS10	Depth Top [m]:	1.20
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
17	42	20	22	99



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/12/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

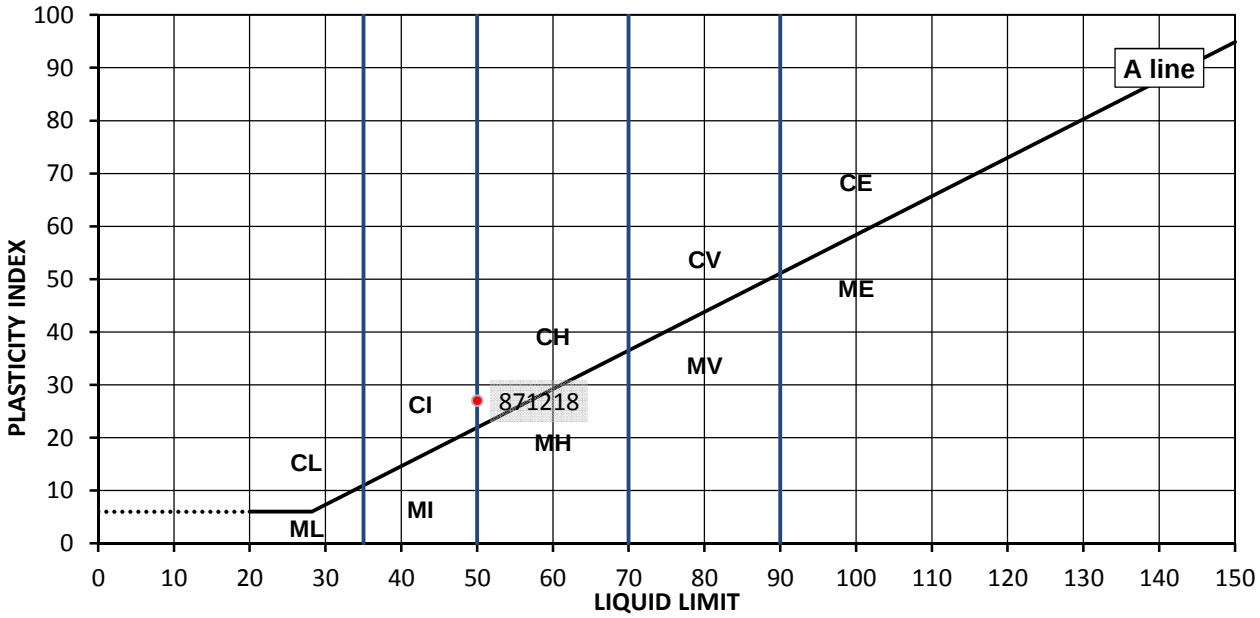
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871218
Sample Reference: Not Given

Description:	Light brown slightly sandy CLAY	Sample Type:	D
Location:	WS08	Depth Top [m]:	1.20
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	50	23	27	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Date Reported: 21/12/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

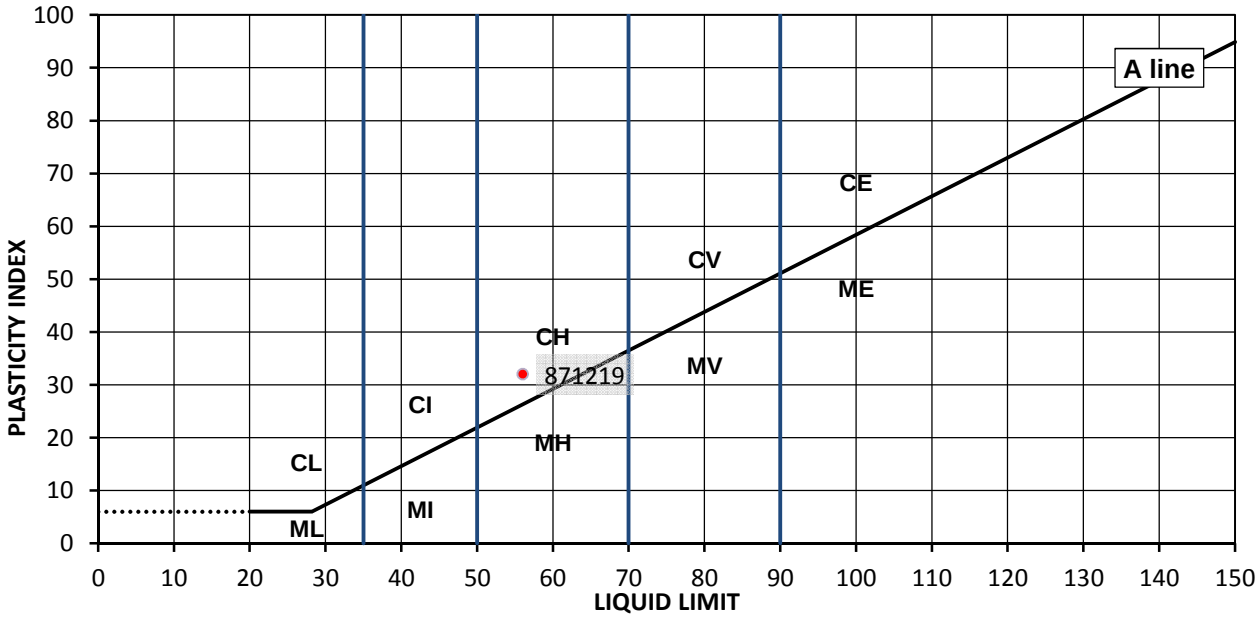
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 871219
Sample Reference: Not Given

Description:	Grey slightly sandy CLAY	Sample Type:	D
Location:	WS08	Depth Top [m]:	3.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
17	56	24	32	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Environmental Science

Client: CURTINS
Client Address: 2 The Wharf
Bridge Street
Birmingham
B1 2JS
Contact: Sean Taylor
Site Name: Granville Community College
Site Address: Not Given

Client Reference: 64491
Job Number: 17-69972
Date Sampled: 29/11 - 02/12/2017
Date Received: 06/12/2017
Date Tested: 13/12 - 14/12/2017
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
871210	WS01	WAC12	1.20	Not Given	D	Light brown to grey CLAY			30	100	63	24	39	
871208	WS02	WAC04	1.20	Not Given	D	Light brown slightly gravelly slightly sandy CLAY			28	74	53	26	27	
871209	WS03	WAC05	2.00	Not Given	D	Multicolor slightly sandy CLAY			22	100	45	21	24	
871211	WS04	WAC07	3.00	Not Given	D	Light brown slightly gravelly sandy CLAY			16	95	40	21	19	
871213	WS05	Not Given	1.40	Not Given	D	Light brown slightly gravelly sandy CLAY			18	96	40	21	19	
871212	WS06	Not Given	1.20	Not Given	D	Reddish to grey sandy CLAY			21	100	39	17	22	
871215	WS07	Not Given	2.00	Not Given	D	Purple to grey slightly sandy CLAY			18	100	55	20	35	
871216	WS07	Not Given	4.00	Not Given	D	Grey slightly sandy CLAY			15	100	55	24	31	
871218	WS08	Not Given	1.20	Not Given	D	Light brown slightly sandy CLAY			28	100	50	23	27	
871219	WS08	Not Given	3.00	Not Given	D	Grey slightly sandy CLAY			17	100	56	24	32	

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 21/12/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Environmental Science

Client: CURTINS
Client Address: 2 The Wharf
Bridge Street
Birmingham
B1 2JS
Contact: Sean Taylor
Site Name: Granville Community College
Site Address: Not Given

Client Reference: 64491
Job Number: 17-69972
Date Sampled: 01/12 - 02/12/2017
Date Received: 06/12/2017
Date Tested: 14/12/2017
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
871214	WS09	Not Given	1.20	Not Given	D	Dark grey slightly gravelly sandy CLAY			23	98	44	23	21	
871217	WS10	Not Given	1.20	Not Given	D	Reddish brown slightly gravelly sandy CLAY			17	99	42	20	22	

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 21/12/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

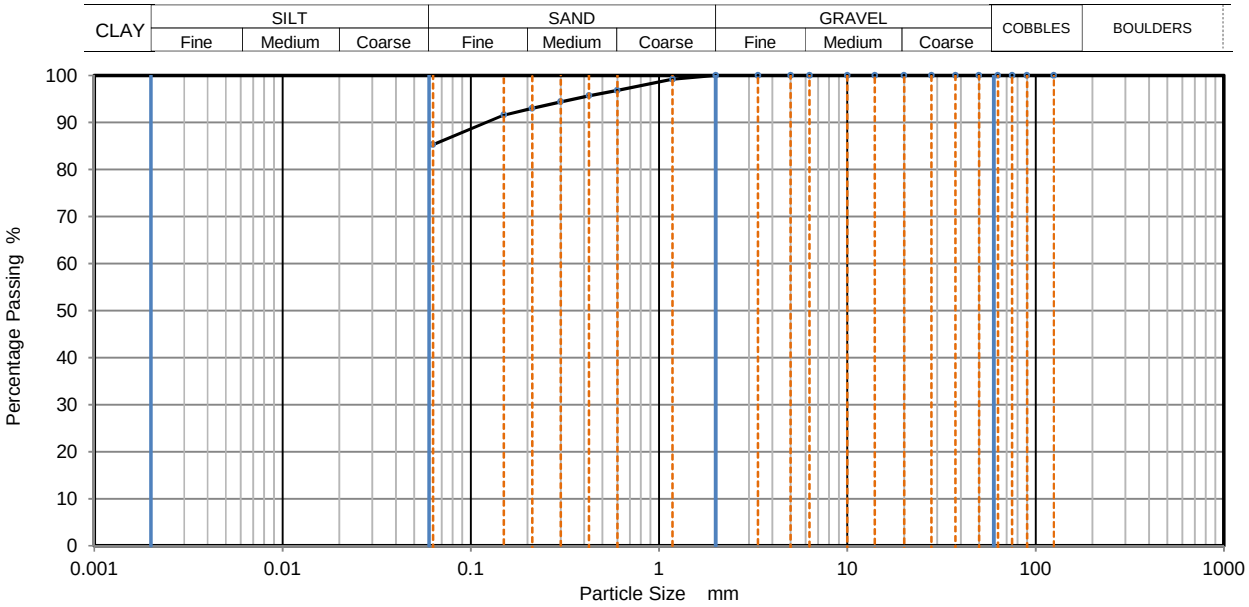
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

	Laboratory Reference: 871220	Sample Reference:	WAC07
Sample description:	Brownish grey slightly sandy CLAY	Sample Type:	B
Location: WS04		Depth Top [m]:	1.00
Supplier: Not Given		Depth Base [m]:	Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	97		
0.425	96		
0.3	94		
0.212	93		
0.15	92		
0.063	85		

Dry Mass of sample [g]: 142

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	14.70
Fines <0.063mm	85.30

Grading Analysis		
D100	mm	2
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

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TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
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Watford Herts WD18 8YS

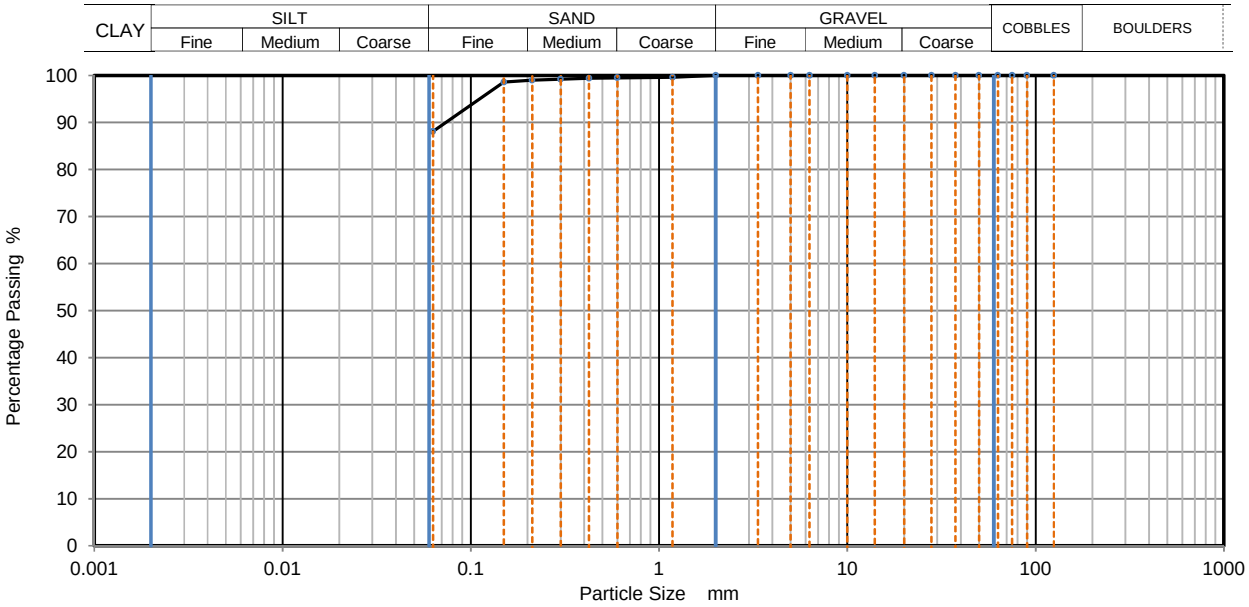
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 871221

Sample description:	Light brown slightly sandy CLAY	Sample Reference:	Not Given
Location:	WS06	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	0.20
		Depth Base [m]:	Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	99		
0.212	99		
0.15	99		
0.063	88		

Dry Mass of sample [g]: 122

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	11.90
Fines <0.063mm	88.10

Grading Analysis		
D100	mm	2
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
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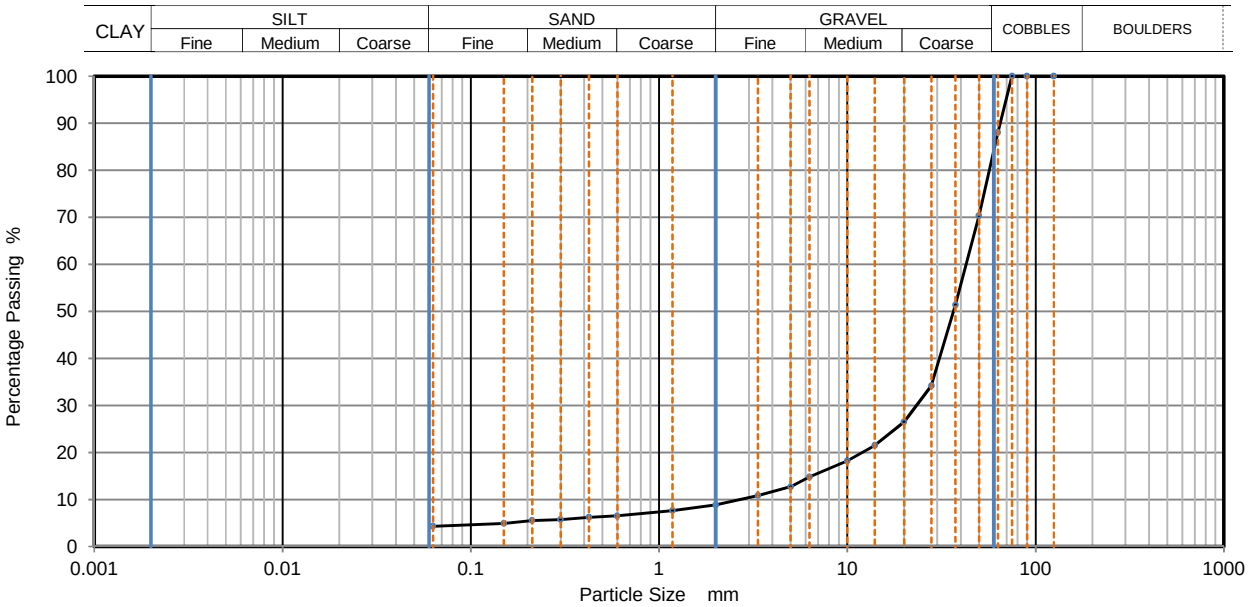
UKAS TESTING 4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

	Laboratory Reference: 871222	Sample Reference:	Not Given
Sample description:	Brown slightly clayey slightly sandy GRAVEL with cobbles	Sample Type:	B
Location:	WS09	Depth Top [m]:	0.50
Supplier:	Not Given	Depth Base [m]:	Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	88		
50	70		
37.5	51		
28	34		
20	27		
14	22		
10	18		
6.3	15		
5	13		
3.35	11		
2	9		
1.18	8		
0.6	7		
0.425	6		
0.3	6		
0.212	6		
0.15	5		
0.063	4		

Dry Mass of sample [g]: 12653

Sample Proportions	% dry mass
Very coarse	12.00
Gravel	79.20
Sand	4.50
Fines <0.063mm	4.30

Grading Analysis		
D100	mm	75
D60	mm	42.8
D30	mm	23.3
D10	mm	2.73
Uniformity Coefficient		16
Curvature Coefficient		4.6

Remarks

Preparation and testing in accordance with BS1377 unless noted below
The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

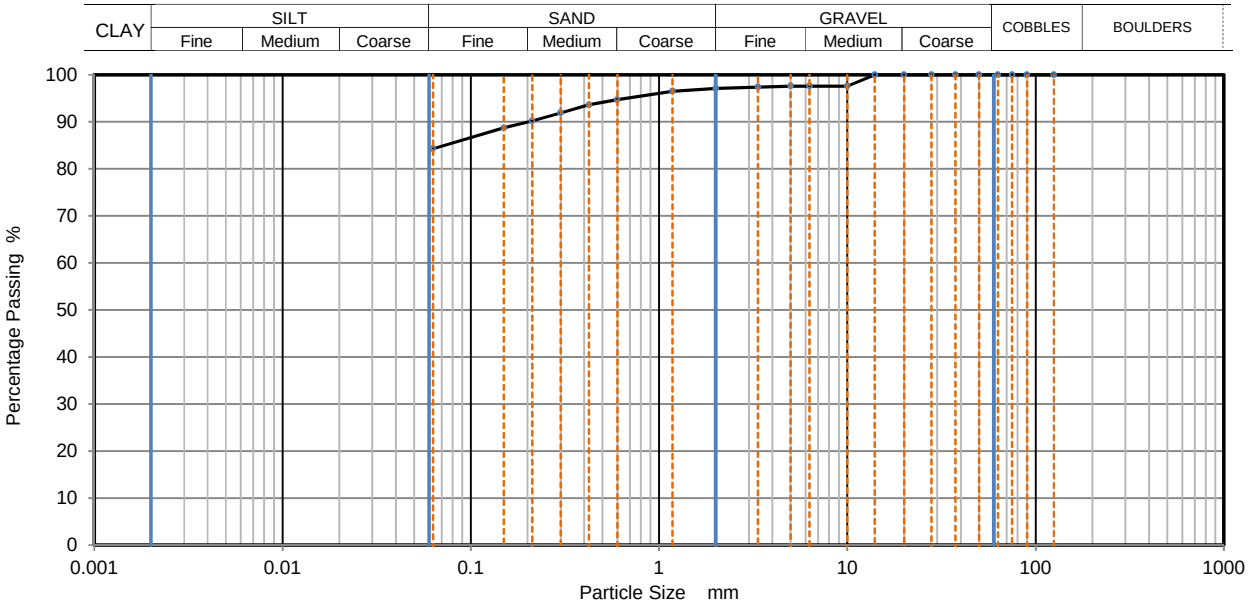
Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	14/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 871223 Sample Reference: WAC10

Sample description: Brownish grey slightly sandy slightly gravelly CLAY Sample Type: B

Location: HP06 Depth Top [m]: 1.00

Supplier: Not Given Depth Base [m]: Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	97		
0.6	95		
0.425	94		
0.3	92		
0.212	90		
0.15	89		
0.063	84		

Dry Mass of sample [g]: 125

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.90
Sand	12.70
Fines <0.063mm	84.30

Grading Analysis		
D100	mm	14
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	15/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

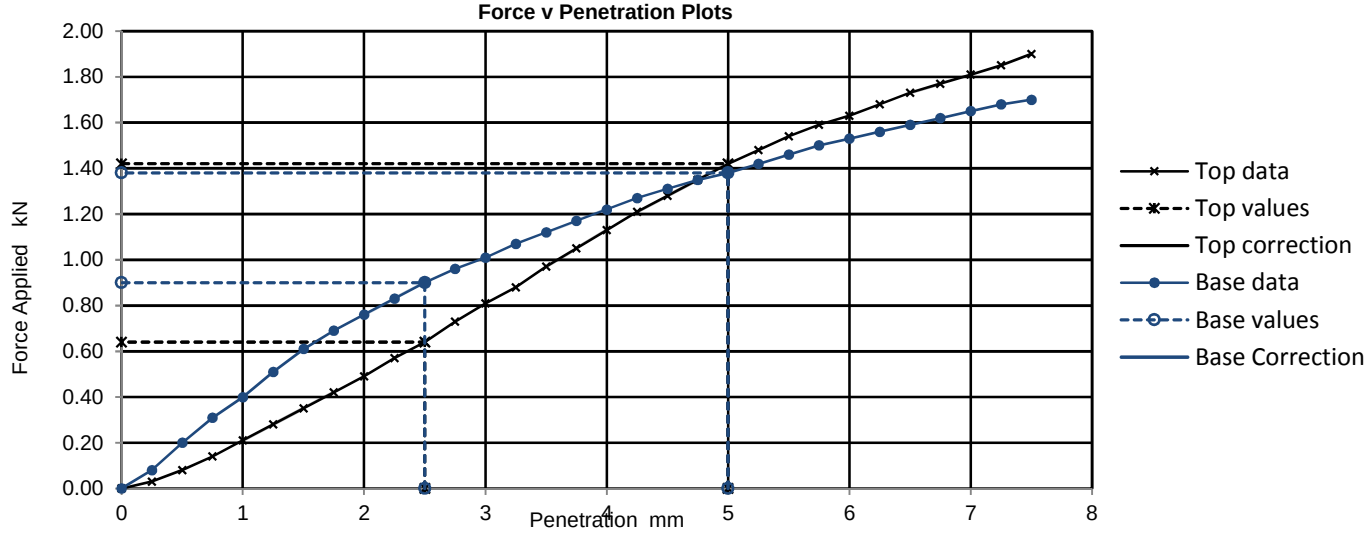
Test Results:

Laboratory Reference:	871220	Depth Top [m]:	1.00
Hole No.:	WS04	Depth Base [m]:	Not Given
Sample Reference:	WAC07	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Mottled brown silty CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.92	Mg/m3	Surcharge applied	8	kg
	Dry density	1.53	Mg/m3		4.9	kPa
	Moisture content	25	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	4.8	7.1	7.1	7.0	24
BASE	No	6.8	6.9	6.9		22

Remarks:

Test/ Specimen specific remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical
Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	30/11/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	15/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

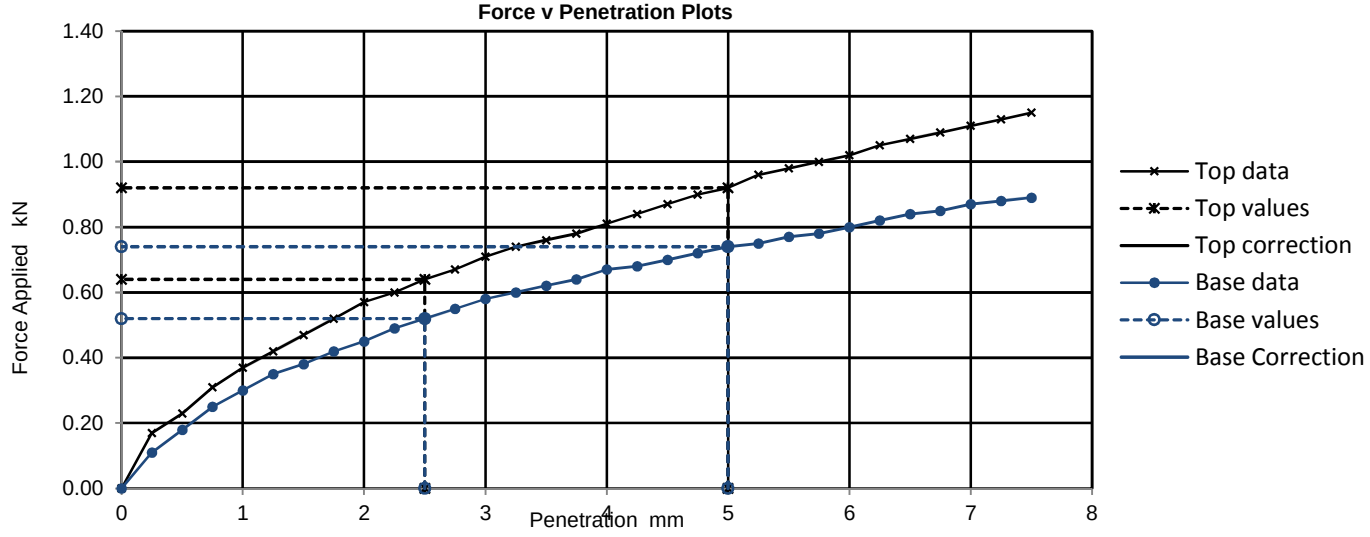
Test Results:

Laboratory Reference:	871221	Depth Top [m]:	0.20
Hole No.:	WS06	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Orangish brown to mottled grey CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.01	Mg/m3	Surcharge applied	8	kg
	Dry density	1.64	Mg/m3		4.8	kPa
	Moisture content	23	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	4.8	4.6	4.8		23
BASE	No	3.9	3.7	3.9		22

Remarks:

Test/ Specimen specific remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical
Commercial Manager

Date Reported: 21/12/2017

for and on behalf of i2 Analytical Ltd

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Environmental Science

Client:	CURTINS	Client Reference:	64491
Client Address:	2 The Wharf Bridge Street Birmingham B1 2JS	Job Number:	17-69972
		Date Sampled:	02/12/2017
		Date Received:	06/12/2017
Contact:	Sean Taylor	Date Tested:	15/12/2017
Site Name:	Granville Community College	Sampled By:	Not Given
Site Address:	Not Given		

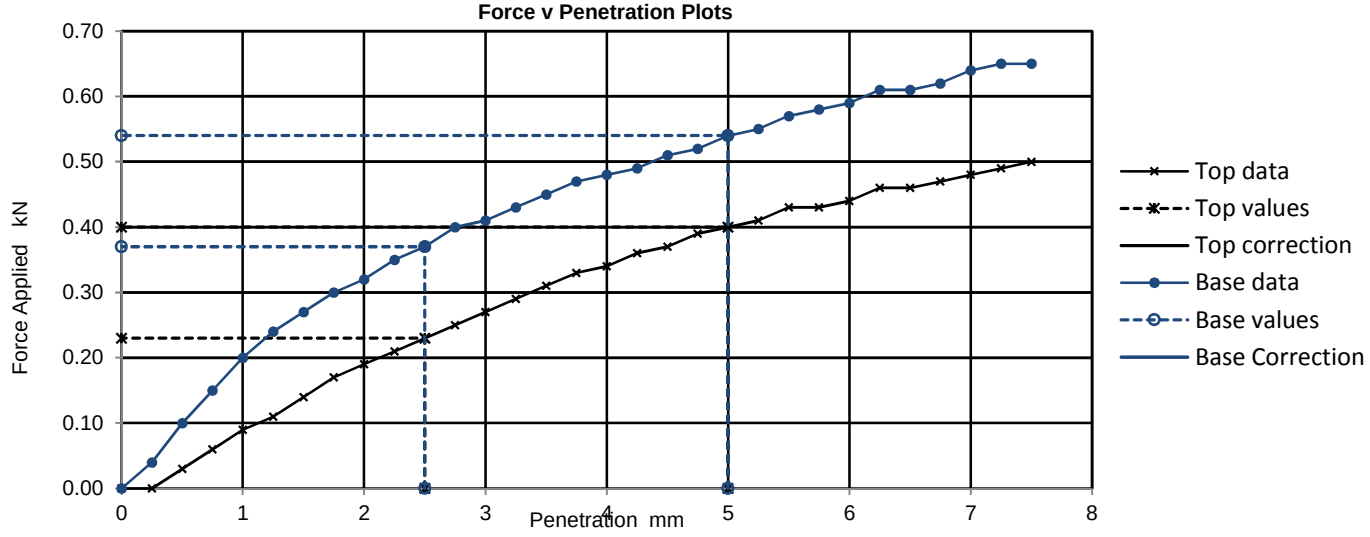
Test Results:

Laboratory Reference:	871223	Depth Top [m]:	1.00
Hole No.:	HP06	Depth Base [m]:	Not Given
Sample Reference:	WAC10	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Mottled brown CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		2	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.92	Mg/m3	Surcharge applied	8	kg
	Dry density	1.52	Mg/m3		4.9	kPa
	Moisture content	26	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.7	2.0	2.0		27
BASE	No	2.8	2.7	2.8		25

Remarks:

Test/ Specimen specific remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical
Commercial Manager

Date Reported: 21/12/2017

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Appendix A5 – Ground Gas and Groundwater Monitoring Results

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Curtins Consulting
2 The Wharf, Bridge Street, Birmingham, B1 2JS
Tel: 0121 643 4694

GAS MONITORING LOG SHEET

Project:	Granville Community Coledge	**Date:**	15/12/17
Job Number:	B064491	**Visit:**	1
Client:	Kier Construction Ltd	**Weather:**	Sunny
Barometric State:	Steady	**Ground Conditions:**	Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Note
		Max	SS	Max	SS	Max	SS					
Curtins Installaions												
WS03/WAC05	986	0.0	0.0	5.0	5.0	5.3	5.3	2.7	0	1	DRY	
WS01/WAC12	986	0.0	0.0	0.0	0.0	0.9	0.9	18.2	0	0	DRY	
WS05	986	0.0	0.0	0.0	0.0	1.0	1.0	14.3	0	3	6.89	
WS07	986	N/A	N/A									1
WS11	986	N/A	N/A	0.0	0.0	5.4	5.4	11.4	0	0	0.35	2
RH01	986	0.0	0.0	1.7	1.7	12.3	12.3	1.6	0	2	2.57	
RH02	986											3
RH03	986	-5.4	-1.1	0.0	0.0	0.8	0.8	19.7	0	0	6.28	5
Previous Installations												
CP101												6
CP102												4
WS101												3
WS102												3
WS103												3
WS104												3

Notes

1. Completely flooded.
2. Flooded at surface. Drained down borehole. No accurate flow available.
3. Unable to locate due to snow and ice cover.
4. No install.
5. Flow of -5.5 to -1.1 over siz seconds stable after this perios.
6. Destroyed during phase two works.

Logged by

ST

1% gas volume = 10,000 ppm
Flow rate, methane and cabon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

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Tel: 0121 643 4694

GAS MONITORING LOG SHEET

Project:	Granville Community Coledge	**Date:**	03/01/18
Job Number:	B064491	**Visit:**	2
Client:	Kier Construction Ltd	**Weather:**	Overcast and raining
Barometric State:	Steady	**Ground Conditions:**	Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Note
		Max	SS	Max	SS	Max	SS					
Curtins Installaions												
WS03/WAC05	970	0.0	0.0	6.0	6.0	0.1	0.1	1.7	0	0	DRY	
WS01/WAC12	970	0.0	0.0	0.0	0.0	0.9	0.9	18.3	0	0	DRY	
WS05	970	0.0	0.0	0.0	0.0	1.1	1.1	16.4	0	1	0.24	
WS07												1
WS11	970	0.0	0.0	0.0	0.0	0.1	0.1	18.2	0	2	0.51	
RH01	970	0.0	0.0	0.0	0.0	7.3	7.3	6.9	0	0	2.39	
RH02	970	0.0	0.0	0.0	0.0	1.5	1.5	4.2	0	1	6.61	
RH03	970	0.1	0.0	0.2	0.2	4.3	4.3	12.9	0	2	3.60	
Previous Installations												
CP101												2
CP102												2
WS101	970	0.0	0.0	0.0	0.0	0.1	0.1	20.4	0	0	1.27	
WS102												1
WS103												1
WS104	970	0.0	0.0	0.0	0.0	0.4	0.4	20.3	0	1	3.61	

Notes

1. Complete Flooding.
2. Destroyed during Phase two works.

Logged by

ST

1% gas volume = 10,000 ppm
Flow rate, methane and cabon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

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GAS MONITORING LOG SHEET

Project:	Granville Community Coledge	**Date:**	05/02/18
Job Number:	B064491	**Visit:**	3
Client:	Kier Construction Ltd	**Weather:**	Sunny
Barometric State:	Steady	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Note
		Max	SS	Max	SS	Max	SS					
Curtins Installaions												
WS03/WAC05	1017	0.0	0.0	1.7	1.7	8.1	8.1	0.0	0	0	3.50	
WS01/WAC12	1017	0.0	0.0	0.0	0.0	1.6	1.6	16.7	0	2	1.76	
WS05	1017	0.0	0.0	0.0	0.0	0.4	0.4	20.1	0	2	0.40	
WS07												1
WS11	1017	0.0	0.0	0.0	0.0	0.2	0.2	18.7	0	1	0.70	
RH01	1017	0.0	0.0	6.4	6.4	6.7	6.7	0.0	0	1	Dry	
RH02	1017	1.6	0.0	0.0	0.0	1.3	1.3	0.0	0	1	6.75	5
RH03	1017	-2.2	0.0	0.4	0.4	8.4	8.4	10.3	1	2	6.14	4
Previous Installations												
CP101												3
CP102												1
WS101	1017	0.0	0.0	0.0	0.0	0.1	0.1	20.7	0	1	1.51	
WS102												3
WS103												2
WS104	1017	0.0	0.0	0.0	0.0	0.6	0.6	20.2	0	1	1.48	

Notes

Logged by

ST

1. Complete Flooding.
2. Unable to locate.
3. Destroyed During Phase 2 Works.
4. Flow -2.2 to 0.0 in 30 sec.
5. Flow 1.6 to 0.0 in 2 mins.

1% gas volume = 10,000 ppm
Flow rate, methane and cabon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

				Project Name		Granville Sports College	
				Project Reference		WIE10720-102	
				Date		22/09/2016	
Borehole			**CP101**		AP	1006	
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			1.12	m			

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	0.1	1.7	18.2	<0.1	<0.1	<0.1	
30	<0.1	1.8	18.1	<0.1	<0.1	<0.1	
60	<0.1	1.8	18.1	<0.1	<0.1	<0.1	
Peak State	0.1	1.8	18.1	<0.1	<0.1	<0.1	

Borehole	**CP102**	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	1.72	m

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	0.2	0.9	19.9	<0.1	<0.1	<0.1	
30	0.2	0.9	20	<0.1	<0.1	<0.1	
60	0.2	0.8	20	<0.1	<0.1	<0.1	
Peak State	0.2	0.9	20	<0.1	<0.1	<0.1	

Borehole	**WS101**	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	DRY	m

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.5	20.3	<0.1	<0.1	<0.1	
30	<0.1	0.5	20.3	<0.1	<0.1	<0.1	
60	<0.1	0.4	20.4	<0.1	<0.1	<0.1	
Peak State	<0.1	0.5	20.4	<0.1	<0.1	<0.1	

Borehole	**WS102**	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	0.25	m

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.9	19.9	<0.1	<0.1	<0.1	
30	<0.1	0.8	19.9	<0.1	<0.1	<0.1	
60	<0.1	0.8	19.9	<0.1	<0.1	<0.1	
Peak State	<0.1	0.9	19.9	<0.1	<0.1	<0.1	

Project Name	Granville Sports College	
Project Reference	WIE10720-102	
Date	22/09/2016	

Borehole	**WS103**	AP	1006
Flow range	<0.1	l/hr	
Peak flow	<0.1	l/hr	
Depth to water	DRY	m	
Depth of standpipe and diameter		50mm (ID)	

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.8	19.9	<0.1	<0.1	<0.1	
30	<0.1	0.8	19.9	<0.1	<0.1	<0.1	
60	<0.1	0.8	20	<0.1	<0.1	<0.1	
Peak State	<0.1	0.8	20	<0.1	<0.1	<0.1	

Borehole	**WS104**		
Flow range	<0.1	l/hr	
Peak flow	<0.1	l/hr	
Depth to water	DRY	m	
Depth of standpipe and diameter		50mm (ID)	

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.6	20.1	<0.1	<0.1	<0.1	
30	<0.1	0.6	20.1	<0.1	<0.1	<0.1	
60	<0.1	0.6	20.2	<0.1	<0.1	<0.1	
Peak State	<0.1	0.6	20.2	<0.1	<0.1	<0.1	

waterman					**Project Name**		Granville Sports College
					Project Reference		WIE10720-102
					Date		09/10/2016
Borehole			**CP101**		AP		1011
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			1.12	m			
Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	2.6	18.2	<0.1	<0.1	<0.1	
30	<0.1	2.6	18.2	<0.1	<0.1	<0.1	
60	<0.1	2.7	18.2	<0.1	<0.1	<0.1	
Peak State	<0.1	2.7	18.2	<0.1	<0.1	<0.1	
Borehole			**CP102**				
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			1.79	m			
Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.3	20.2	<0.1	<0.1	<0.1	
30	<0.1	0.3	20.1	<0.1	<0.1	<0.1	
60	<0.1	0.3	20.3	<0.1	<0.1	<0.1	
Peak State	<0.1	0.3	20.3	<0.1	<0.1	<0.1	
Borehole			**WS101**				
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			DRY	m			
Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.2	20.1	<0.1	<0.1	<0.1	
30	<0.1	0.3	20.2	<0.1	<0.1	<0.1	
60	<0.1	0.3	20.2	<0.1	<0.1	<0.1	
Peak State	<0.1	0.3	20.2	<0.1	<0.1	<0.1	
Borehole			**WS102**				
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			0.28	m			
Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.4	19.7	<0.1	<0.1	<0.1	**Gas monitored after being purged.**
30	<0.1	0.4	20.1	<0.1	<0.1	<0.1	
60	<0.1	0.4	20.2	<0.1	<0.1	<0.1	
Peak State	<0.1	0.4	20.2	<0.1	<0.1	<0.1	

				Project Name		Granville Sports College	
				Project Reference		WIE10720-102	
				Date		09/10/2016	
Borehole			**WS103**		AP	1011	
Flow range			<0.1	l/hr			
Peak flow			<0.1	l/hr			
Depth to water			DRY	m			

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15	<0.1	1.8	19.3	<0.1	<0.1	<0.1	
30	<0.1	1.9	19.2	<0.1	<0.1	<0.1	
60	<0.1	1.9	19.2	<0.1	<0.1	<0.1	
Peak State	<0.1	1.9	19.3	<0.1	<0.1	<0.1	

Borehole	**WS104**		
Flow range	<0.1	l/hr	
Peak flow	<0.1	l/hr	
Depth to water	DRY	m	

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15	<0.1	2.9	17.2	<0.1	<0.1	<0.1	
30	<0.1	3	16.9	<0.1	<0.1	<0.1	
45	<0.1	3	16.8	<0.1	<0.1	<0.1	
60	<0.1	3	16.7	<0.1	<0.1	<0.1	
90	<0.1	3.1	16.6	<0.1	<0.1	<0.1	
120	<0.1	3.2	16.5	<0.1	<0.1	<0.1	
180	<0.1	3.3	16.3	<0.1	<0.1	<0.1	
240	<0.1	3.3	16.3	<0.1	<0.1	<0.1	
Peak State	<0.1	3.3	17.2	<0.1	<0.1	<0.1	

Project Name	Granville Sports College	
Project Reference	WIE10720-102	
Date	20/10/2016	

Borehole	CP101		AP	1008
Flow range	<0.1	l/hr		
Peak flow	<0.1	l/hr		
Depth to water	2.18	m		

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15	<0.1	4	15.8	<0.1	<0.1	<0.1	
30	<0.1	4.1	15.8	<0.1	<0.1	<0.1	
60	<0.1	4.2	15.5	<0.1	<0.1	<0.1	
90	<0.2	4.4	15.5	<0.1	<0.1	<0.1	
60	<0.1	4.2	15.4	<0.1	<0.1	<0.1	
Peak State	<0.1	4.4	15.8	<0.1	<0.1	<0.1	

Borehole	CP102	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	1.92	m

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15	<0.1	0.3	20.1	<0.1	<0.1	<0.1	
30	<0.1	0.2	20.2	<0.1	<0.1	<0.1	
60	<0.1	0.2	20.2	<0.1	<0.1	<0.1	
Peak State	<0.1	0.3	2.2	<0.1	<0.1	<0.1	

Borehole	WS101	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	3.41	m

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15	<0.1	0.4	19.8	<0.1	<0.1	<0.1	
30	<0.1	0.4	19.9	<0.1	<0.1	<0.1	
60	<0.1	0.3	20	<0.1	<0.1	<0.1	
Peak State	<0.1	0.4	20	<0.1	<0.1	<0.1	

Borehole	WS102	
Flow range	<0.1	l/hr
Peak flow	<0.1	l/hr
Depth to water	0.32	m

Seconds	CH_4 (%)	CO_2 (%)	O_2 (%)	LEL (%)	H_2S (ppm)	CO (ppm)	Comments:
15							**No headspace available - install was filled with water.**
30							
60							
Peak State							

Project Name	Granville Sports College	
Project Reference	WIE10720-102	
Date	20/10/2016	

Borehole	**WS103**		AP	1008
Flow range	<0.1	l/hr		
Peak flow	<0.1	l/hr		
Depth to water	DRY	m		

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	0.8	19.5	<0.1	<0.1	<0.1	
30	<0.1	0.8	19.7	<0.1	<0.1	<0.1	
60	<0.1	0.8	19.8	<0.1	<0.1	<0.1	
Peak State	<0.1	1.9	19.8	<0.1	<0.1	<0.1	

Borehole	**WS104**			
Flow range	<0.1	l/hr		
Peak flow	<0.1	l/hr		
Depth to water	DRY	m		

Seconds	**CH_4 (%)**	**CO_2 (%)**	**O_2 (%)**	**LEL (%)**	**H_2S (ppm)**	**CO (ppm)**	**Comments:**
15	<0.1	1.7	18.1	<0.1	<0.1	<0.1	
30	<0.1	1.6	18.1	<0.1	<0.1	<0.1	
60	<0.1	1.6	18.1	<0.1	<0.1	<0.1	
Peak State	<0.1	1.7	18.1	<0.1	<0.1	<0.1	

Appendix A6 – Tier 1 Screening Thresholds

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Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM

curtins

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] [*30*]
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*160*	*160*	*3900*	*12000*	*600000*	*180000*
$EC_{>6}$ - EC_8	*530*	*530*	*13000*	*40000*	*620000*	*320000*
$EC_{>8}$ - EC_{10}	*150*	*150*	*1700*	*11000*	*13000*	*21000*
EC_{10}-EC_{12}	*760*	*770*	*7300*	*47000*	*13000*	*24000*
EC_{12}-EC_{16}	*4300*	*4400*	*13000*	*90000*	*13000*	*26000*
$EC_{>16}$ - EC_{35}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
$EC>_{35}$ - EC_{44}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC>_5$ - EC_7	*300*	*1400*	*57*	*86000*	*56000*	*92000*
$EC>_7$ - EC_8	*660*	*3900*	*120*	*180000*	*56000*	*100000*
$EC_{>8}$ - EC_{10}	*190*	*270*	*51*	*17000*	*5000*	*9300*
EC_{10} - EC_{12}	*380*	*1200*	*74*	*34000*	*5000*	*10000*
EC_{12} - EC_{16}	*660*	*2500*	*130*	*38000*	*5000*	*10000*
$EC_{>16}$ - EC_{21}	*930*	*1900*	*260*	*28000*	*3800*	*7800*
$EC_{>21}$ - EC_{35}	*1700*	*1900*	*1600*	*28000*	*3800*	*7900*
$EC>_{35}$ - EC_{44}	*1700*	*1900*	*1600*	*28000*	*3800*	*7900*
Aliph + Arom EC >44-70	*1900*	*1900*	*3000*	*28000*	3800	7900
Aromatic						
Benzene	**0.33** 0.87	**1.0** 3.3	**0.07** 0.18	**95** 98	*73* 140	*110* 230
Ethyl benzene	**350**	**840**	**90**	**2800**[8] [66000]	**2800**[8] [*25000*]	**2800**[8] [*27000*]
Toluene	**610**	**2700**	**120**	**4400**[8] [190000]	**4400**[8] [*56000*]	**4400**[8] [*100000*]
Xylene[9]	**230**	**290**	**160**	**2600**[8] [32000]	**2600**[8] [*43000*]	**2600**[8] [*31000*]
Phenol	**420**	**520**	**280**	**3200**[14] (38000)	**3200**[14] (*10000*)	**3200**[14] (*9300*)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*13*	*13*	*24*	*1100*	*4900*	*3000*
Acenaphthylene	*920*	*6000*	*160*	*100000*	*15000*	*30000*
Acenaphthene	*1100*	*6000*	*200*	*100000*	*15000*	*30000*
Fluorene	*860*	*4500*	*160*	*71000*	*9900*	*20000*
Phenanthrene	*440*	*1500*	*90*	*23000*	*3100*	*6300*
Anthracene	*11000*	*37000*	*2200*	*540000*	*74000*	*150000*
Fluoranthene	*890*	*1600*	*290*	*23000*	*3100*	*6400*
Pyrene	*2000*	*3800*	*620*	*54000*	*7400*	*15000*
Benz(a)anthracene	*13*	*15*	*13*	*180*	*29*	*62*
Chrysene	*27*	*32*	*19*	*350*	*57*	*120*
Benzo(b)fluoranthene	*3.7*	*4.0*	*3.9*	*45*	*7.2*	*16.0*
Benzo(k)fluoranthene	*100*	*110*	*130*	*1200*	*190*	*440*
Benzo(a)pyrene	*3.0* 5.0	*3.2* 5.3	*3.5* 5.7	*36* 77	*5.7* 10	*13* 21
Indeno(123cd)pyrene	*41*	*46*	*39*	*510*	*82*	*180*
Dibenzo(ah)anthracene	*0.3*	*0.32*	*0.43*	*3.6*	*0.58*	*1.4*
Benzo(ghi)perylene	*350*	*360*	*640*	*4000*	*640*	*1600*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.0014*	*0.0015*	*0.0018*	*0.12*	*3.5*	*5.4*
Trichloroethene (TCE)	*0.075*	*0.08*	*0.21*	*5.7*	*120*	*120*
1,1,1,2 Tetrachlorethane	*6.4*	*8.2*	*4.4*	*560*	*1400*	*2100*
Tetrachlorethene (PCE)	*0.90*	*0.92*	*3.6*	*95*	*1400*	*1500*
1,1,1 Trichlorethane	*39*	*40*	*240*	*3000*	*140000*	*100000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM

curtins

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] [*30*]
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*78*	*78*	*1700*	*5900*	*590000*	*130000*
$EC_{>6}$ - EC_8	*230*	*230*	*5600*	*17000*	*610000*	*220000*
$EC_{>8}$ - EC_{10}	*65*	*65*	*770*	*4800*	*13000*	*18000*
EC_{10}-EC_{12}	*330*	*330*	*4400*	*23000*	*13000*	*23000*
EC_{12}-EC_{16}	*2400*	*2400*	*13000*	*82000*	*13000*	*25000*
$EC_{>16}$ - EC_{35}	*92000*	*92000*	*270000*	*1700000*	*250000*	*480000*
$EC>_{35}$ - EC_{44}	*92000*	*92000*	*270000*	*1700000*	*250000*	*480000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC>_5$ - EC_7	*140*	*690*	*27*	*46000*	*56000*	*84000*
$EC>_7$ - EC_8	*290*	*1800*	*51*	*110000*	*56000*	*95000*
$EC_{>8}$ - EC_{10}	*83*	*110*	*21*	*8100*	*5000*	*8500*
EC_{10} - EC_{12}	*180*	*590*	*31*	*28000*	*5000*	*9700*
EC_{12} - EC_{16}	*330*	*2300*	*57*	*37000*	*5100*	*10000*
$EC_{>16}$ - EC_{21}	*540*	*1900*	*110*	*28000*	*3800*	*7700*
$EC_{>21}$ - EC_{35}	*1500*	*1900*	*820*	*28000*	*3800*	*7800*
$EC>_{35}$ - EC_{44}	*1500*	*1900*	*820*	*28000*	*3800*	*7800*
Aliph + Arom EC >44-70	*1800*	*1900*	*2100*	*28000*	3800	7800
Aromatic						
Benzene	**0.16**	**0.49**	**0.035**	**50**	*72*	*100*
Ethyl benzene	**150**	**380**	**39**	**1200**[8] [35000]	**1200**[8] [*24000*]	**1200**[8] [*22000*]
Toluene	**270**	**1300**	**51**	**1900**[8] [110000]	**1900**[8] [*56000*]	**1900**[8] [*95000*]
Xylene[9]	**98**	**120**	**70**	**1200**[8] [14000]	**1200**[8] [*42000*]	**1200**[8] [*23000*]
Phenol	**290**	**420**	**140**	**1500**[14] (35000)	**1500**[14] (*10000*)	**1500**[14] (*8300*)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*5.6*	*5.6*	*10*	*460*	*4900*	*1900*
Acenaphthylene	*420*	*4600*	*69*	*97000*	*15000*	*30000*
Acenaphthene	*510*	*4700*	*85*	*97000*	*15000*	*30000*
Fluorene	*400*	*3800*	*67*	*68000*	*9900*	*20000*
Phenanthrene	*220*	*1500*	*38*	*22000*	*3100*	*6200*
Anthracene	*5400*	*35000*	*950*	*540000*	*74000*	*150000*
Fluoranthene	*560*	*1600*	*130*	*23000*	*3100*	*6300*
Pyrene	*1200*	*3800*	*270*	*54000*	*7400*	*15000*
Benz(a)anthracene	*11*	*14*	*6.5*	*170*	*29*	*56*
Chrysene	*22*	*31*	*9.4*	*350*	*57*	*110*
Benzo(b)fluoranthene	*3.3*	*4.0*	*2.1*	*44*	*7.2*	*15*
Benzo(k)fluoranthene	*93*	*110*	*75*	*1200*	*190*	*410*
Benzo(a)pyrene	*2.7*	*3.2*	*2*	*35*	*5.7*	*12*
Indeno(123cd)pyrene	*36*	*46*	*21*	*510*	*82*	*170*
Dibenzo(ah)anthracene	*0.28*	*0.32*	*0.27*	*3.6*	*0.57*	*1.3*
Benzo(ghi)perylene	*340*	*360*	*470*	*4000*	*640*	*1500*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.00087*	*0.001*	*0.001*	*0.077*	*3.5*	*5*
Trichloroethene (TCE)	*0.034*	*0.036*	*0.091*	*2.6*	*120*	*91*
1,1,1,2 Tetrachlorethane	*2.8*	*3.5*	*1.9*	*250*	*1400*	*1800*
Tetrachlorethene (PCE)	*0.39*	*0.4*	*1.5*	*42*	*1400*	*1100*
1,1,1 Trichlorethane	*18*	*18*	*110*	*1300*	*140000*	*76000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM

curtins

Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS_{resi}	Public park POS_{park}
Metals						
Beryllium	*1.7*	*1.7*	*35*	*12*	*2.2*	*63*
Boron	*290*	*11,000*	*45*	*240,000*	*21,000*	*46,000*
Cadmium	**10**[13] 22	**85**[13] 150	**1.8** 3.9	**230** 410	*120* 220	*560* 880
Chromium III	*910*	*910*	*18,000*	*8,600*	*1,500*	*33,000*
Chromium VI	*6* 21	*6* 21	*1.8* 170	*33* 49	*7.7* 21	*220* 250
Lead	200	310	80	2,300	630	1,300
Mercury *(elemental)*	**1**	**1**	**26**	**26**	*16*	**26**[8] *[30]*
Mercury (inorganic)	**170**	**240**	**80**	**3600**	*120*	*240*
Nickel	*130*[10]	*180*[10]	*53*[11]	*980*[10]	*230*	*800*
Vanadium	*410*	*1200*	*91*	*9000*	*2000*	*5000*
Copper	*2400*	*7100*	*520*	*68000*	*12000*	*44000*
Zinc	*3700*	*40000*	*620*	*730000*	*81000*	*170000*
Semi-Metals and non-metals						
Arsenic	**32**[12] 37	**35**[12] 40	**43**[12] 49	**640**[12] 640	*79* 79	*170* 170
Antimony		***550***		***7500***	***1500***	***3300***
Selenium	**350**	**600**	**120**	**13000**	*1100*	*1800*
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*42*	*42*	*730*	*3200*	*570000*	*95000*
$EC_{>6}$ - EC_8	*100*	*100*	*2300*	*7800*	*600000*	*150000*
$EC_{>8}$ - EC_{10}	*27*	*27*	*320*	*2000*	*13000*	*14000*
EC_{10}-EC_{12}	*130*	*130*	*2200*	*9700*	*13000*	*21000*
EC_{12}-EC_{16}	*1100*	*1100*	*11000*	*59000*	*13000*	*25000*
$EC_{>16}$ - EC_{35}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
$EC_{>35}$ - EC_{44}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_7	*70*	*370*	*13*	*26000*	*56000*	*76000*
$EC_{>7}$ - EC_8	*130*	*860*	*22*	*56000*	*56000*	*87000*
$EC_{>8}$ - EC_{10}	*34*	*47*	*8.6*	*3500*	*5000*	*7200*
EC_{10} - EC_{12}	*74*	*250*	*13*	*16000*	*5000*	*9200*
EC_{12} - EC_{16}	*140*	*1800*	*23*	*36000*	*5100*	*10000*
$EC_{>16}$ - EC_{21}	*260*	*1900*	*46*	*28000*	*3800*	*7600*
$EC_{>21}$ - EC_{35}	*1100*	*1900*	*370*	*28000*	*3800*	*7800*
$EC_{>35}$ - EC_{44}	*1100*	*1900*	*370*	*28000*	*3800*	*7800*
Aliph + Arom EC >44-70	*1600*	*1900*	*1200*	*28000*	3800	7800
Aromatic						
Benzene	**0.08**	**0.3**	**0.017**	**28**	*72*	*90*
Ethyl benzene	**65**	**170**	**16**	**520**[8] [17000]	**520**[8] *[24000]*	**520**[8] *[17000]*
Toluene	**120**	**610**	**22**	**860**[8] [59000]	**860**[8] *[56000]*	**860**[8] *[87000]*
Xylene[9]	**41**	**53**	**28**	**480**[8] [69000]	**480**[8] *[41000]*	**480**[8] *[17000]*
Phenol	**180**	**310**	**66**	**760**[14] (31000)	**760**[14] *(10000)*	**760**[14] *(7600)*
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	*2.3*	*2.3*	*4.1*	*190*	*4900*	*1200*
Acenaphthylene	*170*	*2900*	*28*	*83000*	*15000*	*29000*
Acenaphthene	*210*	*3000*	*34*	*84000*	*15000*	*29000*
Fluorene	*170*	*2800*	*27*	*63000*	*9900*	*20000*
Phenanthrene	*95*	*1300*	*15*	*22000*	*3100*	*6200*
Anthracene	*2400*	*31000*	*380*	*520000*	*74000*	*150000*
Fluoranthene	*280*	*1500*	*52*	*23000*	*3100*	*6300*
Pyrene	*620*	*3700*	*110*	*54000*	*7400*	*15000*
Benz(a)anthracene	*7.2*	*11*	*2.9*	*170*	*29*	*49*
Chrysene	*15*	*30*	*4.1*	*350*	*57*	*93*
Benzo(b)fluoranthene	*2.6*	*3.9*	*0.99*	*44*	*7.1*	*13*
Benzo(k)fluoranthene	*77*	*110*	*37*	*1200*	*190*	*370*
Benzo(a)pyrene	*2.2*	*3.2*	*0.97*	*35*	*5.7*	*11*
Indeno(123cd)pyrene	*27*	*45*	*9.5*	*500*	*82*	*150*
Dibenzo(ah)anthracene	*0.24*	*0.31*	*0.14*	*3.5*	*0.57*	*1.1*
Benzo(ghi)perylene	*320*	*360*	*290*	*3900*	*640*	*1400*
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	*0.00064*	*0.00077*	*0.00055*	*0.059*	*3.5*	*4.8*
Trichloroethene (TCE)	*0.016*	*0.017*	*0.041*	*1.2*	*120*	*70*
1,1,1,2 Tetrachlorethane	*1.2*	*1.5*	*0.79*	*110*	*1400*	*1500*
Tetrachlorethene (PCE)	*0.18*	*0.18*	*0.65*	*19*	*1400*	*810*
1,1,1 Trichlorethane	*8.8*	*9*	*48*	*660*	*140000*	*57000*

Notes

1. All values above are in mg/kg
2. **Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters**, *numbers in italics are S4ULs*, ***numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters*** and underlined numbers are C4SLs
3. Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
15. NA: Not applicable

Appendix A7 – Risk Assessment Methodology

The site-specific risk assessment, presented in this report, follows the principle of establishing whether there is a viable linkage between a contaminant source to a potential receptor, via an exposure pathway.

The risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of contaminant source on a site does not necessarily mean there is a risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the source and receptor and the viability of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability (Likelihood)	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

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In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

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In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a *high probability* that *severe harm* could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	*Harm* is *likely to arise* to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	*It is possible* that without appropriate further action *harm could arise* to a designated receptor. It is relatively *unlikely* that any such harm would be *severe,* and if any harm were to occur it is *more likely* that such harm would be *relatively mild.*
Low Risk	*It is possible* that *harm could arise* to a designated receptor from an identified hazard. It is *likely* that, at worst, if any harm was realised any effects would be *mild.*
Negligible Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term ‘risk’ in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.

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