building & project consultants

Phase 2

Site Investigation Report

Longcross Film Studios, Chobham Lane, Longcross, Chertsey, KT16 0EE

A REPORT PREPARED

FOR AND ON BEHALF OF ARK DATA CENTRES LTD C/O HURLEY PALMER FLATT

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	For and on behalf of Paragon Building Consultancy Limited

EXECUTIVE SUMMARY

KEY INVESTIGATION FINDINGS

	Rationale For The Investigation
1.	The development site is situated within the wider Longcross Film Studios demise (Figure 1, Appendix 1). The client, Hurley Palmer Flatt (HPF) on behalf of Ark Data Centres Limited has been appointed as the structural engineer for the development of a Data Centre with HV Energy Centre, generator and water tanks. This investigation, by Paragon, is intended to facilitate the engineer's design process and to be submitted in support of a planning application for the development.
2.	The site is approximately 3.5 hectares in size and is currently undergoing demolition by Lawson Demolition Limited (Lawson) on behalf of Crest Nicholson (the current site owner). Lawson are currently using the exposed concrete slab situated in the centre of the development area as their welfare and storage yard, whilst demolishing the existing buildings. At the time of the investigation, the studio canteen (Building 100 and 101) and office building (Building 114) in the southern part of the site had been demolished. A steep slope is present along the western boundary and an office building (Building 124) is present at the top of the slope, this building is offsite.
3.	Paragon completed a previous Phase 1 and Phase 2 investigation on behalf of Ark Data Centres Limited in 2019 for due diligence purposes. In addition, third party reports were completed by others. It is understood that the client has full reliance on the data collected in the investigations completed by third parties and relevant information is used and referred to herein. The Phase 1 was updated for planning purposes in July 2020.
4.	The Phase 1 Report presented a conceptual site model for the site which highlighted moderate risks from contaminated Made Ground to future site users. Made Ground was also highlighted as potential source of ground gas. Key receptors include future site users, surface water features, groundwater, infrastructure and construction workers and all contamination pathways with exception of vegetable ingestion are active (ingestion, inhalation, dermal contact, surface runoff, infiltration and throughflow).
5.	The Phase 2 due diligence investigation completed in 2019 included seventeen intrusive locations, including eleven windowless boreholes and six hand excavated pits completed between 0.30m and 4.00m bgl. A subsequent indicative ground gas and groundwater monitoring visit was completed on 7 June 2019.
6.	This subsequent report details the additional works completed by Paragon in 2020 which comprised seven deep boreholes using a sonic drilling rig, ten shallow boreholes using a windowless terrier rig, twelve trial pits by means of mechanical excavation and four hand excavated foundation inspection pits. Chemical testing was undertaken on soils and groundwater, in-situ geotechnical testing including Standard Penetration Tests (SPTs), California Bearing Ratio (CBRs), ex-situ geotechnical laboratory analysis, and three rounds of gas monitoring were undertaken. Groundwater sampling was also completed during monitoring.
7.	In addition, a specialist contractor was commissioned to complete Ground Resistivity Testing (GRT) using the Wenner surface method in the location of all seven deep borehole locations.

Ground Conditions

8. Ground conditions comprise of Made Ground, River Terrace Deposits, Windlesham Formation and Bagshot Formation. The Made Ground is formed of predominately granular material and is approximately up to 1.5m thick. It was found at its deepest in BH06, WS01 and WS02, situated in the southwest and eastern parts of the site. In the remaining areas, the Made Ground was found to be <0.5m thick. The River Terrace Deposits are predominately formed of sand and was typically found in locations where ground level is above 52mOD. The Windlesham Formation is predominately cohesive and appears to increase in thickness from approximately 0.5m along the northern site boundary to around 1.5 to 2m along the southern boundary of the site. The stratum however does not appear to be present in the centre of the site. The Bagshot Formation is present below the River Terrace Deposits and Windlesham Formation across the entire site. While the Bagshot Formation is predominately formed of sand, there are bands of silty/cohesive material present, particularly towards the top of the stratum.

9. During the monitoring visits, groundwater was recorded at a level of approximately 43.5mOD to 44mOD across the site in the deep monitoring wells in boreholes BH05 and BH06. A higher water level of 48mOD was recorded on the first monitoring visit in Window Sample Hole WS06, however this was found to drop over the next visits, with the level becoming dry on the final visit. Groundwater is therefore taken to be at 44mOD, however local perched groundwater may be encountered, particularly in locations close to existing drainage or mains water infrastructure. There is further potential for perched water above the Windlesham Clay Formation within the River Gravels in wet periods.

Environmental Findings

10. A Geoenvironmental Risk Assessment was carried out on the chemical laboratory test data and a revised Conceptual Site Model was presented. Chemical test data found that the concentrations of contaminants testing within the Made Ground and natural soil were below the Generic Assessment Criteria (GAC) for a commercial land use. As such, the risk to human health is considered to be low. Furthermore, whilst the analysis from the groundwater identified marginal exceedances of heavy metals, the remaining contaminants were below the threshold used or below the limit of detection. In addition, there are no groundwater abstractions within the vicinity of the site and the site is not situated within a Source Protection Zone, as such, the risk to Controlled Waters is considered to be low.

11. Four rounds of gas monitoring were completed as part of this investigation and the results identified low concentrations of carbon dioxide, and the concentration of methane was below the limit of detection. Based on a preliminary assessment using BS 8485:2015+A1:2019 '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*', the site falls within Characteristic Situation 1 (CS1), whereby gas protection measures are not required.

	Geotechnical Findings
12.	The results of SPTs show a consistent 'N' value trendline of around 20 through the top of the Bagshot Formation to around 46mOD. Below this level the 'N' increases with depth to 200 at around 16.5mOD. 'N' values in the River Terrace Deposits and Windlesham are also relatively consistent.
13.	The monitoring results indicate a deep average groundwater level across the site of 44mOD, with potential for localised perched water within the Made Ground and above the Windlesham Formation.
14.	The findings of the site investigation show that natural ground conditions are suitable to support shallow and deep foundations. With regard to shallow foundations, pad and raft foundations are considered feasible, depending on the specific magnitude of the pressures applied.

RECOMMENDATIONS

	Environmental
1.	The concentrations of contaminants within soil and groundwater are considered to be suitable for the proposed end use of the development, and no further remediation is required. However, in areas of soft landscaping, a suitable growth medium is recommended. As such topsoil and subsoil should be imported with a minimum thickness of 150mm and should meet the requirements of BS3882, Specification for topsoil. The supplier should provide a test certificate to confirm the composition prior to purchase. It is then recommended to test the soils once they arrive onsite to ensure they meet the requirements for a commercial land use based on S4ULs and C4SLs.
2.	Whilst it is unlikely, in the event that previously unidentified contamination is uncovered during construction, works should cease until inspection and testing has been undertaken by an appropriately qualified person. Therefore, a watching brief and discovery strategy should be adopted on site during development.
3.	From a preliminary risk assessment of the results to thresholds set in the UK Water Industry Research (2010) '*Guidance for the selection of water supply pipes to be used in brownfield sites*', it is possible that barrier water pipes may be required for drinking water supply pipework. This is based on the contaminant concentrations recorded (in particular TPH C10 – C16 and TPH C16 – C40). However, the exceedances were only identified in two locations (WS01 adjacent to the former canteen building 100 and 101 and WS04 which is situated in the eastern part of the site) within the Made Ground and therefore it may be possible to discuss the findings with the local water provider to discuss their requirements.
4.	It is anticipated that throughout the development, surplus soil will be created from reducing ground levels and from foundation arisings. The arisings will therefore need to be managed appropriately. Whilst some arisings may require disposal off-site as waste, it is likely that the majority of the surplus soil could be re-used either onsite or on another site under the Definition of Waste: Code of Practice (DoW CoP) outlined by CL:AIRE. At this stage, it is anticipated that the Made Ground would be classified as non-hazardous and the underlying natural soil would be classified as inert. Therefore under DoW CoP it would be possible for the Made Ground to be reused onsite and the surplus natural soil could be reused through the direct transfer of clean and naturally occurring soils materials between sites. This method would promote a sustainable management strategy for soil arisings.
	Regulatory
5.	This report should be submitted to the Local Planning Authority in support of a planning application for the development.

	Geotechnical
6.	Geotechnical design parameters for the ground conditions encountered have been provided. They are based on the results of in-situ and laboratory test results.
7.	The monitoring results indicate a deep average groundwater level across the site of 44mOD, with potential for localised perched water within the Made Ground and above the Windlesham Formation.
8.	Shallow foundations are considered feasible in the form of pads/strips or raft slab foundation. A recommended allowable bearing pressure is provided for shallow pad/strip foundations. The feasibility of a raft foundation should be informed by appropriate geotechnical settlement and differential movement analysis. The results of this assessment would also enable spring stiffness values to be derived to supplement structural analysis and design of the raft by the structural engineer.
9.	Should the magnitude of the structural loads of the proposed development preclude the use of economical shallow foundation options, pile foundations are considered feasible. It is recommended that piles are formed using either Continuous Flight Auger (CFA) or bored piling methods. It is also recommended that the toe of all piles should be terminate below 37mOD to avoid bearing onto bands of variable and predominately silty material within the upper region of the Bagshot Formation. A preliminary pile capacity design for a range of pile diameters are provided.
10.	Recommendations are provided for excavations, including the proposed retaining wall along the western site boundary.
11.	Floors slabs are recommended to be ground bearing. The formation level should be inspected, and proof rolled prior to construction of the slab. Weak/soft spots should be removed and backfilled with compacted granular fill material.
12.	An assessment of the current data suggests that roads or pavements within locations where the ground conditions are found to be predominately cohesive, should be design for a CBR of 3%. In locations where the formation is predominately granular, pavements and roads can be designed for a CBR value of 20%.
13.	Design Sulphate (DS) classification to inform concrete mix designs have been provided based on the soil strata present. At this stage it is considered the DS-1, AC-1 is appropriate.

CONTENTS

PHASE 2 SITE INVESTIGATION REPORT

CLIENT NAME: Ark Data Centres LTD C/O Hurley Palmer Flatt

PROPERTY ADDRESS: Longcross Film Studios
Chobham Lane, Longcross, Chertsey

INVESTIGATION DATE: 22 June 2020 – 7 July 2020

1.0 INSTRUCTIONS

1.1	Paragon Building Consultancy Limited were instructed by Ark Data Centres Limited c/o Hurley Palmer Flatt on 8 June 2020 to complete a Phase 2 Ground Investigation on a site referred to as Longcross Film Studios, Chobham Lane, Longcross, Chertsey, KT16 0EE. The investigation included an intrusive investigation, laboratory analysis and risk assessment. These works have been completed in connection with redevelopment of the site as a Data Centre with HV Energy Centre, generator and water tanks.

2.0 AIMS AND OBJECTIVES

2.1	The aims of this report are: • To provide information on the geotechnical and environmental quality of the ground present onsite to highlight potential risks and abnormal development constraints associated with potential redevelopment of the site. • To assess the potential health and environmental risks to the development and other significant receptors from onsite sources. • To assess the potential offsite sources of contamination and their impact on the potential development. • To complete a gas risk assessment. • Provide provisional geotechnical recommendations in relation to the development.

2.2	The objectives of this report are: • To provide ground conditions information and recommendations in relation to the redevelopment of the site; • Characterise the contamination onsite by completing an intrusive site investigation; • To suggest a remediation strategy should contamination be identified; and • Determine the quality of the ground for geotechnical design by completing a ground investigation.

3.0 SCOPE OF WORKS

3.1	The ground investigation was undertaken in general accordance with the Code of Practice for Site Investigation British Standard BS5930 (2015), Code of Practice for the Investigation of Potentially Contaminated Sites BS10175:2011+A2:2017, Land Contamination: Risk Management (LCRM) 2019 (CLR11 currently under revision). Due regard is made to the Environmental Protection Act (EPA) 1990 Part 2A in connection with the contamination risk assessment and requirements of the National Planning Policy Framework (NPPF).
3.2	This report outlines the results from a second phase of intrusive site investigation works, which have been targeted to allow for conceptual design for the proposed development. Two previous phases of work have been completed by Paragon: A Phase 1 Desk Study and a Phase 2 Site Investigation. • An earlier Phase 1 Environmental Risk Assessment was previously prepared by Paragon for due diligence purposes in 2019 and updated in August 2020 (20.0576/CB/KJH, 13 August 2020). The report outlined the potential health and environmental risks identified from desk-based searches including online searches of the historical maps, geological maps, planning records and review of data on the Environment Agency website. A site walkover was completed and an initial Conceptual Site Model (CSM) was presented. • A Phase 2 Site Investigation was undertaken by Paragon in 2019 (19.0415/CB/LSG, 22 August 2019) for due diligence purposes. This comprised the intrusive investigation (drilling and trial pitting), laboratory testing of soils, groundwater and gas, onsite monitoring and environmental and geotechnical risk assessment.

4.0 INTRODUCTION

4.1	**Site Location**
4.1.1	Previous Phase 1 and Phase 2 investigations have been reported separately by Paragon as referenced above. The Phase 1 should be read in conjunction with this report; the following is a summary.
4.1.2	The site is centred approximately at National Grid Reference: 497740, 165682, and extends to 3.5Ha. The approximate elevation of the site is 54m Above Ordnance Datum (mAOD). Site information gathered during the preliminary report is summarised below and a location plan and existing layout plan are provided as Figure 1 and 2 respectively, in Appendix 1.
4.2	**Proposed Development**
4.2.1	It is understood that a Phase 2 Ground Investigation Report is required to provide additional preliminary data on ground conditions at the site to facilitate the development of a Data Centre with HV Energy Centre, generator and water tanks. The proposed layout is presented as Figure 3 in Appendix 1.
4.2.2	The RIBA Stage 2 Design Report provided by HPF describes the Data Centre buildings (named hereafter DC01 and DC02) as three-storey individual blocks, each of which measuring approximately 76.20m x 48.75m on plan and including two additional 11.30m x 61.30m steel gantries to the North and South facades. The blocks are aligned on plan. The HV Energy Centre block consists of a three-storey building, with a footprint of approximately 64.90m x 22.10m and with a partial plant enclosure, at the roof level. Adjacent to the HV Energy Centre, an external concrete slab 300mm thick and with a footprint 18.20m x 17.80m has been provided to support the 3 no. generator sets. A similar supporting slab construction has been provided on the southern part of the site to support the remaining 8no. generator sets of the scheme. The current development of the site requires the provisions of 6no. water tanks, each with a diameter of 5.50m and a total height of about 9.0m. These tanks have been split in two: 3 no thanks will be located on the northern elevation of DC01 building and 3 no. tanks will be located on the southern elevation of DC02 building. Each of these two sets of tanks have been placed on a concrete slab 350mm think stiffened by ground beams 500mm wide and 950mm deep.
4.2.3	A preliminary drawing of the data centre has been provided by the client for guidance, however we understand this may be subject to change. It is understood that the preferred option is to use pile foundations and a suspended floor slab. Existing information shows typical column loads are in the range of 6,500-7,500 kN.
4.2.4	It is understood that there will be some areas of soft landscaping along the perimeter of the site, with a larger area in the southern part of the site. Furthermore, a swale / attenuation pond is also proposed.

4.3	**Planning Conditions**
4.3.1	At the time of writing no formal planning application has been made. It is envisaged that this report will be used in support of a planning application to the Local Planning Authority and for preliminary structural design purposes.
4.4	**General Description and Current Site Use**
4.4.1	The site comprises an exposed concrete slab in the centre, a shallow gradient slope in the northern part of the site with an exposed concrete slab and buildings, a car park in the eastern part of the site, canteen and associated parking in the southern part, and a steep slope with office units in the west. The site is immediately surrounded by commercial properties relating to the wider Longcross Studios with Chobham lane to the south. Crest Nicholson are currently constructing residential properties 350m northeast of the site.
4.4.2	Some demolition has taken place within the site boundary, mainly Building 99 where the large slab in the centre of the site is present. At the time of the investigation the hardstanding area was being used by the film studios with temporary marquee structures in place. A steep incline / slope is present along the western boundary, which falls eastwards to the hardstanding. The profile of the slope is stepped with a car park present at the top, Building 114 on the middle level and hardstanding at the base.
4.4.3	Based on our recent site walkover, completed 11 June 2020, no visual evidence of significant ground contamination was noted.
4.4.4	The surface of the site was mainly formed of a concrete slab with areas of bituminous surfacing and some soft landscaping. Vegetation was present along the slope, in the northern part of the site and along the eastern and southern boundaries.
4.5	**History**
4.5.1	Historical mapping indicated that the site was open, undeveloped woodland / scrubland for most of its history until structures were recorded on site on mapping editions from 2002 onwards. It is known from online research that the site was a military site long before this used for research and experiment relating to vehicles and tanks. Between 1941 and 2005 the site was used by various government military agencies until it became the Defence Evaluation & Research Agency site (DERA) and finally the Defence Logistics Organisation (DLO) Chertsey. The most recent use of the site was for the testing, evaluation and certification of the full range of British Army vehicles. It is understood that the site was later sold off and was then used by Longcross Film Studios.
4.5.2	The surrounding area (within 250m) also showed a number of changes through the historical maps. The site was largely surrounded by undeveloped land / green belt and Chobham Common to the west. Longcross Station and railway were evident to the north. Immediately to the east of the site were further buildings and land used by DERA for military use historically; there were also barracks buildings to the south.

4.6 Geology

4.6.1 From a review of the British Geological Survey mapping, the geology of the subject site comprises River Terrace Deposits (western part of the site only) over the Windlesham Formation (Sand, Silt and Clay) and Bagshot Formation (Sand).

4.6.2 A number of borehole records have been obtained from BGS that are situated within 50m of the site. The records indicate the ground conditions comprise Made Ground to 3m bgl over Sand, described as 'peaty, black with layers of brown/green silty sand and stones and roots', over the Bagshot Beds, described as 'orange-brown, grey-green silty and clayey with stones', to the base of the borehole at 15m. Groundwater was not encountered.

4.6.3 The results from the Preliminary Phase 2 Due Diligence Investigation are presented in Table 1 below.

Table 1. Ground Conditions

Depth From (min/max) (m)	Depth To (min/max) (m)	Soil Type	Description
Ground level	0.10 / 0.18	Hardstanding	Concrete
Ground level	0.20 / 0.30	Topsoil	TOPSOIL. Grass over brown gravelly Sand. Sand is fine, gravel is fine to medium, angular flint.
Ground level / 0.25	0.48 / 1.10	MADE GROUND	MADE GROUND. Comprising sandy Gravel of fine to coarse, angular to sub-angular ash, brick and clinker. Included potential asbestos in WS05.
0.10 / 0.22	1.45 / 4.00	CLAY, SILT and SAND	Interbedded dense, orange mottled, light grey, clayey, silty, SAND. Sand is fine to medium. (WINDLESHAM FORMATION – Parent unit: BRACKLESHAM GROUP)
1.45	2.45 / 3.45	SAND	Dense, light grey mottled and orange SAND. Sand is fine. (BAGSHOT FORMATION)

4.6.4 The geology was found to vary beneath the Made Ground and comprised clay, sand and silt of the Windlesham Formation. Gravelly bands were encountered which are thought to be the minor bands within the Windlesham Formation and the Bagshot Formation was thought to be identified within one borehole (WS10).

4.6.5 Based on a review of BGS geology and nearby boreholes the geology encountered is typical of the area. A nearby borehole, approximately 200m east of the site encountered the Bagshot Formation at 4.55m below the Windlesham Formation, which suggests that the Bagshot Beds are likely to be encountered at depths beyond those identified within this investigation.

4.7	**Hydrogeology**
4.7.1	The River Terrace Deposits, Windlesham Formation and Bagshot Formation are classified as Secondary (A) Aquifers. The previous investigation did not identify groundwater during drilling or during subsequent monitoring visit and based on the permeability of the sand it is likely that groundwater is found at depths within the Bagshot Formation, below 4m.
4.7.2	The site is not situated within a Groundwater Source Protection Zone (SPZ).
4.7.3	No groundwater abstraction licences have been identified within 1km.
4.8	**Hydrology**
4.8.1	The nearest surface water feature is an unnamed drainage ditch that is located some 250m west of the site. There are no active surface water abstraction points located within a 1km radius of the site.
4.8.2	There are no discharge consents within 250m of the site.
4.9	**Flooding**
4.9.1	The Environment Agency website indicates that the flood risk at the site is less than 1 in 1,000 chance of flooding in any year. The site has marginal areas shown to be susceptible to surface water flooding, however this is limited to external areas. The site is shown to be susceptible to groundwater flooding, however the BGS confidence rating in the result is low.
4.10	**Regulatory Enquiries**
4.10.1	The Local Authority has not been contacted at this time. However, it is considered unlikely that the site is currently designated as contaminated land under the provisions of the Environmental Protection Act (EPA) 1990 Part 2A.
4.10.2	The Environment Agency has not been contacted at this stage.
4.11	**Environmental Database Information**
4.11.1	The southwest part of the site is located within a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Special Protection Area (SPA). However, the SSSI would be considered as up-gradient and therefore unlikely to be at risk of site derived contamination impacts (if any).
4.11.2	A landfill has been identified 450m northwest of the site. The record indicates that the landfill received industrial, commercial and household waste between 1960 and 1978. The potential for ground gas to migrate onto site from the landfill is limited due to the distance, however ground gas monitoring was recommended to be completed as part of future investigations as a precautionary measure and due the likelihood of Made Ground being present.

4.12	**Ground Stability Hazards**
4.12.1	Records indicate that the area in general has a low risk of subsidence hazards.
4.12.2	A slope is present in the western part of the site. The steep slope was formed of 3 stepped levels with 2 steep slopes between. A car park was present at the top (off site), a building was present on the middle level (Building 114, on site) and the exposed slab was found at the lowest level (on site). Recommendations have been made for further investigation on the slope as part of the Phase 2 Investigation.
4.12.3	The site is not located in a coal affected area.
4.13	**Unexploded Ordnance (UXO)**
4.13.1	The site was formerly owned by the Ministry of Defence (MOD) and historical uses of the site include military use, including manufacture and testing of military tanks. The risk of UXO has been assessed using the Zetica Maps, which indicate a moderate risk onsite, although no strategic targets have been identified by Zetica within 1km of the site.
4.13.2	In addition, a Land Quality Assessment was completed by Entec in 1999 on behalf of the MOD to assess the presence of contamination and provide recommendations for remedial measures necessary for redevelopment of the site. The report indicated that the majority of the site is 'free from contamination' and 'only limited and localised areas of significant contamination are present'. The areas identified as contaminated do not cross within the site boundary.
4.13.3	Entec identified that only one area was noted as having a potential for explosive residues, and this is situated by Building 120 which is not located within the development area. As such, no further testing for explosive residues was considered necessary.
4.13.4	During the decommissioning and divestment of a military site, the MOD has an obligation to surrender the site in a suitably safe condition. No surrender information has been provided but it is considered unlikely that UXO from their activities would have been left on site to remove onwards liability.
4.13.5	Paragon was supplied with a report by Crest Nicholson who commissioned Wilson Bailey to undertake an assessment of Unexploded Ordnance (UXO) onsite in August 2019 (Ref J19010/DB/c07). As the site was historically DERA Longcross and used by MOD and the Army, Wilson Bailey engaged with specialist advisors (EOD Contracts) to assess the site. Although the site was noted to have had an increased risk of discarded, buried, concealed and stored munitions, MOD closure works included clearance and inspection of all parts of the site. Furthermore, in the southern part of the site where the studio canteen was situated, an intrusive UXO survey was undertaken and no UXO were identified. Based on the above, the report concluded that the potential risk of encountering unexploded items is reduced and it would not be necessary for a UXO specialist to be on site for further assessment
4.14	**Radon**
4.14.1	The site is not located within a radon affected area.

4.15 Previous Reports

4.15.1 A previous report was provided for review: Entec UK Limited (1999). DERA Chertsey Land Quality Assessment. Dated 4 October 1999. Although Paragon cannot be held responsible for the accuracy of the work of others, the following key points and extracts have been noted:

- The report did not identify significant contamination in the development area. Within the wider film studios and Crest housing development area, concentrations of petroleum hydrocarbons, PCBs, and faecal coliforms were identified within the soil and cadmium and nickel within the groundwater.
- Explosive residues were only identified near Building 120 which is situated off-site.
- No recommendations were made within the development area. Recommendations were made for remediation within the wider film studios and Crest Nicholson housing development area.

4.15.2 The site investigation completed by Paragon in 2019 (22 August 2019, Ref. 190415/CB/LSG) comprised seventeen intrusive locations, including eleven windowless boreholes and six hand excavated pits completed between 0.30m and 4.00m bgl. A single ground gas and groundwater monitoring visit was also completed. The report concluded:

- Asbestos was identified within the Made Ground within the slope, however the remaining contaminants assessed were found below the assessment criteria for a commercial land use.
- No groundwater sampling was completed, however based on the low levels of contaminants identified within the soils, it was considered unlikely that grossly contaminated groundwater would be identified.
- Ground gas monitoring results suggested the site falls within Characteristic Situation 1 (CS1).
- Whilst the investigation did not find gross contamination, the investigation was restricted by a number of constraints listed in section 4.16 and as such, it was recommended that an additional phase of work was undertaken to fill in the data gaps.
- It was also recommended that the asbestos was remediated prior to purchase. We understand that this has now been completed by Crest Nicholson and their consultants (Wilson Bailey) and verification reports will be provided in due course to Ark Data Centres Limited.
- The investigation completed geotechnical testing which provided an early indication of geotechnical risks, however a further investigation was recommended for formal design purposes.

4.16 Constraints to Previous Investigations

4.16.1 A number of constraints were identified during the previous investigation by Paragon. These included the angle of the slope, ecological exclusion areas, vegetation, utilities, buildings and operational areas.

4.17	**Potential Contaminants of Concern**
4.17.1	Based on the above, the potential contaminants of concern that require further investigation are associated with Made Ground due to the historical uses of the site and changes in elevation. Contaminants of concern include: • Total Petroleum Hydrocarbons; • Polycyclic Aromatic Hydrocarbons; • Heavy Metals; • Asbestos; and • Ground gas.
4.17.2	Polychlorinated Biphenyls (PCBs), vapours, Volatile Organic Compounds (VOCs), and explosive residues have not been listed as a potential source as these were not identified within the development area in the previous investigation by Entec.
4.18	**Potential Active Pathways**
4.18.1	Inhalation / ingestion / dermal contact to future site users is likely to be minimal following completion of the development as extensive hardstanding will prevent site users coming into contact with residual underlying contaminants. As soft landscaped areas are proposed, confirmation that contamination is absent from such areas should be sought by means of investigation. If contamination is present, these areas should be capped with a clean cover system.
4.18.2	There is the potential for wider site users to be exposed to translocated particulates / fibres during the development, however, it is anticipated that with control measures in place the pathways can be broken.
4.18.3	Inhalation / ingestion / dermal contact to current site workers and construction workers may occur during construction. However, it is anticipated that with control measures in place the pathway can be broken.
4.18.4	The development may require piling and as such may inadvertently produce a preferential pathway for contaminants to migrate into the deeper geology, which are classified moderately sensitive aquifers – see below. It is not yet clear at what depth the groundwater table is at and whether there is an appreciable flow direction. As such, the potential for migration of dissolved phase contamination off the site in groundwater cannot be entirely discounted at this stage. The SSSI would be considered as up-gradient and therefore unlikely to be at risk of site derived contamination impacts (if any). However, there are new residential dwellings down-gradient of the development area which would need to be assessed, albeit the risk is probably minimal since the residential area is some 380m from the development site.

4.19	**Potential Receptors**
4.19.1	The key receptors that have been identified for this site are the construction workers and offsite workers during the redevelopment and future site users and landscape/maintenance workers once the development is complete.
4.19.2	Property including site structures and services and plants/landscaping are considered a receptor as they may be in contact with contaminated soils.
4.19.3	Whilst there are no groundwater abstractions within a 1km radius of the site, and the site is not located within a Source Protection Zone for groundwater, the geology underlying the site (River Terrace Deposits, Windlesham Formation and Bagshot Formation) are classified as a Secondary (A) Aquifer of high permeability.
4.19.4	The nearest surface water feature is an unnamed inland river approximately 180m west of the site.
4.19.5	There are also off-site residential properties, currently being constructed by Crest, which are situated some 380m from the site.

5.0 PRELIMINARY CONCEPTUAL SITE MODEL

5.1 Conceptual Site Model (CSM)

5.1.1 Based on the risks identified within the Phase 1 Investigation a Preliminary Conceptual Site Model has been produced.

Table 2. Preliminary Conceptual Site Model

Receptor	Potential sources	Pathways	Risk	Justification
Human Heath				
Construction workers and off site workers	Organic and inorganic contamination from the historical development of the site as MOD land	Direct contact, ingestion, and inhalation via outdoor soils or translocated soil and dust indoors.	M	**Moderate risk:** Ingestion, inhalation and dermal contact with contaminated soils in excavations or stockpiles cannot be discounted. Asbestos fibres and residual contaminants may be present onsite. Personal Protective Equipment (PPE) and Risk Assessments and Method Statements are required during construction to mitigate risk. There is the potential for current wider users of the film studios to be exposed to translocated particulates / fibres during the development, however, it is anticipated that with control measures in place the pathway can be broken.
	Ground gas from Made Ground	Inhalation, migration through granular and fractured soils into confined spaces.	M	**Moderate risk:** There is potential for ground gas at the site due to historical site uses. Personal Protective Equipment (PPE) and Risk Assessments and Method Statements are required during construction to mitigate risk.
Future site users including maintenance / landscape workers	Organic and inorganic contamination in soils and groundwater from the historical development of the site as MOD land	Direct contact, ingestion, and inhalation of outdoor soils or translocated soil and dust indoors.	M	**Moderate risk:** With respect to the future development, areas of risk to future site users are likely to be restricted to areas of soft landscaping. To manage the risk, these areas would be subjected to chemical testing followed by installation of 'clean', imported capping topsoil. Contaminants within areas beneath the proposed buildings and roads are not considered to be accessible and therefore do not present a risk to future site users. If asbestos is located on site, the asbestos register will be updated. Future maintenance of the landscaped areas is to be managed by use of Personal Protective Equipment (PPE).
	Ground gas from Made Ground	Inhalation, migration through granular and fractured soils into confined spaces.	M	**Moderate risk:** There is potential for ground gas at the site due to the historical uses of the site. Gas monitoring has been recommended as part of an intrusive investigation at the site to determine a suitable management strategy.

5.1.2

Table 2. Preliminary Conceptual Site Model (Continued)

Receptor	Potential sources	Pathways	Risk	Justification
Property				
Site structures and services	TPH in site soils	Direct contact between soil and structures or services.	L M	**Low to moderate risk:** Made Ground is likely to be present as a result of the historical uses of the site. As such, chemical analysis of the soils will be required to determine the requirements for buried concrete and whether barrier pipework is required for drinking water supply pipework. By ensuring that appropriate building materials are used as part of the new development, the risks can be managed.
	Ground gas	Migration through granular and fractured soils into confined spaces.	M	**Moderate risk:** There is potential for ground gas at the site due to the historical uses of the site.
Off-site residential properties (380m east)	Organic and inorganic contamination	Direct contact between soil and structures or services	L M	**Low to moderate risk:** Made Ground is likely to be present as a result of the historical uses of the site. However, there is a low likelihood that off-site residential properties would be affected due to the distance from the site.
	Ground gas	Migration through granular and fractured soils into confined spaces	L M	**Low to moderate risk:** There is potential for ground gas at the site due to the historical uses of the site. However, there is a low likelihood that off-site residential properties would be affected due to the distance from the site.
Plants /Landscaping	Organic and inorganic contamination in soils	Root contact and uptake	L M	**Low to moderate risk:** There are currently some nominal areas of soft landscaping on site and areas of soft landscaping are proposed as part of the future development. Testing of the underlying soils will be required to check for the presence of contaminants and determine whether the soils are a suitable growth medium for planting. Significant issues are not anticipated, as the risks can be controlled straightforwardly during development by importing fresh topsoil as part of a capping layer.
Groundwater				
Secondary (A) Aquifer	Organic and inorganic contamination in soils	Soil leaching and migration of potential soil contamination.	M	**Moderate Risk:** Leaching of mobile contaminants through soil pore space to the shallow water table and deeper aquifer cannot be discounted. Furthermore, piling may be required onsite which may produce a preferential pathway for contaminants to migrate.
Surface Waters				
Unnamed Inland River (180m west)	Leachable metals and organic contamination	Soil leaching and migration into drains and sewers which discharge into the ditch.	L M	**Low to moderate risk:** Direct discharge or surface run off of contaminants to surface water features is low to moderate due to the distance between the site and inland river. Furthermore, the potential for migration of dissolved phase contamination in groundwater cannot be discounted at this stage.

5.2 **Key Risks Requiring Further Investigation**

5.2.1 Further investigations were deemed to be required due to the constraints identified in the previous investigation and to determine the potential risks from soil and groundwater contamination in areas that were previously inaccessible.

5.2.2 Furthermore, additional geotechnical information was deemed to be required to provide preliminary information on ground conditions in relation to the proposed redevelopment of the site.

6.0 GEOTECHNICAL RISK ASSESSMENT

6.1 **Risk Assessment**

6.1.1 The Phase 1 and Phase 2 investigations identified potential geotechnical hazards which have been summarised in Table 3.

Table 3. Geotechnical Risk Assessment

Hazard	Risk Rating	Rationale
Made Ground	M	Made Ground has been identified onsite and is considered to be due to the historical use of the site. Due to the general highly variable nature of Made Ground, the proposed foundations of the proposed development may require deepening to ensure that a suitable bearing stratum is identified.
Collapsible / Unstable Excavations	M	Due to the presence of Made Ground and sand, there is the potential for excavations to be unstable and prone to collapse. An allowance for shoring should be considered during groundworks.
Shallow Groundwater	L	Groundwater was not identified during the previous investigation. As such, there is a low likelihood that shallow groundwater will impact the stability of excavations.
Compressible strata	M	Made Ground and clay soils have been identified onsite which indicate foundations will require deepening to a competent bearing stratum.
Aggressive ground conditions for concrete	M	There is the potential for naturally occurring sulphate within the natural soils or Made Ground to produce ground that is aggressive to concrete. Current test results indicate the Design Class for the Made Ground would be DS-2, AC-1s. Sulphate testing on the natural soils indicated DS-1, AC-1s. Additional testing is required for final design purposes.
Dissolution	L	The site is unlikely to be affected by dissolution.
Landslide	M	Due to the presence of a slope there is the potential for slippage or failure. The composition of the slope or existing retaining structures is unknown and as such a retaining wall is likely to be required.
Mining	L	The site has not been identified as being at risk of historical mining.

6.2	**Summary of Desk Based Risk Assessment**
6.2.1	The desk based searches have identified that from the relevant British Geological Survey (BGS) map, the site is underlain by the Windlesham Formation and the Bagshot Formation. However, the ground conditions identified from the previous investigation also identified topsoil and Made Ground. The extent and depths of each geological band including topsoil and Made Ground is therefore important to understand to enable a foundation design.
6.2.2	Due to the loadings provided by the client, shallow foundations may not be appropriate and a piled foundation solution may be a more viable option. Furthermore a suspended floor slab may also be required due to the high loadings. It is understood that current maximum data centre pile loads may be in the order of 6,500-7,500 kN (ULS). As such, further testing is required to provide information for the structural engineer's pile design.
6.2.3	Data from the previous investigation by Paragon identified that the concrete design class for Made Ground fall within Design Sulphate Class DS-2 AC-1s and natural soils would be classed as DS-1 AC-1s, although additional testing would be required to confirm this.
6.2.4	Data from the previous investigation by Paragon identified that due to the variability of the Made Ground a CBR value of 2% was recommended for preliminary road and pavement design purposes based on Transport Road Research Laboratory (TRRL) guidance. Further testing should be completed to provide a more robust CBR value for design.
6.2.5	Based on the above, a ground investigation was considered to be required. The following sections outline the work carried out by Paragon in 2020.

7.0 GROUND INVESTIGATION

7.1	**Investigation Rationale**
7.1.1	The objectives for the investigation were to identify and characterise the ground conditions, the sources, pathways and receptors (in general accordance with the Environmental Protection 1990 Part 2A), to reduce uncertainties and to provide an overview of site conditions. Details of the site methods are presented in Appendix 3.
7.1.2	The ground investigation was undertaken in general accordance and with reference, where relevant to the following documents: • Specification for Ground Investigation, Site Investigation Steering Group, Thomas Telford, 1994; • British Standard BS10175:2011 (A2) Investigation of potentially contaminated sites – code of practice, as amended; • Environment Agency (2000) Secondary model procedures for the development of appropriate soil sampling strategies for land contamination. Technical Report P5-066/TR; and • BS IS0 5667-22:2010 Water quality. Sampling. Guidance on the design and installation of groundwater monitoring points.

7.1.3 The intrusive investigation was specified by the client and was completed between 22 June 2020 and 7 July 2020 and comprised a total of 42 exploratory holes. This included:

- 7 boreholes drilled using a sonic drilling rig to a maximum depth of 35mbgl for geotechnical testing;
- 10 boreholes drilled using a windowless sampler drilling rig to a maximum depth of 5m for environmental and geotechnical testing;
- 9 CBR tests at 0.5mbgl;
- 12 Trial pits excavated using mechanical excavator (JCB 3CX);
- 4 Hand dug foundation inspection pits;
- Ground resistivity testing in the location of the deep boreholes;
- Geotechnical laboratory testing (in situ Standard Penetration testing (SPTS) and ex situ sampling for laboratory testing;
- Geoenvironmental laboratory testing commensurate with the findings of the CSM; and
- 3 groundwater and ground gas monitoring visits.

7.1.4 A site plan showing the locations of each exploratory hole is provided in Appendix 1.

7.2 Intrusive Locations

7.2.1 Combined ground gas and groundwater wells were installed in the boreholes as outlined below. Full details of the installations are also provided on the borehole logs presented in Appendix 4.

7.2.2 ***Table 4. Monitoring Well Installation Details.***

ID	Drilling Depth mbgl [AOD]	Plain Well Section mbgl [AOD]	Slotted Well Section mbgl [AOD]	Bentonite Seal mbgl [AOD]
BH01	30.0 [26.38]	No monitoring well installed		
BH02	25.0 [25.99]	No monitoring well installed		
BH03	30.0 [24.13]	No monitoring well installed		
BH04	25.0 [25.15]	No monitoring well installed		
BH05	35.0 [16.35]	0.0 – 15.0 [51.35 – 36.35]	15.0 – 23.0 [36.35 – 28.35]	0.0 – 15.0, and 23.0 – 35.0 [51.35 – 36.35, and 28.35 – 16.35]
BH06	30.0 [27.29]	0.0 – 10.0 [57.29 – 47.29]	10.0 – 18.0 [47.29 – 39.29]	0.0 - 10.0, and 18.0 – 30.0 [57.29 – 47.29, and 39.29 – 27.29]
BH07	25.0 [25.18]	No monitoring well installed		
WS01	5.0 [45.23]	No monitoring well installed		
WS02	5.0 [43.51]	No monitoring well installed		
WS03	2.0 [46.82]	No monitoring well installed		
WS04	2.8 [46.49]	No monitoring well installed		
WS05	5.0 [47.82]	No monitoring well installed		
WS06	5.0 [47.48]	0.0 – 0.5 [52.78 – 52.28]	0.5 – 5.0 [52.28 – 47.48]	0.0 – 0.5 [52.78 – 52.28]
WS07	5.0 [52.78]	No monitoring well installed		
WS08	5.0 [51.68]	No monitoring well installed		
WS09	5.0 [56.46]	0.0 – 0.5 [51.46 – 50.96]	0.5 – 5.0 [50.96 – 56.46]	0.0 – 0.5 [51.46 – 50.96]
WS10	5.0 [46.45]	0.0 – 0.5 [51.45 – 50.95]	0.5 – 5.0 [50.95 – 46.45]	0.0 – 0.5 [51.45 – 50.95]

7.2.3	The mechanically excavated trial pits were advanced to incestigate ground conditions including nature of the Made Ground and depth to the natural strata below. Additionally, some locations were targeted to try to establish the makeup of remnant floor slabs and structural elements (such as foundations) in the location of existing / demolished structures. Further details can be found on the logs and the cross-sections in Appendix 5.
7.2.4	Four hand excavated pits were excavated against the eastern edge of Building 124 (off site) to try to ascertain the nature of the building's foundations and localised ground conditions. These works were required due to the proposals for a retaining wall along the western flank of the development site that adjoins this building. The logs and cross sections are included in Appendix 6.
7.3	**Sampling and Testing Strategy**
7.3.1	Soil samples were collected from across the development area to provide an even coverage of both the Made Ground and natural strata. Samples were submitted for geotechnical testing in accordance with relevant versions of BSEN ISO 17892-6:2017, BSEN ISO 14688-1:2002, and BSEN 1997-2:2007. Environmental samples were submitted under controlled conditions with a Chain of Custody to i2 Analytical a UKAS and MCerts accredited facility.
7.3.2	In addition, in-situ testing was undertaken in the form of Standard Penetration Tests (SPTs) within the boreholes and CBR tests in areas of proposed roads. The SPTs are presented on the borehole logs in Appendix 4, and the CBR test results are presented in Appendix 7.
7.3.3	Environmental soil samples were tested for a suite of contaminants to assess the risks identified in the Phase 1 report: • Heavy metals including; arsenic, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, and zinc; • Cyanide; • Phenols; • Petroleum Hydrocarbons (PHC) – Total Petroleum Hydrocarbons Criteria Working Group (TPH-CWG); • Benzene, Toluene, Ethylbenzene and Xylene (BTEX); • Polyaromatic Hydrocarbons (PAH) – Speciated 16; • Asbestos screen and identification; • Organic Matter; • Total Organic Carbon (TOC), Sulphates and pH.
7.3.4	The results of the soil analysis is presented in Appendix 8.

7.3.5	Groundwater was encountered in BH05, BH06 and WS06 during subsequent rounds of monitoring. Groundwater sampling was undertaken from BH05 and BH06 on a two occasions. The recharge of water in WS06 was too low to provide a sample. The samples from BH05 and BH06 were submitted to i2 Analytical for the following analysis: • Heavy metals including; arsenic, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, and zinc; • Cyanide; • Phenols; • Petroleum Hydrocarbons (PHC) – Total Petroleum Hydrocarbons Criteria Working Group (TPH-CWG); • Benzene, Toluene, Ethylbenzene and Xylene (BTEX); • Polyaromatic Hydrocarbons (PAH) – Speciated 16; and • Total Organic Carbon (TOC), Sulphates and pH.
7.3.6	The results of the groundwater analysis is provided in Appendix 8.
7.3.7	Gas and groundwater monitoring was undertaken using a multi-probe gas analyser and dip meter. The results are presented in Appendix 9.
7.3.8	Soil samples were also recovered for geotechnical testing, which included: • Atterberg testing with natural moisture content; • Particle Size Distribution; and • Sulphates and pH.
7.3.9	The results of the geotechnical testing are presented in Appendix 10.

8.0 GROUND CONDITIONS

8.1	**General**
8.1.1	The ground conditions are described in detail in the logs that are presented within Appendix 4 and 5. A summary of the ground conditions is also presented in Table 5.

8.1.2 ***Table 5. Summary of Ground Conditions.***

Depth From (min/max) mbgl [mOD]	Depth To (min/max) mbgl [mOD]	Soil Type	Description
Ground Level [51.35]	0.7 / 1.5 [50.65 / 49.55]	MADE GROUND / CONCRETE	MADE GROUND. Black, gravelly SAND. Gravel comprised fine to coarse angular to sub-rounded flint. Rare cobble of angular flint. Occasional roots.
0.7 [50.65]	1.2 [50.15]	TOPSOIL	TOPSOIL. Brown gravelly sand. Gravel comprised fine to coarse sub-angular to rounded flint. Occasional roots.
1.2 [50.15]	2.6 / 5.0 [48.75 / 46.35]	SAND / GRAVEL / SILT	Medium dense, orange brown and grey slightly gravelly silty SAND. Gravel comprised fine to coarse, sub-angular to angular flint. Sand is fine to coarse
2.6 [53.78]	5.2 [51.18]	CLAY	Very stiff, reddish brown silty CLAY. (BH01 only)
1.0 / 7.0 50.35 / 44.35]	3.0 / 8.4 [48.35 / 42.95]	SILT	Medium dense to dense, thinly laminated, grey and orange, sandy SILT.
13.4 / 9.0 [42.95 / 42.35]	14.1 / 19.5 [37.25 / 31.85]	SAND	Dense to very dense, orange, brown and grey slightly silty SAND. Sand is fine to coarse.
11.0 / 25.0 [40.35 / 26.35]	17.0 / 35.0 [34.35 / 16.35]	SAND	Very dense grey and black SAND. Sand is fine to coarse.
19.0 / 25.0 [32.35 / 26.35]	25 / 35.0 [26.35 / 16.35]	SAND / SILT / CLAY / SILTSTONE	Very dense, greenish grey and black SILT interbedded with siltstone, sand and clay.

8.1.3 The geology was found to vary beneath the Made Ground and comprised clay, sand and silt of the Windlesham Formation. Gravelly bands were encountered which are thought to be the minor bands within the Windlesham Formation and the Bagshot Formation was identified to be underlying the Windlesham Formation.

8.1.4 Based on a review of BGS geology and nearby boreholes the geology encountered is typical of the area.

8.2 Olfactory and Visible Evidence of Contamination

8.2.1 No significant contamination was identified during drilling. No evidence for free product was observed during the investigation or monitoring.

8.3 Groundwater

8.3.1 Groundwater was identified during drilling in the boreholes summarised below.

Table 6. Groundwater Strikes.

Borehole ID	Strike 1	Strike 2
BH02	17mbgl (33.99mOD). Water level rose to 16mbgl (34.99mOD) after 20 minutes	
BH04	5mbgl (45.15mOD) seepage. Water level rose to 4.8mbgl (45.35mOD) after 20 minutes	14.5mbgl (35.65mOD). Water level rose to 3.8mbgl (46.35mOD) after 20 minutes
BH05	21mbgl (30.35mOD). Water level rose to 17mbgl (34.35mOD) after 20 minutes	
BH06	16mbgl (41.29mOD)	

8.3.2 Groundwater was dipped on three occasions and the water levels are presented in Table 7.

8.3.3 ***Table 7. Groundwater Monitoring Results.***

Borehole Name	Response Zone (mbgl)	Monitoring Date		
		07/07/2020	15/07/2020	22/07/2020
BH05	15.0 to 23.0	7.07mbgl (44.28mOD)	7.02mbgl (44.33mOD)	7.55mbgl (43.80mOD)
BH06	10.0 to 18.0	13.52mbgl (43.77mOD)	13.53mbgl (43.76mOD)	13.85mbgl (43.44mOD)
WS06	0.5 to 5.0	4.57mbgl (48.21mOD)	4.75mbgl (48.03mOD)	Dry
WS09	0.5 to 5.0	Dry	Dry	Dry
WS10	0.5 to 5.0	Dry	Dry	Dry

8.4 Ground Resistivity Testing

8.4.1 Paragon commissioned Soil Environment Services Limited to undertake an Electrical Resistivity Survey. The survey was completed on 26 June 2020 and was undertaken in the location of the deep borehole locations BH01 – BH07. The survey adopted that Wenner surface method and took readings at 1.0m, 3.0m and 6.0m depths at the request of the structural engineer. The report is presented in Appendix 12.

8.5	**Constraints**
8.5.1	The investigation was restricted by a number of factors. As the site was an active demolition site, frequent plant and vehicle movements and pedestrians prevented access to certain areas. Furthermore, the location of site cabins, large open excavations and Japanese Knotweed treatment areas also restricted access. The majority of the buildings within the development boundary had been demolished but some areas were still inaccessible due to stockpiles and demolition rubble.
8.5.2	Furthermore, the investigation was undertaken during COVID-19 which also introduced restrictions mainly for health and safety purposes.
8.5.3	Exploratory holes were placed in locations that were deemed safe in relation to the active demolition site activities and utilities. Despite the site undergoing active demolition, Paragon was not provided with firm information regarding disconnected services, and were advised by the onsite demolition contractor to treat all services as live.
8.5.4	Parts of the development area were situated outside of the demolition area. This land was still operational as Longcross Film Studios. As such, access routes, vehicles, pedestrians, roads and pavements restricted the investigation.
8.5.5	During drilling, a number of obstructions were identified at BH07. This borehole was located twice due to concrete at 0.5m bgl. No further information on the obstruction was available and as all services had to be treated as live, these positions were abandoned and the locations are provided on the Exploratory Hole Location Plan in Appendix 1 referenced as BH07a and BH07b.

9.0 GEOTECHNICAL RESULTS

9.1 Ground Conditions Discussion

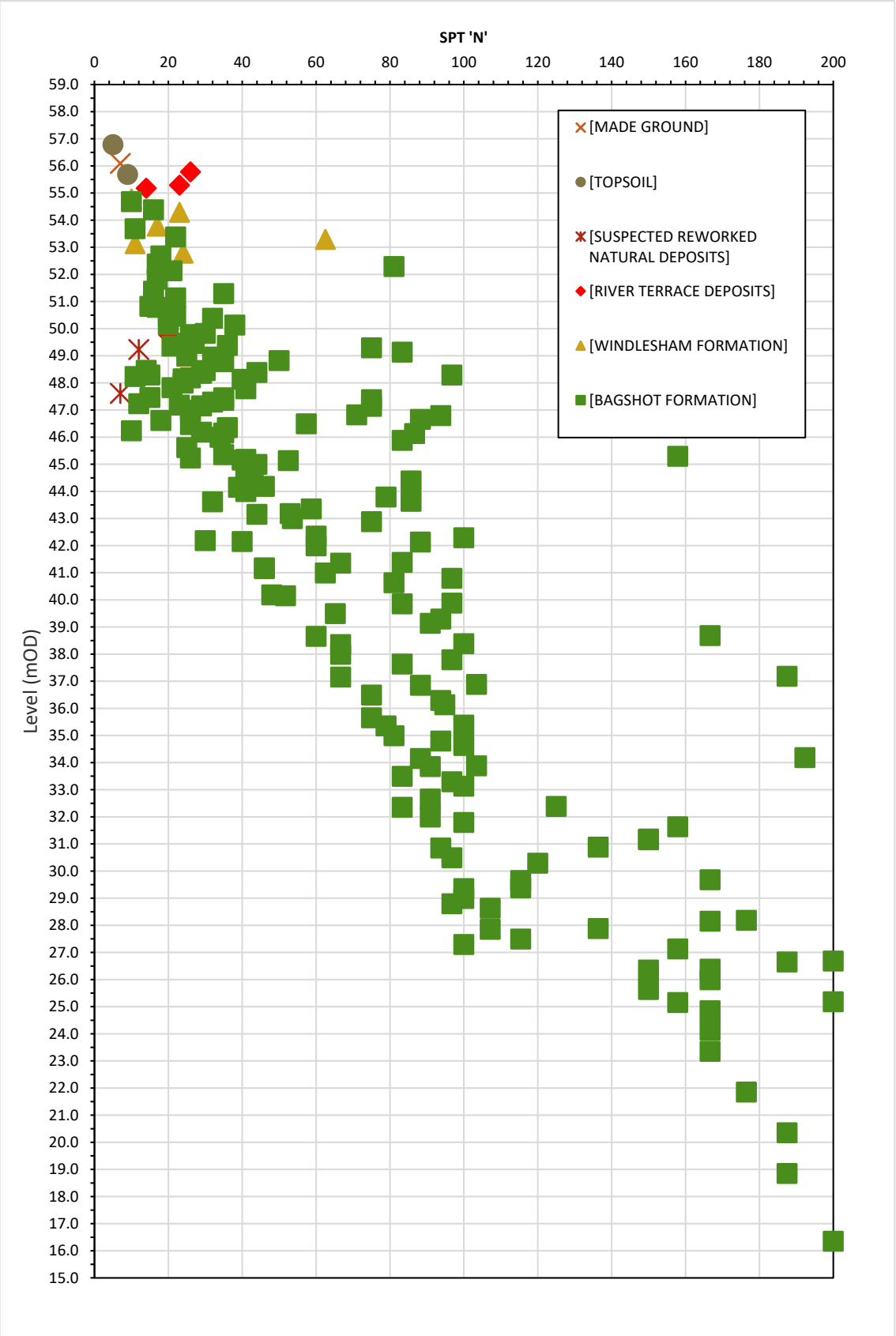
9.1.1 The geotechnical laboratory and in-situ test results from the current site investigation are summarised in Table 8. The geotechnical results can be found in Appendix 10.

9.1.2 ***Table 8. Summary of Geotechnical Testing.***

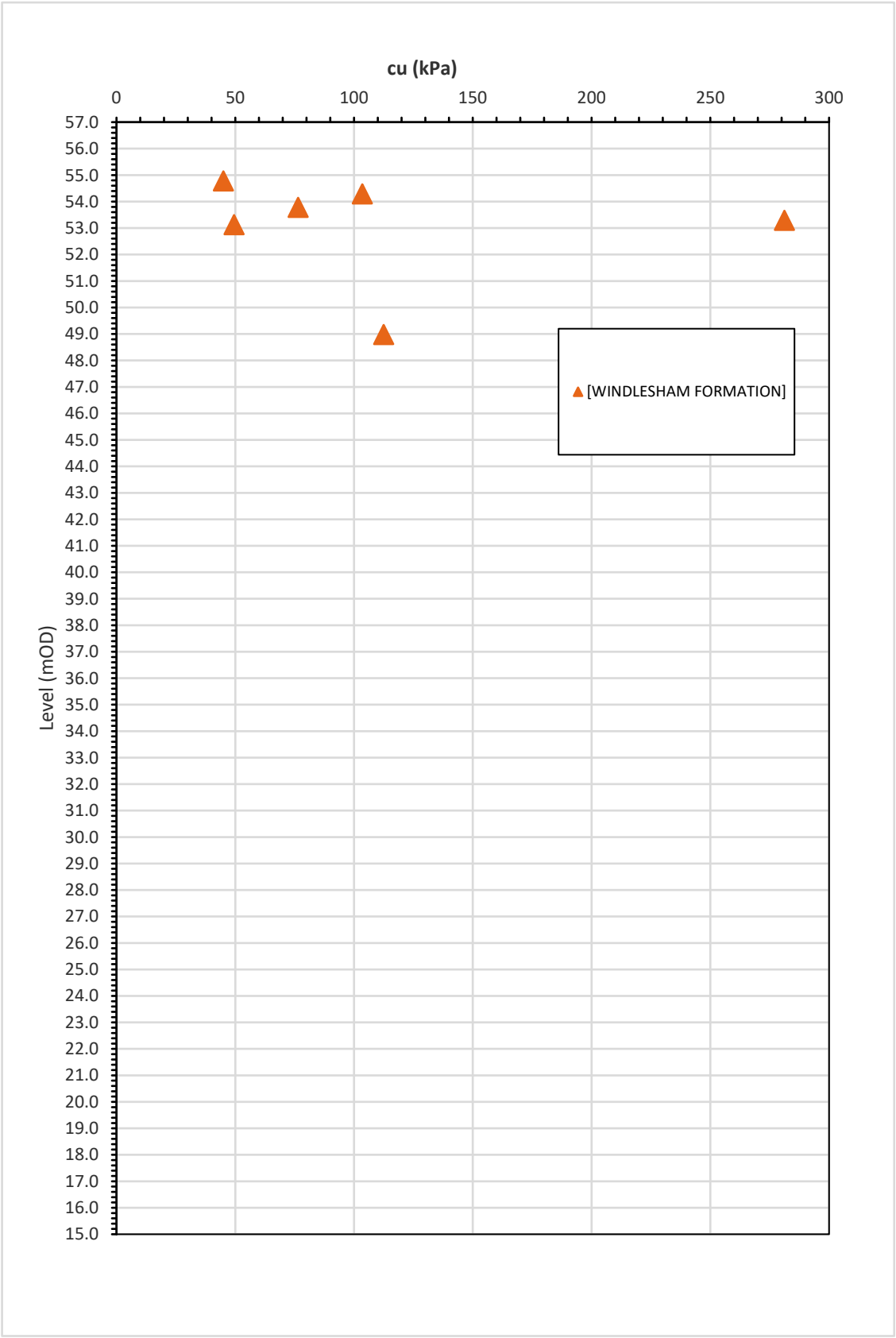
Geotechnical Testing	Geology			
	Made Ground	**River Terrace Deposits**	**Windlesham Formation**	**Bagshot Formation**
Standard Penetration Test (SPT) – N Value	5 to 12	14 to 26	10 to 63	10 to 200
Moisture Content (%)	-	-	13	21
Liquid Limit (%)	-	-	20	50
Plastic Limit (%)	-	-	12	18
Plasticity Index (%)	-	-	8	32
Sulphate (mg/l)	-	-	-	100 to 400
pH	-	-	-	7.33 to 7.56
Particle Size Distribution (%)	-	Gravel = 42.8% Sand = 46.7% Clay & Silt = 10.6%	Gravel = 4.7% Sand = 45.7% Silt = 27.2% Clay = 22.4%	Gravel = 0.1 to 8.8% Sand = 43.1 to 95% Silt = 3.7 to 50.6% Clay = 1.1 to 11.4% Clay & Silt = 4.5 to 56.2%

9.1.3 A plot of SPT 'N' values against elevation level is presented in Plate 1. It is noted the SPT hammer energy efficiency for the deep boreholes was 74% and 81%. While these values are above the standard 60% energy ratio, it is noted that the method of drilling these boreholes (sonic drilling), may have influenced the soil, by increasing the density of granular soil deposits. Therefore, these values have been not been modified in order to provide conservative values.

9.1.4 Plate 1. SPT 'N' values against level



9.1.5 Plate 2. Undrained shear strength against level



9.2	**Made Ground**
9.2.1	Made Ground was generally found to comprise of topsoil, gravelly sand and reworked natural deposits ranging in thickness from 0.2m to 1.5m across the exploratory holes undertaken.
9.2.2	Topsoil was encountered in areas of soft landscaping and generally comprised brown gravelly sand with occasional cobbles and roots. The gravel was found to be fine to coarse, angular to rounded of flint. The SPT 'N' values recorded ranged from 5 to 9 which corresponds to a 'loose' granular soil based on BS5930 (2015).
9.2.3	Made Ground was generally encountered in areas outside of soft landscaping and generally comprised orangish brown to black to dark grey gravelly sand with occasional cobbles of concrete. Sand was found to be fine to coarse. Gravel was found to be fine to coarse, subangular to subrounded of brick, tarmacadam, wood, slate, flint and concrete. A single SPT 'N' value of 9 was recorded, which corresponds to a 'loose' granular soil based on BS5930 (2015). In locations of existing or previous buildings concrete was also encountered, between 0.15m and 0.5m thick.
9.2.4	Reworked Natural deposits were encountered along the southern and eastern site boundaries in windowless sampler boreholes WS01 and WS02 respectively. The material in WS01 was recorded as orangish brown, silty sand. Sand was medium. In WS02 the material was recovered as very dark grey, sandy clay with rare gravel and a slightly organic odour. The gravel was medium to coarse, subrounded to rounded of flint and rare brick. An SPT 'N' value of 12 was recorded in WS01, which corresponds to a medium dense granular soil. The 'N' value in WS02 was recorded as 7.
9.3	**River Terrace Deposits**
9.3.1	River Terrace Deposits were encountered in the northern area of the site and in the south-west corner of the site, along the top of a slope in this area of the site. The ground level is approximately 57.5mOD at the top of the slope, which is approximately 7m above the mean ground level across the site (~50.5mOD). The stratum was encountered between 0.2m (56.48mOD) to 3mbgl (54.38mOD). Where the stratum was encountered in borehole BH02 it was recovered to depths of between 0.2mbgl (50.79mOD) and 1.5mbgl (49.49mOD).
9.3.2	The stratum generally comprises of brown and orange gravelly sand. The sand was fine to coarse while the gravel was fine to coarse, angular to subangular and comprised of flint.
9.3.3	SPT 'N' values for the stratum ranged from 14 to 26, which corresponds to a medium dense granular soil based on BS5930 (2015).

9.4	**Windlesham Formation**
9.4.1	The Windlesham Formation was found to dip towards the northeast and to increase in thickness from the north of the site towards the south of the site. The northern extent of the stratum was encountered in the vicinity of WS06 with an approximately thickness of 0.5m. Along the southern site boundary the stratum was found to be between 0.5m (WS01) and 2.2m (BH06) thick. The stratum was not encountered in the centre of the site. The level to the top of the stratum ranged from 54.78mOD (WS07) to 48.45mOD. The base of the stratum ranged from 52.23mOD (BH03) to 48.23mOD (WS01).
9.4.2	The stratum generally comprised green, brown and orange sandy silty clay with rare gravel. Sand was fine to medium. Gravel was fine to medium of flint. In some locations (WS03, WS06, WS07 and BH03) the stratum comprised of green, brown and grey silty slightly clayey sand with occasional gravel. Sand was medium to coarse and the gravel was fine to coarse, angular to rounded of weak siltstone.
9.4.3	SPT 'N' values for the stratum ranged from 10 to 63. This corresponds to an undrained shear strength of 45 to 284kPa, assuming a multiplier of 4.5kPa[1]. A plot of undrained shear strength, cu is presented in Plate 2. Where the stratum was found to be predominately granular, 'N' values ranged from 16 to 24, which corresponds to a medium dense granular soil based on BS5930 (2015).
9.5	**Bagshot Formation**
9.5.1	The Bagshot Formation was found to extend across the site, with the level to top of the stratum dropping from approximately 55mOD in the northern site boundary to approximately 48.5mOD along the southern site boundary.
9.5.2	The stratum generally comprised orange, grey and brown silty sand. Sand is fine to coarse. Occasional black grains were recovered, which were suspected to be mica and lignite. Occasional bands of orange, grey and white sandy clayey silt with occasional gravel of angular, fine siltstone were also encountered, particularly in the top of the stratum.
9.5.3	SPT 'N' values for where the predominantly silt layers were encountered ranged from 10 to 63, between typically around 51mOD to 46mOD. Below 46mOD the stratum was found be predominately granular throughout, with 'N' values ranging from 14 to 208, corresponding to medium to very dense granular soil based on BS5930 (2015).

[1] Stroud M.A., Butler, F.G. (1975). The Standard Penetration Test and the Engineering Properties of Glacial Materials.

10.0 GEOENVIRONMENTAL RESULTS

10.1	**Analytical Test Results**
10.1.1	Chemical testing was completed on soil and water samples from the 2020 investigation to determine the concentration of potential contaminants arising from existing and historical site uses, in line with the Conceptual Site Model. The results of the soil and groundwater analysis have been compared to a screening value to assess the degree of risk. The results are presented in a screening table in Appendix 8 and summarised below. The laboratory test certificates are also provided in Appendix 8.
10.1.2	Where possible, a statistical assessment has been carried out based on the methodology set out in CIEH report 2008: Guidance on comparing Soil Contamination Data with a Critical Concentration. The statistical assessment has involved calculating the upper confidence level (U95 value) which is compared with the mean of the dataset. The U95 is the level at which we would be 95% confident that the true mean is less than the screening value. Statistical analysis has been undertaken on populations of 6 or more.
10.1.3	In accordance with Health Protection Agency (HPA) guidance for the risk assessment approaches for Polycyclic Aromatic Hydrocarbons (PAH) (2010), benzo(a)pyrene has been used as a surrogate marker for carcinogenic PAHs. The threshold PAHs have been assessed individually.
10.1.4	The Soil Organic Matter (SOM) content of the Made Ground and natural soils ranged between 0.1% and 6.3%. The GACs used in this assessment are based on a SOM content of 2.5% which is considered to reflect the conditions present onsite and provides the basis for a conservative assessment.
10.2	**Analytical Test Results – Made Ground Soils**
10.2.1	The results from the Made Ground have been compared to industry accepted screening values known as Generic Assessment Criteria (GAC) to determine the risks to human health. The GAC used in this investigation includes Category 4 Screening Levels and Suitable 4 Use Levels (C4SLs and S4ULs). The GAC selected is based on a commercial use in line with the proposed development. The screening assessment is presented in Table 9. A detailed methodology for the assessment is presented in Appendix 11.
10.2.2	The results identified that there were no exceedances of the contaminants tested, above acceptable thresholds for a commercial land use.

10.2.3

Table 9. Chemical Analysis (Made Ground Soils)

Contaminant	Maximum Result (mg/kg)	Number of Samples	U95 (mg/kg)	Evidence Level (%)	GAC (mg/kg)	Exceedances
Asbestos	None Identified	7	N/A	N/A	N/A	None
Arsenic	12.0	7	9.56	100	640	None
Cadmium	<0.2	7	0.1	100	410	None
Chromium	26.0	7	24.15	100	8600	None
Copper	59.0	7	50.43	100	68000	None
Lead	72.0	7	47.70	100	2330	None
Mercury	<0.3	7	0.15	100	1100	None
Nickel	18.0	7	15.29	100	980	None
Selenium	<1.0	7	0.5	100	12000	None
Zinc	86.0	7	57.88	100	730000	None
Naphthalene	<0.05	7	0.025	100	460	None
Acenaphthylene	<0.05	7	0.025	100	97000	None
Acenaphthene	0.23	7	0.18	100	97000	None
Fluorene	1.9	7	1.45	100	68000	None
Phenanthrene	5.4	7	4.74	100	22000	None
Anthracene	2.4	7	1.97	100	540000	None
Fluoranthene	12.0	7	10.08	100	23000	None
Benzo(a)pyrene	3.2	7	2.13	100	76	None
Aliphatic >EC5 - EC6	< 0.001	7	0.0005	100	5900	None
Aliphatic >EC6 - EC8	< 0.001	7	0.0005	100	17000	None
Aliphatic >EC8 - EC10	< 0.001	7	0.0005	100	4800	None
Aliphatic >EC10 - EC12	1.8	7	1.50	100	23000	None
Aliphatic >EC12 - EC16	62.0	7	51.57	100	82000	None
Aliphatic >EC16 - EC21	87.0	7	92.29	100	1700000	None
Aliphatic >EC21 - EC35	560.0	7	432.52	100	1700000	None
Aromatic >EC5 - EC7	< 0.001	7	0.0005	100	46000	None
Aromatic >EC7 - EC8	< 0.001	7	0.0005	100	110000	None
Aromatic >EC8 - EC10	< 0.001	7	0.0005	100	8100	None
Aromatic >EC10 - EC12	2.9	7	2.93	100	28000	None
Aromatic >EC12 - EC16	64.0	7	53.99	100	37000	None
Aromatic >EC16 - EC21	170.0	7	179.35	100	28000	None
Aromatic >EC21 - EC35	1600	7	1246.87	100	28000	None

Notes to table:

a. GAC has been selected using a SOM of 2.5%, calculated as the mean TOC multiplied by 1.72.
b. GAC based on there being no free product present.
c. GAC based on S4UL and C4SL. C4ULs used for Arsenic, Cadmium, Lead and Benzo(a)Pyrene
d. N/A: Not applicable/not available

10.3 Analytical Test Results – Natural Soils

10.3.1 The results of the chemical analysis on the natural soil samples are presented in Appendix 8 and summarised in Table 10. The results were compared to the GAC for a commercial use.

10.3.2 No exceedances, above acceptable thresholds for a commercial land use, were identified of the contaminants tested from natural soils.

10.3.3 ***Table 10. Chemical Analysis (Natural Soils)***

Contaminant	Maximum Result (mg/kg)	Number of Samples	U95 (mg/kg)	Evidence Level (%)	GAC (mg/kg)	Exceedances
Asbestos	None Identified	13	N/A	N/A	N/A	None
Arsenic	51	13	26.55	100	640	None
Cadmium	<0.2	13	0.10	100	410	None
Chromium	57	13	33.08	100	8600	None
Copper	120	13	57.23	100	68000	None
Lead	50	13	25.85	100	2330	None
Mercury	<0.3	13	0.15	100	58	None
Nickel	68	13	33.42	100	980	None
Selenium	8.3	13	3.72	100	12000	None
Zinc	150	13	71.82	100	730000	None
Naphthalene	<0.05	13	0.025	100	190	None
Acenaphthylene	<0.05	13	0.025	100	83000	None
Acenaphthene	<0.05	13	0.025	100	84000	None
Fluorene	0.25	13	0.12	100	63000	None
Phenanthrene	2.0	13	0.86	100	22000	None
Anthracene	0.59	13	0.26	100	520000	None
Fluoranthene	3.4	13	1.46	100	23000	None
Benzo(a)pyrene	1.3	13	0.57	100	76	None
Aliphatic >EC5 - EC6	<0.001	13	0.0005	100	5900	None
Aliphatic >EC6 - EC8	<0.001	13	0.0005	100	17000	None
Aliphatic >EC8 - EC10	<0.001	13	0.0005	100	4800	None
Aliphatic >EC10 - EC12	<1.0	13	0.5	100	23000	None
Aliphatic >EC12 - EC16	<2.0	13	1.0	100	82000	None
Aliphatic >EC16 - EC21	<8.0	13	4.0	100	1700000	None
Aliphatic >EC21 - EC35	<0.001	13	4.0	100	1700000	None
Aromatic >EC5 - EC7	<0.001	13	0.0005	100	46000	None
Aromatic >EC7 - EC8	<0.001	13	0.0005	100	110000	None
Aromatic >EC8 - EC10	<1.0	13	0.0005	100	8100	None
Aromatic >EC10 - EC12	<2.0	13	0.5	100	28000	None
Aromatic >EC12 - EC16	<10	13	1.0	100	37000	None
Aromatic >EC16 - EC21	<0.001	13	5.0	100	28000	None
Aromatic >EC21 - EC35	34.0	13	16.95	100	28000	None

Notes to table:

a. GAC has been selected using a SOM of 2.5%, calculated as the mean TOC multiplied by 1.72.
b. GAC based on there being no free product present.
c. GAC based on S4UL and C4SL. C4ULs used for Arsenic, Cadmium, Lead and Benzo(a)Pyrene
d. N/A: Not applicable/not available

10.4 Analytical Test Results – Groundwater

10.4.1 The results from the groundwater analysis have been compared with Tier 1 screening values, as for the soils. This has included Environmental Quality Standards (EQS) for freshwater, due to the presence of the unnamed inland river 180m west of the site, which would be considered the most sensitive surface water receptor and the underlying Secondary (A) Aquifer.

10.4.2 No assessment has been completed against the Drinking Water Standards (DWS) as there are no sensitive potable abstractions within a 1km radius and the site is not within an SPZ.

10.4.3 Groundwater was recovered from BH05 and BH06 during the 2020 investigation by Paragon. Due to the small sample population, statistical analysis was not completed. Instead, the results were directly compared to the EQS. The results from the analysis are presented in Table 11 and laboratory test certificates are presented in Appendix 8.

10.4.4 The results identified marginal exceedances of the EQS (freshwater) for cadmium, copper, nickel, and zinc.

10.4.5 ***Table 11. Chemical Analysis (Groundwater)***

Contaminant	Result Range (µg/l)	Number of Samples	EQS (µg/l)	Exceedances
Arsenic (dissolved)	0.24 – 0.35	2	50	None
Boron (dissolved)	51.0 – 53.0	2	N/A	None
Cadmium (dissolved)	0.12 – 0.19	2	0.08	2 (BH05 and BH06)
Calcium (dissolved)	70.0 – 96.0	2	N/A	None
Chromium (dissolved)	< 0.2	2	4.7	None
Copper (dissolved)	1.0 – 1.1	2	1	2 (BH05 and BH06)
Lead (dissolved)	<0.2 – 0.5	2	4	None
Magnesium (dissolved)	14.0 – 18.0	2	N/A	None
Mercury (dissolved)	< 0.05	2	0.07	None
Nickel (dissolved)	20.0 – 28.0	2	4	2 (BH05 and BH06)
Selenium (dissolved)	0.6 – 0.7	2	N/A	None
Zinc (dissolved)	8.9 – 20.0	2	10.9	1 (BH05)
Total Cyanide	<10.0	2	1	None
Total Phenols	<10.0	2	7.7	None
Naphthalene	< 0.01	2	2.0	None
Anthracene	< 0.01	2	0.1	None
Fluoranthene	< 0.01	2	0.1	None
Benzo(a)pyrene	< 0.01	2	0.02	None
Total PAH	< 0.16	2	< LOD	None
Benzene	< 1.0	2	10.0	None
Toluene	< 1.0	2	74.0	None
TPH-CWG Aliphatic and Aromatic bands	<10.0	2	10.0	None

Notes to table:

a. GAC based on EQS provided in the Water Framework Directive (Standards and Classification) (England and Wales) 2015
b. N/A: Not applicable/not available

10.5 Gas Monitoring Results

10.5.1 Pollutant linkages associated with risks from ground gas and vapour to the property and to human health have been assed using BS 8485:2015+A1:2019 '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*.

10.5.2 Three weekly gas monitoring visits were undertaken on 7 July 2020, 15 July 2020 and 22 July 2020. A summary of the results from the gas monitoring have been presented in Table 12. The gas monitoring records are presented in Appendix 9.

10.5.3 ***Table 12. Summary of Gas Monitoring Results.***

Exploratory hole	Steady Flow (l/hr)	Steady Methane (%)	Steady Carbon Dioxide (%)	Minimum Oxygen (%)	Steady Hydrogen Sulphide (ppm)	Atmospheric Pressure (mbar)
BH05	-0.26 to -1.38	<0.1	0.2 to 2.0	18.7 to 20.3	0	1006 to 1019
BH06	0 to -0.79	<0.1	0.4 to 3.9	17.4 to 20.3	0	1007 to 1019
WS06	0 to -1.12	<0.1	0.4 to 1.8	18.9 to 20.0	0	1006 to 1019
WS09	-0.12 to -0.85	<0.1	0.9 to 5.1	16.0 to 19.0	0	1006 to 1019
WS10	-0.13 to -1.32	<0.1	1.3 to 3.5	16.9 to 18.3	0	1006 to 1019

10.5.4 The results for the gas monitoring identified methane was below the limit of detection in all boreholes, throughout the monitoring period whereas the concentrations of carbon dioxide were detectable in all boreholes and ranged between 0.2% and 5.1% by volume in air. There was limited flow recorded within the boreholes, which ranged from <0.1 l/hr (the limit of detection) to -1.32 l/hr.

10.5.5 The ground gas monitoring was undertaken over periods of high atmospheric pressure ranging between 1006mb and 1019mb. No monitoring during atmospheric pressure events below 1000mb were undertaken due to the time available for the investigation and due to the investigation being completed throughout a period of hot and dry weather. During the previous investigation, Paragon completed one round of monitoring during a period of lower atmospheric pressure of 1000mb and the results identified a maximum methane concentration of 0.2% and a maximum carbon dioxide concentration of 4.2%. In addition the greatest flow reading recorded was 0.3l/hr.

10.6 Barrier Pipework Assessment

10.6.1 The assessment for whether barrier pipework is likely to be required as part of the development has been undertaken by directly comparing the results from the soil testing with the Polyethylene (PE). metal and barrier pipe thresholds. The results are presented in Table 13.

10.6.2 The results have shown that barrier pipework may be required due to the elevated TPH concentrations in fractions TPH >C10-C16 and TPH C16-C40 found in WS01 adjacent to the former canteen building 100 and 101, and WS04 which is situated in the eastern part of the site.

10.6.3 ***Table 13. Barrier Pipework Assessment***

Parameter Group	Testing Required	PE Pipe Threshold (mg/kg)	Metal or Barrier Pipe Threshold	Test Result Range	Outcome
Total BTEX and MTBE	Chemical Analysis	0.1	No Limit	<LOD	Pass
TPH >C5-C10		2	No Limit	<LOD	Pass
TPH >C10-C16		10	No Limit	<LOD to 66.9mg/kg	Fail
TPH >C16-C40		500	No Limit	<LOD to 1770mg/kg	Fail
Phenols		2	No Limit	<1	Pass
Presence of liquid free phase hydrocarbons	Observation	None allowed	None allowed	None observed	Pass

11.0 DISCUSSION

11.1 Environmental findings

11.1.1 This section evaluates the risks to potential receptors at the site from identified chemical contamination. Potential receptors have been identified in line with the CSM presented in Table 2 and reference to environmental guidance, whereby all receptors (humans, Controlled Waters, plants, and buildings) have been considered. Additional information on the assessment is presented in Appendix 11.

11.2 Risks to Human Health from Soil Derived Contaminants

11.2.1 It is understood that a Phase 2 Ground Investigation Report is required to provide additional preliminary data on ground conditions at the site to facilitate the development of a Data Centre with HV Energy Centre, generator and water tanks. It is understood that there will be some areas of soft landscaping along the perimeter of the site, with a larger area in the southern part of the site. Furthermore, it is understood that there is also a swale / attenuation pond in the southern part of the site.

11.2.2 On this basis, the laboratory test results were compared against the GAC for a commercial land use. The results were separated between Made Ground and natural soils.

11.2.3 <u>Made Ground</u>

The chemical analysis of the Made Ground has been compared to the GAC for a commercial use and the results have identified that no exceedances were identified above acceptable thresholds for a commercial land use. As such, the risk to human health from Made Ground soils is considered to be **Low**. Furthermore, the risk to offsite workers on the wider film studios land and offsite residents in the nearby residential development (380m east) from Made Ground as a result of translocated particulates is **Low**.

11.2.4	Slightly elevated concentrations of the petroleum hydrocarbon band Aromatic >EC21-EC35 were identified in WS01, WS02 and WS04. WS01 was situated adjacent to the former café in the southern part of the site, and WS02 and WS04 were in the area of the car park in the eastern part of the site. The concentrations identified were below the acceptable standard for a commercial land use and do not require remediation. However, as a precautionary measure, Personal Protective Equipment (PPE) and Risk Assessments and Method Statements will still be required for construction workers in the event that previously unidentified or residual contamination is uncovered during construction. Whilst it is unlikely, if significant contamination is encountered, works should cease until inspection and testing has been undertaken by an appropriately qualified person. A watching brief and discovery strategy should be implemented as part of the ongoing development.
11.2.5	<u>Natural Soils</u> The chemical analysis of the natural soils has also been compared to the GAC for a commercial use and the results have identified that no exceedances were identified above acceptable thresholds. As such, the risk to human health from the natural soils is considered to be **Low**. Furthermore, the risk to offsite workers on the wider film studios land and offsite residents in the nearby residential development (380m east) from natural soil as a result of translocated particulates is **Low**.
11.3	**Risks to Human Health from Ground Gas**
11.3.1	The Gas Risk Assessment has been carried out in general accordance with BS8485:2015+A1:2019 whereby the Characteristic Situation (CS) of the site has been identified. The Characteristic Situation ranges are between 1 and 6 and determine the gas risk to the property and the level of protection required. The process calculates a Gas Screening Value (GSV) based on gas monitoring which was undertaken based on boreholes within the Made Ground and natural geology.
11.3.2	The GSV for the site has been calculated based on the maximum concentration of methane or carbon dioxide monitored and the maximum flow rate recorded in the boreholes using the equation: $$GSV = q\left(\frac{Chg}{100}\right)$$ Where: • Chg = Concentration of a specific hazardous gas expressed as a percentage of total gas volume (%v/v) • q = Total gas flow from a borehole in litres per hour (l/hr) • Qhg = Calculated flow rate of a specific hazardous gas from a borehole reading The results are then compared to tables set out in the guidance for assessment.

11.3.3	Made Ground has been identified at the site, which can be a source of ground gas, and as such, monitoring wells were installed. In addition, gas monitoring has been undertaken over a range of atmospheric pressures to understand the gas regime in best case (high pressure) and worst case (low pressure) scenarios. The atmospheric pressure range was between 1006mb and 1019mb. No monitoring during atmospheric pressure events below 1000mb were undertaken due to the time available for the investigation and due to the investigation being completed throughout a period of hot and dry weather. However the results from the previous investigation by Paragon from one round of monitoring, during a period of lower atmospheric pressure of 1000mb found the gas concentrations were similar with a maximum methane concentration of 0.2% and a maximum carbon dioxide concentration of 4.2%. In addition the greatest flow reading recorded was 0.3l/hr.
11.3.4	The results for the gas monitoring identified methane was below the limit of detection in all boreholes, throughout the monitoring period whereas the concentrations of carbon dioxide were detectable in all boreholes and ranged between 0.2% and 5.1%. There was limited flow from the boreholes, which ranged from <0.1 l/hr (the limit of detection) to -1.32 l/hr.
11.3.5	The GSC for a worst case scenario was calculated using the greatest carbon dioxide reading of 5.1% and the greatest flow reading of -1.32 l/hr. Based on a preliminary assessment the GSV for carbon dioxide has been calculated as 0.067 l/hr which falls within CS1.
11.3.6	Whilst the guidance notes that consideration can be made for raising the Characteristic Situation level to CS2 where carbon dioxide concentrations are greater than 5%, this has not been actioned as the maximum result was identified on one occasion and the exceedance is minimal.
11.3.7	Based on the site being classified as CS1, no gas protection systems are necessary as there are not considered to be intolerable risks to the development or future site users. In addition, the site is not situated within a Radon Affected Area and as such, radon gas protection is not considered to be required. As such, the risk from ground gas is **Low**. Furthermore, the gas risk to off-site receptors is considered to be **Low** as the concentrations identified on site are not considered to present a significant risk.
11.4	**Risks to Controlled Waters from Groundwater**
11.4.1	During the groundwater monitoring visits, groundwater was noted within three monitoring wells. These included BH05 at approximately 44.0mOD, BH06 at approximate 43.5mOD and WS06 at approximately 48.1mOD. The water did not have a visible oily sheen and did not have an odour.
11.4.2	Groundwater samples from BH05 and BH06 were analysed for a range of contaminants and as a first tier of assessment, the results were compared to Environmental Quality Standards (EQS) for freshwater, due to the presence of the unnamed inland river 180m west of the site. This would be considered the most sensitive surface water receptor. The site is underlain by Secondary (A) Aquifers, which included River Terrace Deposits, the Windlesham Formation and the Bagshot Formation. However, the assessment did not compare the results against the Drinking Water Standards (DWS) as there are no sensitive potable abstractions within a 1km radius and the site is not within an SPZ. Therefore, this would be considered as an overly conservative assessment.

11.4.3	The results identified very marginal exceedances of the EQS (freshwater) for cadmium, copper, nickel, and zinc. It has not been possible to ascertain a groundwater flow direction at the site and so hydraulic continuity with the inland river 180m west is unclear. However, given that this feature is upgradient from the development site and owing to the distance between the two areas, it seems unlikely that these minor, residual concentrations would impact the surface water feature. As such, comparison to EQS also represents a very conservative assessment. The remaining contaminants analysed were low and were found below the EQS.
11.4.4	Based on the above, the risks to groundwater and surface water features (offsite) are considered to be **Low** on the basis that the exceedances identified are marginal and there are no significant receptors within the vicinity of the site. Therefore no further action is considered necessary.
11.4.5	The extensive covering of hardstanding offered to the final development is likely to minimise infiltration. However, areas of soft landscaping are proposed where infiltration could occur though based on the low soil concentrations and groundwater testing completed, this is not considered to present a significant risk.
11.5	**Property and Infrastructure**
11.5.1	Plant growth can be affected due to the presence of phytotoxic contaminants such as copper and zinc, however, these contaminants were identified at low concentrations within the Made Ground and as such, plant growth onsite is unlikely to be affected. As such, the risk to plants and vegetation from phytotoxic contaminants is deemed to be **Low**. Furthermore, in areas of soft landscaping, imported topsoil is recommended to create a suitable growth medium for plant growth.
11.5.2	Sulphate testing was undertaken to assess the risks from aggressive ground on buried concrete. Based on the results the Design Sulphate Class for natural soils would be DS-1, AC-1. Consequently, the risk is considered to be **Low**.
11.5.3	From a preliminary risk assessment of the results to thresholds set in the UK Water Industry Research (2010) '*Guidance for the selection of water supply pipes to be used in brownfield sites*', it is possible that barrier water pipes may be required for drinking water supply pipework. This is based on the contaminant concentrations recorded (in particular TPH C10 – C16 and TPH C16 – C40). However, the exceedances were only identified in two locations (WS01 adjacent to the former canteen building 100 and 101, and WS04 which is situated in the eastern part of the site) within the Made Ground and therefore it may be possible to discuss the findings with the local water provider to discuss their requirements. As such, the risk rating is considered to be **Low to Moderate**.
11.6	**Waste Management**
11.6.1	Although a formal waste classification exercise was beyond the scope of the investigation, a summary of the results from the previous investigation has been provided below.
11.6.2	The 2019 investigation undertook chemical analysis of the Made Ground and natural soils, and two Waste Acceptance Criteria (WAC) tests were also carried out. The exercise also included the use of the software Hazwaste Online, to provide an assessment of the data. The investigation summarised that based on a preliminary waste classification assessment, the tested soils onsite (Made Ground and Natural Soil) appear to be Non-Hazardous in nature.

11.6.3	Although no formal assessment was made in this investigation, the chemical analysis of the Made Ground has identified low levels of contaminants below the relevant acceptance criteria for a commercial end use. The Made Ground can therefore remain onsite from a human health perspective.
11.6.4	It is anticipated that throughout the development, surplus soil will be created from reducing ground levels and from foundation arisings. The arisings will therefore need to be managed appropriately. Whilst some arisings may require disposal off-site as waste, it is likely that the majority of the surplus soil could be re-used either onsite or on another site under the Definition of Waste: Code of Practice (DoW CoP) outlined by CL:AIRE. At this stage, it is anticipated that the Made Ground would be classified as non-hazardous and the underlying natural soil would be classified as inert. Therefore under DoW CoP it would be possible for the Made Ground to be reused onsite and the surplus natural soil could be reused through the direct transfer of clean and naturally occurring soils materials between sites. This method would promote a sustainable management strategy for soil arisings.
11.6.5	If material is to be removed as waste, then this report including the laboratory certificates and drilling logs provided in the appendices, should be provided to the waste receivers to confirm their ability to accept waste arisings from the site. It is the waste producer's responsibility to classify and appropriately manage waste under duty of care (section 34 of the Environmental Protection Act 1990).
11.7	**Risk Evaluation**
11.7.1	Following the implementation of the Phase 2 site investigation, the pollutant linkages identified in the CSM have been re-evaluated and re-classified in relation to the additional information obtained. Overall there is a **Low Risk** associated with the proposed redevelopment of the site.

11.7.2

Revised Assessment of Potential Pollutant Linkages

Table 14. Revised Conceptual Site Model

Receptor	Potential sources	Pathways	Risk	Justification
Human Heath				
Construction and maintenance workers / Users of the site	Organic and metal contamination	Direct contact, ingestion, and inhalation via outdoor soils or translocated soil and dust indoors.	L	**Low Risk.** The results of the chemical analysis from the soil samples have identified the concentrations of contaminants tested were below the GAC and therefore do not present a risk to human health. In addition, asbestos was not identified onsite in the areas tested by the recent investigation. It is understood that previous areas of known asbestos contamination on site have been remediated by Crest Nicholson and the verification reports are forthcoming. Personal Protective Equipment (PPE) is recommended for construction workers, to ensure mitigation is in place for potentially previously unidentified contamination and to promote good hygiene practices. The risk to current wider users of the film studios from translocated particulates is low.
	Ground gas	Inhalation, migration through granular and fractured soils into confined spaces.	L	**Low Risk.** The results of the gas monitoring have identified low concentrations of carbon dioxide across the site, and the concentration of methane was found below the limit of detection. The gas risk assessment determined that the site falls within CS1 whereby no gas protection measures are required. Personal Protective Equipment (PPE) and Risk Assessments and Method Statements would be required during construction to mitigate risks associated with specific construction activities.
Future site users including maintenance / landscape workers	Organic and metal contamination	Direct contact, ingestion, and inhalation of outdoor soils or translocated soil and dust indoors.	L	**Low Risk.** The results of the chemical analysis from the soil samples have identified the concentrations of contaminants tested were below the GAC and therefore do not present a risk to human health. In addition, asbestos was not identified onsite in the areas tested by the recent investigation. Furthermore, it is envisaged that the landscaped areas will be dressed with imported topsoil to provide a suitable growth medium for vegetation. The topsoil will be subject to chemical analysis to ensure it is suitable for use. Personal Protective Equipment (PPE) is recommended for maintenance / landscape workers.
	Ground gas	Inhalation, migration through granular and fractured soils into confined spaces.	L	**Low Risk.** The results of the gas monitoring have identified low concentrations of carbon dioxide across the site, and the concentration of methane was found below the limit of detection. The gas risk assessment determined that the site falls within CS1 whereby no gas protection measures are required. Personal Protective Equipment (PPE) and Risk Assessments and Method Statements would be required to mitigate risks associated with construction activities such as working near plant/exhausts or confined spaces.

11.7.3

Table 15. Revised Conceptual Site Model. (Continued)

Receptor	Potential sources	Pathways	Risk	Justification
Property				
Site structures and services	TPH in site soils	Direct contact between soil and structures or services.	L M	**Low to Moderate Risk.** The results of the chemical analysis have identified the concentration of TPH within the soil and groundwater marginally exceeds the acceptable limits for water supply pipes. As such, barrier pipework may be required. As the exceedances were only found in two locations, discussions with the water provider should be made to understand their requirements. Furthermore the concrete design class has been determined to be DS-1, AC-1.
	Ground gas	Migration through granular and fractured soils into confined spaces.	L	**Low Risk.** The results of the gas monitoring has identified low concentrations of carbon dioxide and methane was identified below the limit of detection. The gas risk assessment determined the site falls within CS1 whereby no gas protection measures are required.
Offsite Residents (380m east)	Organic and metal contamination	Direct contact, ingestion, and inhalation of outdoor soils or translocated soil and dust indoors.	L	**Low Risk.** The results of the chemical analysis have identified the concentrations of contaminants tested were below the GAC and therefore do not present a risk to human health.
	Ground gas	Migration through granular and fractured soils into confined spaces.	L	**Low Risk.** The results of the gas monitoring has identified low concentrations of carbon dioxide and methane was identified below the limit of detection. The gas risk assessment determined the site falls within CS1 whereby no gas protection measures are required. As such, the risk to off-site properties is considered to be low.
Plants /Landscaping	Organic and metal contamination	Root contact and uptake	L	**Low Risk.** Although no significant contamination has been identified within the soils onsite, they may not provide a suitable growth medium for proposed areas of soft landscaping/planting. As such, it is anticipated that imported topsoil will be used to dress these areas.
Groundwater				
Secondary (A) Aquifer	Organic and metal contamination	Soil leaching and migration of potential soil contamination.	L	**Low Risk.** The results of the groundwater analysis have identified marginal exceedances of some heavy metals. Due to the absence of a groundwater abstraction, and as the site is not situated within a Source Protection Zone, the impacts are minimal. As such, there is a low risk associated with groundwater contamination.
Surface Waters				
Unnamed Inland River (180m west)	Leachable metals and organic contamination	Soil leaching and migration into drains and sewers which discharge into the ditch.	L	**Low Risk.** The results of the groundwater analysis have identified marginal exceedances of some heavy metals. Due to the distance from the inland river, the receptor being up-gradient and likely groundwater flow being east, the impacts are minimal. As such, there is a low risk associated with groundwater contamination.

12.0 GEOENVIRONMENTAL RECOMMENDATIONS

12.1	**Contamination and Remediation**
12.1.1	The concentrations of contaminants within soil and groundwater are considered to be suitable for the proposed end use, and no further remediation is required. However, in areas of soft landscaping, a suitable growth medium is recommended. As such topsoil and subsoil should be imported with a minimum thickness of 150mm and should meet the requirements of BS3882, Specification for Topsoil. The supplier should provide a test certificate to confirm the composition prior to purchase. It is then recommended to test the soils once they arrive onsite to ensure they meet the requirements for a commercial land use based on S4ULs and C4SLs.
12.1.2	Whilst it is unlikely, in the event that previously unidentified contamination is uncovered during construction, works should cease until inspection and testing has been undertaken by an appropriately qualified person. A watching brief and discovery strategy should be implemented during the development.
12.2	**Gas Protection Measures**
12.2.1	Based on the gas monitoring undertaken, the site falls within CS1 under the methodology outlined in BS8485:2015+A1:2019. As such, gas mitigation measures are not required.
12.3	**Buried Services**
12.3.1	From a preliminary risk assessment of the results to thresholds set in the UK Water Industry Research (2010) '*Guidance for the selection of water supply pipes to be used in brownfield sites*', it is possible that barrier water pipes may be required for drinking water supply pipework. This is based on the contaminant concentrations recorded (in particular TPH C10 – C16 and TPH C16 – C40). However, the exceedances were only identified in two locations (WS01 adjacent to the former canteen building 100 and 101 and WS04 which is situated in the eastern part of the site) within the Made Ground and therefore it may be possible to discuss the findings with the local water provider to discuss their requirements.
12.4	**Buried Concrete**
12.4.1	Sulphate testing was undertaken to assess the risks from aggressive ground on buried concrete. Based on the results the Design Sulphate Class for natural soils would be DS-1, AC-1. Consequently, the risk is considered to be **Low**.

12.5	**Material Management and Waste**
12.5.1	It is anticipated that throughout the development, surplus soil will be created from reducing ground levels and from foundation arisings. The arisings will therefore need to be managed appropriately. Whilst some arisings may require disposal off-site as waste, it is likely that the majority of the surplus soil could be re-used either onsite or on another site under the Definition of Waste: Code of Practice (DoW CoP) outlined by CL:AIRE. At this stage, it is anticipated that the Made Ground would be classified as non-hazardous and the underlying natural soil would be classified as inert. Therefore under DoW CoP it would be possible for the Made Ground to be reused onsite and the surplus natural soil could be reused through the direct transfer of clean and naturally occurring soils materials between sites. This method would promote a sustainable management strategy for soil arisings.

13.0 GEOTECHNICAL RECOMMENDATIONS

13.1	**Geotechnical Discussion – Ground Conditions**
13.1.1	The proposed development includes the construction of two adjacent three-storey data centre buildings, an energy centre, two generator buildings, a substation building and a reception building. It has been assumed that the buildings will be founded at a formation level of ~50mOD.
13.1.2	Along the western site boundary there is a slope, with the proposed development at the bottom of the slope. As part of the proposed development, a retaining wall is to be installed along the line the slope and the slope removed to maximise the level footprint for the proposed development. It is expected that the wall will retaining a height of between 1.5m to 9.5m.
13.1.3	Roads and pavements will be constructed around the proposed development.
13.2	**Geotechnical Design Parameters**
13.2.1	The geotechnical design parameters presented in Table 16 are based on the in-situ SPTs, results of the laboratory testing and established correlations.

13.2.2 ***Table 16. Geotechnical Design Parameters***

Stratum	Design Level (mOD)	Bulk Weight, γ_b (kN/m^3)	Undrained Cohesion, c_u (kPa) [c']	Angle of friction, φ' (°)	Young's Modulus, E_u (MPa) [E']
Made Ground	Varies (58 to 49)	18	[0]	28[a]	[15]
River Terrace Deposits	Varies (56 to 51)	20	[0]	33[a]	[40]
Windlesham Formation	Varies (55 to 48.5)	20	70 [2]	28[b]	42[c] [33.6][d]
Bagshot Formation (with silt bands)	51	20	[0]	35[a]	[50][d]
Bagshot Formation (without silt bands)	46	20	[0]	40[a]	[60 +10z[e]]

a. Peck, R.B., Hanson, W.E., and Thornburn, T.H., Foundation Engineering, 2nd Edn, John Wiley, New York, 1967, p.310.
b. BS 8002:2015 Code of practice for Earth retaining structures, British Standards institution.
c. Based on 600c_u
d. Based on 0.8E_u
e. z – Depth below top of stratum

13.3 Groundwater

13.3.1 The groundwater strikes encountered during the site investigation and subsequent monitoring visits are summarised in Table 6 and Table 7. The groundwater strikes were all within the Bagshot Formation.

13.3.2 Groundwater level has been monitored at 44mOD in two deep monitoring wells. It is noted that shallower perched water may be present around the site, as potentially recorded in WS06. Perched water is likely to occur during wet periods above the Windlesham Formation.

13.4 Shallow Foundations

13.4.1 Based on the findings of the site investigation, proposed development and anticipated loadings, shallow foundations are considered feasible.

13.4.2 Assuming a formation level within the Bagshot Formation within the centre of the development area, an allowable bearing pressure for pad/strip foundations of 200kPa is recommended for initial design. This value takes into consideration the variability of the silt content encountered at the top of the Bagshot Formation and cohesive bands. If pad foundations are founded on the Windlesham Formation, an allowable bearing pressure of 150kPa is recommended (in the centre of the site). The allowable bearing pressure should be reassessed during detailed design once the location and formation level of the development is finalised.

13.4.3 Should structural loads lead to uncommercially large pad/strips, a raft slab foundation is also considered feasible, including for the two data centre building, subject to appropriate geotechnical analysis to assess settlement and differential movement, and also to derive spring stiffness values to supplement detailed structural analysis and design of the raft slabs. A raft foundation could locally benefit from excavation unloading to reach formation levels.

13.5 Piled Foundations

13.5.1 Should the structural loads applied to the foundations exceed the capacity of shallow foundations, pile foundations are recommended. Contiguous Flight Auger (CFA) or bored pile foundations are considered suitable for the proposed development. The pile foundations may be connected to conventional isolated pile caps or be designed as part of a piled raft/slab. CFA piling is typically limited to around 32m depth, while rotary piles are typically limited to 75m. It is recommended that a piling contractor be consulted to discuss the most appropriate pile construction method. Groundwater conditions should be taken into consideration when selecting piling methodology.

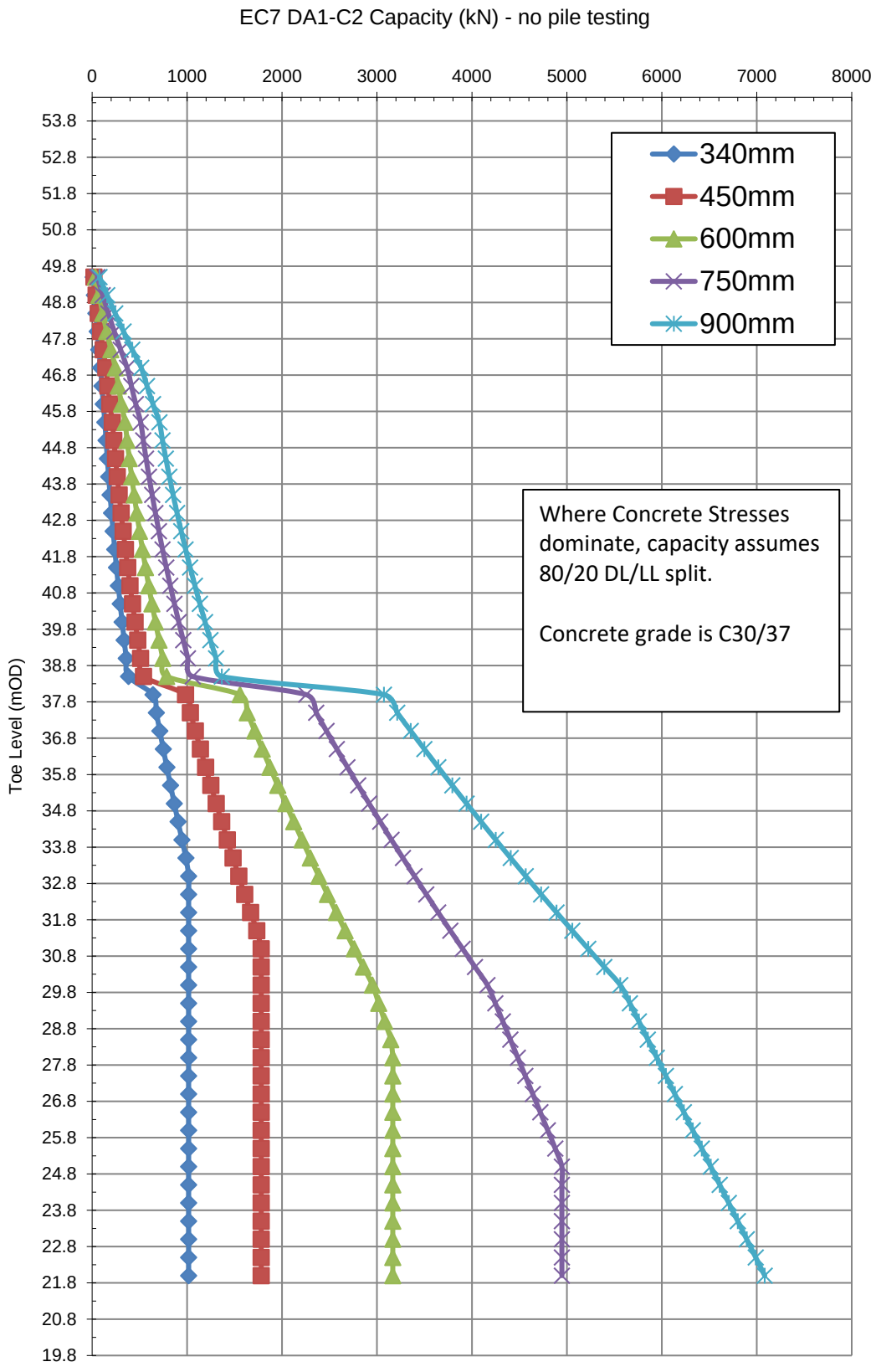
13.5.2 It is recommended that piles are taken to a toe level of below 37mOD to improve end-bearing capacity and avoid potential silt bands at a shallower level.

13.5.3 A preliminary pile design has been undertaken in accordance with Eurocode 7 Design Approach 1, Combination 2. The preliminary pile design is presented in Graph 2. It is understood that preliminary Serviceability Limit State (SLS) loads are between 1500kN and 2200kN, as per the Stage 2 report by Hurley Palmer Flatt (Structural Engineer). The following assumptions have been made regarding the preliminary design:

- All piles will be cast in-situ, CFA or bored;
- A pile cut-off level of 50mOD and pile platform level of 51mOD have been assumed;
- The preliminary design has been carried out in accordance with Eurocode 7 Design Approach 1, Combination 2 assuming no working or preliminary pile load tests;
- Pile concrete grade is assumed to be C30/37;
- Combination 2 applies partial factors to the dead and live loads of 1.0 and 1.3 respectively, with geotechnical partial factors of 1.6 for the skin friction, 2.0 for the base capacity and 1.4 for the model factor; and
- The top of the Bagshot Formation has been assumed to be at 51mOD. The capacity for the stratum assumes a K_o of 0.8 for the Bagshot Formation, limits the base stress capacity to 2.5MPa between 50mOD and 38mOD (to account for the presence of silty bands), and 15MPa below 38mOD. Geotechnical parameters are based on those presented in Table 18.
- The pile capacities presented should be compared to appropriately factored Design Actions.

13.5.4

Graph 2. Preliminary pile design



13.6 Buried Concrete Sulphate Durability Classification

13.6.1 Soil samples from the strata encountered were send for laboratory testing to determine the sulphate concentrations and pH in accordance with Building Research Establishment (BRE) SD1 guidance[2]. The test results can be found in Appendix 10. A summary of the Design Sulphate (DS) and Aggressive Chemical Environment for Concrete (ACEC) classes are provided in Table 17.

13.6.2 ***Table 17. Design Sulphate (DS) classification for encountered soil strata***

Stratum	pH	Water Soluble Sulphate as SO_4 (2:1) mg/l	Design Sulphate (DS) Class [ACEC]
Bagshot Formation	7.3 to 7.6	100 to 400	DS-1 [AC-1]

13.7 Floor Slabs

13.7.1 Based on the ground model and assumed development formation level, it is recommended that floor slabs can be ground bearing, subject to appropriate proof rolling and inspection of the formation soils prior to blinding and slab construction. Any identified weak or soft spots across the formation should be removed and backfilled within compacted granular fill. The formation should also be blinded as soon as possible after the above preparation works to prevent determination

13.8 Pavements and Roads

13.8.1 An assessment of the current data suggests that roads or pavements within locations where the ground conditions are found to be predominately cohesive, should be design for a CBR of 3%. In locations where the formation is predominately granular, pavements and roads can be designed for a CBR value of 20%.

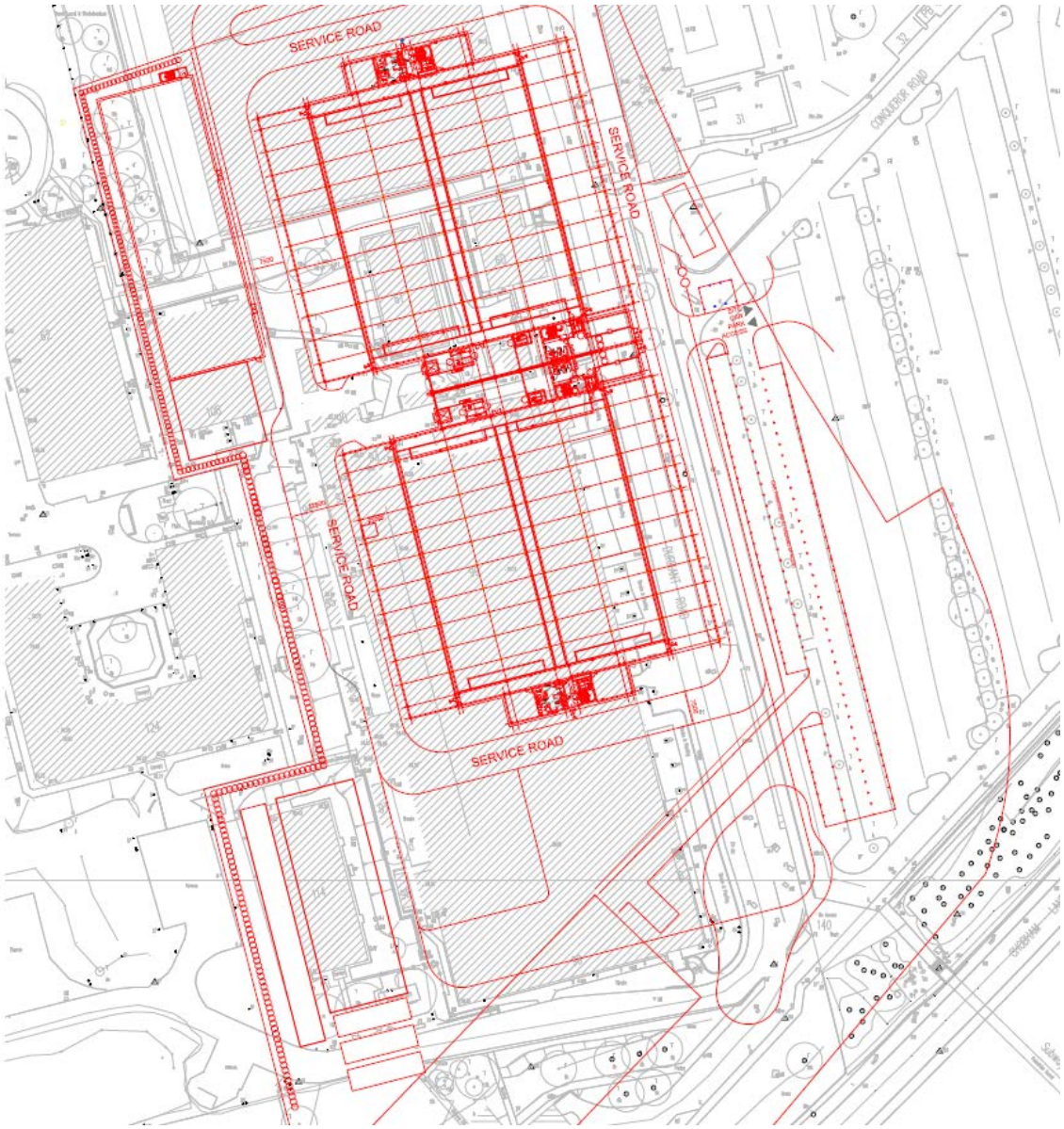
13.8.2 Once the alignment and formation level for the roads and pavements has been establish, it is recommended that the formation level should be exposed, proof rolled, inspected and insitu CBR tested. Locations identified as being weak/soft spots or falling below the design criteria above should be removed and replaced with well compacted granular fill.

[2] Building Research Establishment. (2005). Special Digest 1 – Concrete in aggressive ground, third edition.

13.9 **Excavations**

13.9.1 Along the western site boundary there is slope, with the site located at the toe of the slope. The height of the slope varies between 1.5m and 9.5m. The proposed development requires a retaining wall to be cut into the slope. The location of the retaining wall is shown in Plate 3. Due to the constraints of constructing the proposed development directly adjacent to the retaining wall, traditional propping supports are not possible. Soil anchors are also not feasible, as the land at the top of the slope is outside the site boundary. Additionally, the land at the top of the slope external to the site is currently occupied by two buildings. Due to these restrictions, the wall will either need to be designed to cantilever in the long-term permanent condition or some alternative form of support will be required – either buttress piles or propping to the new structure.

13.9.2 ***Plate 3. Position of proposed retaining wall***



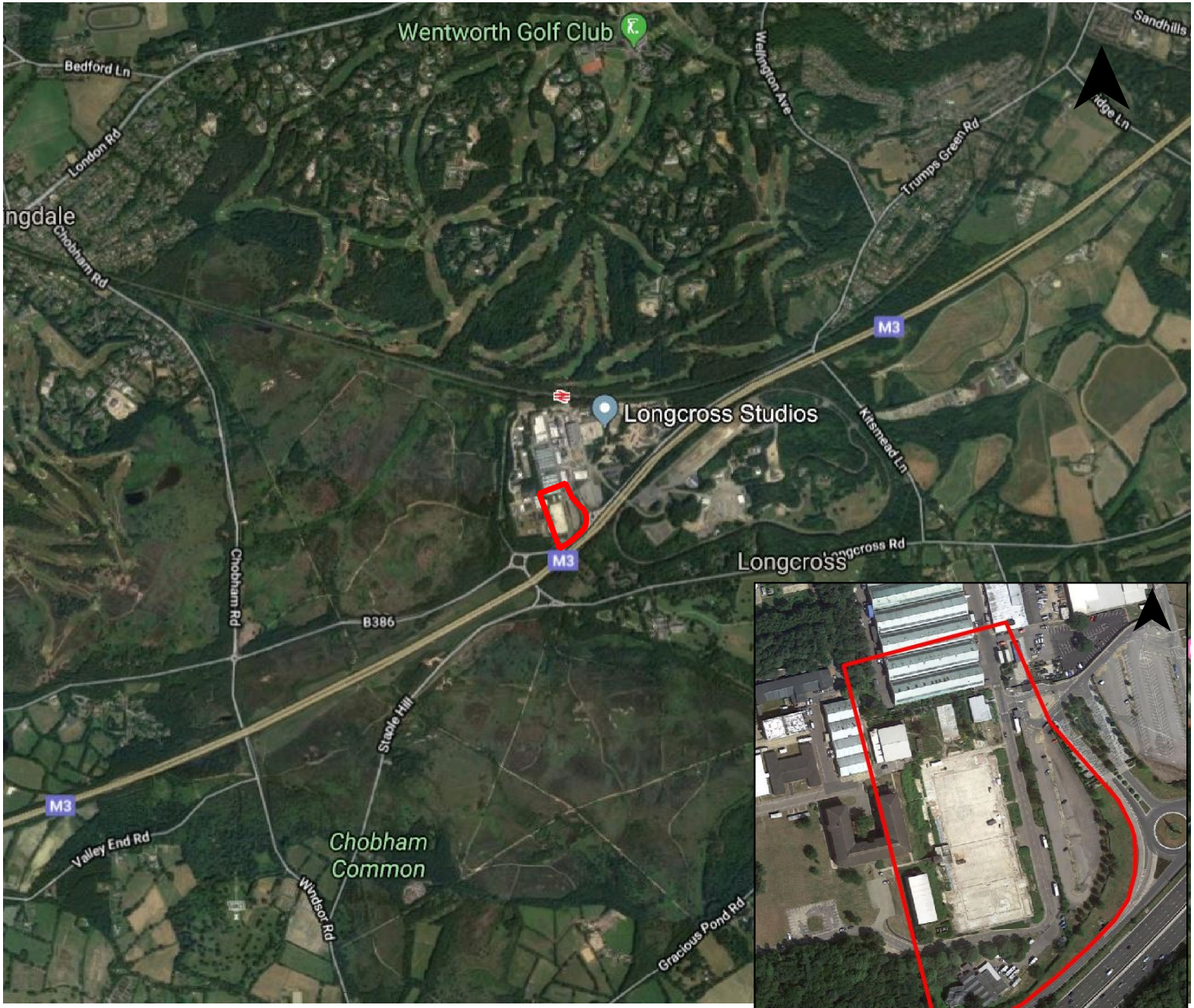
13.9.3	Based on the ground and groundwater conditions encountered during the site investigation, a contiguous pile wall is recommended, formed using CFA or bored piling methodology. The pile wall design will be dependent on ground movement limits behind the wall, as to not cause unacceptable damage to the neighbouring properties or infrastructure. This will need to be carefully considered in the design. Depending on the potential limited space that may be available behind or in front of the piled wall, a non-conventional propping system in the form of buttress piles could be considered, which may be more economical with regard to overall pile wall depth, diameter and limiting wall deflection and corresponding ground movement below adjacent sensitive constraints. The diameter and length of the piles may also vary based on the maximum retained height required.
13.9.4	A slope stability assessment should be undertaken to assess the impact of construction activity along the top of the slope to form the required retaining wall.
13.9.5	Shallow excavations should not pose difficulties for conventional excavators and earthmoving equipment. Excavations should be planned and inspected regularly by a competent person. No operative should enter un-shored or excavations identified as unstable by a competent person, however shallow they are, in accordance with guidance presented in CIRIA Report 97[3].
13.9.6	Should groundwater be encountered during excavation works, it is expected that this can be controlled through sump pumping.

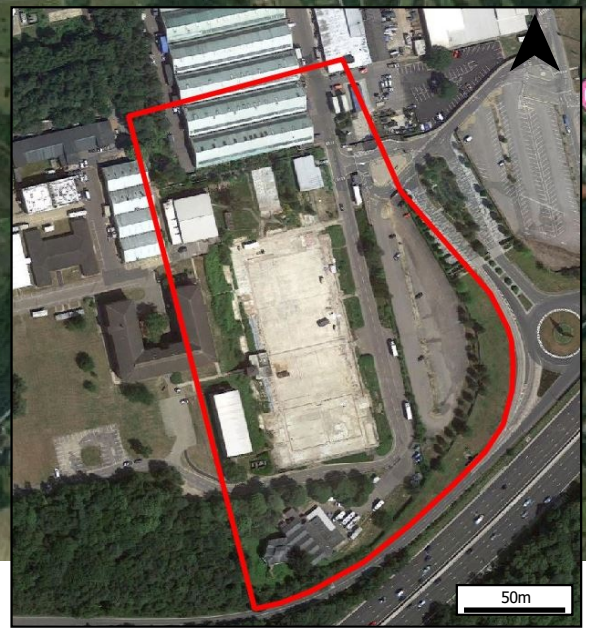
[3] CIRIA Report 97 (1992). *Trenching Practise – Second Edition.* Construction Industry Research and Information Association Report 97.

14.0 CONCLUSIONS

14.1	The results from the investigation have indicated that the site is underlain by Made Ground to a maximum depth of 2.00mbgl (49.35mAOD) comprising black, gravelly SAND with gravel of fine to coarse angular to sub-rounded flint, rare cobble of angular flint and occasional roots. The Made Ground was underlain by natural deposits of the Windlesham Formation and Bagshot Formation to the extent of the boreholes at 35.00mbgl (16.35mAOD). Groundwater was encountered during the works at depths of 16.00mbgl (44.00mAOD).
14.2	The results of the chemical analysis of the Made Ground and natural soils identified that the concentration of the contaminants tested were below the GAC for a commercial land use. As such, the risks to human health are considered to be low. Furthermore, whilst marginal exceedances of heavy metals were identified from the results of the groundwater analysis, due to the lack of a significant sensitive receptors, the risk of significant harm to Controlled Waters is low. In addition, the results of the gas monitoring determined that the site would fall within CS1 whereby no protective measures are required. Overall, it is considered that there is a **Low Risk** associated with the site in respect of land contamination and the site is considered suitable for development for a commercial end use.
14.3	Geotechnical parameters have been derived based on the results of in-situ and laboratory testing. A design groundwater level has also been derived based on groundwater strikes encountered and monitoring results from the current site investigation.
14.4	A buried concrete classification assessment has been carried out to determine the DS and ACEC classification for the Bagshot Formation. At this stage DS-1, AC-1 is considered appropriate.
14.5	Shallow foundations in the form of pad and raft foundations are considered feasible subject to review of structural loading. Preliminary allowable bearing pressures have been provided. Should a raft foundation be adopted, a raft settlement analysis should be carried out to derive spring stiffnesses for the raft to supplement the structural design. A piled raft could also be considered to limit differential settlements, if movements are considered excessive for a raft foundation alone.
14.6	Where shallow foundations are considered to be inappropriate due to structural loading, pile foundations are recommended and a preliminary pile design has been provided for a range of pile diameters.
14.7	A contiguous pile wall is recommended for the retaining wall along the western site boundary. The pile diameter would need to be determined following a soil-structure interaction assessment. The pile diameter is likely to be determined by the ground movements and structural forces in the wall. Where a cantilever is not feasible, an alternative form of propping, such as buttress piles or propping to the proposed structure may be considered.
14.8	CBR values for Pavement and Road design are provided. It is considered that a CBR of 3% is suitable in cohesive soils and 20% in granular deposits. Once the alignment and formation level of the pavements and roads have been established, the formation level should be exposed, proof rolled, inspected and insitu tested to identify weak/soft spots and areas that are below the design criteria. These should be removed and replaced with well compacted granular backfill.

APPENDIX 1: FIGURES





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Key

Site Boundary (Approx)

Rev	Description	Date

Project: Longcross Studios	Scale: See bar
	Drawn by: CB
	Approved By: CK
Title: Site Location Plan	Drawing Number: 1
	Date: 11/07/2020

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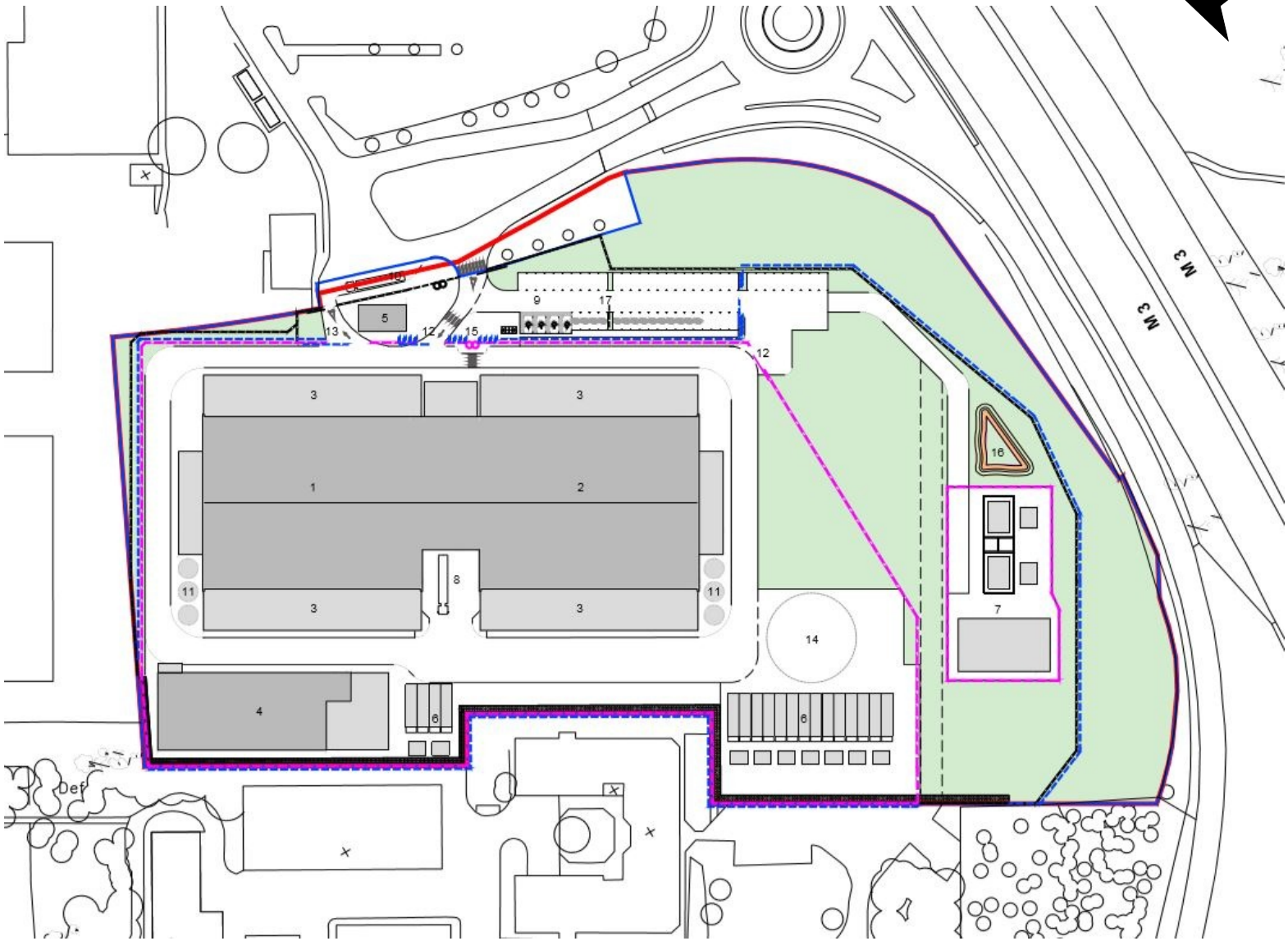
Notes

Basemap provided by HPF.

Rev	Description	Date

Project: Longcross Studios	Scale: N/A
	Drawn by: CB
	Approved By: CK
Drawing Title: Existing Layout Plan	Drawing Number: 2
	Date: 17/07/2020



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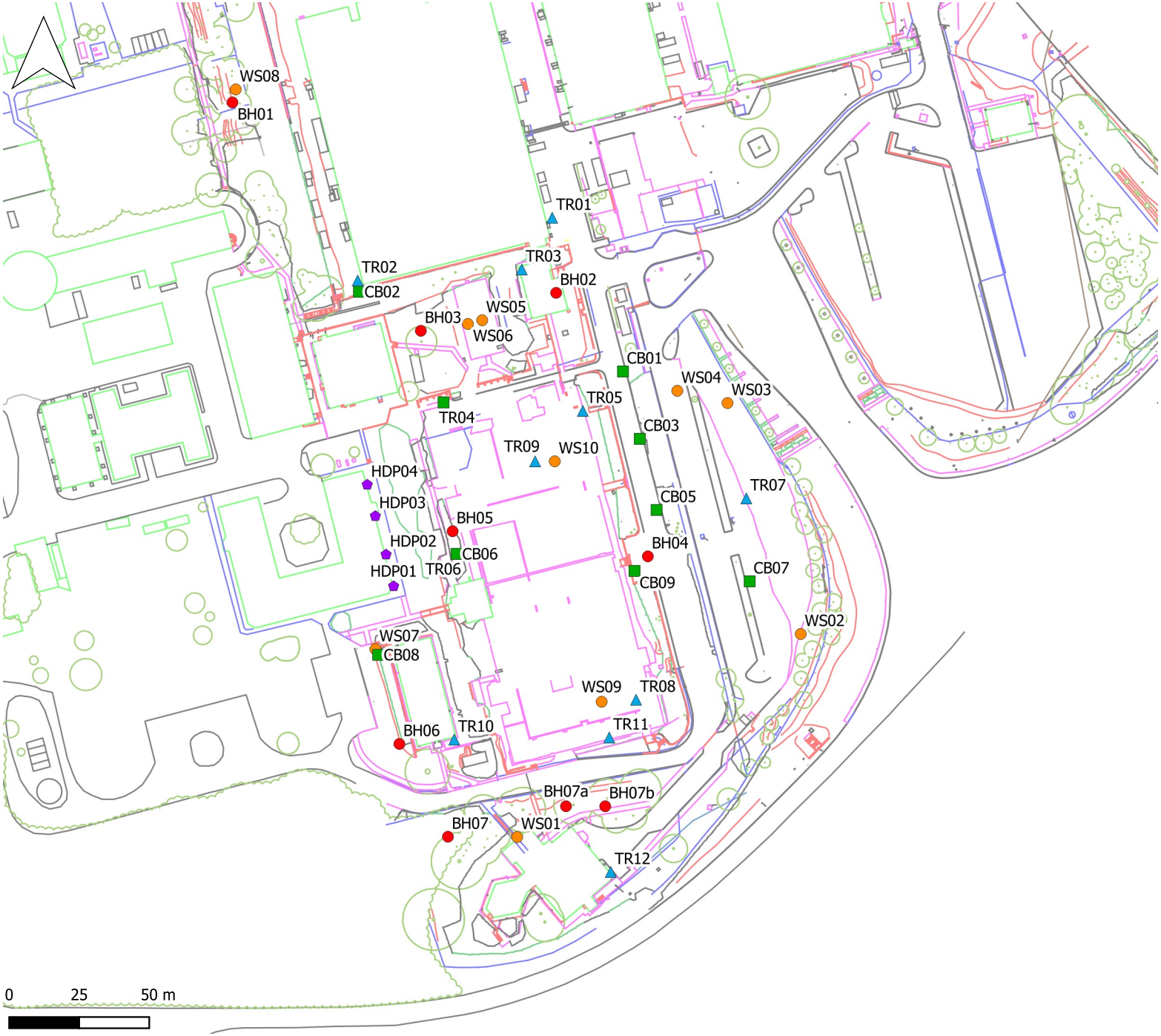
Notes

Basemap prepared by Hale Architecture. Dated: 14 December 2020. Reference: 19063-PL1100

Rev	Description	Date

Project: Longcross Studios	Scale: N/A
	Drawn by: CB
	Approved By: CK
Drawing Title: Proposed Layout Plan	Drawing Number: 3
	Date: 14/12/2020



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Key

- Hand Pit
- CBR Location
- Trial Pits
- Deep Borehole
- Shallow Borehole

Notes

Basemap based on Topographical Survey produced by Paragon in 2019.

Rev	Description	Date

Project: Longcross Studios	Scale: 1:2000
	Drawn by: CB
	Approved By: CK
Drawing Title: Intrusive Location Plan	Drawing Number: 4
	Date: 17/07/2020

APPENDIX 2: PHOTOGRAPHS

BH01

01: BH01 1.2-2m, 2-3m, 3-4m, 4-5m.

02: BH01 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH01 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH01 15-16m, 16-17m, 17-18m, 18-19m.

05: BH01 20-21.5m.

06: BH01 22-23.5m.

07: BH01 24-25m.

08: BH01 25.5-26m.

BH02

01: BH02 2-3m, 3-4m, 4-5m.

02: BH02 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH02 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH02 15-16m, 16-17m, 17-18m, 18-19m, 19-20m.

05: BH02 20-21m, 21-22m, 22-23m, 23-24m, 24-25m.

BH03

01: BH03 1.2-2m, 2-3m, 3-4m, 4-5m.

02: BH03 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH03 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH03 15-16m, 16-17m, 17-18m, 18-19m, 19-20m.

05: BH03 20-21m, 21-22m, 22-23m, 23-24m, 24-25m.

06: BH03 25-26m, 26-27m, 27-28m.

07: BH03 25.5m, 27.0m-27.38m, 28.5m, 28.5m (SPT), 29.0m, 29.5m, 30.0m, 30.0m (SPT).

BH04

01: BH04 2-3m, 3-4m, 4-5m.

02: BH04 5-6m, 6-7m, 7-8m.

03: BH04 10-10.44m, 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH04 15-16m, 16-17m, 17-18m, 18-19m, 19-20m.

05: BH04 20-21m, 21-22m, 22-23m, 23-24m, 24-25m.

BH05

01: BH05 2-3m, 3-4m, 4-5m.

02: BH05 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH05 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH05 15-16m, 16-17m, 17-18m, 18-19m, 19-20m.

05: BH05 20-21m, 21-22m, 22-23m, 23-24m.

06: BH05 23.5-34.6m

BH06

01: BH06 1.2-2m, 2-3m, 3-4m, 4-5m.

02: BH06 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH06 10-11m, 11-12m, 12-13m, 13-14m, 14-15m.

04: BH06 15-16m, 16-17m, 17-18m, 18-19m, 19.5-20m.

05: BH06 19-19.5m.

06: BH06 20-21m, 21-22m, 22-23m, 23-24m, 24-25m

07: BH06 25-26m, 26-27m, 27-28m, 28-29m, 29-30m.

BH07

01: BH07 1-2m, 2-3m, 3-4m, 4-5m.

02: BH07 5-6m, 6-7m, 7-8m, 8-9m, 9-10m.

03: BH07 10-11m.

04: BH07 12-13m.

05: BH07 13.5-14.5m, 14.5-16m.

06: BH07 11-11.5m, 11.5-12m, 13.5-14m, 14.5-16m, 16.5-17m.

07: BH07 16.5-17m

08: BH07 17.5-18.5m, 18.5-19.5m, 19.5-20.5m.

09: BH07 20.5-21.5m, 21.5-22.5m, 22.5-23.5m, 23.5-24.5m, 24.5-25.5m.

Foundation Inspection Pits

01: East wall of Building 124 facing north

02: East wall of Building 124 facing south

03: Northern part of Building 124 facing north

04: Northern part of Building 124 facing south

05: HDP1

06: HDP1

07: HDP1

08: HDP1

09: HDP2

10: HDP2

11: HDP2

12: HDP2

13: HDP3

14: HDP3

15: HDP3

16: HDP3

17: HDP4

18: HDP4 right of drain

19: HDP4 right of drain

20: HDP4 right of drain

21: HDP4 left of drain

22: HDP4 left of drain

23: HDP4 left of drain

24: HDP4 left of drain

General Site Photographs

01: TR01

02: TR01

03: TR02

04: TR02

05: TR03

06: TR03

07: TR04

08: TR04

09: TR05

10: TR05

11: TR06

12: TR06

13: TR07

14: TR07

15: TR08

16: TR08 (A)

17: TR08 (B)

18: TR08 Column

19: TR09

20: Natural strata – TR09

21: TR10

22: TR11

23: TR11 - section

24: TR11 - plan

25: TR12

26: TR12

27: WS01

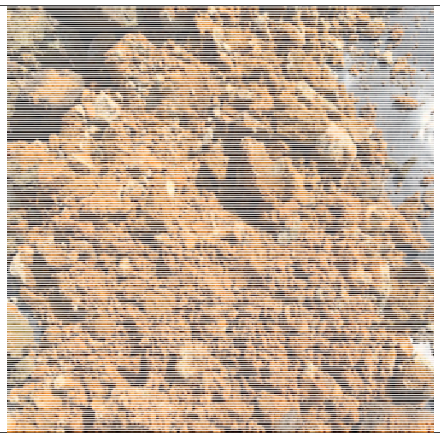
28: WS02

29: WS03

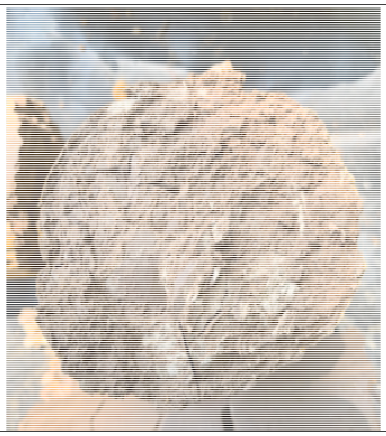
30: WS04

31: WS5/6 locations

32: WS06

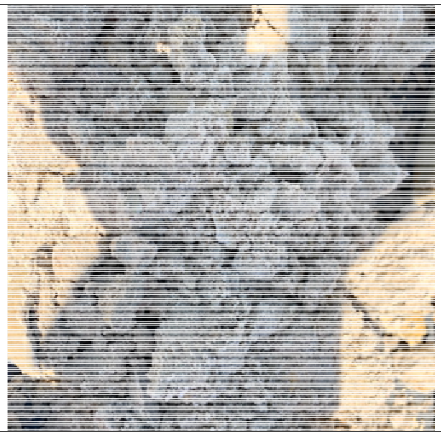


33: Natural strata – WS07



34: Natural strata – WS08

35: Natural strata – WS09



36: Natural strata – WS10

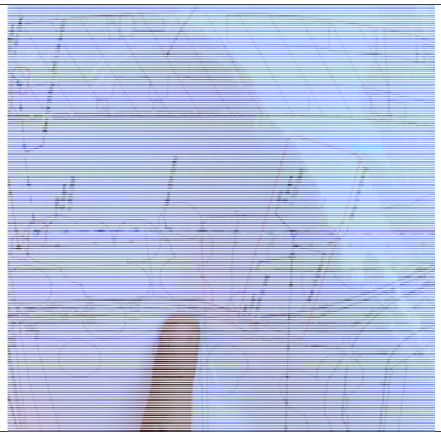
37: Constraints – vacuum excavation and deep excavations

38: Constraints – site cabins / set up

39: Constraints – Demolition stockpiles

40: Constraints – Demolition stockpiles

41: Constraints – Japanese Knotweed treatment



42: Constraints – live utilities

43: Constraints – Demolition stockpiles and vehicular access

44: Constraints – Storage and delivery areas

APPENDIX 3: FIELD METHODS

FIELD METHODS

3.1	**Design of Investigation**
3.1.1	The site investigation was broadly undertaken in general accordance and with reference, where relevant to the following documents: • Specification for Ground Investigation, Site Investigation Steering Group, Thomas Telford, 1994; • British Standard BS10175:2011 (A2) Investigation of potentially contaminated sites – code of practice, as amended; • Code of Practice for the Investigation of Potentially Contaminated Sites BS10175:2011+A2:2017; • Land Contamination: Risk Management (LCRM) 2019 (CLR11 currently under revision); • Environment Agency (2000) Secondary model procedures for the development of appropriate soil sampling strategies for land contamination. Technical Report P5-066/TR; • DEFRA/Environmental Agency Report: Land Contamination: Risk Management (LCRM) 2019; • BS5930, 2015. Code of Practice for Ground Investigation; • BS1377 (1990) Methods of test for Soils for Civil Engineering Purposes; • BS EN 1997-2 (2007) Eurocode 7 – Geotechnical Design – Ground Investigation and Testing; and • BS IS0 5667-22:2010 Water quality. Sampling. Guidance on the design and installation of groundwater monitoring points.
3.1.2	The works were progressed on site by a subcontractor who have been scrutinised by Paragon and are on Paragon's approved sub-contractor list. The investigation was designed to provide a preliminary assessment of the ground conditions at the subject site. Prior to the progression of the site investigation, all areas were checked for services through the use of CAT and Genny and by Ground Penetrating Radar (GPR).
3.2	**Onsite Methods**
3.2.1	The deep boreholes were drilled using a sonic drilling rig. Casing was used to keep the borehole open and a water flush was added throughout drilling.
3.2.2	The windowless sample boreholes were drilled with a terrier drilling rig. Casing was used to keep the borehole open throughout drilling.
3.2.3	A JCB 3CX was used to excavate trial pits across the site.
3.2.4	Ground resistivity testing was undertaken in the location of the deep boreholes.
3.2.5	The Foundation Inspection pits were excavated using a hand digging tools and a hand auger to expose the foundations.

3.2.6	Onsite geotechnical testing included Standard Penetration Testing (SPT) and CBR testing. SPTs were completed within the boreholes at regular intervals. CBRs were undertaken at a depth of 0.5m in areas where new roads are proposed.
3.2.7	Soils were logged by a qualified engineering geologist in general accordance with BS 5930: 1999+A2:2010 and BS EN ISO 14688 Pt 1&2.
3.3	**Constraints**
3.3.1	The ground conditions reported relate only to the point of excavation and do not necessarily guarantee a continuation of the ground conditions throughout the non-inspected area of the site. Whilst such exploratory holes would usually provide a reasonable indication as to the general ground conditions these cannot be determined with complete certainty.
3.3.2	A number of constraints were identified within the previous investigation by Paragon. These included the angle of the slope, ecological exclusion areas, vegetation, utilities, buildings and operational areas.
3.4	**Monitoring Well Installation**
3.4.1	Upon completion of the boreholes, where required a monitoring well was installed with 50mm HDPE well pipe to depths presented on the borehole logs. A slotted section of well pipe was surrounded by gravel to provide a 'response zone'. A plain section of pipe was surrounded by bentonite to produce a seal.
3.4.2	Groundwater levels within the monitoring wells were recorded during each visit using an electronic dip/interface meter.
3.5	**Sampling and Testing Strategy**
3.5.1	All the exploratory holes were logged and sampled by a site engineer. Testing and sampling at the site was undertaken to investigate the ground conditions present.
3.5.2	Soil samples were collected from across the site and at different depths within each trial position to provide an even coverage of the site.
3.5.3	Geotechnical bulk disturbed samples were obtained from the strata encountered and were subjected to careful examination at a geotechnical laboratory.
3.5.4	Environmental soil samples representative of the underlying conditions were collected and submitted for a suite of determinants based on the risks identified in the Phase 1 report and the specific ground conditions identified during the intrusive investigation. The soil samples were transported to an appointed United Kingdom Accreditation Service (UKAS) accredited laboratory.
3.6	**Quality Control**
3.6.1	The samples were despatched under a chain of custody procedure to a UKAS accredited laboratory, for subsequent chemical analysis. Where appropriate, samples were stored within cool boxes containing ice packs. A Chain of Custody is included with all sample consignments.

3.7	**Gas Monitoring**
3.7.1	The wells were monitored for methane, carbon dioxide, oxygen and hydrogen sulphide using a multi-gas analyser (GFM436).
3.7.2	Ground gas monitoring was carried out in general accordance with the guidelines presented in CIRIA C665 'Assessing risk posed by hazard ground gases to buildings'. Flow was monitored for a period of two minutes where possible; maximum flow was recorded. Ground gases, including concentrations of methane, carbon dioxide, hydrogen sulphide and carbon monoxide were monitored for up to five minutes. During monitoring, ground gas readings were logged every thirty seconds.
3.7.3	Following gas monitoring, water levels were checked using an interface meter, which is also capable of detecting the presence of free product. If groundwater is present, then water samples were retrieved using bailers. Prior to groundwater sampling, up to three times the well volume was purged to remove stagnant / rain water.
3.8	**Health and Safety**
3.8.1	A site-specific Risk Assessment and Method Statement (RAMS) was produced prior to the works beginning on site; works were completed in general accordance with the methodology set up in this assessment. No incidents occurred during this investigation.

APPENDIX 4: BOREHOLE LOGS

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Borehole Log

ver. 0.5

Borehole No. **BH01**

Project Name:	Longcross Studios	**Co-ords:**	497785E - 165685N
Location:	Longcross	**Level (mAOD):**	56.38
Client:	HPF	**Dates:**	05/07/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
		0.00 - 1.00	B	5kg			Brown gravelly SAND with occasional roots. Gravel is fine to coarse of subangular to rounded flint. TOPSOIL
		1.00 - 1.45	D	1kg			
		1.20	SPT	N=14 (2,4/4,3,3,4)	1.20	55.18	Medium dense, brown and orange, gravelly SAND. Gravel is fine to coarse of subangular flint. Sand is fine to coarse.
		1.50 - 2.00	B	5kg			
		2.00 - 2.45	D	1kg	2.00	54.38	Firm to stiff, orangish brown, silty CLAY.
		2.00	SPT	N=16 (4,4/4,3,4,5)			
		2.40		HVP=60			
		2.50 - 3.00	B	5kg	2.60	53.78	Very stiff, reddish brown, silty CLAY.
		3.00 - 3.45	D	1kg			
		3.00 - 4.00	B	5kg			
		3.00	SPT	N=22 (4,4/5,5,6,6)			
		4.00 - 4.45	D	1kg			
		4.00	SPT	N=17 (3,3/4,4,5,4)			
		5.00 - 5.45	D	1kg			
		5.00	SPT	N=16 (3,3/4,3,4,5)	5.20	51.18	Medium dense to dense, grey, sandy, clayey SILT.
		5.20 - 5.50	B	5kg			
		6.00 - 6.45	D	1kg			*Recovered as wet between 6.00m and 8.00m bgl.*
		6.00	SPT	N=32 (5,7/7,8,8,9)			
		7.00	SPT	N=36 (7,8/8,9,9,10)			
		8.00 - 8.45	D	1kg			
		8.00	SPT	N=44 (7,10/11,10,11, 12)			
		8.50 - 9.00	B	5kg	8.40	47.98	Very dense, greenish grey, silty SAND. Sand is fine to coarse with occasional black grains (suspected mica).
		9.00 - 9.35	D	1kg			*Becoming orangish brown between 9.00m and 10.00m bgl.*
		9.00	SPT	N=50 (7,10/50 for 200mm)			
		9.50 - 10.00	B	5kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	30.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

ver. 0.5

Borehole No. **BH01**

Project Name:	Longcross Studios	**Co-ords:**	497785E - 165685N
Location:	Longcross	**Level (mAOD):**	56.38
Client:	HPF	**Dates:**	05/07/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, greenish grey, silty SAND. Sand is fine to coarse with occasional black grains (suspected mica).
							Becoming brown from 10.00m bgl.
		10.50	SPT	50 (9,12/50 for 180mm)			
		10.80 - 11.00	B	5kg			
							Fine organic matter identified between 11.00m and 15.00m bgl.
		12.00 - 12.33	D	1kg			
		12.00	SPT	50 (10,12/50 for 175mm)			
		12.50 - 13.00	B	5kg			
		13.50 - 13.85	D	1kg			
		13.50	SPT	50 (8,14/50 for 200mm)			
		14.50 - 15.00	B	5kg			
		15.00 - 15.32	D	1kg			
		15.00	SPT	50 (25 for 140mm/50 for 180mm)			
		16.50 - 16.80	D	1kg			
		16.50 - 17.00	B	5kg			
		16.50	SPT	50 (25 for 140mm/50 for 155mm)			
		18.00 - 18.28	D	1kg			
		18.00	SPT	50 (25 for 130mm/50 for 150mm)			*Gravel of fine to coarse sub-angular flint between 18.00m and 18.20m bgl.*
		18.50 - 19.00	B	5kg			
		19.50	D	1kg	19.50	36.88	
		19.50	SPT	50 (25 for 80mm/50 for 145mm)			Very dense, orange and grey, fine to coarse SAND.
		20.00	D	1kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	30.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH01**

Project Name:	Longcross Studios	**Co-ords:**	497785E - 165685N
Location:	Longcross	**Level (mAOD):**	56.38
Client:	HPF	**Dates:**	05/07/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, orange and grey, fine to coarse SAND.
		20.50	D	1kg			
		21.00	D	1kg			
		21.00	SPT	50 (25 for 75mm/50 for 150mm)			
		21.50	D	1kg			
		22.00	D	1kg			
		22.50	D	1kg			
		22.50	SPT	50 (25 for 75mm/50 for 145mm)			
		23.00	D	1kg			*Becoming darker in colour from 23.00m bgl.*
		23.50	D	1kg			
		24.00	D	1kg			
		24.00	SPT	50 (25 for 70mm/50 for 120mm)			
		24.50	D	1kg			
		25.00	D	1kg	25.00	31.38	Very dense, blackish grey, coarse SAND.
		25.50	D	1kg			
		25.50	SPT	50 (25 for 60mm/50 for 110mm)			
		26.00	D	1kg			
		27.00	SPT	50 (25 for 75mm/50 for 130mm)			
		28.50	SPT	50 (25 for 70mm/50 for 110mm)			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	30.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH01**

Project Name:	Longcross Studios	**Co-ords:**	497785E - 165685N
Location:	Longcross	**Level (mAOD):**	56.38
Client:	HPF	**Dates:**	05/07/2020
		Weather:	Overcast

Project No.:	200576	
Rev.:	1.0	
Logged By:	CB	
Checked By:	AJ	

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		30.00	SPT	50 (25 for 50mm/50 for 90mm)	30.14	26.24	Very dense, blackish grey, coarse SAND.
							Borehole terminated at 30.14m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	30.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH02**

Project Name:	Longcross Studios	**Co-ords:**	497903E - 165609N
Location:	Longcross	**Level (mAOD):**	50.99
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
					0.20	50.79	Light orangish brown, silty SAND. Sand is fine. MADE GROUND
		0.50 - 0.60	B	5kg			Medium dense, orange, gravelly SAND. Gravel is angular to subangular of fine to coarse mixed lithologies.
		1.20	SPT	N=20 (3,4/4,5,5,6)			
					1.50	49.49	Medium dense to dense, orange brown and grey mottled, silty SAND. Sand is fine to coarse.
		2.00	SPT	N=25 (3,4/5,6,7,7)			
		2.50 - 3.00	B	5kg			
		3.00 - 3.40	B	5kg			*Gravel band between 3.00m and 3.40m bgl. Gravel is coarse sub-rounded flint.*
		3.00	SPT	N=24 (4,4/5,6,6,7)			
		4.00	SPT	N=26 (4,5/5,6,7,8)			*Light brown and grey between 4.00m and 5.00m bgl.*
		4.50 - 5.00	B	5kg			
		5.00	SPT	N=34 (5,6/7,8,9,10)			
		6.00	SPT	N=44 (6,8/9,11,12,12)			
		6.50 - 7.00	B	5kg			
		7.00	SPT	N=41 (6,8/8,9,11,13)	7.00	43.99	Dense, light grey, sandy, clayey SILT.
		7.50 - 8.00	B	5kg			
					7.70	43.29	Dense to very dense, grey, medium to coarse SAND.
		8.00	SPT	N=50 (7,9/50 for 280mm)			*Becoming mottled orange with occasional clay lenses between 8.00m and 9.00m bgl.*
		9.00	SPT	N=50 (6,7/50 for 250mm)			
		9.40 - 9.60	B	5kg			
		9.80 - 10.00	B	5kg			*Recovered as wet from 9.80m bgl.*

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	25.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)
17.00	20	16.00

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH02**

Project Name:	Longcross Studios	**Co-ords:**	497903E - 165609N
Location:	Longcross	**Level (mAOD):**	50.99
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
		10.00	SPT	N=50 (9,11/50 for 240mm)			Dense to very dense, grey, medium to coarse SAND.
		10.50 - 11.00	B	5kg			
					11.00	39.99	Very dense, orange brown slightly clayey silty SAND. Sand is fine to coarse.
							Recovered as wet from 11.00m bgl.
		11.50 - 12.00	B	5kg			
		11.50	SPT	N=50 (8,10/50 for 230mm)			
							Clay lens between 12.00m and 12.30m bgl.
		12.50 - 13.00	B	5kg			
		13.00	SPT	N=50 (9,11/50 for 225mm)			
		14.50 - 15.00	B	5kg			
		14.50	SPT	50 (7,9/50 for 200mm)			
							Sand becomes coarse with black minerals (suspected mica) were observed between 15.00m and 16.00m bgl.
		15.50 - 16.00	B	5kg			
	▼	16.00	SPT	50 (6,9/50 for 185mm)			*Becoming greenish grey from 16.00m bgl.*
	▽						
		17.50 - 18.00	B	5kg			
		17.50	SPT	50 (8,12/50 for 180mm)			
							Recovered as wet between 18.00m and 19.00m bgl.
		18.50 - 19.00	B	5kg			
		19.00 - 19.40	B	5kg	19.00	31.99	Very dense, greenish grey and black SILT interbedded with siltstone, sand and very stiff clay.
		19.00	SPT	50 (10,12/50 for 165mm)			
		19.40 - 19.80	U				
							Shiny crystals (suspected selenite) observed from 19.00m bgl.
		20.00 - 20.40	U				

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	25.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
17.00	20	16.00

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH02**

Project Name:	Longcross Studios	**Co-ords:**	497903E - 165609N
Location:	Longcross	**Level (mAOD):**	50.99
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, greenish grey and black SILT interbedded with siltstone, sand and very stiff clay.
							Siltstone between 20.00m and 20.40m bgl.
		20.40 - 20.80	B	5kg			
		20.50	SPT	50 (25 for 110mm/50 for 155mm)			
							Sandy band (fine to coarse) between 20.80m and 22.00m bgl.
		21.50 - 22.00	B	5kg			
		22.00	SPT	50 (25 for 80mm/50 for 150mm)			
							Clay lens between 22.20m and 22.40m bgl.
		22.20 - 22.40	D	1kg			
		22.30		HVP=80			
		22.50 - 23.00	B	5kg			
							Recovered as wet between 23.00m and 24.00m bgl.
		23.50	SPT	50 (25 for 75mm/50 for 130mm)			
		24.50 - 25.00	B	5kg			
		25.00	SPT	50 (25 for 75mm/50 for 90mm)	25.16	25.83	
							Borehole terminated at 25.16m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	25.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)
17.00	20	16.00

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

ver. 0.5

Borehole No. **BH03**

Project Name:	Longcross Studios	**Co-ords:**	497852E - 165604N
Location:	Longcross	**Level (mAOD):**	54.13
Client:	HPF	**Dates:**	29/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		0.00 - 1.20	B	5kg			Brown gravelly SAND with occasional cobbles and rare root. Cobbles are angular of concrete and flint. Gravel is angular to subrounded of fine to coarse flint. TOPSOIL
					0.60	53.53	
		1.00	SPT	N=11 (2,3/3,2,3,3)			Soft to firm, greenish grey and orangish brown, very sandy, silty CLAY.
					1.20	52.93	
		2.00	SPT	N=21 (4,6/4,5,6,6)			Medium dense, green, brown and grey, slightly clayey SAND with occasional gravel. Gravel is angular to rounded of fine to coarse weak siltstone.
		2.50 - 3.00	B	5kg	1.90	52.23	Grey and white, SILT with occasional siltstone and orange clay lenses.
		3.00	SPT	N=22 (4,4/5,5,6,6)			
					3.30	50.83	Medium dense to very dense, orange and grey, slightly clayey, silty SAND with occasional gravel of weak siltstone. Sand is fine to coarse.
		4.00	SPT	N=38 (5,7/7,9,10,12)			
		4.50 - 5.00	B	5kg			
		5.00	SPT	N=50 (5,8/50 for 180mm)			
							Becoming grey from 5.80m bgl.
		6.00	SPT	N=40 (8,9/9,11,10,10)			
		6.50 - 7.00	B	5kg			
		7.00	SPT	50 (11,13/50 for 200mm)			*Becoming brownish grey from 7.00m bgl.*
		7.50 - 8.00	B	5kg			
		8.00	SPT	52 (10,16/52 for 180mm)			
		9.00	SPT	28 (25 for 100mm/28 for 160mm)			*Recovered as wet between 9.00m and 10.00m bgl.*
		9.50 - 10.00	B	5kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	21.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

ver. 0.5

Borehole No. **BH03**

Project Name:	Longcross Studios	**Co-ords:**	497852E - 165604N	**Project No.:**	200576
Location:	Longcross	**Level (mAOD):**	54.13	**Rev.:**	1.0
Client:	HPF	**Dates:**	29/06/2020	**Logged By:**	CB
		Weather:	Overcast	**Checked By:**	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		10.50 - 11.00 10.50	B SPT	5kg 50 (11,13/50 for 175mm)			Medium dense to very dense, orange and grey, slightly clayey, silty SAND with occasional gravel of weak siltstone. Sand is fine to coarse.
							Black grains (suspected mica) between 11.00m and 13.00m bgl.
		12.00	SPT	50 (13,14/50 for 170mm)			
		12.50 - 13.00	B	5kg			
		13.50 - 14.00 13.50	B SPT	5kg 50 (10,14/50 for 185mm)			
		14.50 - 15.00	B	5kg			
		15.00	SPT	50 (25 for 125mm/50 for 165mm)	15.00	39.13	Very dense, blackish grey, fine to coarse SAND.
		15.50 - 16.00	B	5kg			
		16.50 - 17.00 16.50	B SPT	5kg 50 (25 for 130mm/50 for 180mm)			
		18.00 - 18.60 18.00	B SPT	5kg 49 (25 for 90mm/49 for 155mm)			*Silty lens between 18.00m and 18.60m bgl.*
		19.50 - 20.00 19.50	B SPT	5kg 50 (25 for 85mm/50 for 150mm)			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details			Chiselling Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hrs)
GL	21.00	200			

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

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Borehole Log

ver. 0.5

Borehole No. **BH03**

Project Name:	Longcross Studios	**Co-ords:**	497852E - 165604N
Location:	Longcross	**Level (mAOD):**	54.13
Client:	HPF	**Dates:**	29/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
							Very dense, blackish grey, fine to coarse SAND.
		21.00	SPT	50 (25 for 80mm/50 for 150mm)	21.00	33.13	Very dense, greenish grey, brown and black, clayey, silty SAND, interbedded with siltstone, silt and clay.
		21.50 - 22.00	B	5kg			
		22.50 - 23.00	B	5kg			
		22.50	SPT	50 (25 for 80mm/50 for 95mm)			
		22.60		HVP=25			
		23.70 - 23.90	D	1kg			*Siltstone between 23.70m and 23.90m bgl.*
		23.80		HVP=90			*No longer clayey from 24.00m bgl.*
		24.50 - 24.70	D	1kg			
		25.50 - 26.00	B	5kg			
		25.50		HVP=25			
		25.50	SPT	50 (25 for 75mm/50 for 140mm)			
		26.50 - 27.00	B	5kg			
		26.50		HVP=20			
		27.00 - 27.38	D	1kg			
		27.00	SPT	50 (25 for 75mm/50 for 95mm)			
		28.50	D	1kg			
		28.50	SPT	50 (25 for 70mm/50 for 100mm)			
		29.00	D	1kg			
		29.50	D	1kg			
		30.00	D	1kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	21.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH03**

Project Name:	Longcross Studios	**Co-ords:**	497852E - 165604N
Location:	Longcross	**Level (mAOD):**	54.13
Client:	HPF	**Dates:**	29/06/2020
		Weather:	Overcast

Project No.:	200576	
Rev.:	1.0	
Logged By:	CB	
Checked By:	AJ	

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		30.00	SPT	50 (25 for 60mm/50 for 90mm)	30.15	23.98	Very dense, greenish grey, brown and black, clayey, silty SAND, interbedded with siltstone, silt and clay.
							Borehole terminated at 30.15m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	21.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH04**

Sheet 1 of 3

Project Name:	Longcross Studios	**Co-ords:**	497932E - 165523N
Location:	Longcross	**Level (mAOD):**	50.15
Client:	HPF	**Dates:**	28/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
							CONCRETE
		0.50 - 0.60	B	5kg	0.50	49.65	Medium dense, grey and orange silty SAND. Sand is fine to medium.
		1.20 - 1.65 1.20	D SPT	1kg N=32 (6,6/7,8,8,9)			
		1.50 - 1.60	B	5kg			*Slightly clayey from 1.50m bgl.*
		2.00	SPT	N=24 (3,4/5,6,6,7)	2.00	48.15	Soft to firm, slightly gravelly, sandy, silty CLAY. Gravel is angular of fine to coarse sandstone.
		2.20 2.30	D	1kg HVP=44	2.40	47.75	Medium dense to dense, light brown mottled orange, slightly silty SAND. Sand is fine.
							Recovered as wet from 2.40m bgl.
		2.80	D	1kg			
		3.00	SPT	N=29 (5,6/6,7,8,8)			
		3.50 - 4.00	B	5kg			
	▼	4.00	SPT	N=35 (6,7/8,8,9,10)	4.20	45.95	Dense, brown, coarse SAND with weak siltstone bands.
	▼	5.00	SPT	N=40 (7,8/9,9,10,12)			*Becoming silty from 5.00m bgl.*
	▽	5.20	D	1kg			*Weak siltstone between 5.00m and 5.30m bgl.*
					5.30	44.85	Dense, orange and light brown mottled, fine to coarse SAND with occasional gravel. Gravel is angular of fine to coarse weak sandstone.
		5.80	D	1kg			
		6.00	SPT	N=39 (6,8/8,9,10,12)	6.00	44.15	Dense to very dense, light brown slightly silty, clayey SAND. Sand is fine to coarse.
							Recovered as wet from 6.00m bgl.
		6.60	D	1kg			
		7.00	SPT	N=44 (8,9/9,10,12,13)			*No longer wet from 7.00m bgl.*
		7.50 - 8.00	B	5kg			
		8.00 - 8.45 8.00	D SPT	1kg N=40 (7,8/9,9,10,12)			
		9.00 - 9.45 9.00	D SPT	1kg N=46 (7,8/15,9,10,12)			
					10.00	40.15	

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
5.00	20	4.80
14.50	20	3.80

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH04**

Project Name:	Longcross Studios	**Co-ords:**	497932E - 165523N
Location:	Longcross	**Level (mAOD):**	50.15
Client:	HPF	**Dates:**	28/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		10.00	SPT	N=50 (7,8/50 for 290mm)			Very dense, light brown and slightly greenish grey, slightly silty, clayey SAND. Sand is fine to coarse.
		11.50 - 12.00	B	5kg			
		11.50	SPT	N=50 (8,9/50 for 250mm)			
		13.00	SPT	N=50 (7,11/50 for 225mm)			
		13.50 - 14.00	B	5kg			
	▽	14.50 - 15.00	B	5kg			
		14.50	SPT	50 (9,11/50 for 200mm)			
							Silty lenses between 15.00m and 15.70m bgl.
							Recovered as wet between 15.00m and 16.00m bgl.
					15.70	34.45	
		16.00	SPT	50 (25 for 140mm/50 for 170mm)			Very dense, greenish grey, brown and black, silty SAND, interbedded with siltstone, silt and clay.
		16.20	D	1kg			
		16.50 - 17.00	B	5kg			
		17.50 - 18.00	B	5kg			
		17.50	SPT	50 (25 for 100mm/50 for 165mm)			
		19.00	SPT	50 (25 for 80mm/50 for 100mm)			
		19.50 - 20.00	B	5kg			
		19.80	D	1kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
5.00	20	4.80
14.50	20	3.80

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH04**

Project Name:	Longcross Studios	**Co-ords:**	497932E - 165523N
Location:	Longcross	**Level (mAOD):**	50.15
Client:	HPF	**Dates:**	28/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, greenish grey, brown and black, silty SAND, interbedded with siltstone, silt and clay.
		20.50	SPT	50 (25 for 80mm/50 for 130mm)			
		21.50 - 22.00	B	5kg			*Recovered as wet between 21.50m and 21.60m bgl.*
		22.00	SPT	50 (25 for 75mm/50 for 90mm)			
		22.50	D	1kg			
		23.30	D	1kg			
		23.50	SPT	50 (25 for 60mm/50 for 80mm)			
		23.60 - 23.70	D	1kg			*Recovered as wet between 24.00m and 25.00m bgl.*
		24.50 - 24.60	D	1kg			
		24.60 - 25.00	B	5kg			
		25.00	SPT	50 (25 for 75mm/50 for 95mm)	25.17	24.98	Borehole terminated at 25.17m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
5.00	20	4.80
14.50	20	3.80

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH05**

Project Name:	Longcross Studios	**Co-ords:**	497864E - 165532N
Location:	Longcross	**Level (mAOD):**	51.35
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
							Brown, gravelly SAND with occasional cobbles and rare roots. Cobbles are of concrete and flint. Gravel is angular to subrounded of fine to coarse flint. TOPSOIL FILL
		0.70	D	1kg	0.60	50.75	Medium dense, light grey fine to coarse SAND.
		1.20 - 1.65	B	5kg	1.20	50.15	Medium dense to dense, thinly laminated, grey and orange, sandy SILT with occasional gravel. Gravel is angular of fine to coarse very weak siltstone.
		1.20	SPT	N=20 (3,4/4,5,5,6)			
		1.50 - 1.60	D	1kg			
		2.00 - 2.45	D	1kg			
		2.00	SPT	N=21 (3,4/4,5,6,6)			
		2.50 - 3.00	B	5kg			
		3.00 - 3.45	D	1kg			
		3.00	SPT	N=29 (5,5/6,7,8,8)			
		3.40 - 3.50	D	1kg			
		3.50 - 4.00	B	5kg			
		4.00 - 4.45	D	1kg			
		4.00	SPT	N=35 (5,6/8,8,9,10)			
		4.50 - 5.00	B	5kg			
		5.00 - 5.45	D	1kg	5.00	46.35	Dense to very dense, orange and brown slightly silty SAND. Sand is fine to coarse.
		5.00	SPT	N=36 (5,6/7,8,10,11)			
		5.60 - 5.70	D	1kg			
		6.00	SPT	N=35 (5,7/8,8,9,10)			
		7.00	SPT	N=43 (7,8/8,10,12,13)			
		7.50 - 8.00	B	5kg			
		8.00	SPT	N=45 (10,11/45 for 280mm)			
		9.00	SPT	N=50 (8,9/50 for 250mm)	9.00	42.35	Very dense, grey and orange mottled, slightly sandy SILT with occasional gravel. Gravel is angular of coarse very weak siltstone.
		9.50 - 9.60	D	1kg			
		9.60 - 10.00	B	5kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
21.00	20	17.00

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH05**

Project Name:	Longcross Studios	**Co-ords:**	497864E - 165532N
Location:	Longcross	**Level (mAOD):**	51.35
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
		10.00	SPT	N=50 (9,10/50 for 225mm)			Very dense, grey and orange mottled, slightly sandy SILT with occasional gravel. Gravel is angular of coarse very weak siltstone.
		10.50 - 10.70	D	1kg			
							Becoming brown and orange mottled from 11.00m bgl.
							Recovered as wet between 11.00m and 14.00m bgl.
		11.50	SPT	50 (8,11/50 for 180mm)			
		12.50 - 13.00	B	5kg			
		13.00 - 13.50	B	5kg			
		13.00	SPT	N=50 (7,10/50 for 225mm)			
					14.10	37.25	Very dense grey and black SAND. Sand is fine to coarse. Occasional black fragments of suspected lignite and mica.
		14.50 - 15.00	B	5kg			
		14.50	SPT	50 (10,13/50 for 170mm)			
							Recovered as wet between 15.00m to 16.00m bgl.
		16.00	SPT	50 (11,13/50 for 190mm)			
		17.50 - 18.00	D	1kg			
		17.50	SPT	50 (25 for 140mm/50 for 165mm)			
		19.00 - 19.20	B	5kg			
		19.00	SPT	50 (25 for 90mm/50 for 180mm)			*Black organic band 19.05 to 19.10m bgl.*
							Occasional silty bands between 19.20m and 19.30m bgl.
		19.50 - 20.00	B	5kg			
		20.00 - 20.40	B	5kg	20.00	31.35	

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
21.00	20	17.00

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH05**

Project Name:	Longcross Studios	**Co-ords:**	497864E - 165532N
Location:	Longcross	**Level (mAOD):**	51.35
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
							Very dense, greenish grey, brown and black, silty SAND interbedded with siltstone, silt and clay.
							Occasional silty bands between 20.00m and 20.40m bgl.
		20.50	SPT	50 (25 for 90mm/50 for 160mm)			
							Siltstone band between 20.80m and 21.00m bgl.
		21.50 - 21.70	B	5kg			
		21.80 - 21.90	D	1kg			
		22.00	SPT	50 (25 for 80mm/50 for 150mm)			*Clay band between 22.00m and 22.20m bgl.*
		23.50 - 24.00	B	5kg			
		23.50	SPT	50 (25 for 95mm/50 for 140mm)			
		24.00 - 24.10	D	1kg			
		24.50 - 24.60	D	1kg			
		25.00 - 25.10	D	1kg			
		25.00	SPT	50 (25 for 80mm/50 for 100mm)			
		25.50 - 25.60	D	1kg			
		26.00 - 26.10	D	1kg			
		26.50 - 26.60	D	1kg			
		26.50	SPT	50 (25 for 78mm/50 for 90mm)			
		27.00 - 27.10	D	1kg			
		27.50 - 27.60	D	1kg			
		28.00 - 28.10	D	1kg			
		28.00	SPT	50 (25 for 65mm/50 for 90mm)			
		28.50 - 28.60	D	1kg			
		29.00 - 29.10	D	1kg			
		29.50 - 29.60	D	1kg			
		29.50	SPT	50 (25 for 50mm/50 for 85mm)			
		30.00 - 30.10	D	1kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
21.00	20	17.00

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH05**

Project Name:	Longcross Studios	**Co-ords:**	497864E - 165532N
Location:	Longcross	**Level (mAOD):**	51.35
Client:	HPF	**Dates:**	30/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, greenish grey, brown and black, silty SAND interbedded with siltstone, silt and clay.
		30.50 - 30.60	D	1kg			
		31.00 - 31.10	D	1kg			
		31.00	SPT	50 (25 for 30mm/50 for 80mm)			
		31.50 - 31.60	D	1kg			
		32.00 - 32.10	D	1kg			
		32.50 - 32.60	D	1kg			
		32.50	SPT	50 (25 for 35mm/50 for 80mm)			
		33.00 - 33.10	D	1kg			
		33.50 - 33.60	D	1kg			
		34.00 - 34.10	D	1kg			
		34.50 - 34.60	D	1kg			
		35.00	SPT	50 (25 for 20mm/50 for 75mm)	35.10	16.25	Borehole terminated at 35.10m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)
21.00	20	17.00

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No.
BH06
Sheet 1 of 4

Project Name:	Longcross Studios	**Co-ords:**	497845E - 165456N
Location:	Longcross	**Level (mAOD):**	57.29
Client:	HPF	**Dates:**	24/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		0.50	B	5kg			Black, gravelly SAND with occasional roots and rare cobbles. Cobbles are angular of flint. Gravel is angular to subangular of fine to coarse flint. sub-rounded flint. MADE GROUND
		1.20	SPT	N=7 (1,2/2,2,1,2)	1.20	56.09	Grey and black sandy GRAVEL. Gravel is angular of fine to coarse brick, clinker, ash, and flint. MADE GROUND
		1.50 - 2.00	B	5kg	1.50	55.79	Medium dense, brown and orange mottled, sandy GRAVEL. Gravel is subangular to angular of fine to coarse flint.
		2.00	SPT	N=23 (5,3/3,4,5,11)			*Recovered as wet and greenish brown between 2.00m and 3.00m bgl.*
		2.80		HVP=40	2.80	54.49	Firm, green, brown and orange, sandy, silty CLAY.
		3.00	SPT	N=23 (3,4/5,6,5,7)			*Recovered as wet between 3.00m and 3.50m bgl.*
		3.50 - 4.00	U				
		4.00	SPT	N=50 (2,5/50 for 240mm)			*Clay strength increasing with depth, hand vane cannot penetrate from 4.00m bgl.*
		4.50 - 5.00	U				
		5.00	SPT	50 (3,6/50 for 185mm)	5.00	52.29	Dense to very dense, orange, light brown, grey and white, sandy, clayey SILT, with occasional gravel. Gravel is coarse of weak siltstone.
		5.40 - 6.00	B	5kg			
		6.00	SPT	N=35 (4,6/8,8,9,10)			*Becoming greyish white between 6.00m and 7.00m bgl.*
		6.50 - 6.70	D	1kg			
		7.00	SPT	50 (9,16/50 for 105mm)			*Recovered as wet and orange mottling between 7.00m and 8.00m bgl.*
		7.50 - 8.00	B	5kg			
		8.00	SPT	50 (8,11/50 for 200mm)			
		8.50 - 8.70	D	1kg			
		9.00	SPT	50 (5,14/50 for 155mm)	9.00	48.29	Very dense, slightly clayey, silty SAND. Sand is fine to coarse.
		9.50 - 10.00	B	5kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

ver. 0.5

Borehole No. **BH06**

Project Name:	Longcross Studios	**Co-ords:**	497845E - 165456N
Location:	Longcross	**Level (mAOD):**	57.29
Client:	HPF	**Dates:**	24/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
		10.50	SPT	50 (7,15/50 for 160mm)			Very dense, slightly clayey, silty SAND. Sand is fine to coarse.
							Orange mottling between 11.00m and 12.00m bgl.
		11.50 - 12.00	B	5kg			
		12.00	SPT	50 (25 for 100mm/50 for 95mm)	12.00	45.29	Very dense, grey, silty SAND. Sand is fine to coarse with occasional black grains (suspected mica).
							Becoming orange brown between 12.50m and 13.00m bgl.
		13.50 - 14.00	B	5kg			
		13.50	SPT	50 (25 for 125mm/50 for 190mm)			
		15.00	SPT	50 (30 for 135mm/50 for 150mm)			
		16.50 - 17.00	B	5kg			
		16.50	SPT	50 (25 for 115mm/50 for 155mm)			
		18.00	SPT	50 (12,13/50 for 160mm)			
		18.50 - 18.60	D	1kg			
		18.60 - 19.00	B	5kg	18.60	38.69	Very dense, greyish black coarse SAND with occasional gravel. Gravel is coarse of lignite and black grains (suspected mica).
		19.50	SPT	50 (27 for 100mm/50 for 155mm)			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH06**

Project Name:	Longcross Studios	**Co-ords:**	497845E - 165456N
Location:	Longcross	**Level (mAOD):**	57.29
Client:	HPF	**Dates:**	24/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		20.50 - 21.00	B	5kg			Very dense, greyish black coarse SAND with occasional gravel. Gravel is coarse of lignite and black grains (suspected mica).
		21.00	SPT	50 (25 for 95mm/50 for 160mm)			
		21.50 - 21.60	D	1kg			*Dark brown organic matter between 21.50m and 21.60m bgl.*
							Recovered as wet between 22.00m and 23.00m bgl.
		22.50 - 23.00	B	5kg			
		22.50	SPT	50 (25 for 85mm/50 for 160mm)			
		23.50 - 24.00	B	5kg			
		24.00	SPT	50 (25 for 90mm/50 for 155mm)			
		24.50 - 24.70	D	1kg			
		25.50	SPT	50 (25 for 80mm/50 for 150mm)	25.60	31.69	
		25.70 - 26.00	D	1kg			Very dense, grey and green, gravelly SAND with occasional white shell fragments. Gravel is angular of fine to medium mixed lithologies. Sand is fine to coarse.
		26.50 - 27.00	B	5kg			
		27.00	SPT	50 (25 for 90mm/50 for 125mm)			
		27.50 - 27.70	D	1kg			
		28.50 - 29.00	B	5kg			
		28.50	SPT	50 (25 for 80mm/50 for 155mm)			
		29.40 - 29.50	D	1kg			
		29.40 - 29.50	D	1kg			
		29.50 - 30.00	B	5kg			
		30.00 - 30.22	D	1kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

SPT Energy Ratio: 74%

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Borehole No. **BH06**

Project Name:	Longcross Studios	**Co-ords:**	497845E - 165456N
Location:	Longcross	**Level (mAOD):**	57.29
Client:	HPF	**Dates:**	24/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
		30.00	SPT	50 (25 for 80mm/50 for 150mm)	30.23	27.06	Very dense, grey and green, gravelly SAND with occasional white shell fragments. Gravel is angular of fine to medium mixed lithologies. Sand is fine to coarse.
							Borehole terminated at 30.23m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 74%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	24.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole No. **BH07**

Project Name:	Longcross Studios	**Co-ords:**	497862E - 165423N
Location:	Longcross	**Level (mAOD):**	50.18
Client:	HPF	**Dates:**	21/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
							Medium dense, yellowish orange, green SAND.
					1.00	49.18	
		1.20	SPT	N=25 (5,7/7,6,6,6)			Firm, green and light brown, sandy CLAY.
					1.30	48.88	
		1.60 - 1.70	D	1kg			Medium dense to dense, grey, orange and white, sandy, clayey SILT with occasional siltstone lenses.
		1.70 - 1.90	B	5kg			
		2.00	SPT	N=26 (5,6/6,7,6,7)			
		2.40 - 2.50	D	1kg			
		2.50 - 12.60	D	1kg			
		3.00	SPT	N=23 (6,6/5,5,6,7)			
		3.50 - 4.00	B	5kg			
		4.00	SPT	N=29 (7,6/7,8,8,6)			
		4.40 - 4.50	D	1kg			
		5.00	SPT	N=41 (9,8/9,10,10,12)			
		5.40 - 5.50	D	1kg			
		5.50 - 6.00	B	5kg			
		6.00	SPT	N=46 (10,12/12,11,11,12)	6.00	44.18	Dense to very dense, light brown slightly silty SAND. Sand is fine to coarse.
		6.70 - 6.80	D	1kg			
		7.00	SPT	N=53 (13,12/15,13,13,12)			
		7.40 - 7.80	B	5kg			
							Recovered as wet between 7.70m and 10.00m bgl.
		8.00	SPT	N=30 (5,6/8,7,7,8)			
		8.30 - 8.40	D	1kg			
		8.70 - 8.80	D	1kg			
		9.00	SPT	N=46 (10,10/11,12,12,11)			
							Becoming siltier from 9.00m bgl.
		9.50 - 10.00	B	5kg			

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	20.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH07**

Project Name:	Longcross Studios	**Co-ords:**	497862E - 165423N
Location:	Longcross	**Level (mAOD):**	50.18
Client:	HPF	**Dates:**	21/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (mbgl)	Level (mAOD)	Stratum Description
		10.00	SPT	N=48 (12,12/12,11,13 ,12)			Dense to very dense, light brown slightly silty SAND. Sand is fine to coarse.
		10.50 - 11.00	B	5kg	10.50	39.68	Very dense, blackish grey coarse SAND.
		11.00 - 11.20	D	1kg			*Silty lens between 11.00 and 11.50m.*
		11.50	SPT	50 (2,17/50 for 90mm)			
		11.80 - 12.00	D	1kg			
		12.60 - 13.00	B	5kg			
		13.00	SPT	50 (20,5/50 for 80mm)			
		13.50	D	1kg			
		14.00 - 14.20	D	1kg			
		14.50 - 14.70	D	1kg			
		14.50	SPT	50 (25,0/50 for 72mm)			
		15.00 - 15.20	D	1kg			
		16.00	SPT	50 (19,6/50 for 78mm)			
		16.50 - 16.70	D	1kg			
		16.70 - 16.80	D	1kg			
		17.00 - 17.20	D	1kg	17.00	33.18	Very dense, greenish grey, brown and black, silty SAND, interbedded with siltstone, silt and clay with shiny grains throughout (suspected selenite).
		18.00 - 18.20	D	1kg			*Clay lenses between 18.00m and 18.50m.*
		19.00 - 19.50	B	5kg			
		19.00	SPT	50 (25 for 90mm/50 for 100mm)			
		19.80 - 20.20	D	1kg			*Becoming silty from 19.80m bgl.*

Continued on next sheet

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details

Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	20.00	200

Water Strike

Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details

Depth Top (m)	Depth Base (m)	Duration (hrs)

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Borehole Log

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Borehole No. **BH07**

Project Name:	Longcross Studios	**Co-ords:**	497862E - 165423N
Location:	Longcross	**Level (mAOD):**	50.18
Client:	HPF	**Dates:**	21/06/2020
		Weather:	Overcast

Project No.:	200576
Rev.:	1.0
Logged By:	CB
Checked By:	AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
		Depth (m)	Type	Results			
							Very dense, greenish grey, brown and black, silty SAND, interbedded with siltstone, silt and clay with shiny grains throughout (suspected selenite).
		20.50	SPT	50 (25 for 80mm/50 for 90mm)			
							Recovered as wet between 20.50m and 21.50m bgl.
		21.00 - 21.50	D	1kg			
		22.00 - 22.50	D	1kg			
		22.00	SPT	50 (25 for 75mm/50 for 85mm)			
							Recovered as wet between 22.50m and 23.50m bgl.
		23.00 - 23.20	D	1kg			
		23.50	SPT	50 (25 for 50mm/50 for 75mm)			
		24.00 - 24.50	D	1kg			
		25.00 - 25.10	D	1kg			
		25.00 - 25.50	D	1kg	25.12	25.06	
		25.00	SPT	50 (25 for 45mm/50 for 75mm)			
							Borehole terminated at 25.12m.

Remarks:

Borehole terminated at target depth.

SPT Energy Ratio: 81%

Casing Details		
Depth Top (m)	Depth Base (m)	Diameter (mm)
GL	20.00	200

Water Strike		
Depth Strike (m)	Time Elapsed (min)	Water Level (m)

Chiselling Details		
Depth Top (m)	Depth Base (m)	Duration (hrs)

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Window Sample Log

ver. 2.0

Window Sample No.
WS01
Sheet 1 of 2

Project Name:	Longcross Studios	Co-ords:	497887E - 165423N
Location:	Longcross	Level (m AOD):	50.23
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
					0.15	50.08	Dark brown, gravelly SAND with frequent roots. Gravels are fine to medium, subangular to subrounded brick. Sand is medium to coarse. TOPSOIL
							Orangish brown, sandy GRAVEL with rare cobbles. Cobbles are angular of brick. Gravel is medium to coarse of brick. Sand is medium to coarse. MADE GROUND
		0.50	ES		0.50	49.73	
					0.60	49.63	Dark black, gravelly SAND. Gravel is fine to medium, subangular to subrounded brick. Sand is medium to coarse. MADE GROUND
							Medium dense, orangish brown, silty SAND. Sand is medium. SUSPECTED REWORKED NATURAL DEPOSITS
		1.00	ES				
		1.00	SPT	N=12 (4,3/2,4,3,3)			
					1.50	48.73	Green and light brown sandy CLAY with rare gravel. Gravel is angular to subangular of fine to medium flint.
					1.70	48.53	Medium dense, pale yellowish brown, very silty, locally clayey, fine to medium SAND with rare gravel. Gravel is fine to medium flint. *Becoming mottled orange from 1.80m bgl.*
		2.00	ES		2.00	48.23	Medium dense, light brown and orange mottled, silty SAND. Sand is fine.
		2.00	SPT	N=11 (2,3/2,3,3,3)			
		3.00	ES				
		3.00	SPT	N=12 (4,2/2,3,4,3)			
		3.50	ES				
		4.00	SPT	N=10 (2,1/2,2,3,3)			
		4.50	ES				
		5.00	SPT	N=26 (3,4/6,5,7,8)			

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS01
Sheet 2 of 2

Project Name:	Longcross Studios	Co-ords:	497887E - 165423N
Location:	Longcross	Level (m AOD):	50.23
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							Medium dense, light brown and orange mottled, silty SAND. Sand is fine.
					5.45	44.78	Window Sample terminated at 5.45m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS02
Sheet 1 of 2

Project Name:	Longcross Studios	Co-ords:	497988E - 165495N
Location:	Longcross	Level (m AOD):	48.61
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
					0.15	48.46	Dark brown silty SAND with frequent roots. TOPSOIL
							Dark brownish grey, gravelly SAND with rare cobbles. Cobbles are angular of brick. Gravel is medium to coarse, angular to sub angular of brick, coal and clinker. Sand is medium to coarse. Roots present. MADE GROUND
		0.50	ES		0.50	48.11	*Becoming ashy from 0.50m bgl.*
					0.60	48.01	Dark grey to black, gravelly SAND. Gravels are subangular to subrounded of fine to medium, brick. Sand is medium to coarse. MADE GROUND
							Very dark grey, sandy CLAY with rare gravel. Gravel is subrounded to rounded of medium to coarse flint and rare brick gravels. Slight organic odour. SUSPECTED REWORKED NATURAL DEPOSITS
		1.00	SPT	N=7 (3,2/2,2,1,2)			
		1.40	ES				
					1.50	47.11	Medium dense to dense, green and grey mottled, silty, locally clayey, fine to medium SAND with rare fine to medium flint gravel.
							Clayey from 1.80m to 2.00m bgl.
		2.00	SPT	N=18 (3,3/4,4,5,5)			
		3.00	ES				*Less silty from 3.00m bgl.*
		3.00	SPT	N=25 (3,5/6,5,7,7)			
		3.50	ES				
		4.00	SPT	N=41 (3,4/8,9,12,12)			
		4.50	ES				
		5.00	SPT	N=32 (4,5/6,7,9,10)			

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS02
Sheet 2 of 2

Project Name:	Longcross Studios	Co-ords:	497988E - 165495N
Location:	Longcross	Level (m AOD):	48.61
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							Medium dense to dense, green and grey mottled, silty, locally clayey, fine to medium SAND with rare fine to medium flint gravel.
					5.45	43.16	Window Sample terminated at 5.45m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS03
Sheet 1 of 1

Project Name:	Longcross Studios	Co-ords:	497962E - 165578N
Location:	Longcross	Level (m AOD):	48.82
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							Dark grey, sandy, silty GRAVEL. Gravel is subangular to subrounded of fine to coarse tarmacadam, brick and flint. Sand is fine. MADE GROUND
					0.20	48.62	
					0.25	48.57	Brown, orange, grey and blue mottled silty clayey SAND. Sand is fine.
					0.40	48.42	Light brown and orange mottled, clayey, silty SAND. Sand is fine.
		1.00	SPT	N=21 (2,4/4,4,5,8)			Cream and light orange, silty SAND. Sand is fine.
					1.10	47.72	
					1.25	47.57	Medium dense, light brown and orange mottled, clayey, silty SAND. Sand is fine.
		2.00	SPT	N=71 (6,10/13,20,15,23)			Very dense, cream to light orange, silty SAND. Sand is fine.
					2.45	46.37	Window Sample terminated at 2.45m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at 2.45m bgl due to refusal.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			0.00	1.00	87
				1.00	2.00	77

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Window Sample Log

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Window Sample No.
WS04
Sheet 1 of 1

Project Name:	Longcross Studios	Co-ords:	497944E - 165582N
Location:	Longcross	Level (m AOD):	49.29
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							MACADAM MADE GROUND
					0.20	49.09	
		0.30	ES		0.25	49.04	Dark brown, gravelly SAND. SUB-BASE
							Orange sandy GRAVEL with occasional coal fragments and slightly ashy. Gravels are subangular of coarse to cobble sized brick. Sand is medium to coarse. MADE GROUND
					0.50	48.79	Medium dense brown, orange, grey and blue mottled clayey, silty SAND. Sand is fine.
		1.00	SPT	N=15 (3,3/3,4,4,4)			
					1.20	48.09	Dense to very dense, orange SAND. Sand is fine.
		1.50	ES				
		2.00	SPT	N=32 (3,4/6,6,8,12)			
							Becoming more orange with depth from 2.20m bgl.
		2.50	ES				
		2.80	SPT	N=65 (6,11/12,13,18,22)			
					3.25	46.04	Window Sample terminated at 3.25m.

1
2
3
4
5

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at 3.25m bgl due to refusal.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77

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Window Sample Log

ver. 2.0

Window Sample No.
WS05
Sheet 1 of 1

Project Name:	Longcross Studios	Co-ords:	497874E - 165607N
Location:	Longcross	Level (m AOD):	52.82
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
					0.15	52.67	CONCRETE slab. MADE GROUND
					0.30	52.52	Grey, gravelly SAND. SUB-BASE
					0.50	52.32	Orange COBBLES. Cobbles are subangular to subrounded of red brick. MADE GROUND
		1.00	SPT	N=17 (3,3/3,4,4,6)			Medium dense, light yellow, silty SAND with occasional gravel. Gravel is subangular to subrounded of fine to medium flint. Sand is fine.
					1.20	51.62	Medium dense, light brown, silty SAND. Sand is fine.
		2.00	SPT	N=15 (2,3/4,3,4,4)			
					2.10	50.72	Medium dense to dense, light orangish brown, silty SAND. Sand is fine.
		3.00	SPT	N=30 (6,6/6,7,7,10)			
					3.50	49.32	Dense to very dense, light grey and cream silty SAND. Sand is fine.
		4.00	SPT	N=50 (5,9/10,10,15, 15)			
					4.60	48.22	Window Sample terminated at 4.60m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at 4.60m bgl due to refusal.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			0.00	1.00	87
				1.00	2.00	77
				2.00	3.00	67
				3.00	4.00	57
				4.00	5.00	47

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Window Sample No.
WS06
Sheet 1 of 2

Project Name:	Longcross Studios	Co-ords:	497869E - 165606N
Location:	Longcross	Level (m AOD):	52.78
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
					0.15	52.63	CONCRETE slab. MADE GROUND
					0.30	52.48	Grey, gravelly SAND. SUB-BASE
					0.90	51.88	Light grey, sandy GRAVEL. Gravel is subangular to subrounded of concrete and flint. Sand is fine. MADE GROUND
		1.00	SPT	N=16 (2,2/3,3,4,6)	1.40	51.38	Medium dense, light greyish green clayey, silty SAND. Sand is fine.
		2.00	SPT	N=17 (3,3/4,4,4,5)	2.10	50.68	Medium dense, light grey, silty SAND. Sand is fine.
		3.00	SPT	N=26 (2,4/6,6,6,8)	3.50	49.28	Medium dense to dense, light orangish brown, silty SAND. Sand is fine.
		4.00	SPT	N=35 (3,4/6,9,9,11)	5.00	47.78	Dense, light grey and cream, silty SAND. Sand is fine.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			0.00	1.00	87
				1.00	2.00	77
				2.00	3.00	67
				3.00	4.00	57
				4.00	5.00	47

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Window Sample Log

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Window Sample No.
WS06
Sheet 2 of 2

Project Name:	Longcross Studios	Co-ords:	497869E - 165606N
Location:	Longcross	Level (m AOD):	52.78
Client:	HPF	Date:	22/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)		Stratum Description
		Depth(m)	Type	Results				
		5.00	SPT	N=41 (3,6/7,7,14,13)				Window Sample terminated at 5.45m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			0.00	1.00	87
				1.00	2.00	77
				2.00	3.00	67
				3.00	4.00	57
				4.00	5.00	47

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Window Sample Log

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Window Sample No.
WS07
Sheet 1 of 2

Project Name:	Longcross Studios	Co-ords:	497836E - 165490N
Location:	Longcross	Level (m AOD):	57.78
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
		0.50	ES				Dark brown gravelly SAND with frequent roots and rare cobbles. Gravel is subangular to subrounded of fine to medium brick, concrete, clinker and flint. Sand is fine to medium. Matrix is ashy. TOPSOIL FILL
		1.00	ES				
		1.00	SPT	N=5 (1,2/2,1,1,1)			
					1.30	56.48	Loose to medium dense, brown and orange mottled, sandy GRAVEL of subangular to angular, fine to coarse, flint.
		1.50	ES		1.50	56.28	Medium dense, green, brown and orange, silty, locally clayey, SAND with rare gravel. Gravel is angular to subangular of fine to medium flint.
							Very silty from 1.70m to 1.80m bgl.
		2.00	SPT	N=26 (2,7/8,7,5,6)			*Slightly damp from 2.00m bgl.*
		2.50	ES				
							Frequent gravel from 2.90m to 3.00m bgl.
		3.00	SPT	N=10 (2,4/3,2,3,2)	3.00	54.78	Soft to firm, green, brown and orange, sandy, silty CLAY. Sand is fine to medium.
		3.50	ES				
		4.00	SPT	N=17 (2,2/3,4,5,5)			
		4.50	ES		4.50	53.28	Medium dense, greenish grey, slightly clayey, silty SAND. Sand is medium to coarse.
		5.00	SPT	N=24 (4,4/5,5,7,7)	5.00	52.78	

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS07
Sheet 2 of 2

Project Name:	Longcross Studios	Co-ords:	497836E - 165490N
Location:	Longcross	Level (m AOD):	57.78
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							Window Sample terminated at 5.45m.

6
7
8
9
10

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS08
Sheet 1 of 1

Project Name:	Longcross Studios	Co-ords:	497786E - 165690N
Location:	Longcross	Level (m AOD):	56.68
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
		0.50	ES				Dark brown gravelly SAND with frequent roots and rare cobbles. Cobbles are subangular to subrounded of mixed lithologies. Gravel is subangular to subrounded of fine to medium brick, concrete and flint. Sand is fine to medium. TOPSOIL FILL
		1.00	SPT	N=9 (2,1/2,2,2,3)			
					1.20	55.48	Firm to stiff, green, brown and orange, sandy, silty CLAY. Sand is fine to medium.
		1.50	ES				
		2.00	SPT	N=10 (1,2/2,2,3,3)			
		2.50	ES				
		3.00	SPT	N=11 (2,2/2,2,3,4)	3.00	53.68	Medium dense, reddish brown and grey SILT with partings of very light grey fine sand.
		3.50	ES				
		4.00	SPT	N=18 (2,3/3,4,5,6)			
					4.20	52.48	Medium dense, very light grey, silty SAND.
		4.50	ES				
					5.00	51.68	Window Sample terminated at 5.00m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS09
Sheet 1 of 2

Project Name:	Longcross Studios	Co-ords:	497917E - 165471N
Location:	Longcross	Level (m AOD):	51.46
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							CONCRETE with steel rebar. MADE GROUND
					0.20	51.26	Orangish brown, gravelly SAND. SUB-BASE
					0.40	51.06	Medium dense, orangish brown, silty, SAND. Sand is fine to coarse.
		0.50	ES				
		1.00	SPT	N=20 (2,3/4,5,5,6)			
					1.40	50.06	Medium dense, thinly laminated, grey and orange, sandy SILT. Sand is fine.
		1.50	ES				
		2.00	SPT	N=25 (3,7/8,7,5,5)			
							Becoming very sandy from 2.10m bgl.
					2.20	49.26	Medium dense, orange and brown mottled, silty SAND. Sand is medium to coarse.
		2.50	ES				
		3.00	SPT	N=14 (4,3/3,4,3,4)			
		3.50	ES				
		4.00	SPT	N=15 (3,3/3,4,3,5)			
		4.50	ES				
		5.00	SPT	N=26 (3,5/6,6,7,7)			

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS09
Sheet 2 of 2

Project Name:	Longcross Studios	Co-ords:	497917E - 165471N
Location:	Longcross	Level (m AOD):	51.46
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing: Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							Medium dense, orange and brown mottled, silty SAND. Sand is medium to coarse.
					5.45	46.01	Window Sample terminated at 5.45m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

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Window Sample Log

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Window Sample No.
WS10
Sheet 1 of 1

Project Name:	Longcross Studios	Co-ords:	497900E - 165557N
Location:	Longcross	Level (m AOD):	51.45
Client:	HPF	Date:	23/06/2020
		Weather:	Hot and sunny.

Project No.: 200576
Logged By: CB
Checked By: AJ

Well / Backfill	Water Strikes	Sample and In Situ Testing Depth(m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
							CONCRETE with steel rebar. MADE GROUND
					0.20	51.25	Orangish brown, gravelly SAND. SUB-BASE
					0.45	51.00	Medium dense to very dense, grey mottled orange, silty SAND. Sand is fine to coarse.
		1.00 1.00	ES SPT	N=22 (3,5/5,5,6,6)			
							Becoming very silty from 1.30m bgl.
		2.00 2.00	ES SPT	N=27 (3,4/6,6,7,8)			
		3.00 3.00	ES SPT	N=30 (4,5/6,7,7,10)			
		4.00 4.00	ES SPT	N=35 (6,7/7,8,9,11)			
							Silt between 4.20m and 4.30m bgl.
		4.80	SPT	50 (3,20/50 for 170mm)			
					5.00	46.45	Window Sample terminated at 5.00m.

Remarks:

Hand excavated pit to 1.20m bgl.

Window sample terminated at target depth.

Water Strike		Casing Details		Sample Sleeve Runs		
Depth Strike	Remarks	Depth Base	Diameter	Depth Top (m)	Depth Base (m)	Diameter (mm)
	Dry			1.00	2.00	87
				2.00	3.00	77
				3.00	4.00	67
				4.00	5.00	57

APPENDIX 5: TRIAL PIT LOGS AND CROSS SECTIONS

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Trial Pit Log

ver. 1.1

Trial Pit No. TR12

Sheet 1 of 1

Project Name:	Longcross Studios	**Level (mAOD):**	50.06	**Date:**	22/06/2020
Location:	Longcross	**Weather:**	Hot and sunny.		
Client:	HPF	**Co-ords:**	497920E - 165411N		

Project No. 200576

Logged By CB

Checked By AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
						Dark brown, black and grey sandy, silty GRAVEL with rare cobbles. Cobbles are angular of concrete. Gravel is subangular to subrounded of fine to coarse brick rubble, tarmacadam, wood, glass and tile. Sand is fine to coarse. MADE GROUND
				0.70	49.36	Greyish green, silty SAND. Sand is fine.
				0.80	49.26	Black, silty SAND. Sand fine. Possible organic odour.
				0.85	49.21	Light grey, silty SAND. Sand is fine.
				1.00	49.06	Trial Pit terminated at 1.00m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

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Trial Pit No. TR11

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.40	**Date:** 25/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By**
Client: HPF	**Co-ords:** 497919E - 165459N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.15	51.25	CONCRETE with steel rebar. MADE GROUND Light brown, grey and orange, clayey, silty SAND.
				0.97	50.43	Trial Pit terminated at 0.97m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

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Trial Pit No. TR10

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 54.78	**Date:** 24/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497864E - 165458N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.04	54.74	PAVING SLAB. MADE GROUND
				0.30	54.48	Light brown, orange and grey gravelly SAND. Gravels are coarse of subrounded to subrounded flint and concrete. Sand is fine. MADE GROUND
				0.50	54.28	CONCRETE. SUB-BASE
				0.80	53.98	Brown, grey and green, clayey, silty SAND. Sand is fine. Trial Pit terminated at 0.80m.

1
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4
5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR09

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.46	**Date:** 28/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497893E - 165557N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.25	51.21	CONCRETE with steel rebar. MADE GROUND
				0.35	51.11	Black, gravelly SAND. SUB-BASE
						Friable, thinly laminated, grey and orange, sandy SILT. Sand is fine.
	1.00	ES	5kg			
						Becoming slightly clayey with depth and occasional medium to coarse, subangular gravels of siltstone present from 1.50m bgl.
				1.90	49.56	
	2.00	ES	5kg			Medium dense, grey mottled orange, silty SAND. Sand is fine to coarse.
				2.50	48.96	Trial Pit terminated at 2.50m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR08B

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.46	**Date:** 28/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497929E - 165472N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.05	51.41	BRICK - edge of old building line. MADE GROUND Reinforced (5mm steel rebar) CONCRETE underlain by grey, GRAVEL (sub-base) and a black membrane.
				0.35	51.11	MADE GROUND Medium dense, light brown mottled orange, silty SAND. Sand is fine to medium.
				1.20	50.26	Trial Pit terminated at 1.20m.

1
2
3
4
5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR08A

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.46	**Date:** 28/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497929E - 165472N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.25	51.21	CONCRETE slab. MADE GROUND
				0.50	50.96	Reinforced (5mm steel rebar) CONCRETE underlain by grey, GRAVEL (sub-base) and a black membrane. MADE GROUND
▼	1.00	D	1kg			Medium dense, light brown mottled orange, silty SAND. Sand is fine to medium.
				1.20	50.26	Trial Pit terminated at 1.20m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
0.70	Water seepage at 0.70m bgl.

Stability:
Stable

Remarks:

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Trial Pit Log

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Trial Pit No. TR07

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 48.85	**Date:** 22/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497968E - 165544N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)		Stratum Description
	Depth (m)	Type	Results				
							Dark brown, grey and orange, sandy, silty GRAVEL. Gravel is subangular to subrounded of fine to coarse tarmacadam, brick, slate and flint. Sand is fine to coarse. MADE GROUND
				0.40	48.45		Light grey, green, brown and orange mottled, clayey, silty SAND. Sand is fine.
				0.70	48.15		Trial Pit terminated at 0.70m.

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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email: CharlieKnox@paragonbc.co.uk
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Trial Pit Log

ver. 1.1

Trial Pit No. TR06

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 50.20	**Date:** 24/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497865E - 165524N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
						CONCRETE sub-base. MADE GROUND
				0.30	49.90	
						Grey, brown and orange, sandy GRAVEL. Gravel is subangular to subrounded of fine to coarse, concrete and brick rubble. Sand is fine. MADE GROUND
				0.50	49.70	Light brownish orange, silty SAND.
				0.90	49.30	Trial Pit terminated at 0.90m.

1
2
3
4
5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

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Trial Pit No. TR05

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.31	**Date:** 25/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By**
Client: HPF	**Co-ords:** 497910E - 165575N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.15	51.16	CONCRETE with steel rebar.
						MADE GROUND
				0.30	51.01	Light grey, sandy GRAVEL. Gravel is subrounded to subangular of fine to coarse flint and concrete. Sand is fine.
						MADE GROUND
						Light brown, grey and orange mottled, clayey, silty SAND. Sand is fine.
				0.60	50.71	Trial Pit terminated at 0.60m.

1
2
3
4
5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR04

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 51.44	**Date:** 22/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497860E - 165578N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
						CONCRETE sub-base.
						MADE GROUND
						Rebar encountered at 0.10m bgl.
				0.30	51.14	*Green membrane encountered at 0.30m bgl.*
						Grey, brown and orange, sandy GRAVEL. Gravel is subangular to subrounded of fine to coarse tarmacadam, concrete and brick rubble. Sand is fine.
				0.50	50.94	MADE GROUND
						Light orange, grey and cream mottled, silty SAND. Sand is fine.
				1.10	50.34	Trial Pit terminated at 1.10m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR03

Sheet 1 of 1

Project Name:	Longcross Studios	**Level (mAOD):**	51.09	**Date:**	22/06/2020
Location:	Longcross	**Weather:**	Hot and sunny.		
Client:	HPF	**Co-ords:**	497888E - 165625N		

Project No. 200576

Logged By CB

Checked By AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)		Stratum Description
	Depth (m)	Type	Results				
				0.20	50.89		CONCRETE sub-base. (No rebar present). MADE GROUND
				0.50	50.59		Light orangish brown, silty SAND. Sand is fine.
							Trial Pit terminated at 0.50m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR02

Sheet 1 of 1

Project Name: Longcross Studios	**Level (mAOD):** 50.02	**Date:** 24/06/2020	**Project No.** 200576
Location: Longcross	**Weather:** Hot and sunny.		**Logged By** CB
Client: HPF	**Co-ords:** 497830E - 165621N		**Checked By** AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.04	49.98	TARMACADAM MADE GROUND
				0.26	49.76	CONCRETE with steel rebar. MADE GROUND
						Sandy GRAVEL. Gravel is subangular to subrounded of coarse brick, concrete and flint. Sand is fine. MADE GROUND
				0.60	49.42	Grey, blue and brown mottled, silty CLAY.
				0.95	49.07	Trial Pit terminated at 0.95m.

1
2
3
4
5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

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Trial Pit Log

ver. 1.1

Trial Pit No. TR01

Sheet 1 of 1

Project Name:	Longcross Studios	**Level (mAOD):**	50.17	**Date:**	28/06/2020
Location:	Longcross	**Weather:**	Hot and sunny.		
Client:	HPF	**Co-ords:**	497899E - 165644N		

Project No. 200576

Logged By CB

Checked By AJ

Water Strike	Samples & In Situ Testing			Depth (mbgl)	Level (mAOD)	Stratum Description
	Depth (m)	Type	Results			
				0.10	50.07	MACADAM MADE GROUND
	0.25	ES	5kg	0.25	49.92	CONCRETE with steel rebar. MADE GROUND
				0.35	49.82	Brown, sandy GRAVEL. Gravel is medium to cobble sized of brick, macadam, concrete. Sand is medium to coarse.
				0.50	49.67	MADE GROUND
						Black, gravelly SAND. Gravel is medium to coarse of brick and concrete. Sand is medium to coarse. Slightly ashy. MADE GROUND
						Medium dense, light brownish orange, silty SAND with occasional lenses of cream / light grey silt. Sand is fine to coarse.
	1.00	ES	5kg			
	1.50	ES	5kg			
						Becoming mottled orange from 1.70m bgl.
				2.80	47.37	Trial Pit terminated at 2.80m.

1 2 3 4 5

Water Strike

Depth Strike (mbgl)	Remarks
	Dry

Stability:
Stable

Remarks:

GL

0.50

1.00

1.50

2.00

2.50

3.00m

Macadam

Concrete with steel rebar.

Made Ground. Brown sandy gravel. Sand is medium to coarse. Gravels are medium to cobble sized of brick, macadam and concrete.

Made Ground. Black gravelly sand. Gravels are medium to coarse sized of brick and concrete. Sand is medium to coarse. Slightly ashey.

Medium dense, light brown orange silty SAND. Sand is fine to caorse. Occasional lenses of cream / light grey silt noted.

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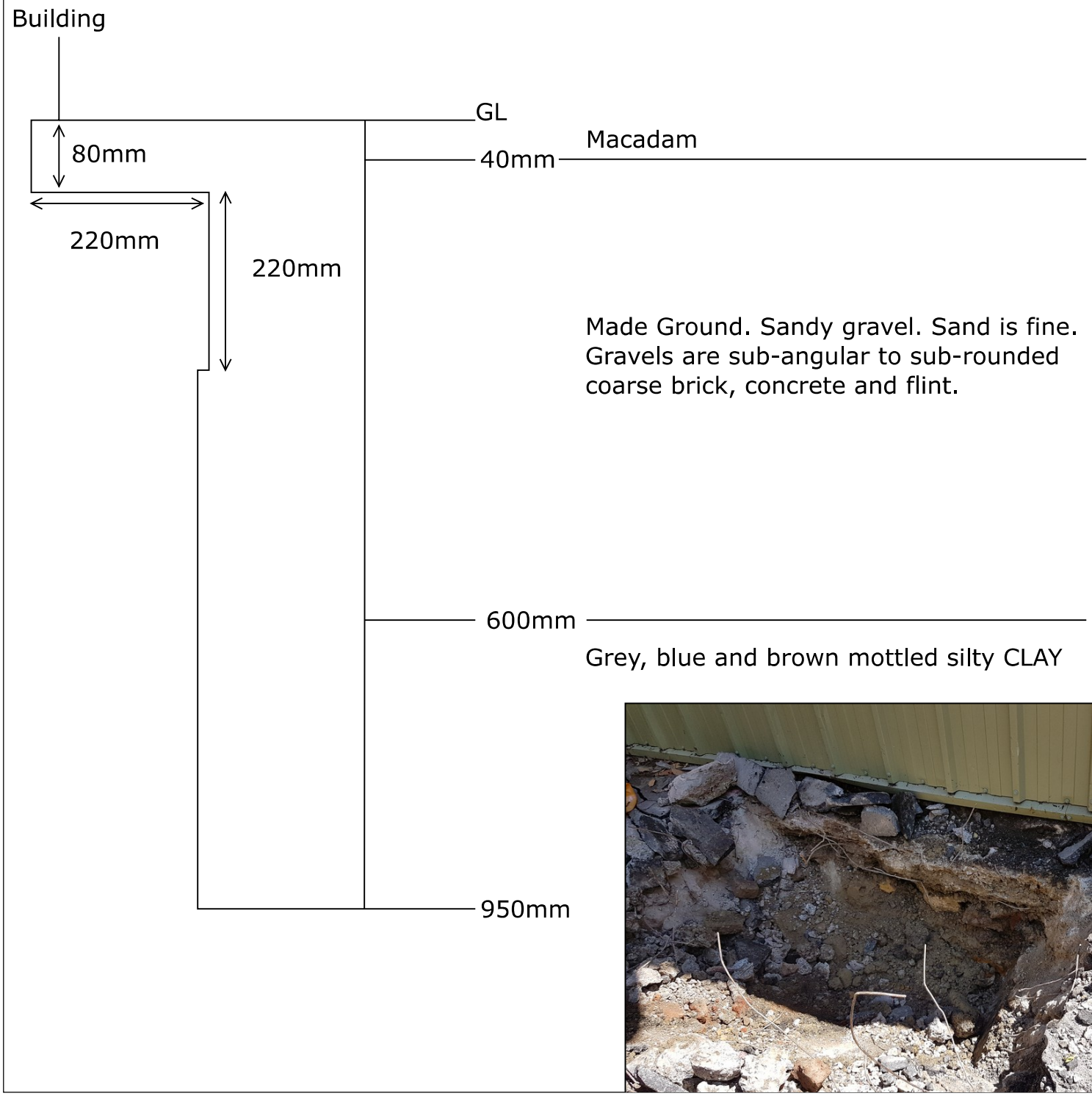
Project: Longcross Film Studios	Drawing Number: TR01-1
Drawing Title: TR01	Date: 28 July 2020



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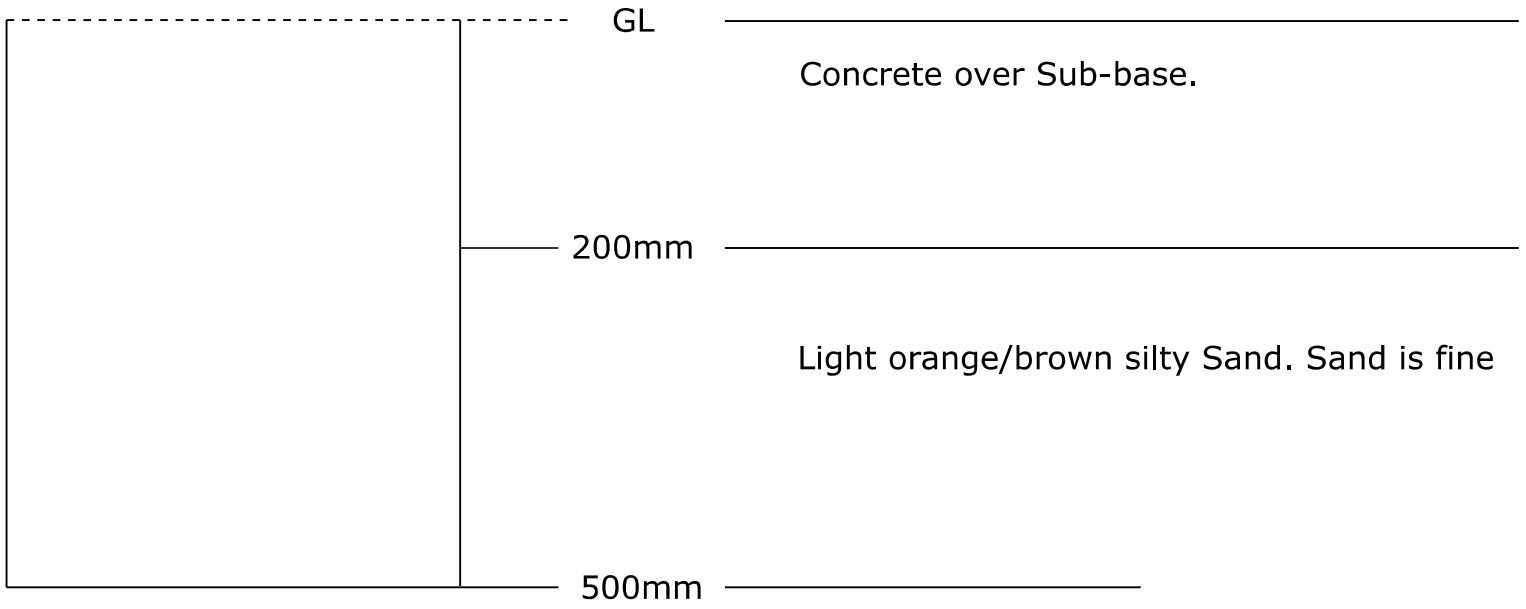
Project
Longcross Film Studios

Drawing Title
TR02

Drawing Number
TR02-01

Date
29 July 2020



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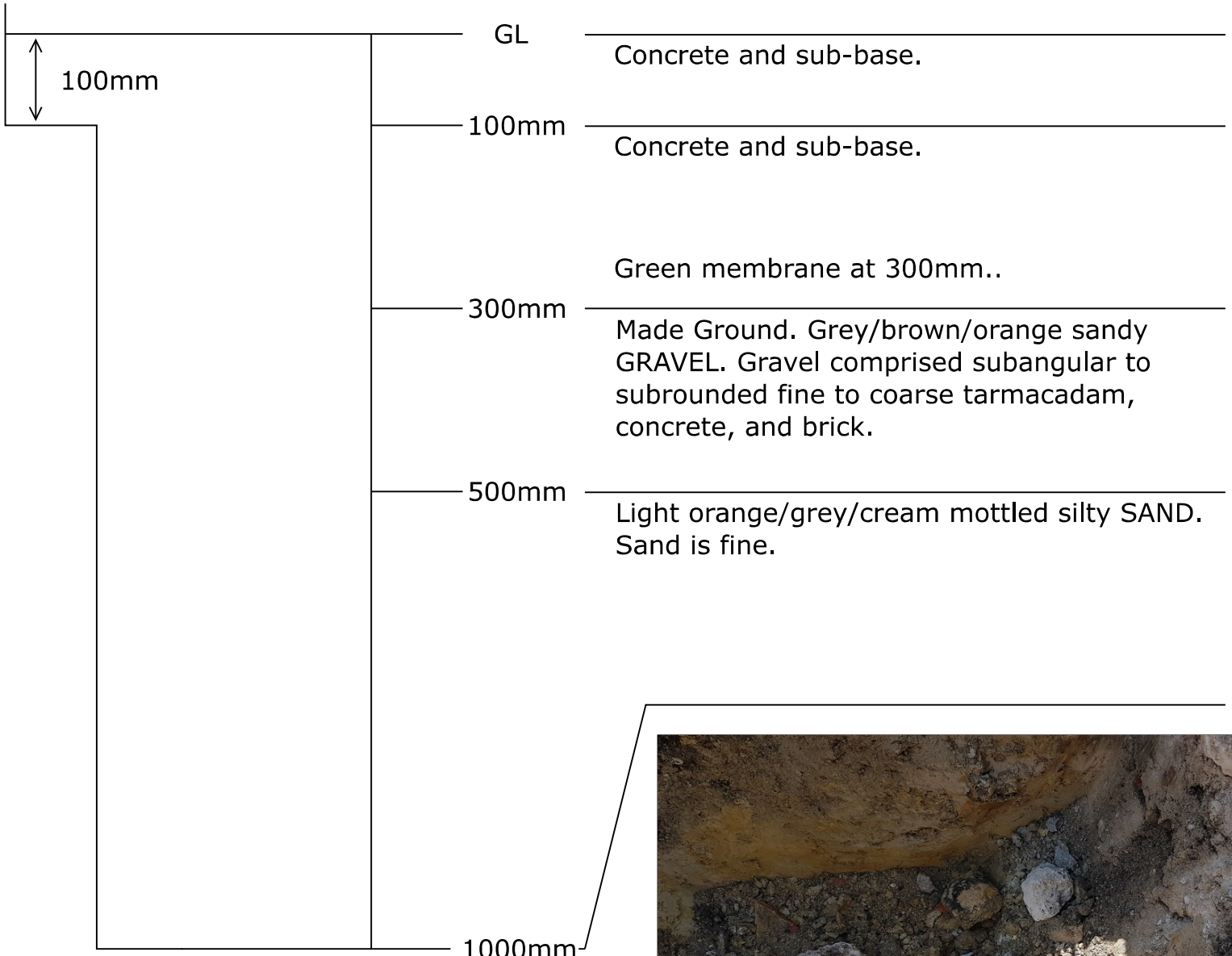
Project
Longcross Film Studios

Drawing Title
TR03

Drawing Number
TR03-01

Date
29 July 2020



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Project
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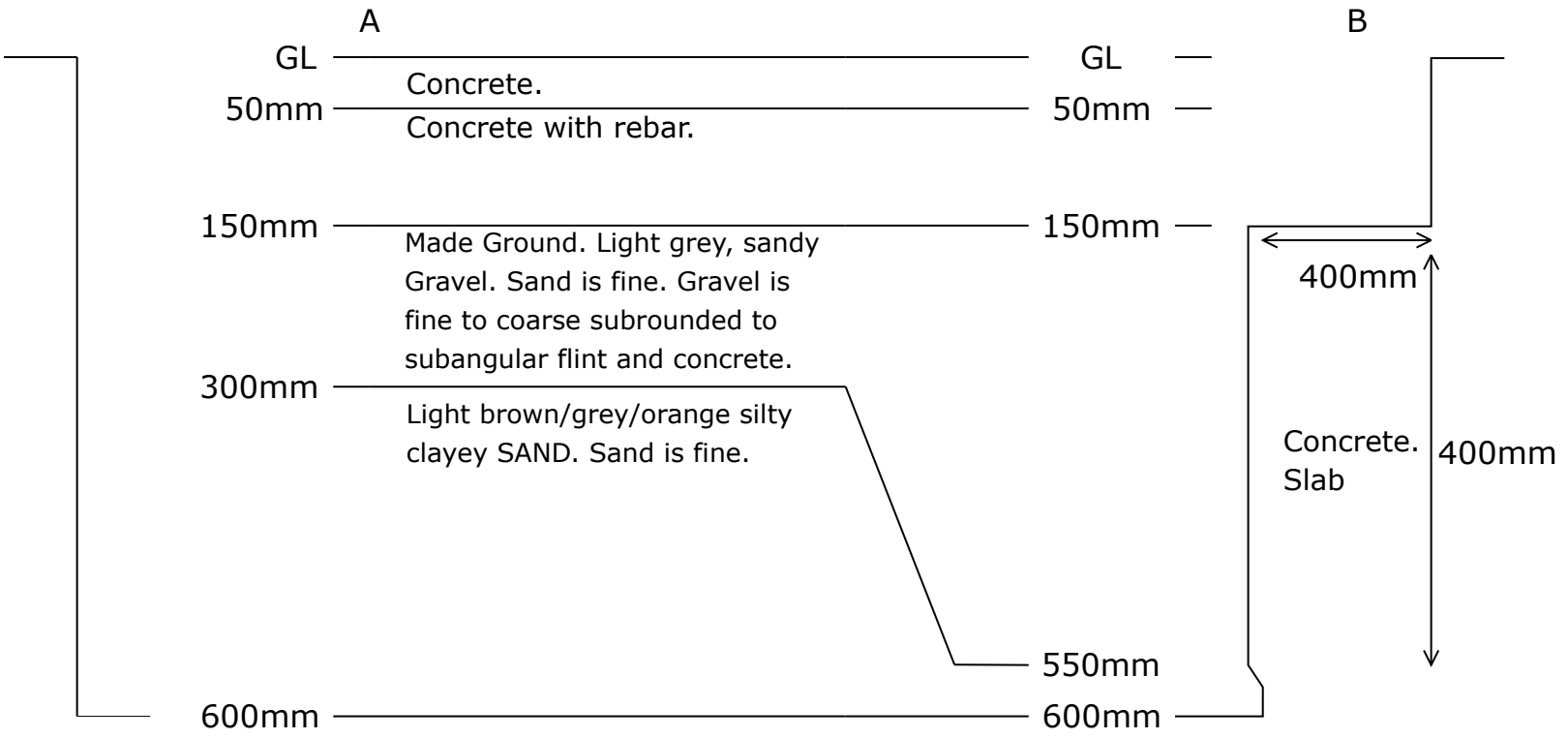
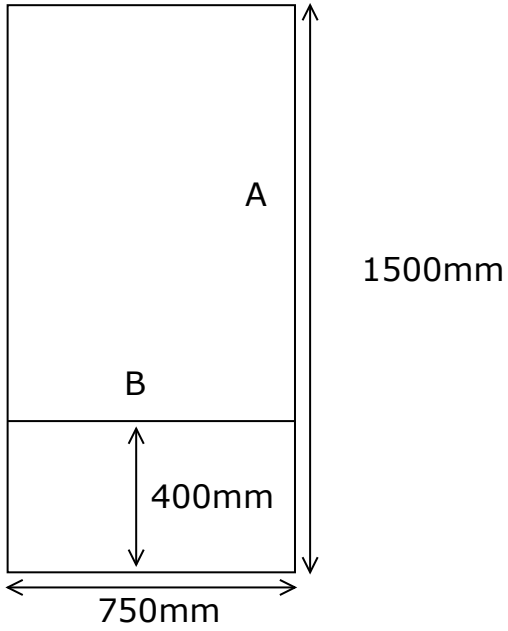
Drawing Title
TR04

Drawing Number
TR04-01

Date
29 July 2020



Plan



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Project
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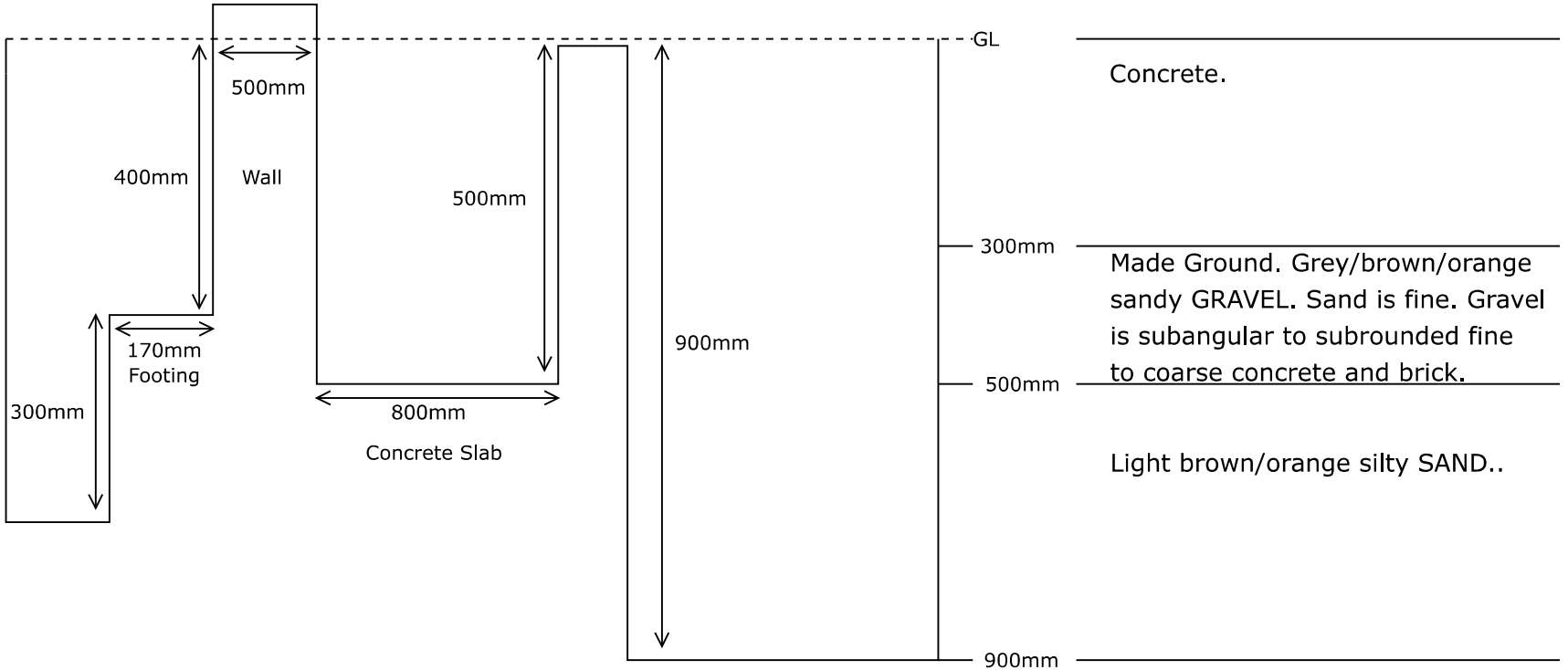
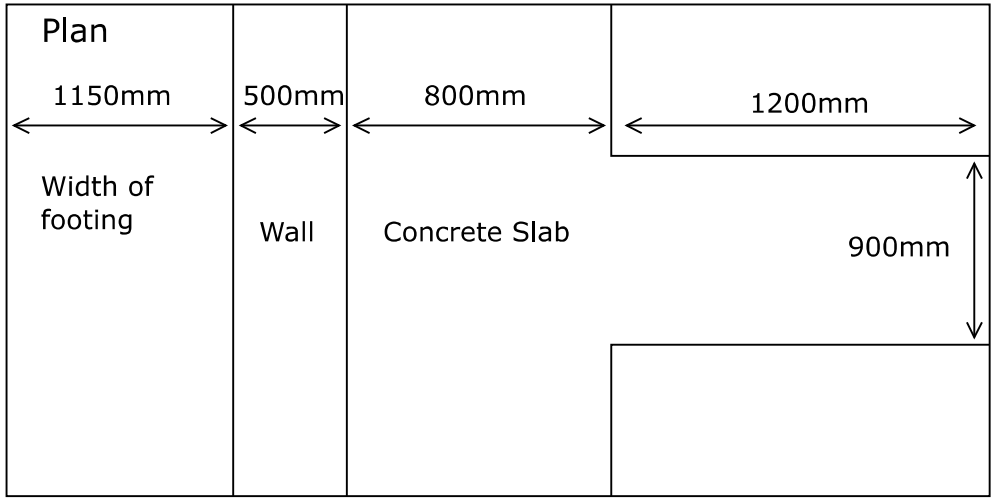
Drawing Title
TR05

Drawing Number
TR05-01

Date
29 July 2020





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Project
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Drawing Title
TR06

Drawing Number
TR06-01

Date
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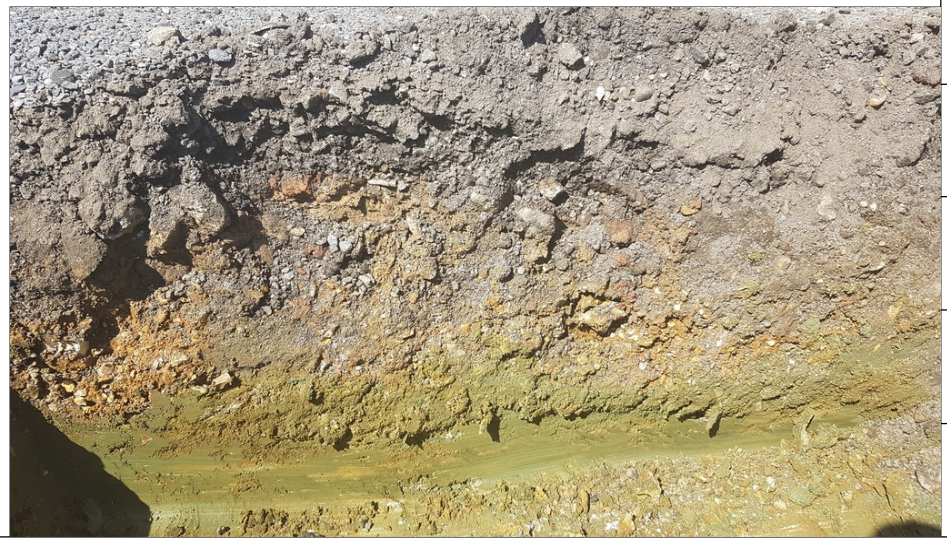
GL

Made Ground. Dark brown/grey/orange sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse tarmacadam, brick, slate and flint.

400mm

Light grey/green/brown/orange motled silty clayey SAND. Sand is fine.

700mm



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Project
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Drawing Title
TR07

Drawing Number
TR07-01

Date
29 July 2020

A

GL — Concrete Slab

250mm — Rough poured concrete, with rebar, over a black membrane and grey gravelly sub-base.

500mm

Medium dense, light brown mottled orange silty SAND. Sand is fine to medium

1200mm

B

GL — Brick

50mm — Rough poured concrete, with rebar, over a black membrane and grey gravelly sub-base.

350mm

Medium dense, light brown mottled orange silty SAND. Sand is fine to medium

1200mm

C

Joist

GL — Concrete Slab

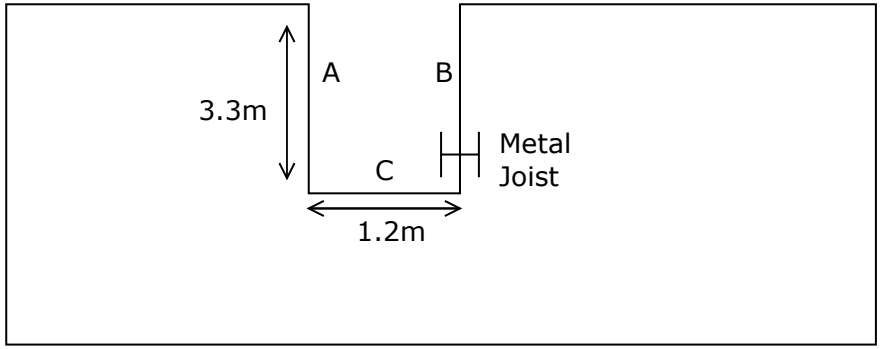
250mm — Rough poured concrete, with rebar, over a black membrane and grey gravelly sub-base.

500mm

Medium dense, light brown mottled orange silty SAND. Sand is fine to medium

1200mm

Plan



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Project
Longcross Film Studios

Drawing Title
TR08

Drawing Number
TR08-01

Date
29 July 2020

GL

Concrete with steel rebar.

250mm

Black gravelly SAND. Sub-base.

350mm

Friable, thinly laminated, grey and orange silty SAND. Sand is fine to coarse.

1.90m

Medium dense, grey mottled orange silty SAND. Sand is fine to coarse.

2.50m

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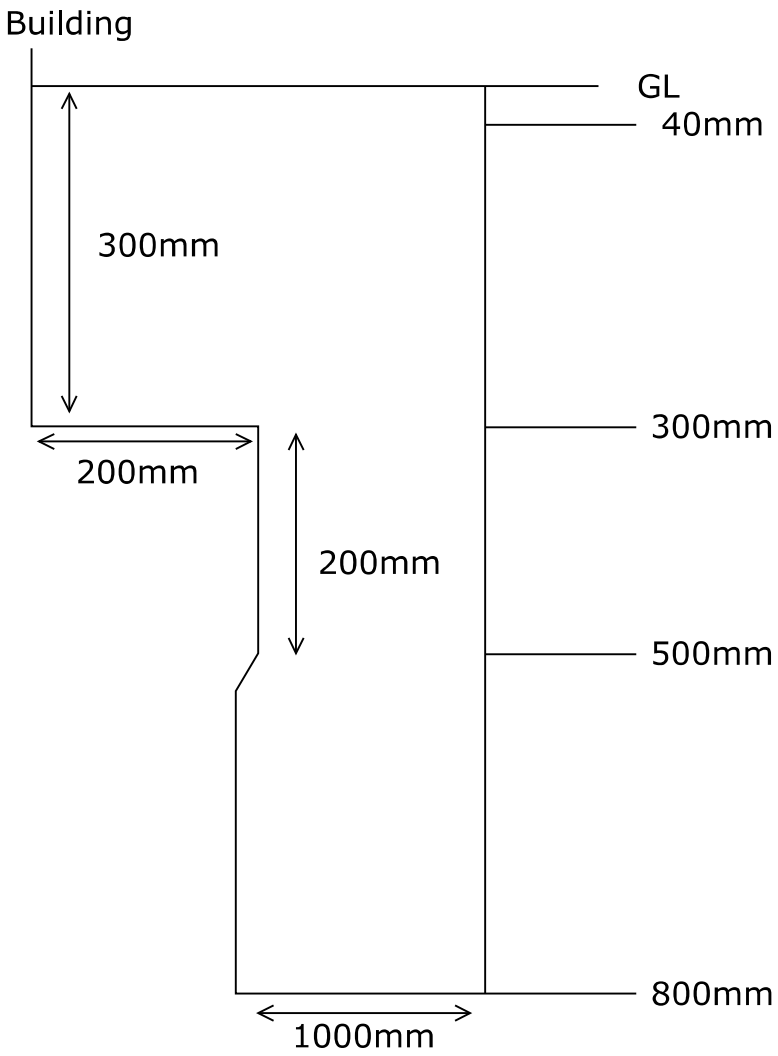
Project
Longcross Film Studios

Drawing Title
TR09

Drawing Number
TR09-01

Date
29 July 2020



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Project
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Drawing Title
TR10

Drawing Number
TR10-01

Date
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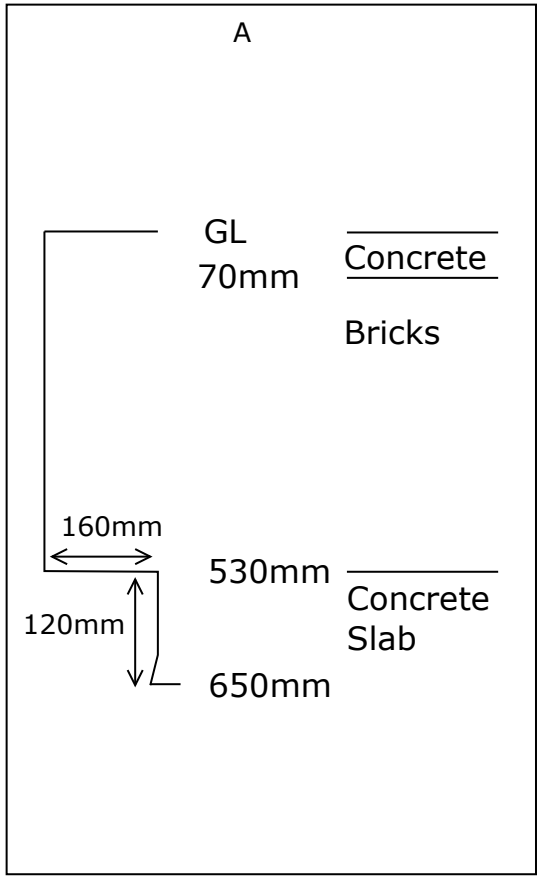

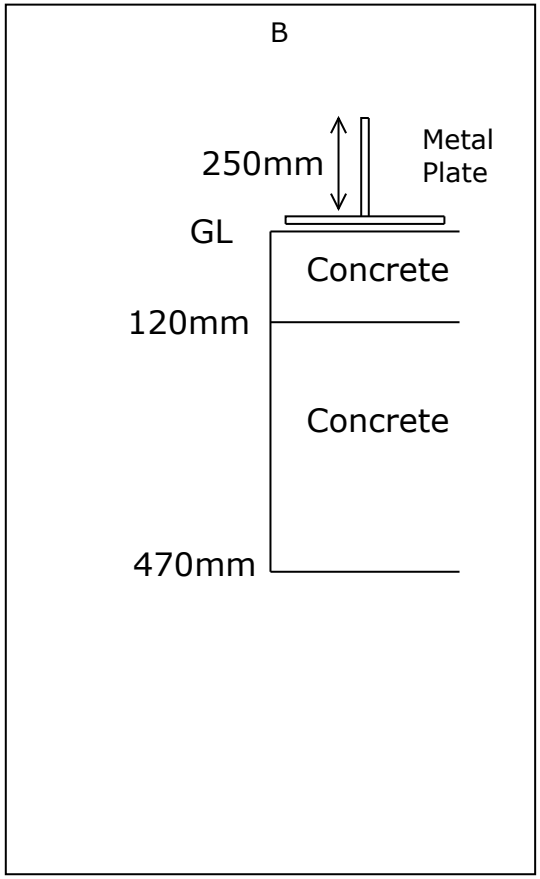

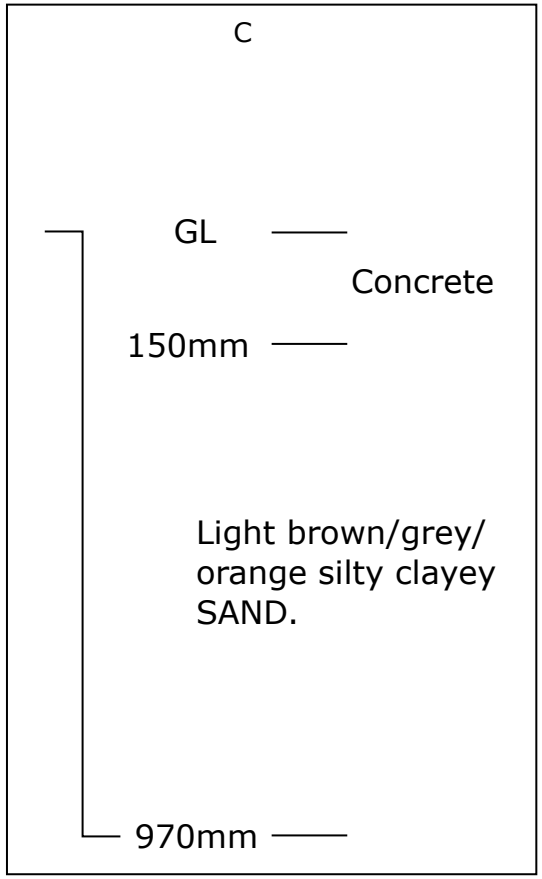

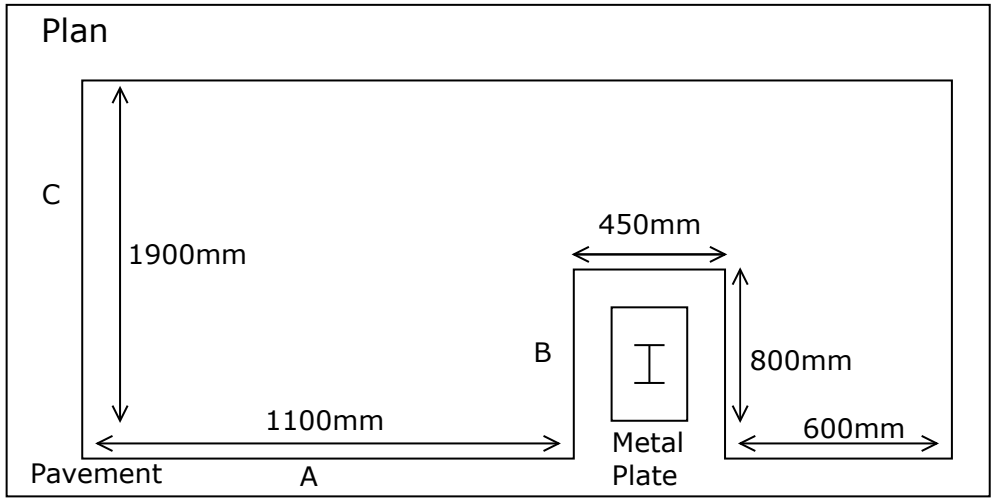

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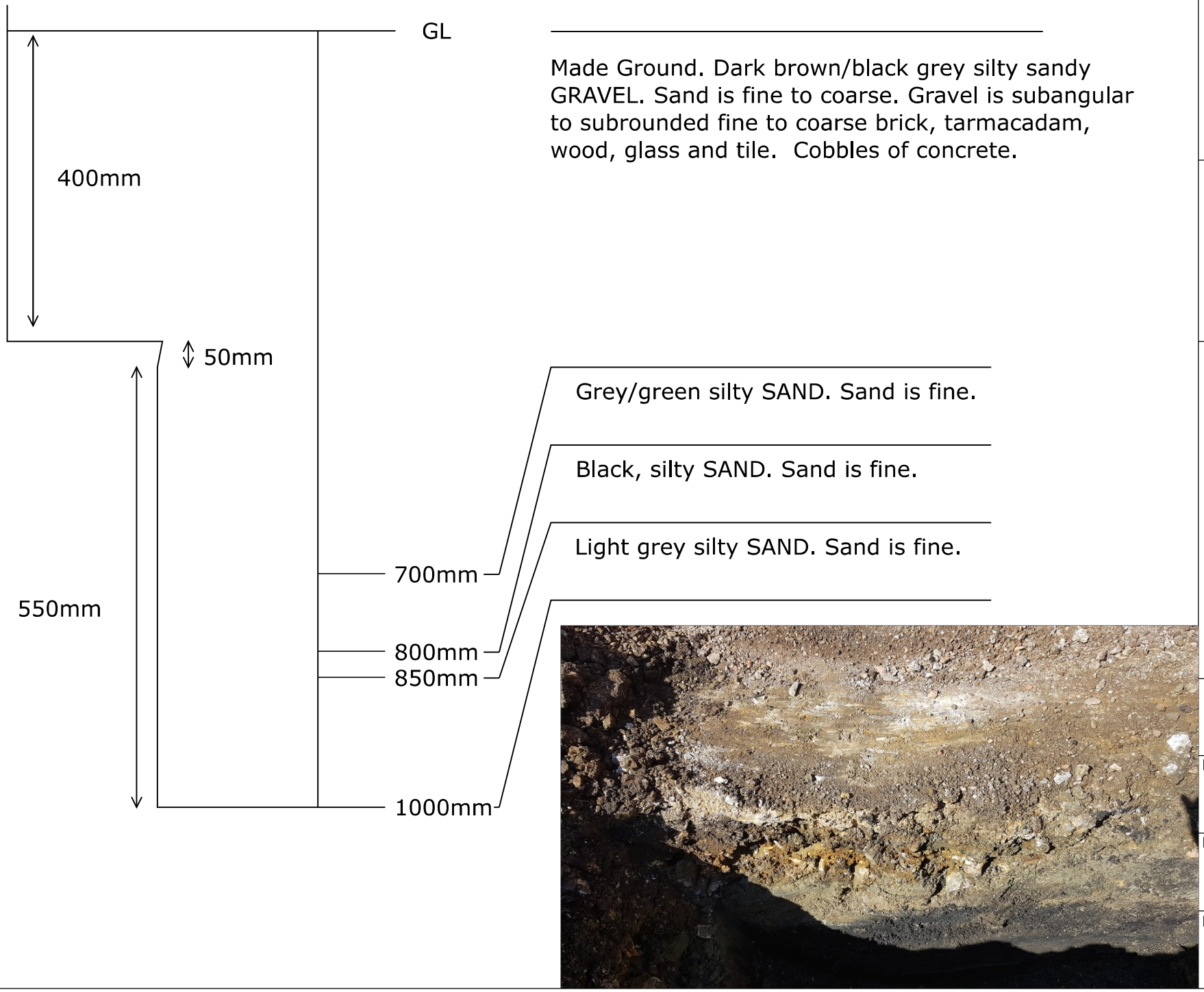
Project
Longcross Film Studios

Drawing Title
TR11

Drawing Number
TR11-01

Date
29 July 2020



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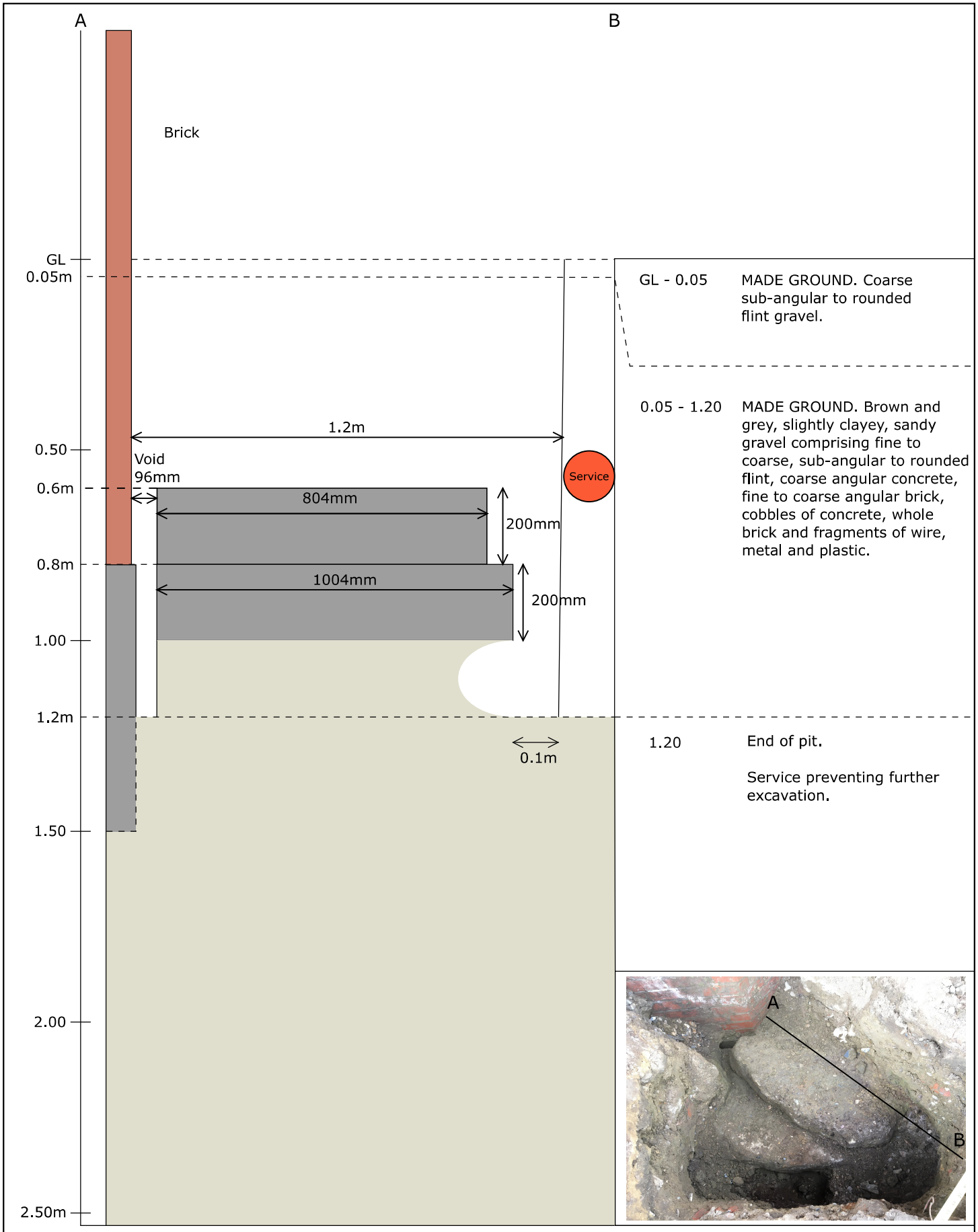
Project
Longcross Film Studios

Drawing Title
TR12

Drawing Number
TR12-01

Date
29 July 2020

APPENDIX 6: HAND PIT LOGS AND CROSS SECTIONS



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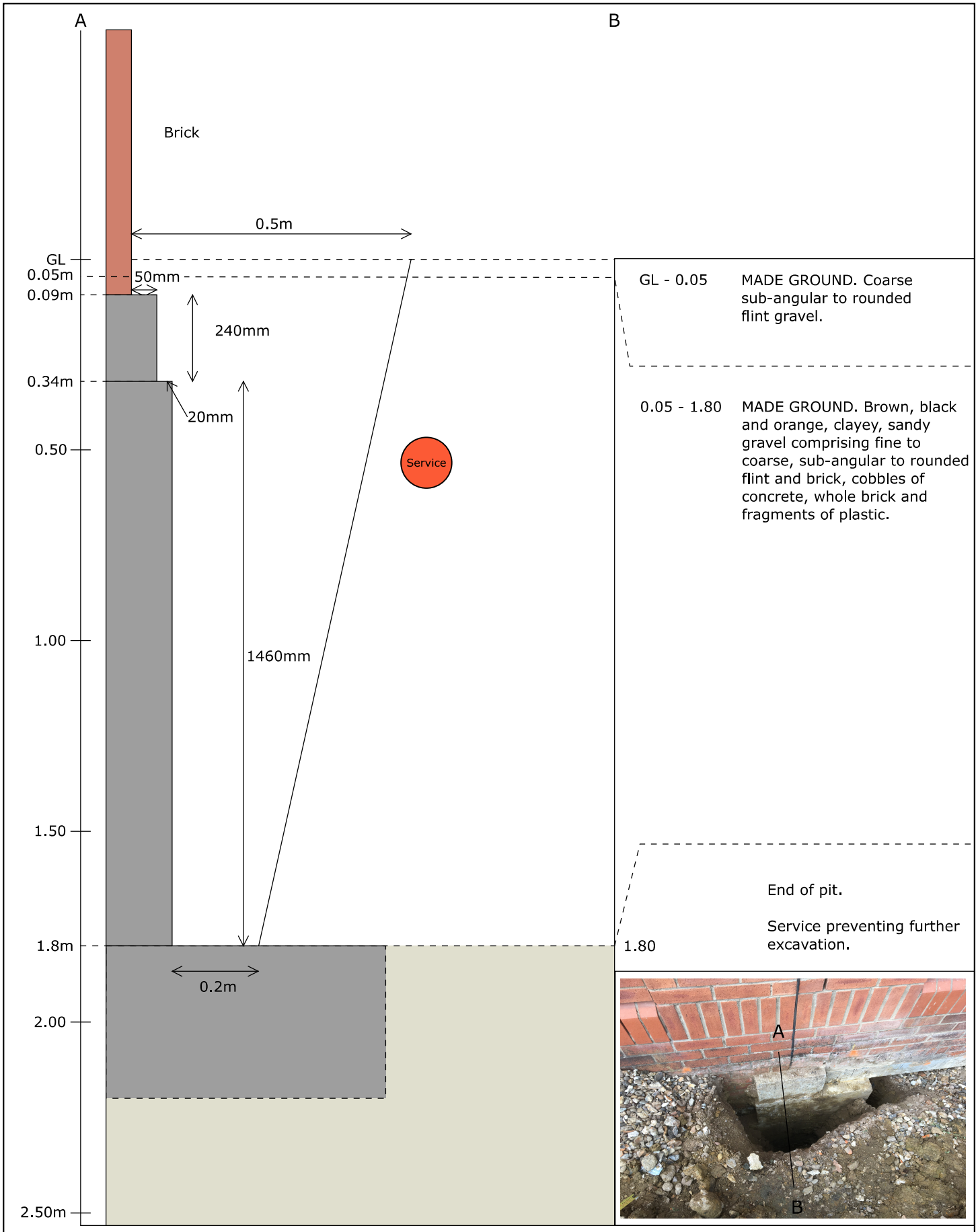
Project	Drawing Number
Longcross Studios	1
Drawing Title	**Date**
HDP 1	17/07/2020



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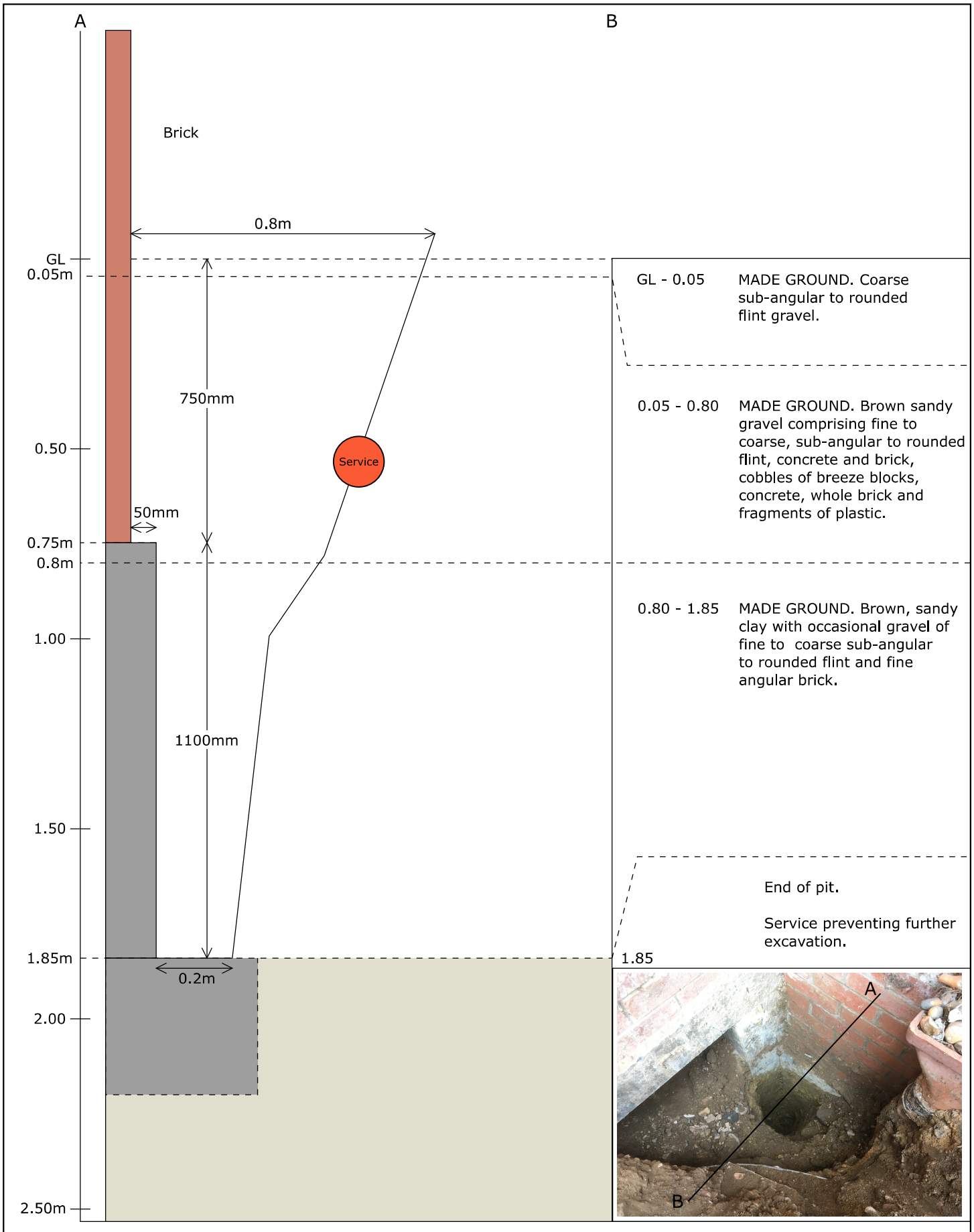
Project	Drawing Number
Longcross Studios	2
Drawing Title	**Date**
HDP 2	17/07/2020



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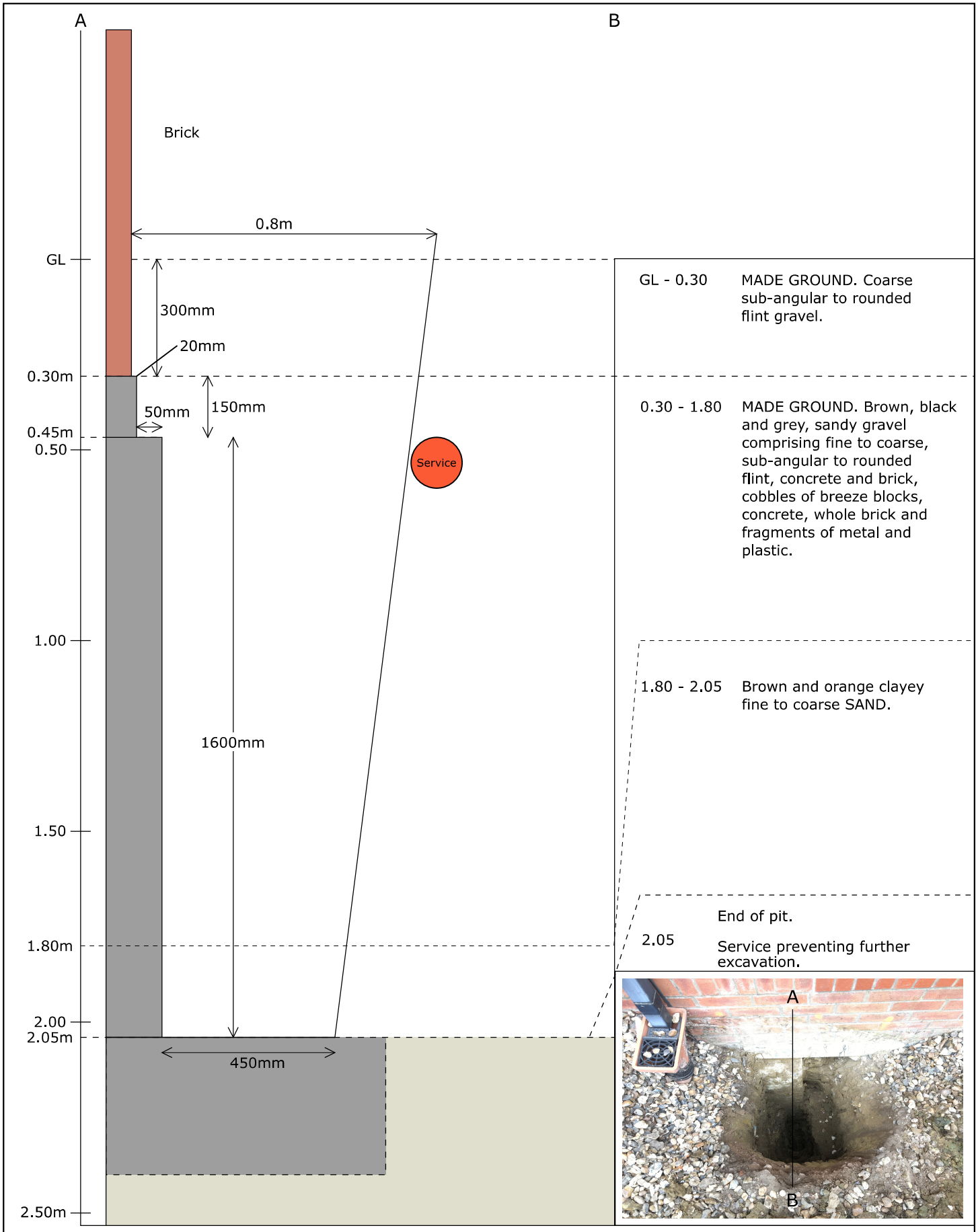
Project	Drawing Number
Longcross Studios	3
Drawing Title	**Date**
HDP 3	17/07/2020



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Project	Drawing Number
Longcross Studios	4
Drawing Title	**Date**
HDP 4	17/07/2020

APPENDIX 7: CBR LOGS AND TEST RESULTS

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		Exploratory Hole No	**CBR1**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
D	0.8								0 - 60		BLACKTOP	Tarmac surfacing.
									60 - 300		CONCRETE	Reinforced concrete slab.
									300 - 450		MADE GROUND	Loose brown medium SAND with frequent fine to coarse flints.
									450 - 800		SAND	Yellow medium slightly clayey SAND.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

building & project consultants

		Exploratory Hole No	**CBR2**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata		
Type	Depth (m)	Results							Depth (m)	Legend	Strata Description
		75	75	75	75	75	75	N			
D	0.8								0 - 250	CONCRETE	Reinforced CONCRETE slab.
									250 - 600	SAND	Loose brown medium SAND with frequent fine to coarse rounded flints.
									600 - 800	SAND	Yellow medium SAND with some coarse rounded flints.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

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		Exploratory Hole No	**CBR3**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata		
Type	Depth (m)	Results							Depth (m)	Legend	Strata Description
		75	75	75	75	75	75	N			
D	0.8								0 - 250	CONCRETE	Reinforced CONCRETE slab.
									250 - 800	SILT	Dense grey SILT

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

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		Exploratory Hole No	**CBR4**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
D	0.8								0 - 200		CONCRETE	Reinforced CONCRETE slab
									200 - 300		MADE GROUND	Yellow very sandy GRAVEL of fine to coarse flint.
									300 - 400		MADE GROUND	Black very sandy GRAVEL of fine to coarse flint.
									400 - 800		SAND	Grey and yellow fine SAND.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

building & project consultants

		Exploratory Hole No	**CBR5**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests										Strata			Strata Description
Type	Depth (m)	Results								Depth (m)		Legend	
		75	75	75	75	75	75	N					
D	0.8									0 - 60		BLACKTOP	Tarmac surfacing.
										60 - 250		CONCRETE	Reinforced concrete slab.
										250 - 500		MADE GROUND	Loose brown medium SAND with frequent brick, concrete and flint.
										500 - 800		SAND	Green and yellow slightly clayey SAND.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

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Tel: 01903 890 746 Email: info@oaklandsi.co.uk

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		Exploratory Hole No	**CBR6**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
D	0.8								0 - 60		BLACKTOP	Tarmac surfacing.
									60 - 250		CONCRETE	Reinforced concrete slab.
									250 - 500		MADE GROUND	Loose brown medium SAND with frequent brick, concrete and flint.
									500 - 800		SAND	Yellow slightly clayey medium SAND.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

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		Exploratory Hole No	**CBR7**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
									0 - 200		BLACKTOP	Tarmac surfacing
									200 - 400		MADE GROUND	Soft orange CLAY with abundant fine to cobble sized flints.
									400 - 700		CLAY	Soft green sandy CLAY.
									700 - 800		CLAY	Orange sandy CLAY.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

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		Exploratory Hole No	**CBR8**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
D	0.8								0 - 150		TOPSOIL	Grass over loose brown fine SAND
									150 - 600		MADE GROUND	Loose brown fine SAND with frequent fine to cobble sized flints, brick and concrete fragments.
									600 - 800		SAND	Yellow medium SAND

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

building & project consultants

		Exploratory Hole No	**CBR9**
Site Address	Longcross Studios	Job Number	J5013
Client	HPF	Client Reference Number	
Site Personnel	MJ	Date	24.06.20

Type and diameter of equipment: Hand dig

Remarks

1.
2.
3.
4

Samples or Tests									Strata			
Type	Depth (m)	Results							Depth (m)		Legend	Strata Description
		75	75	75	75	75	75	N				
D	0.8								0 - 100		BLACKTOP	Tarmac surfacing.
									100 - 250		CONCRETE	Reinforced CONCRETE slab.
									250 - 800		SAND	Yellow and grey slightly clayey SAND with some flints.

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed P - Pot Sample J - Jar W - Water

Completed by subcontractor - Oakland Site Investigation Ltd. Unit 13 Firsland Park Estate, Henfield Road, Albourne, West Sussex, BN6 9JJ

Tel: 01903 890 746 Email: info@oaklandsi.co.uk

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paragon

Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR1
Depth of Test m: 0.8
Operator: MJ
Checked By: JE

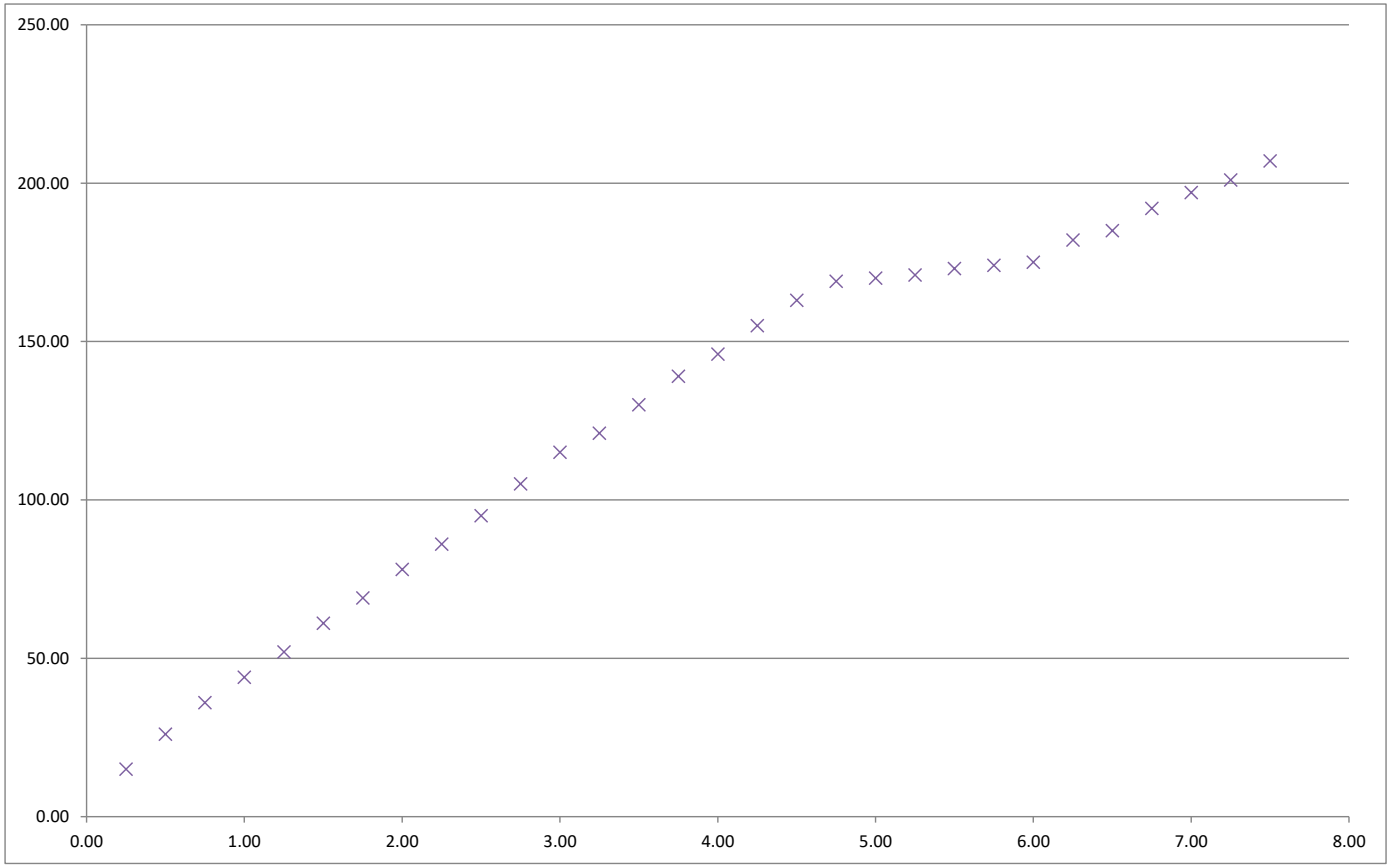
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Yellow slightly clayey SAND

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: 6.6
CBR Value at 5.0mm Penetration %: 7.8
Design Value (higher of two values) %: 7.8
Natural Moisture Content %: 15.1

Penetration (mm)	Dial Gauge Reading
0.25	15
0.50	26
0.75	36
1.00	44
1.25	52
1.50	61
1.75	69
2.00	78
2.25	86
2.50	95
2.75	105
3.00	115
3.25	121
3.50	130
3.75	139
4.00	146
4.25	155
4.50	163
4.75	169
5.00	170
5.25	171
5.50	173
5.75	174
6.00	175
6.25	182
6.50	185
6.75	192
7.00	197
7.25	201
7.50	207



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

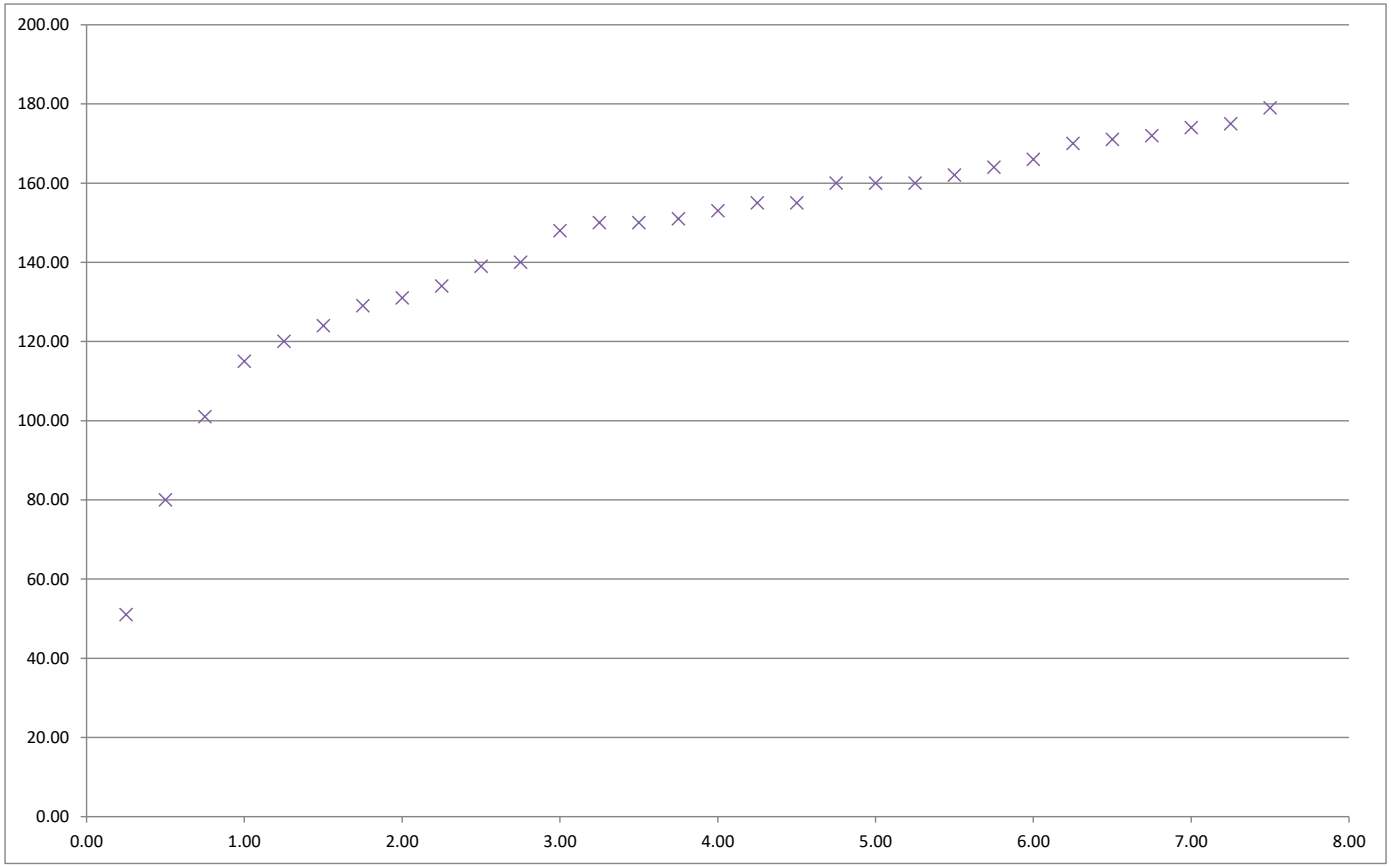
In-Situ CBR No. CBR2
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190
Visual Description of Soil or Material at Depth of Test: Yellow medium SAND with occasional flints.

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **9.6**
CBR Value at 5.0mm Penetration %: **7.3**
Design Value (higher of two values) %: **9.6**
Natural Moisture Content %: **13.8**

Penetration (mm)	**Dial Gauge Reading**
0.25	51
0.50	80
0.75	101
1.00	115
1.25	120
1.50	124
1.75	129
2.00	131
2.25	134
2.50	139
2.75	140
3.00	148
3.25	150
3.50	150
3.75	151
4.00	153
4.25	155
4.50	155
4.75	160
5.00	160
5.25	160
5.50	162
5.75	164
6.00	166
6.25	170
6.50	171
6.75	172
7.00	174
7.25	175
7.50	179



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paragon

Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR3
Depth of Test m: 0.8
Operator: MJ
Checked By: JE

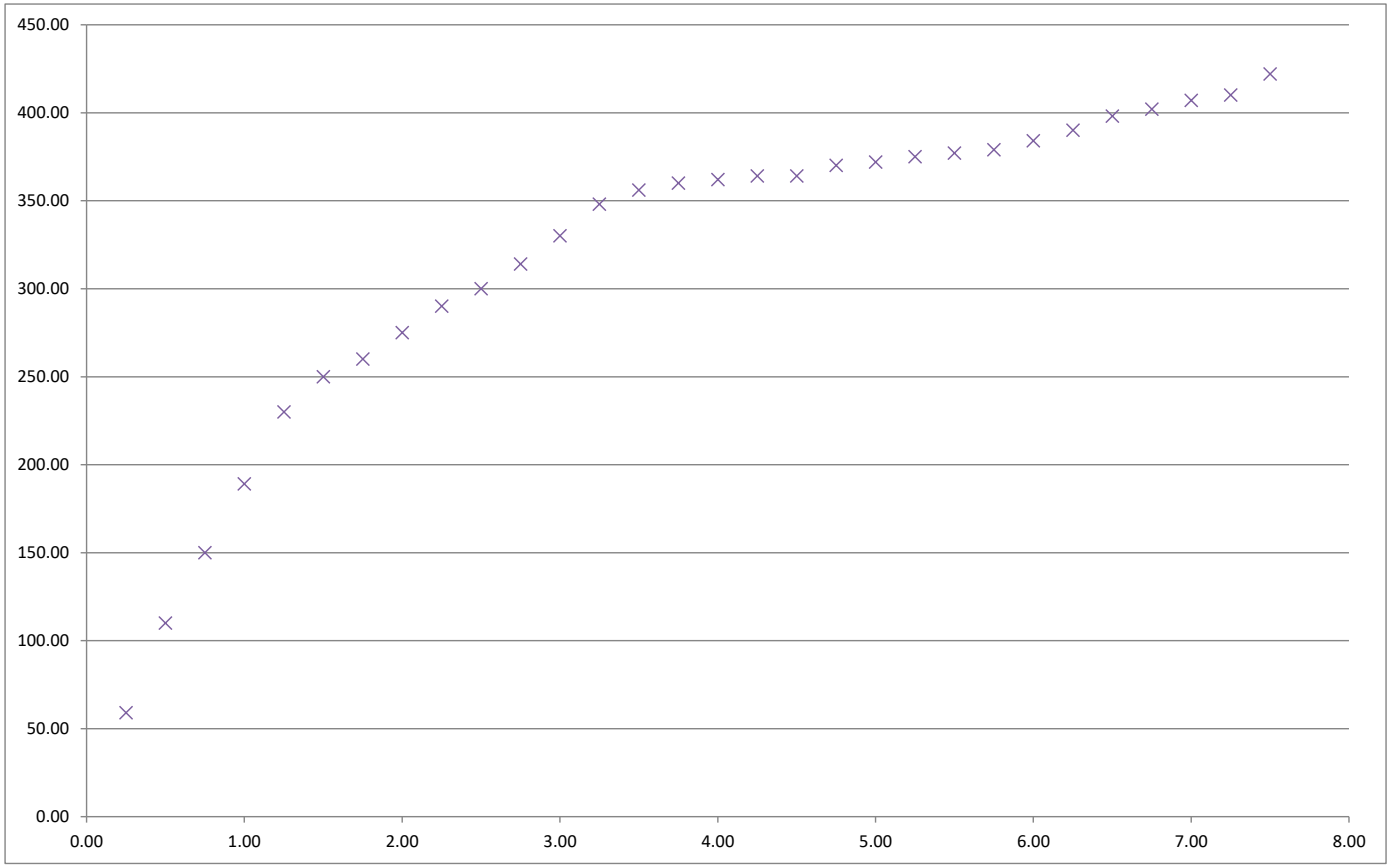
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Dense grey SILT

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **20.7**
CBR Value at 5.0mm Penetration %: **17.0**
Design Value (higher of two values) %: **20.7**
Natural Moisture Content %: **26.2**

Penetration (mm)	Dial Gauge Reading
0.25	59
0.50	110
0.75	150
1.00	189
1.25	230
1.50	250
1.75	260
2.00	275
2.25	290
2.50	300
2.75	314
3.00	330
3.25	348
3.50	356
3.75	360
4.00	362
4.25	364
4.50	364
4.75	370
5.00	372
5.25	375
5.50	377
5.75	379
6.00	384
6.25	390
6.50	398
6.75	402
7.00	407
7.25	410
7.50	422



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR4
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

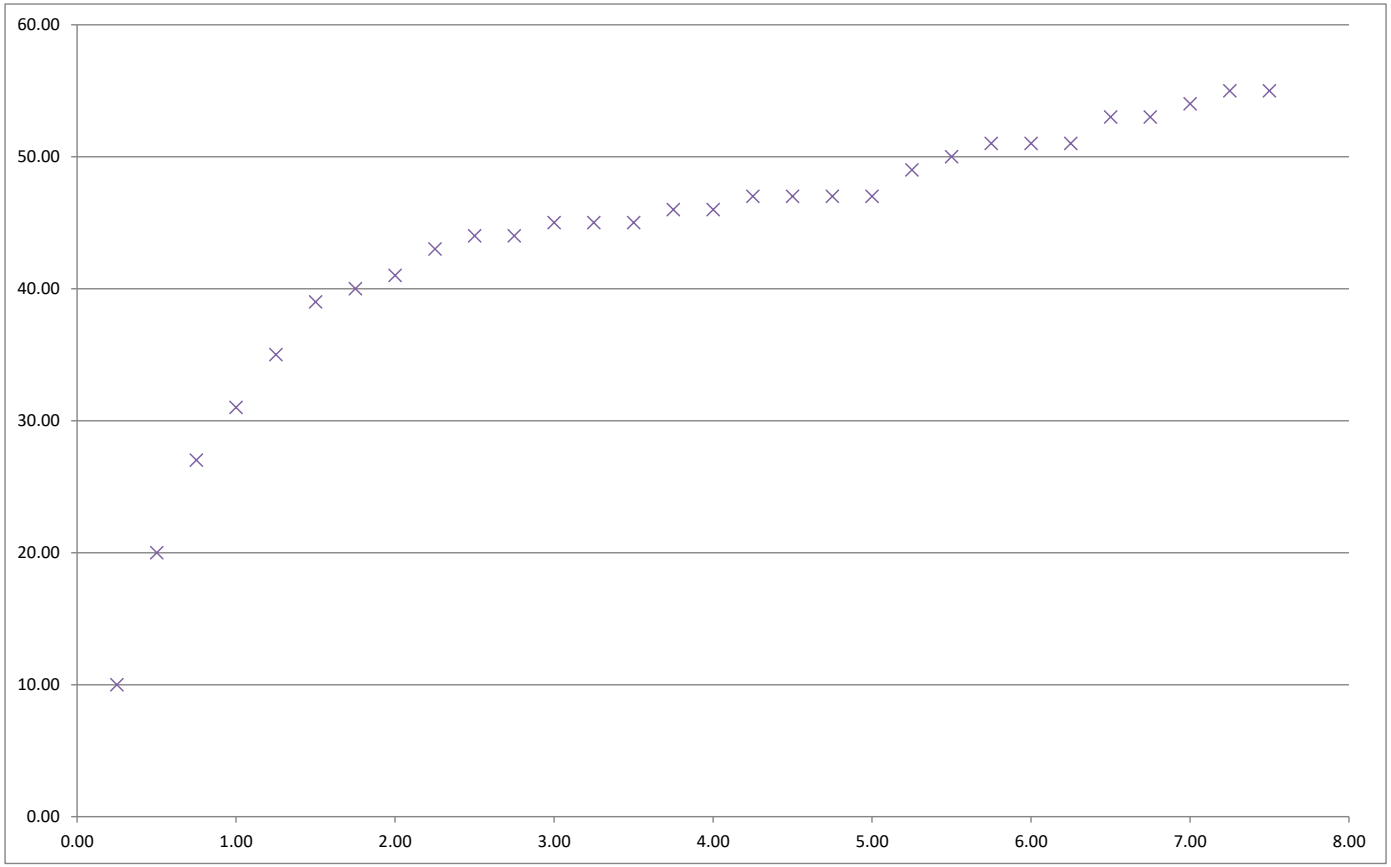
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Grey veined yellow fine SAND

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **3.0**
CBR Value at 5.0mm Penetration %: **2.1**
Design Value (higher of two values) %: **3.0**
Natural Moisture Content %: **13.2**

Penetration (mm)	Dial Gauge Reading
0.25	10
0.50	20
0.75	27
1.00	31
1.25	35
1.50	39
1.75	40
2.00	41
2.25	43
2.50	44
2.75	44
3.00	45
3.25	45
3.50	45
3.75	46
4.00	46
4.25	47
4.50	47
4.75	47
5.00	47
5.25	49
5.50	50
5.75	51
6.00	51
6.25	51
6.50	53
6.75	53
7.00	54
7.25	55
7.50	55



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR5
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

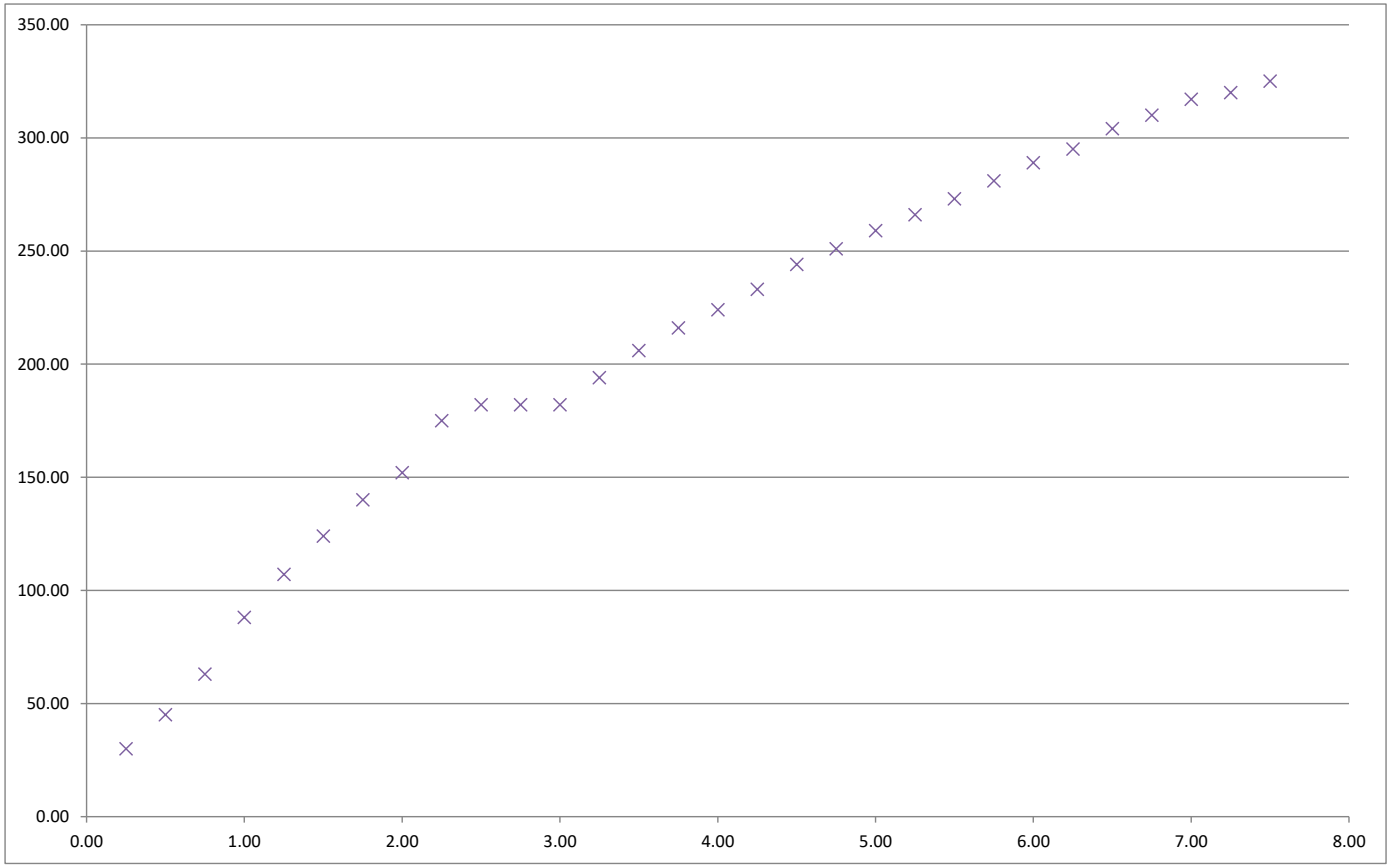
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Green and yellow slightly clayey SAND

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **12.6**
CBR Value at 5.0mm Penetration %: **11.8**
Design Value (higher of two values) %: **12.6**
Natural Moisture Content %: **16.4**

Penetration (mm)	**Dial Gauge Reading**
0.25	30
0.50	45
0.75	63
1.00	88
1.25	107
1.50	124
1.75	140
2.00	152
2.25	175
2.50	182
2.75	182
3.00	182
3.25	194
3.50	206
3.75	216
4.00	224
4.25	233
4.50	244
4.75	251
5.00	259
5.25	266
5.50	273
5.75	281
6.00	289
6.25	295
6.50	304
6.75	310
7.00	317
7.25	320
7.50	325



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paragon

Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR6
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

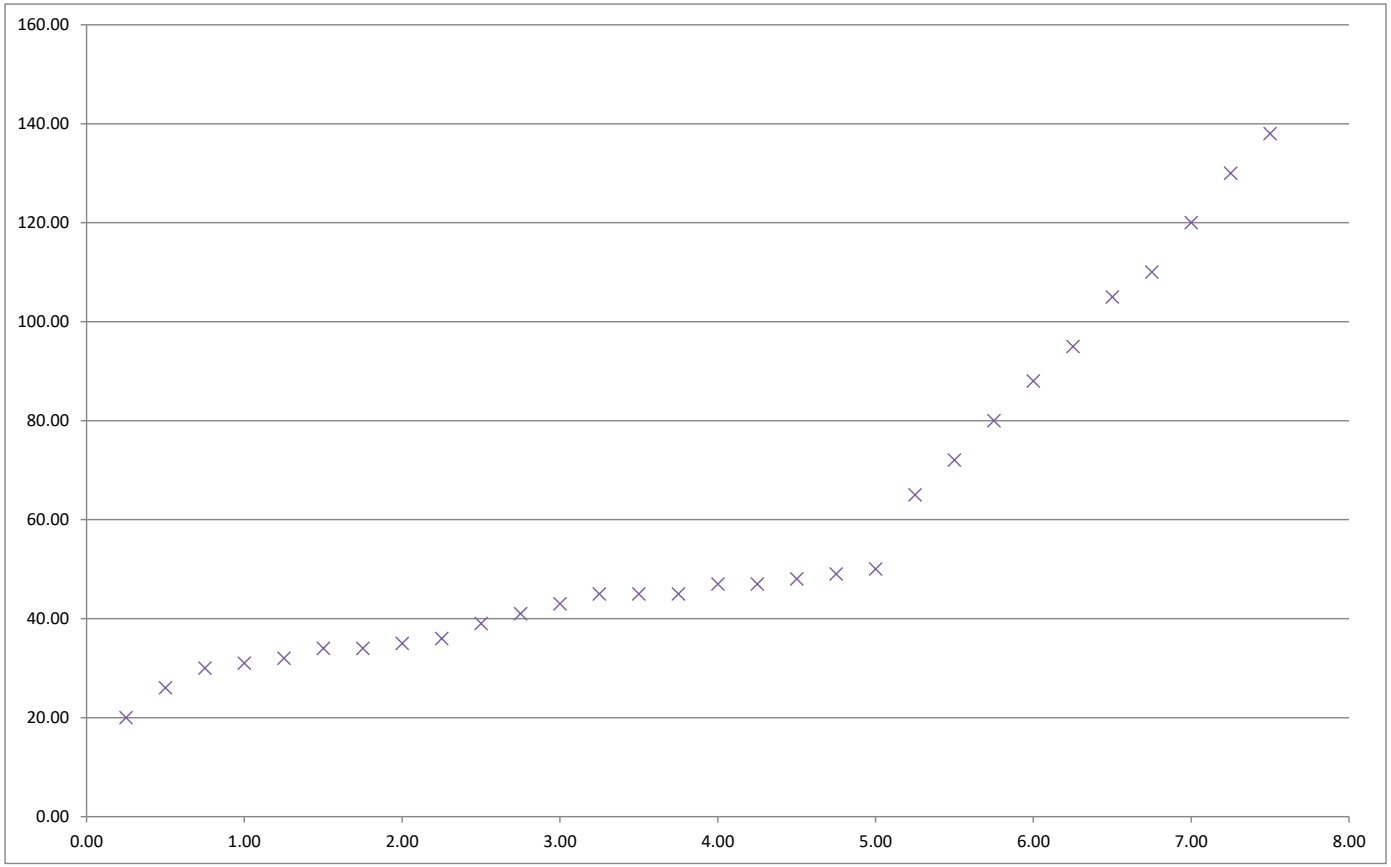
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Yellow slightly clayey medium SAND

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **2.7**
CBR Value at 5.0mm Penetration %: **2.3**
Design Value (higher of two values) %: **2.7**
Natural Moisture Content %: **15.7**

Penetration (mm)	**Dial Gauge Reading**
0.25	20
0.50	26
0.75	30
1.00	31
1.25	32
1.50	34
1.75	34
2.00	35
2.25	36
2.50	39
2.75	41
3.00	43
3.25	45
3.50	45
3.75	45
4.00	47
4.25	47
4.50	48
4.75	49
5.00	50
5.25	65
5.50	72
5.75	80
6.00	88
6.25	95
6.50	105
6.75	110
7.00	120
7.25	130
7.50	138



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR7
Depth of Test m: 0.8
Operator: MJ
Checked By: JE

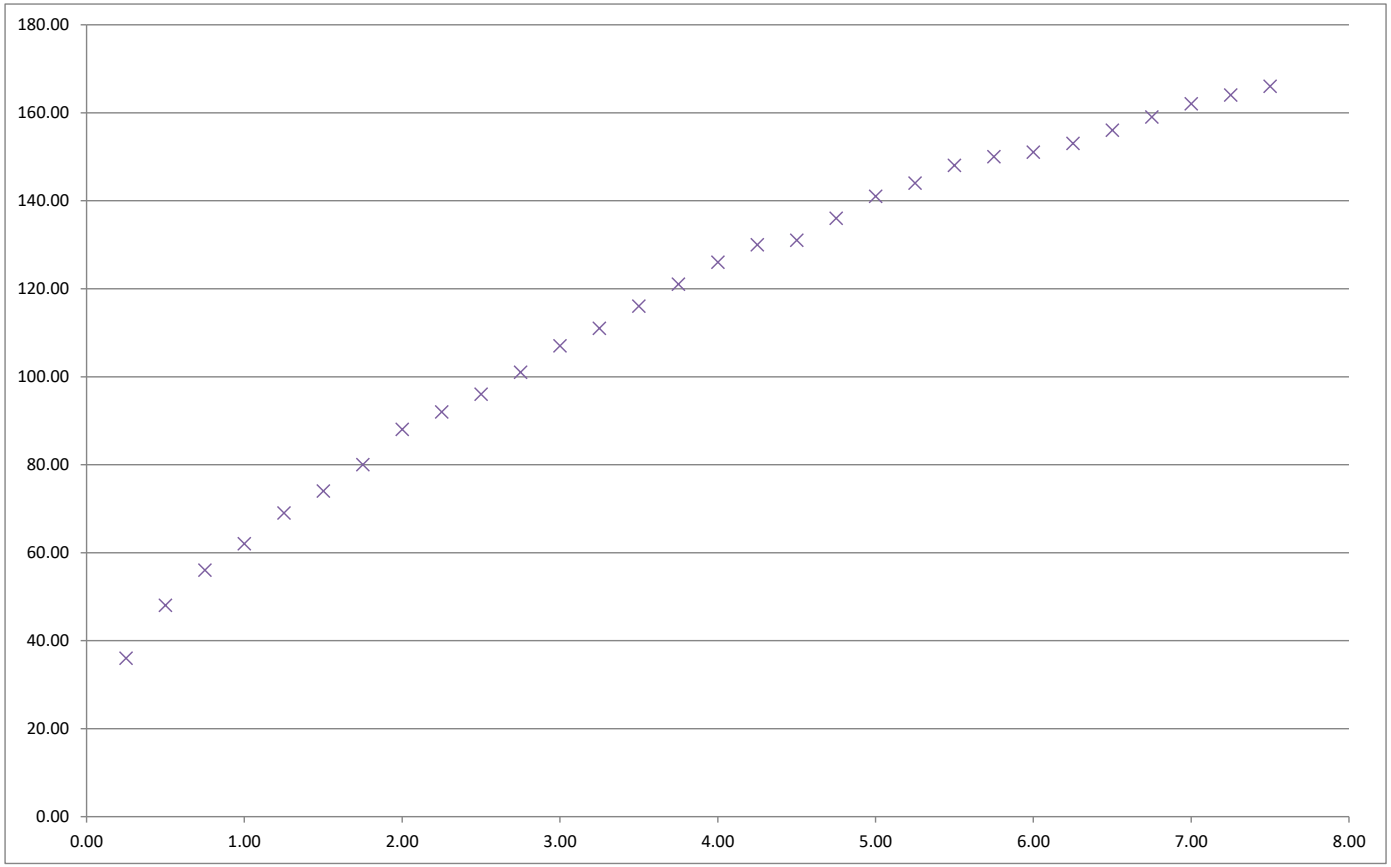
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Orange sandy CLAY

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: 6.6
CBR Value at 5.0mm Penetration %: 6.4
Design Value (higher of two values) %: 6.6
Natural Moisture Content %: 14.7

Penetration (mm)	Dial Gauge Reading
0.25	36
0.50	48
0.75	56
1.00	62
1.25	69
1.50	74
1.75	80
2.00	88
2.25	92
2.50	96
2.75	101
3.00	107
3.25	111
3.50	116
3.75	121
4.00	126
4.25	130
4.50	131
4.75	136
5.00	141
5.25	144
5.50	148
5.75	150
6.00	151
6.25	153
6.50	156
6.75	159
7.00	162
7.25	164
7.50	166



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

In-Situ CBR No. CBR8
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

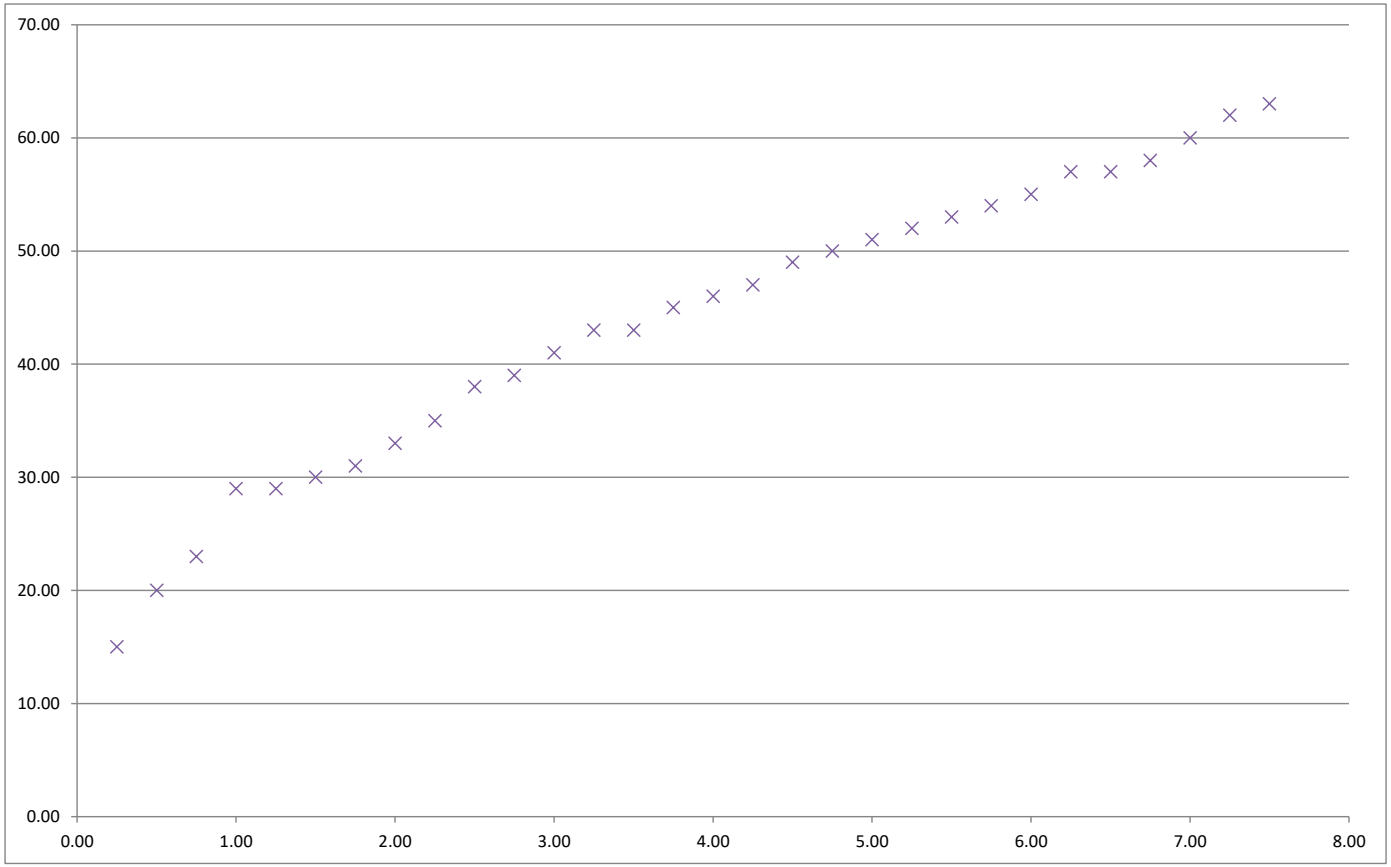
Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190

Visual Description of Soil or Material at Depth of Test: Loose yellow medium SAND

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **2.6**
CBR Value at 5.0mm Penetration %: **2.3**
Design Value (higher of two values) %: **2.6**
Natural Moisture Content %: **8.8**

Penetration (mm)	**Dial Gauge Reading**
0.25	15
0.50	20
0.75	23
1.00	29
1.25	29
1.50	30
1.75	31
2.00	33
2.25	35
2.50	38
2.75	39
3.00	41
3.25	43
3.50	43
3.75	45
4.00	46
4.25	47
4.50	49
4.75	50
5.00	51
5.25	52
5.50	53
5.75	54
6.00	55
6.25	57
6.50	57
6.75	58
7.00	60
7.25	62
7.50	63



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Job Reference: J5013
Site Address: Longcross Studios
Client: HPF
Date: 24-Jun-20

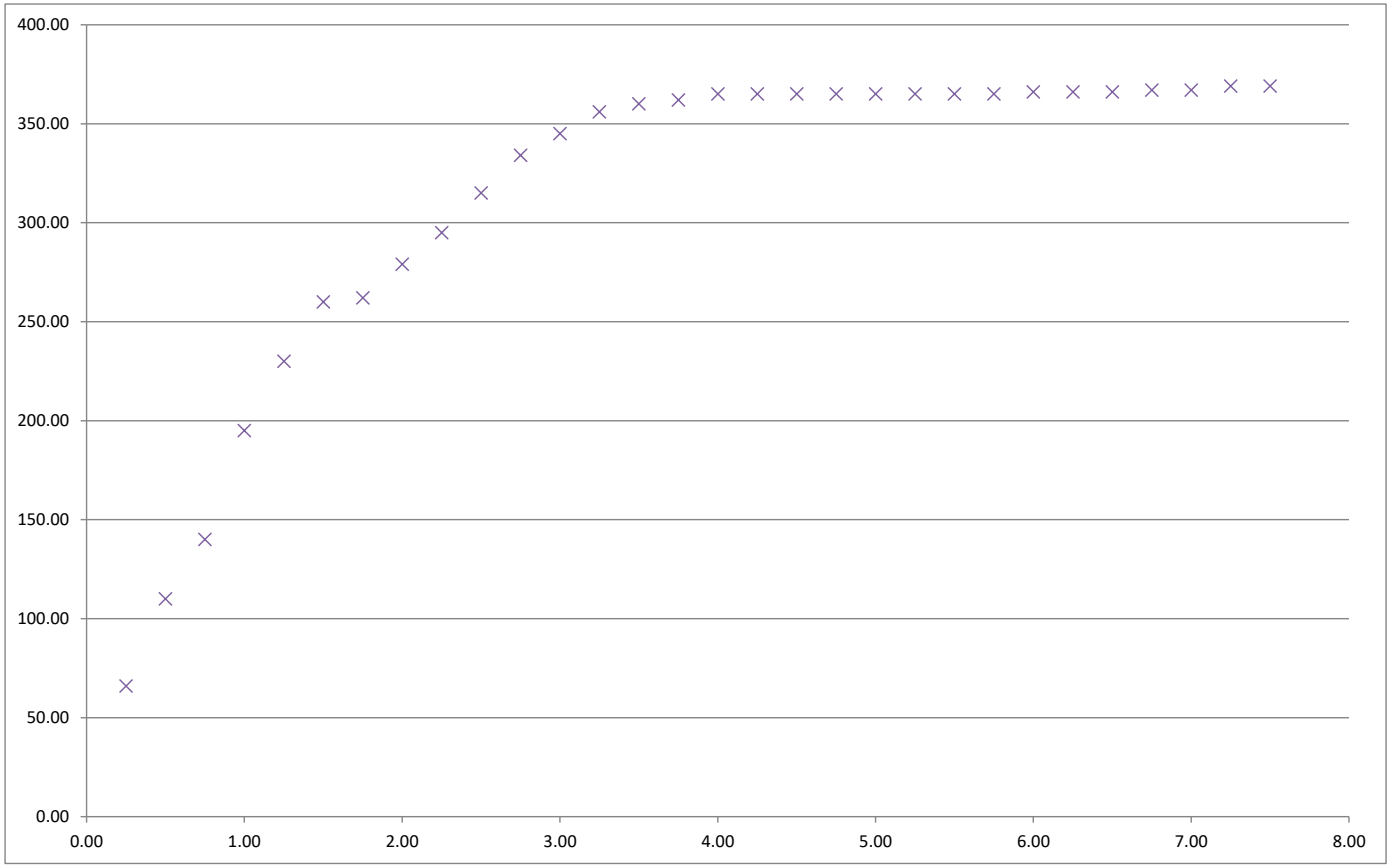
In-Situ CBR No. CBR9
Depth of Test m: **0.8**
Operator: MJ
Checked By: JE

Ring Number: 10kN 15060 (9.119)
Ring Factor: 9.1190
Visual Description of Soil or Material at Depth of Test: Yellow and grey slightly clayey SAND with occasional flints

Mass of Surcharge is 13.5 kg for Gravel or 27 kg for Sand / Clay / Silt

CBR Value at 2.5mm Penetration %: **21.8**
CBR Value at 5.0mm Penetration %: **16.6**
Design Value (higher of two values) %: **21.8**
Natural Moisture Content %: **18.0**

Penetration (mm)	**Dial Gauge Reading**
0.25	66
0.50	110
0.75	140
1.00	195
1.25	230
1.50	260
1.75	262
2.00	279
2.25	295
2.50	315
2.75	334
3.00	345
3.25	356
3.50	360
3.75	362
4.00	365
4.25	365
4.50	365
4.75	365
5.00	365
5.25	365
5.50	365
5.75	365
6.00	366
6.25	366
6.50	366
6.75	367
7.00	367
7.25	369
7.50	369



APPENDIX 8: ENVIRONMENTAL LABORATORY TESTING

Charlie Knox
Paragon New Homes Ltd
The Harlequin Building
65 Southwark Street
London
SE1 0HR

e: charlieknox@paragonbc.co.uk

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

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-16622

Replaces Analytical Report Number : 20-16622, issue no. 1

Client references/information amended.

Project / Site name:	Longcross	**Samples received on:**	24/06/2020
Your job number:	200576	**Sample instructed/ Analysis started on:**	28/06/2020
Your order number:	200576_CK	**Analysis completed by:**	09/07/2020
Report Issue Number:	2	**Report issued on:**	09/07/2020
Samples Analysed:	18 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team

For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-16622

Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546973	1546974	1546975	1546976	1546977
Sample Reference				WS1	WS1	WS2	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.00	0.50	0.30	0.50
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
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	5.4	9.0	6.0	11	8.3
Total mass of sample received	kg	0.001	NONE	0.70	0.70	0.70	0.70	0.70
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	8.5	7.7	8.0	6.1	8.8
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	810	110	280	240	720
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.14	0.0078	0.058	0.084	0.30
Sulphide	mg/kg	1	MCERTS	13	1.5	< 1.0	< 1.0	3.9
Organic Matter	%	0.1	MCERTS	6.3	0.3	1.2	0.3	0.8
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.6	0.2	0.7	0.2	0.5
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	0.23	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.26	< 0.05	< 0.05	< 0.05	1.9
Phenanthrene	mg/kg	0.05	MCERTS	2.0	< 0.05	0.53	0.30	5.4
Anthracene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.31	0.11	2.4
Fluoranthene	mg/kg	0.05	MCERTS	3.5	< 0.05	2.5	0.60	12
Pyrene	mg/kg	0.05	MCERTS	3.6	< 0.05	2.3	0.48	8.0
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.8	< 0.05	2.0	0.34	4.9
Chrysene	mg/kg	0.05	MCERTS	1.7	< 0.05	1.5	0.30	5.0
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	< 0.05	2.6	0.29	4.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	< 0.05	1.3	0.25	2.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	1.7	0.26	3.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.78	< 0.05	1.2	< 0.05	1.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	< 0.05	0.58
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	< 0.05	1.3	< 0.05	1.6
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	20.7	< 0.80	17.5	2.93	53.1
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.0	1.9	9.1	5.3	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	< 0.2	< 0.2	0.4	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	17	20	30	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	31	21	7.1	10
Lead (aqua regia extractable)	mg/kg	1	MCERTS	44	10	33	7.2	35
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	9.2	11	6.5	11
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	86	17	56	15	47

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Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546973	1546974	1546975	1546976	1546977
Sample Reference				WS1	WS1	WS2	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.00	0.50	0.30	0.50
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	3800	< 10	90	< 10	640
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	1.8	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	25	< 2.0	< 2.0	< 2.0	62
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	83	< 8.0	< 8.0	< 8.0	87
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	560	< 8.0	< 8.0	< 8.0	49
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	670	< 10	< 10	< 10	200
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	1.9	< 1.0	< 1.0	< 1.0	2.9
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	28	< 2.0	2.8	< 2.0	64
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	170	< 10	16	< 10	160
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1600	< 10	72	< 10	220
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1800	< 10	90	< 10	440

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Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546978	1546979	1546980	1546981	1546982
Sample Reference				WS5	WS6	WS6	WS7	WS7
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.70	4.00	0.50	2.5
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
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	10	16	9.3	2.5	11
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	1.0	1.0
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	4.5	7.7	8.7	9.2	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	160	250	1500	380	59
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.064	0.10	0.054	0.082	0.0090
Sulphide	mg/kg	1	MCERTS	3.9	< 1.0	1.4	1.0	2.3
Organic Matter	%	0.1	MCERTS	0.2	0.2	0.2	2.0	0.4
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.1	0.1	< 0.1	1.2	0.3
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	< 0.05	< 0.05	2.3	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.67	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.5	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.4	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.4	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.9	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.3	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.9	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.90	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.25	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	21.7	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.4	4.9	3.1	7.0	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5	< 0.2	0.5	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	38	26	16	18	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	4.2	5.3	4.5	59	4.3
Lead (aqua regia extractable)	mg/kg	1	MCERTS	5.8	6.3	8.1	17	4.8
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	12	6.1	4.4	15	8.5
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	26	13	5.2	29	13

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Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546978	1546979	1546980	1546981	1546982
Sample Reference				WS5	WS6	WS6	WS7	WS7
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.70	4.00	0.50	2.5
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	73	< 10
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 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	2.1	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	6.3	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	20	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	45	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	73	< 10

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Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546983	1546984	1546985	1546986	1546987
Sample Reference				WS8	WS8	WS9	WS9	WS10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.50	3.50	1.00
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
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	5.1	9.3	11	7.4	16
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	1.0	1.0
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	5.2	4.3	4.6	5.5	4.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	190	290	150	220	250
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.020	0.045	0.048	0.035	0.067
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Organic Matter	%	0.1	MCERTS	1.6	0.3	0.2	0.2	0.2
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.9	0.2	0.1	0.1	0.1
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	< 0.05	< 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	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 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	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.1	51	7.0	2.1	2.0
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2	0.7	< 0.2	0.3	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	57	27	13	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.1	18	5.2	7.6	6.4
Lead (aqua regia extractable)	mg/kg	1	MCERTS	6.3	19	6.5	5.8	6.6
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	11	19	7.6	4.9	7.8
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	8.5	38	14	5.1	3.3

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Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546983	1546984	1546985	1546986	1546987
Sample Reference				WS8	WS8	WS9	WS9	WS10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.50	3.50	1.00
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 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	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 20-16622

Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546988	1546989	1546990		
Sample Reference				WS10	TR03	TR12		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				2.00	0.30	0.80		
Date Sampled				23/06/2020	23/06/2020	23/06/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	11	8.9	14		
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.5		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	5.0	5.1	7.5		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO_4	mg/kg	50	MCERTS	240	250	2400		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.029	0.045	1.4		
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	91		
Organic Matter	%	0.1	MCERTS	0.2	0.2	5.5		
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.1	0.1	3.2		
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.0		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.59		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	3.4		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	3.0		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.0		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.8		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.2		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.68		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.27		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.82		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	18.9		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	17	12		
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.4	0.9		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	26	38		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	13	120		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	5.3	6.4	50		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	6.0	9.0	68		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	8.3	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	6.3	22	150		

Analytical Report Number: 20-16622

Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1546988	1546989	1546990		
Sample Reference				WS10	TR03	TR12		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				2.00	0.30	0.80		
Date Sampled				23/06/2020	23/06/2020	23/06/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	43		
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	34		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	43		

Analytical Report Number : 20-16622

Project / Site name: Longcross

* 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 *
1546973	WS1	None Supplied	0.50	Brown loam and clay with gravel and vegetation.
1546974	WS1	None Supplied	2.00	Brown sand with gravel.
1546975	WS2	None Supplied	0.50	Brown loam and clay with gravel and vegetation.
1546976	WS3	None Supplied	0.30	Brown sand.
1546977	WS4	None Supplied	0.50	Brown sand with brick.
1546978	WS5	None Supplied	1.00	Brown sand.
1546979	WS6	None Supplied	0.70	Grey sand.
1546980	WS6	None Supplied	4.00	Brown sand.
1546981	WS7	None Supplied	0.50	Brown sand with gravel.
1546982	WS7	None Supplied	2.5	Brown sand.
1546983	WS8	None Supplied	0.50	Brown sand with gravel.
1546984	WS8	None Supplied	1.50	Brown clay.
1546985	WS9	None Supplied	1.50	Brown clay.
1546986	WS9	None Supplied	3.50	Brown sand.
1546987	WS10	None Supplied	1.00	Brown sand.
1546988	WS10	None Supplied	2.00	Brown sand.
1546989	TR03	None Supplied	0.30	Brown sand with gravel.
1546990	TR12	None Supplied	0.80	Grey sand with gravel.

Analytical Report Number : 20-16622

Project / Site name: Longcross

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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
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. (30 oC)	In house method.	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.	In house method.	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.	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.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 20-16622

Project / Site name: Longcross

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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Analytical Report Number : 20-17560

Project / Site name:	Longcross	**Samples received on:**	30/06/2020
Your job number:	200576	**Sample instructed/ Analysis started on:**	01/07/2020
Your order number:	200576_CK	**Analysis completed by:**	10/07/2020
Report Issue Number:	1	**Report issued on:**	10/07/2020
Samples Analysed:	2 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team

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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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-17560

Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1551916	1551917			
Sample Reference				TR01	TR01			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.25	1.00-1.50			
Date Sampled				29/06/2020	29/06/2020			
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	11	11			
Total mass of sample received	kg	0.001	NONE	1.0	1.0			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.7	4.9			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	MCERTS	580	330			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.10	0.040			
Sulphide	mg/kg	1	MCERTS	2.5	< 1.0			
Organic Matter	%	0.1	MCERTS	0.6	0.1			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.3	< 0.1			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.06	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.5	2.3			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.4			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	11			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	6.3			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	72	7.8			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	3.5			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	26	7.7			

Analytical Report Number: 20-17560

Project / Site name: Longcross
Your Order No: 200576_CK

Lab Sample Number				1551916	1551917			
Sample Reference				TR01	TR01			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.25	1.00-1.50			
Date Sampled				29/06/2020	29/06/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

Analytical Report Number : 20-17560

Project / Site name: Longcross

* 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 *
1551916	TR01	None Supplied	0.25	Brown sand with gravel and brick.
1551917	TR01	None Supplied	1.00-1.50	Light brown sand.

Analytical Report Number : 20-17560

Project / Site name: Longcross

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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
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. (30 oC)	In house method.	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.	In house method.	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.	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.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 20-17560

Project / Site name: Longcross

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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Analytical Report Number : 20-18271

Project / Site name:	Longcross	**Samples received on:**	08/07/2020
Your job number:	200576	**Sample instructed/ Analysis started on:**	09/07/2020
Your order number:	200576	**Analysis completed by:**	17/07/2020
Report Issue Number:	1	**Report issued on:**	17/07/2020
Samples Analysed:	1 water sample		

Signed: A. Czerwińska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
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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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-18271

Project / Site name: Longcross

Your Order No: 200576

Lab Sample Number				1555833				
Sample Reference				BH05				
Sample Number				None Supplied				
Depth (m)				7.07				
Date Sampled				07/07/2020				
Time Taken				1315				
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	6.3				
Total Cyanide	µg/l	10	ISO 17025	< 10				
Sulphate as SO_4	µg/l	45	ISO 17025	20000				
Sulphide	µg/l	5	NONE	< 5.0				
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	2.06				
Hardness - Total	mgCaCO3/l	1	ISO 17025	314				
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10				
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Pyrene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01				
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16				
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.24				
Boron (dissolved)	µg/l	10	ISO 17025	51				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.19				
Calcium (dissolved)	mg/l	0.012	ISO 17025	96				
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Copper (dissolved)	µg/l	0.5	ISO 17025	1.1				
Lead (dissolved)	µg/l	0.2	ISO 17025	0.5				
Magnesium (dissolved)	mg/l	0.005	ISO 17025	18				
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05				
Nickel (dissolved)	µg/l	0.5	ISO 17025	28				
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.7				
Zinc (dissolved)	µg/l	0.5	ISO 17025	20				
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Analytical Report Number: 20-18271

Project / Site name: Longcross

Your Order No: 200576

Lab Sample Number				1555833				
Sample Reference				BH05				
Sample Number				None Supplied				
Depth (m)				7.07				
Date Sampled				07/07/2020				
Time Taken				1315				
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH1 (C10 - C40)	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-18271

Project / Site name: Longcross

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
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-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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Analytical Report Number : 20-19675

Project / Site name:	Longcross	**Samples received on:**	16/07/2020
Your job number:	200576	**Sample instructed/ Analysis started on:**	16/07/2020
Your order number:	200576	**Analysis completed by:**	27/07/2020
Report Issue Number:	1	**Report issued on:**	27/07/2020
Samples Analysed:	1 water sample		

Signed: A. Czerwińska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
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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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-19675

Project / Site name: Longcross

Your Order No: 200576

Lab Sample Number				1564112				
Sample Reference				BH06				
Sample Number				None Supplied				
Depth (m)				13.53				
Date Sampled				15/07/2020				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	6.1				
Total Cyanide	µg/l	10	ISO 17025	< 10				
Sulphate as SO_4	µg/l	45	ISO 17025	18700				
Sulphide	µg/l	5	NONE	< 5.0				
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	1.99				
Hardness - Total	mgCaCO3/l	1	ISO 17025	234				
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10				
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Pyrene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01				
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16				
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.35				
Boron (dissolved)	µg/l	10	ISO 17025	53				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.12				
Calcium (dissolved)	mg/l	0.012	ISO 17025	70				
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Copper (dissolved)	µg/l	0.5	ISO 17025	1.0				
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Magnesium (dissolved)	mg/l	0.005	ISO 17025	14				
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05				
Nickel (dissolved)	µg/l	0.5	ISO 17025	20				
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.6				
Zinc (dissolved)	µg/l	0.5	ISO 17025	8.9				

Analytical Report Number: 20-19675

Project / Site name: Longcross

Your Order No: 200576

Lab Sample Number				1564112				
Sample Reference				BH06				
Sample Number				None Supplied				
Depth (m)				13.53				
Date Sampled				15/07/2020				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
Petroleum Hydrocarbons								
TPH1 (C10 - C40)	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-19675

Project / Site name: Longcross

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
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-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.

building & project consultants

Soil Analysis Longcross

TP / BH No	WS1	WS1	WS2	WS3	WS4	WS5	WS6	WS6	WS7	WS7	WS8	WS8	WS9	WS9	WS10	WS10	TR03	TR12	TR01	TR01
Depth (m)	0.5	2	0.5	0.3	0.5	1	0.7	4	0.5	2.5	0.5	1.5	1.5	3.5	1	2	0.3	0.8	0.25	1.00-1.50
Date Sampled	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	29/06/2020	29/06/2020
Report No:	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-17560	20-17560
Sample No	1546973	1546974	1546975	1546976	1546977	1546978	1546979	1546980	1546981	1546982	1546983	1546984	1546985	1546986	1546987	1546988	1546989	1546990	1551916	1551917

Determinand	Unit	LOD	GAC																			
Asbestos Screen (S)	N/a	N/a	Detection	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
pH - Automated	pH Units	N/A	N/A	8.5	7.7	8	6.1	8.8	4.5	7.7	8.7	9.2	7.4	5.2	4.3	4.6	5.5	4.7	5	5.1	7.5	9.7	4.9
Total Cyanide	mg/kg	1	N/A	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	N/A	810	110	280	240	720	160	250	1500	380	59	190	290	150	220	250	240	250	2400	580	330
Water Soluble SO4 16hr extraction (	g/l	0.0013	N/A	0.14	0.0078	0.058	0.084	0.3	0.064	0.1	0.054	0.082	0.009	0.02	0.045	0.048	0.035	0.067	0.029	0.045	1.4	0.1	0.04
Sulphide	mg/kg	1	N/A	13	1.5	< 1.0	< 1.0	3.9	3.9	< 1.0	1.4	1	2.3	< 1.0	< 1.0	< 1.0	< 1.0	1	< 1.0	< 1.0	91	2.5	< 1.0
Organic Matter	%	0.1	N/A	6.3	0.3	1.2	0.3	0.8	0.2	0.2	0.2	2	0.4	1.6	0.3	0.2	0.2	0.2	0.2	0.2	5.5	0.6	0.1
Total Organic Carbon (TOC)	%	0.1	N/A	3.6	0.2	0.7	0.2	0.5	0.1	0.1	< 0.1	1.2	0.3	0.9	0.2	0.1	0.1	0.1	0.1	0.1	3.2	0.3	< 0.1
Arsenic (As)	mg/kg	< 2	640	9	1.9	9.1	5.3	12	8.4	4.9	3.1	7	12	6.1	51	7	2.1	2	14	17	12	6.5	2.3
Boron	mg/kg	<0.2	N/A	0.6	< 0.2	< 0.2	0.4	1.2	0.7	0.5	< 0.2	0.5	0.4	0.2	0.7	< 0.2	0.3	< 0.2	< 0.2	0.4	0.9	0.6	0.4
Cadmium (Cd)	mg/kg	< 0.2	410	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	8600	23	17	20	30	26	38	26	16	18	33	20	57	27	13	15	26	26	38	15	11
Copper (Cu)	mg/kg	< 4	68000	13	31	21	7.1	10	4.2	5.3	4.5	59	4.3	5.1	18	5.2	7.6	6.4	23	13	120	23	6.3
Lead (Pb)	mg/kg	< 3	2330	44	10	33	7.2	35	5.8	6.3	8.1	17	4.8	6.3	19	6.5	5.8	6.6	5.3	6.4	50	72	7.8
Mercury (Hg)	mg/kg	< 1	1100	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (Ni)	mg/kg	< 3	980	18	9.2	11	6.5	11	12	6.1	4.4	15	8.5	11	19	7.6	4.9	7.8	6	9	68	15	3.5
Selenium (Se)	mg/kg	< 3	12000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (Zn)	mg/kg	< 3	730000	86	17	56	15	47	26	13	5.2	29	13	8.5	38	14	5.1	3.3	6.3	22	150	26	7.7
Total Phenols (monohydric)	mg/kg	< 2	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	mg/kg	< 0.1	460	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	< 0.1	97000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	< 0.1	97000	0.23	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	< 0.1	68000	0.26	< 0.05	< 0.05	< 0.05	1.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.25	< 0.05	< 0.05
Phenanthrene	mg/kg	< 0.1	22000	2	< 0.05	0.53	0.3	5.4	< 0.05	< 0.05	< 0.05	2.3	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2	< 0.05	< 0.05
Anthracene	mg/kg	< 0.1	540000	0.56	< 0.05	0.31	0.11	2.4	< 0.05	< 0.05	< 0.05	0.67	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	< 0.05	< 0.05
Fluoranthene	mg/kg	< 0.1	23000	3.5	< 0.05	2.5	0.6	12	< 0.05	< 0.05	< 0.05	3.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3.4	< 0.05	< 0.05
Pyrene	mg/kg	< 0.1	22000	3.6	< 0.05	2.3	0.48	8	< 0.05	< 0.05	< 0.05	3.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	< 0.1	N/A	1.8	< 0.05	2	0.34	4.9	< 0.05	< 0.05	< 0.05	2.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2	< 0.05	< 0.05
Chrysene	mg/kg	< 0.1	N/A	1.7	< 0.05	1.5	0.3	5	< 0.05	< 0.05	< 0.05	1.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.8	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	< 0.1	N/A	2.1	< 0.05	2.6	0.29	4.1	< 0.05	< 0.05	< 0.05	2.3	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.6	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	< 0.1	N/A	1.4	< 0.05	1.3	0.25	2.4	< 0.05	< 0.05	< 0.05	1.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.2	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	< 0.1	76	1.7	< 0.05	1.7	0.26	3.2	< 0.05	< 0.05	< 0.05	1.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.3	0.06	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	N/A	0.78	< 0.05	1.2	< 0.05	1.5	< 0.05	< 0.05	< 0.05	0.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.68	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	< 0.1	N/A	< 0.05	< 0.05	0.26	< 0.05	0.58	< 0.05	< 0.05	< 0.05	0.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.27	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	< 0.1	N/A	1.1	< 0.05	1.3	< 0.05	1.6	< 0.05	< 0.05	< 0.05	1.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.82	< 0.05	< 0.05
Total EPA-16 PAHs	mg/kg	< 1.6	N/A	20.7	< 0.80	17.5	2.93	53.1	< 0.80	< 0.80	< 0.80	21.7	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	18.9	< 0.80	< 0.80
Aliphatic >C5 - C6	mg/kg	< 0.01	5900	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C6 - C8	mg/kg	< 0.05	17000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C8 - C10	mg/kg	< 2	4800	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C10 - C12	mg/kg	< 2	23000	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic >C12 - C16	mg/kg	< 3	82000 (24)	25	< 2.0	< 2.0	< 2.0	62	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic >C16 - C21	mg/kg	< 3	1700000	83	< 8.0	< 8.0	< 8.0	87	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic >C21 - C35	mg/kg	< 10	1700000	560	< 8.0	< 8.0	< 8.0	49	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic (C5 - C35)	mg/kg	< 21	N/A	670	< 10	< 10	< 10	200	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic >C5 - C7	mg/kg	< 0.01	46000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C7 - C8	mg/kg	< 0.05	110000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C8 - C10	mg/kg	< 2	8100	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C10 - C12	mg/kg	< 2	28000	1.9	< 1.0	< 1.0	< 1.0	2.9	< 1.0	< 1.0	< 1.0	2.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic >C12 - C16	mg/kg	< 2	37000 (169)	28	< 2.0	2.8	< 2.0	64	< 2.0	< 2.0	< 2.0	6.3	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic >C16 - C21	mg/kg	< 3	28000	170	< 10	16	< 10	160	< 10	< 10	< 10	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic >C21 - C35	mg/kg	< 10	28000	1600	< 10	72	< 10	220	< 10	< 10	< 10	45	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	34	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	N/A	1800	< 10	90	< 10	440	< 10	< 10	< 10	73	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	43	< 10	< 10
TPH C10 - C40	mg/kg	10	N/A	3800	< 10	90	< 10	640	< 10	< 10	< 10	73	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	43	< 10	< 10
Benzene	ug/kg	< 2	98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	< 5	110000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	< 2	13000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	< 2	14000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	< 2	15000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	ug/kg	< 5	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Made Ground Analysis
Longcross

TP / BH No	WS1	WS2	WS4	WS6	WS7	WS8	TR01
Depth (m)	0.5	0.5	0.5	0.7	0.5	0.5	0.25
Date Sampled	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	29/06/2020
Report No:	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-17560
Sample No	1546973	1546975	1546977	1546979	1546981	1546983	1551916

Determinand	Unit	LOD	GAC							
Asbestos Screen (S)	N/a	N/a	Detection	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
pH - Automated	pH Units	N/A	N/A	8.5	8	8.8	7.7	9.2	5.2	9.7
Total Cyanide	mg/kg	1	N/A	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	N/A	810	280	720	250	380	190	580
Water Soluble SO4 16hr extraction (	g/l	0.0013	N/A	0.14	0.058	0.3	0.1	0.082	0.02	0.1
Sulphide	mg/kg	1	N/A	13	< 1.0	3.9	< 1.0	1	< 1.0	2.5
Organic Matter	%	0.1	N/A	6.3	1.2	0.8	0.2	2	1.6	0.6
Total Organic Carbon (TOC)	%	0.1	N/A	3.6	0.7	0.5	0.1	1.2	0.9	0.3
Arsenic (As)	mg/kg	< 2	640	9	9.1	12	4.9	7	6.1	6.5
Boron	mg/kg	<0.2	N/A	0.6	< 0.2	1.2	0.5	0.5	0.2	0.6
Cadmium (Cd)	mg/kg	< 0.2	410	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	8600	23	20	26	26	18	20	15
Copper (Cu)	mg/kg	< 4	68000	13	21	10	5.3	59	5.1	23
Lead (Pb)	mg/kg	< 3	2330	44	33	35	6.3	17	6.3	72
Mercury (Hg)	mg/kg	< 1	1100	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (Ni)	mg/kg	< 3	980	18	11	11	6.1	15	11	15
Selenium (Se)	mg/kg	< 3	12000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (Zn)	mg/kg	< 3	730000	86	56	47	13	29	8.5	26
Total Phenols (monohydric)	mg/kg	< 2	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	mg/kg	< 0.1	460	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	< 0.1	97000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	< 0.1	97000	0.23	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	< 0.1	68000	0.26	< 0.05	1.9	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	< 0.1	22000	2	0.53	5.4	< 0.05	2.3	< 0.05	< 0.05
Anthracene	mg/kg	< 0.1	540000	0.56	0.31	2.4	< 0.05	0.67	< 0.05	< 0.05
Fluoranthene	mg/kg	< 0.1	23000	3.5	2.5	12	< 0.05	3.5	< 0.05	< 0.05
Pyrene	mg/kg	< 0.1	N/A	3.6	2.3	8	< 0.05	3.4	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	< 0.1	N/A	1.8	2	4.9	< 0.05	2.4	< 0.05	< 0.05
Chrysene	mg/kg	< 0.1	N/A	1.7	1.5	5	< 0.05	1.9	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	< 0.1	N/A	2.1	2.6	4.1	< 0.05	2.3	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	< 0.1	N/A	1.4	1.3	2.4	< 0.05	1.1	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	< 0.1	76	1.7	1.7	3.2	< 0.05	1.9	< 0.05	0.06
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	N/A	0.78	1.2	1.5	< 0.05	0.9	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	< 0.1	N/A	< 0.05	0.26	0.58	< 0.05	0.25	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	< 0.1	N/A	1.1	1.3	1.6	< 0.05	1.1	< 0.05	< 0.05
Total EPA-16 PAHs	mg/kg	< 1.6	N/A	20.7	17.5	53.1	< 0.80	21.7	< 0.80	< 0.80
Aliphatic >C5 - C6	mg/kg	< 0.01	5900	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C6 - C8	mg/kg	< 0.05	17000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C8 - C10	mg/kg	< 2	4800	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C10 - C12	mg/kg	< 2	23000	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic >C12 - C16	mg/kg	< 3	82000	25	< 2.0	62	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic >C16 - C21	mg/kg	< 3	1700000	83	< 8.0	87	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic >C21 - C35	mg/kg	< 10	1700000	560	< 8.0	49	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic (C5 - C35)	mg/kg	< 21	N/A	670	< 10	200	< 10	< 10	< 10	< 10
Aromatic >C5 - C7	mg/kg	< 0.01	46000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C7 - C8	mg/kg	< 0.05	110000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C8 - C10	mg/kg	< 2	8100	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C10 - C12	mg/kg	< 2	28000	1.9	< 1.0	2.9	< 1.0	2.1	< 1.0	< 1.0
Aromatic >C12 - C16	mg/kg	< 2	37000	28	2.8	64	< 2.0	6.3	< 2.0	< 2.0
Aromatic >C16 - C21	mg/kg	< 3	28000	170	16	160	< 10	20	< 10	< 10
Aromatic >C21 - C35	mg/kg	< 10	28000	1600	72	220	< 10	45	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	N/A	1800	90	440	< 10	73	< 10	< 10
TPH C10 - C40	mg/kg	10	N/A	3800	90	640	< 10	73	< 10	< 10
Benzene	ug/kg	< 2	27	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	< 5	11000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	< 2	13000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	< 2	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	< 2	15000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	ug/kg	< 5	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Natural Soil Analysis
Longcross

TP / BH No				WS1	WS3	WS5	WS6	WS7	WS8	WS9	WS9	WS10	WS10	TR03	TR12	TR01
Depth (m)				2	0.3	1	4	2.5	1.5	1.5	3.5	1	2	0.3	0.8	1.00-1.50
Date Sampled				23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	29/06/2020
Report No:				20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-16622	20-17560
Sample No				1546974	1546976	1546978	1546980	1546982	1546984	1546985	1546986	1546987	1546988	1546989	1546990	1551917
Determinand	**Unit**	**LOD**	**GAC (Commercial Use)**													
Asbestos Screen (S)	N/a	N/a	Detection	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
pH - Automated	pH Units	N/A	N/A	7.7	6.1	4.5	8.7	7.4	4.3	4.6	5.5	4.7	5	5.1	7.5	4.9
Total Cyanide	mg/kg	1	N/A	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	N/A	110	240	160	1500	59	290	150	220	250	240	250	2400	330
Water Soluble SO4 16hr extraction (2	g/l	0.00125	N/A	0.0078	0.084	0.064	0.054	0.009	0.045	0.048	0.035	0.067	0.029	0.045	1.4	0.04
Sulphide	mg/kg	1	N/A	1.5	< 1.0	3.9	1.4	2.3	< 1.0	< 1.0	< 1.0	1	< 1.0	< 1.0	91	< 1.0
Organic Matter	%	0.1	N/A	0.3	0.3	0.2	0.2	0.4	0.3	0.2	0.2	0.2	0.2	0.2	5.5	0.1
Total Organic Carbon (TOC)	%	0.1	N/A	0.2	0.2	0.1	< 0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	3.2	< 0.1
Arsenic (As)	mg/kg	< 2	640	1.9	5.3	8.4	3.1	12	51	7	2.1	2	14	17	12	2.3
Boron	mg/kg	<0.2	N/A	< 0.2	0.4	0.7	< 0.2	0.4	0.7	< 0.2	0.3	< 0.2	< 0.2	0.4	0.9	0.4
Cadmium (Cd)	mg/kg	< 0.2	410	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	8600	17	30	38	16	33	57	27	13	15	26	26	38	11
Copper (Cu)	mg/kg	< 4	68000	31	7.1	4.2	4.5	4.3	18	5.2	7.6	6.4	23	13	120	6.3
Lead (Pb)	mg/kg	< 3	2330	10	7.2	5.8	8.1	4.8	19	6.5	5.8	6.6	5.3	6.4	50	7.8
Mercury (Hg)	mg/kg	< 1	1100	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (Ni)	mg/kg	< 3	980	9.2	6.5	12	4.4	8.5	19	7.6	4.9	7.8	6	9	68	3.5
Selenium (Se)	mg/kg	< 3	12000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	< 1.0	< 1.0	< 1.0
Zinc (Zn)	mg/kg	< 3	730000	17	15	26	5.2	13	38	14	5.1	3.3	6.3	22	150	7.7
Total Phenols (monohydric)	mg/kg	< 2	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	mg/kg	< 0.1	460	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	< 0.1	97000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	< 0.1	97000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	< 0.1	68000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.25	< 0.05
Phenanthrene	mg/kg	< 0.1	22000	< 0.05	0.3	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2	< 0.05
Anthracene	mg/kg	< 0.1	540000	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	< 0.05
Fluoranthene	mg/kg	< 0.1	23000	< 0.05	0.6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3.4	< 0.05
Pyrene	mg/kg	< 0.1	N/A	< 0.05	0.48	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3	< 0.05
Benzo(a)anthracene	mg/kg	< 0.1	N/A	< 0.05	0.34	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2	< 0.05
Chrysene	mg/kg	< 0.1	N/A	< 0.05	0.3	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.8	< 0.05
Benzo(b)fluoranthene	mg/kg	< 0.1	N/A	< 0.05	0.29	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.6	< 0.05
Benzo(k)fluoranthene	mg/kg	< 0.1	N/A	< 0.05	0.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.2	< 0.05
Benzo(a)pyrene	mg/kg	< 0.1	76	< 0.05	0.26	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.3	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	N/A	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.68	< 0.05
Dibenz(a,h)anthracene	mg/kg	< 0.1	N/A	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.27	< 0.05
Benzo(ghi)perylene	mg/kg	< 0.1	N/A	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.82	< 0.05
Total EPA-16 PAHs	mg/kg	< 1.6	N/A	< 0.80	2.93	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	18.9	< 0.80
Aliphatic >C5 - C6	mg/kg	< 0.01	5900	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C6 - C8	mg/kg	< 0.05	17000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C8 - C10	mg/kg	< 2	4800	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aliphatic >C10 - C12	mg/kg	< 2	23000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic >C12 - C16	mg/kg	< 3	82000	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic >C16 - C21	mg/kg	< 3	1700000	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic >C21 - C35	mg/kg	< 10	1700000	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic (C5 - C35)	mg/kg	< 21	N/A	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic >C5 - C7	mg/kg	< 0.01	46000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C7 - C8	mg/kg	< 0.05	110000	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C8 - C10	mg/kg	< 2	8100	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Aromatic >C10 - C12	mg/kg	< 2	28000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic >C12 - C16	mg/kg	< 2	37000	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic >C16 - C21	mg/kg	< 3	28000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic >C21 - C35	mg/kg	< 10	28000	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	34	< 10
Aromatic (C5 - C35)	mg/kg	< 21	N/A	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	43	< 10
TPH C10 - C40	mg/kg	10	N/A	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	43	< 10
Benzene	ug/kg	< 2	27	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	< 5	11000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	< 2	13000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	< 2	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	< 2	15000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	ug/kg	< 5	N/A	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Water Analysis
Longcross

TP / BH No	BH05	BH06
Depth (m)	7.07	13.53
Date Sampled	07/07/2020	15/07/2020
Lab Report No:	20-18271	20-19675
Lab Sample No	1555833	1564112

Determinand	Unit	LOD	GAC Freshwater EQS (ug/l)		
pH	pH Units	N/A	6.0-9.0	6.3	6.1
Total Cyanide	ug/l	<10	N/A	< 10	< 10
Sulphate as SO4	ug/l	<45	N/A	20000	18700
Sulphide	ug/l	<5	N/A	< 5.0	< 5.0
Total Organic Carbon (TOC)	mg/l	< 0.1	N/A	2.06	1.99
Hardness - Total	mgCaCO3/l	< 1	N/A	314	234
Arsenic (dissolved)	µg/l	0.15	50	0.24	0.35
Boron (dissolved)	µg/l	10	N/A	51	53
Cadmium (dissolved)	µg/l	0.02	0.08	0.19	0.12
Calcium (dissolved)	mg/l	0.012	N/A	96	70
Chromium (dissolved)	µg/l	0.2	4.7	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	1	1.1	1
Lead (dissolved)	µg/l	0.2	4	0.5	< 0.2
Magnesium (dissolved)	mg/l	0.005	N/A	18	14
Mercury (dissolved)	µg/l	0.05	0.07	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	4	28	20
Selenium (dissolved)	µg/l	0.6	10	0.7	0.6
Zinc (dissolved)	µg/l	0.5	10.9	20	8.9
Total Phenols (monohydric)	ug/l	< 10	7.7	< 10	< 10
Naphthalene	ug/l	< 0.01	2	< 0.01	< 0.01
Acenaphthylene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Fluorene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Phenanthrene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Anthracene	ug/l	< 0.01	0.1	< 0.01	< 0.01
Fluoranthene	ug/l	< 0.01	0.1	< 0.01	< 0.01
Pyrene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	0.02	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	N/A	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	< 0.008	N/A	< 0.01	< 0.01
Total EPA-16 PAHs	ug/l	< 0.01	N/A	< 0.16	< 0.16
Aliphatic >C5 - C6	ug/l	< 1	N/A	< 1.0	< 1.0
Aliphatic >C6 - C8	ug/l	< 1	N/A	< 1.0	< 1.0
Aliphatic >C8 - C10	ug/l	< 1	N/A	< 1.0	< 1.0
Aliphatic >C10 - C12	ug/l	< 10	N/A	< 10	< 10
Aliphatic >C12 - C16	ug/l	< 10	N/A	< 10	< 10
Aliphatic >C16 - C21	ug/l	< 10	N/A	< 10	< 10
Aliphatic >C21 - C35	ug/l	< 10	N/A	< 10	< 10
Aliphatic (C5 - C35)	ug/l	< 10	N/A	< 10	< 10
Aromatic >C5 - C7	ug/l	< 1	N/A	< 1.0	< 1.0
Aromatic >C7 - C8	ug/l	< 1	N/A	< 1.0	< 1.0
Aromatic >C8 - C10	ug/l	< 1	N/A	< 1.0	< 1.0
Aromatic >C10 - C12	ug/l	< 10	N/A	< 10	< 10
Aromatic >C12 - C16	ug/l	< 10	N/A	< 10	< 10
Aromatic >C16 - C21	ug/l	< 10	N/A	< 10	< 10
Aromatic >C21 - C35	ug/l	< 10	N/A	< 10	< 10
Aromatic (C5 - C35)	ug/l	< 10	N/A	< 10	< 10
Benzene	ug/l	< 1	10	< 1.0	< 1.0
Toluene	ug/l	< 1	74	< 1.0	< 1.0
Ethylbenzene	ug/l	< 1	300	< 1.0	< 1.0
p & m-xylene	ug/l	< 1	500	< 1.0	< 1.0
o-xylene	ug/l	< 1	500	< 1.0	< 1.0
MTBE	ug/l	< 1	N/A	< 1.0	< 1.0

APPENDIX 9: MONITORING RESULTS

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client:	HPF	**Job No:**	200576		
Site:	Longcross	**Visit No:**	1 **of** 3		
Date:	07.07.20	**Operator:**	JE	**Project Manager:**	CK

Site	Longcross Studios						BH Depth	16.17		
Date	07/07/2020						Water Lvl	7.07		
Hole ID	BH05						Weath/°C	Cloudy / 19°c		
Tech	JE						Atm Press	1012		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.95	
	10	20	30	60	120	180				
O_2	20.40	20.40	20.30	20.30	20.30	20.30	na	Flow Max (l/hr)	-1.12	
CO_2	0.20	0.20	0.20	0.30	0.30	0.30	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0.17	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	15.48		
Date	07/07/2020						Water Lvl	13.52		
Hole ID	BH06						Weath/°C	Cloudy / 19°c		
Tech	JE						Atm Press	1012		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	0	
	10	20	30	60	120	180				
O_2	20.40	20.40	20.30	20.30	20.30	20.40	na	Flow Max (l/hr)	0	
CO_2	0.20	0.40	0.40	0.40	0.40	0.40	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.92		
Date	07/07/2020						Water Lvl	4.57		
Hole ID	WS06						Weath/°C	Cloudy / 19°c		
Tech	JE						Atm Press	1012		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	0	
	10	20	30	60	120	180				
O_2	19.60	18.90	19.30	19.70	19.90	20.00	na	Flow Max (l/hr)	0	
CO_2	1.40	1.00	0.70	0.60	0.50	0.40	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.97		
Date	07/07/2020						Water Lvl	DRY		
Hole ID	WS09						Weth/°C	Cloudy / 19°c		
Tech	JE						Atm Press	1012		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.12	
	10	20	30	60	120	180				
O_2	19.60	17.40	16.80	16.60	16.50	16.50	na	Flow Max (l/hr)	0	
CO_2	2.20	3.40	3.50	3.50	3.50	3.50	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.58		
Date	07/07/2020						Water Lvl	DRY		
Hole ID	WS10						Weath/°C	Cloudy / 19°c		
Tech	JE						Atm Press	1012		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.13	
	10	20	30	60	120	180				
O_2	19.80	17.80	17.20	17.00	16.90	16.80	na	Flow Max (l/hr)	0	
CO_2	1.60	2.30	2.30	2.30	2.40	2.40	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

JOB DETAILS:

Client:	HPF	**Job No:**	200576		
Site:	Longcross	**Visit No:**	2 **of** 3		
Date:	15.07.20	**Operator:**	JE	**Project Manager:**	CK

Site	Longcross Studios						BH Depth	16.15		
Date	15/07/2020						Water Lvl	7.02		
Hole ID	BH05						Weth/°C	Cloudy / 18°c		
Tech	JE						Atm Press	1006		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.26	
	10	20	30	60	120	180				
O_2	20.10	19.10	18.80	18.70	18.70	18.70	na	Flow Max (l/hr)	-0.13	
CO_2	1.60	1.90	2.00	2.00	2.00	2.00	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.05	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	15.4		
Date	15/07/2020						Water Lvl	13.53		
Hole ID	BH06						Weth/°C	Cloudy / 18°c		
Tech	JE						Atm Press	1007		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.79	
	10	20	30	60	120	180				
O_2	20.30	18.00	17.60	17.40	17.40	17.30	na	Flow Max (l/hr)	-0.15	
CO_2	2.40	3.70	3.80	3.90	3.90	3.90	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.1	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.85		
Date	15/07/2020						Water Lvl	4.75		
Hole ID	WS06						Weth/°C	Cloudy / 18°c		
Tech	JE						Atm Press	1006		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	0	
	10	20	30	60	120	180				
O_2	20.00	19.20	19.40	19.80	20.00	20.10	na	Flow Max (l/hr)	0	
CO_2	1.80	1.70	1.30	0.90	0.70	0.70	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.03	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.95		
Date	15/07/2020						Water Lvl	DRY		
Hole ID	WS09						Weth/°C	Cloudy / 18°c		
Tech	JE						Atm Press	1006		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	0	
	10	20	30	60	120	180				
O_2	19.40	17.00	16.30	16.10	16.00	16.00	na	Flow Max (l/hr)	0	
CO_2	3.60	4.90	5.00	5.00	5.10	5.10	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

Site	Longcross Studios						BH Depth	4.6		
Date	15/07/2020						Water Lvl	DRY		
Hole ID	WS10						Weth/°C	Cloudy / 18°c		
Tech	JE						Atm Press	1006		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.26	
	10	20	30	60	120	180				
O_2	19.60	17.90	17.30	17.10	17.00	17.00	na	Flow Max (l/hr)	-0.13	
CO_2	2.30	3.40	3.50	3.50	3.50	3.50	na			
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.05	
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na			
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na	

JOB DETAILS:

Client:	HPF	**Job No:**	200576		
Site:	Longcross	**Visit No:**	3 **of** 3		
Date:	22/07/2020	**Operator:**	JE	**Project Manager:**	CK

Site	Longcross Studios					BH Depth	16.13		
Date	22/07/2020					Water Lvl	7.55		
Hole ID	BH05					Weth/°C	Sunny / 19°c		
Tech	JE					Atm Press	1019		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-1.38
	10	20	30	60	120	180			
O_2	20.30	20.20	20.10	20.10	20.10	20.20	na	Flow Max (l/hr)	-1.42
CO_2	0.20	0.20	0.20	0.20	0.20	0.10	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.33
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na		
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na

Site	Longcross Studios					BH Depth	15.4		
Date	22/07/2020					Water Lvl	13.85		
Hole ID	BH06					Weth/°C	Sunny / 19°c		
Tech	JE					Atm Press	1019		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	0
	10	20	30	60	120	180			
O_2	20.30	20.20	20.20	20.20	20.10	20.10	na	Flow Max (l/hr)	0
CO_2	0.30	0.40	0.40	0.40	0.40	0.40	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na		
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na

Site	Longcross Studios					BH Depth	4.89		
Date	22/07/2020					Water Lvl	DRY		
Hole ID	WS06					Weth/°C	Sunny / 19°c		
Tech	JE					Atm Press	1019		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-1.12
	10	20	30	60	120	180			
O_2	20.20	20.10	20.00	20.10	20.20	20.20	na	Flow Max (l/hr)	-1.08
CO_2	0.50	0.60	0.60	0.50	0.40	0.40	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.17
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na		
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na

Site	Longcross Studios					BH Depth	4.97		
Date	22/07/2020					Water Lvl	DRY		
Hole ID	WS09					Weth/°C	Sunny / 19°c		
Tech	JE					Atm Press	1019		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-0.85
	10	20	30	60	120	180			
O_2	20.20	19.40	19.10	19.00	19.00	18.90	na	Flow Max (l/hr)	-0.54
CO_2	0.90	1.50	1.50	1.50	1.60	1.60	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	-0.12
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na		
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na

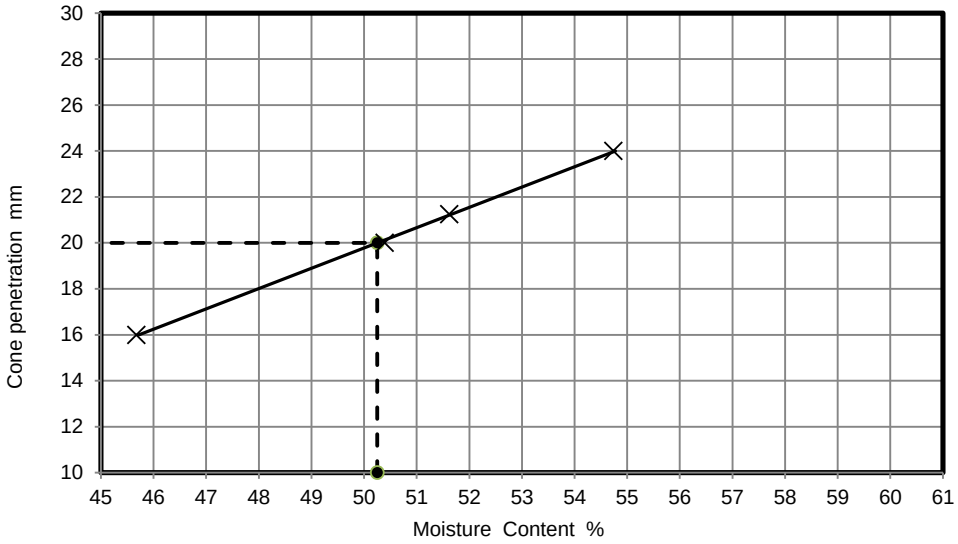
Site	Longcross Studios					BH Depth	4.6		
Date	22/07/2020					Water Lvl	DRY		
Hole ID	WS10					Weth/°C	Sunny / 19°c		
Tech	JE					Atm Press	1019		
Gas (%)	Time (seconds)						Atm (%)	Flow Min (l/hr)	-1.32
	10	20	30	60	120	180			
O_2	19.90	18.70	18.40	18.30	18.30	18.30	na	Flow Max (l/hr)	-1.26
CO_2	1.30	1.70	1.80	1.80	1.70	1.70	na		
CH_4	0.00	0.00	0.00	0.00	0.00		na	Hole Press (mb)	-0.26
H_2S	0.00	0.00	0.00	0.00	0.00	0.00	na		
LEL	0.00	0.00	0.00	0.00	0.00	0.00	na	VOC	na

APPENDIX 10: GEOTECHNICAL LABORATORY TESTING

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

Site Name	Longcross Studios			Sample No.	
Project No.	200576	Client	Paragon	Depth Top	3.00 m
Soil Description	Dark greenish grey sandy silty CLAY			Depth Base	3.45 m
				Sample Type	D
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
				Project Started	15/07/2020
				Date Tested	04/08/2020

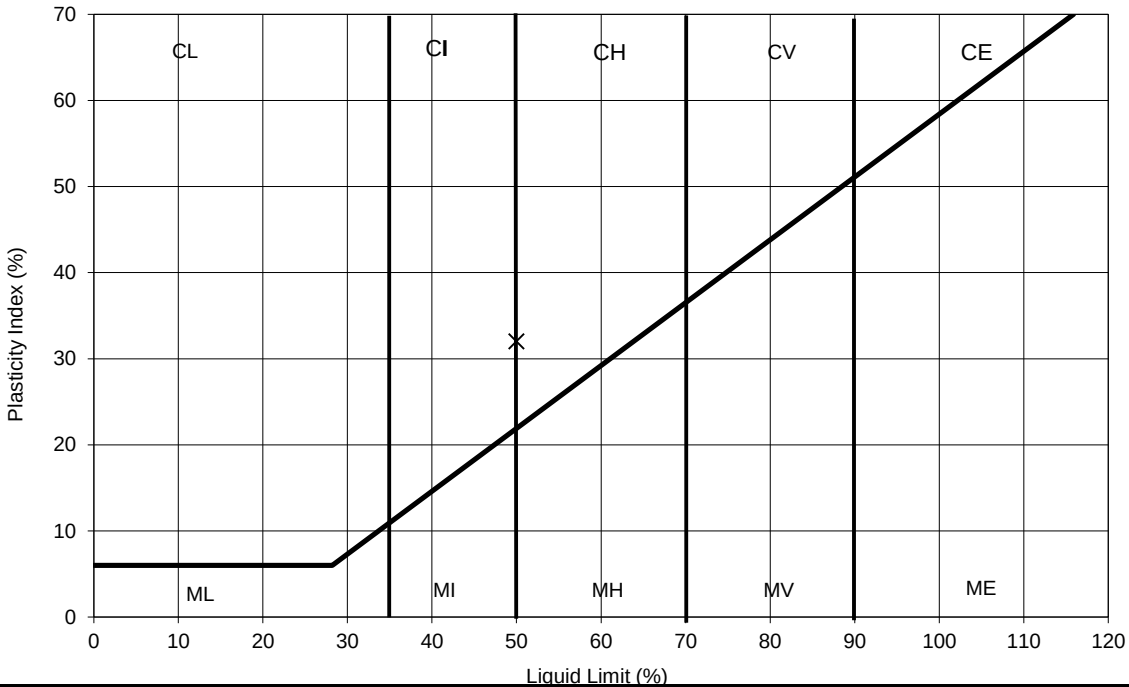
Job No.	28476
Borehole/Pit No.	BH05



NATURAL MOISTURE CONTENT	**21**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**50**	**%**
PLASTIC LIMIT	**18**	**%**
PLASTICITY INDEX	**32**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying method

Checked and Approved

Initials: J.P
Date: 05/08/2020

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

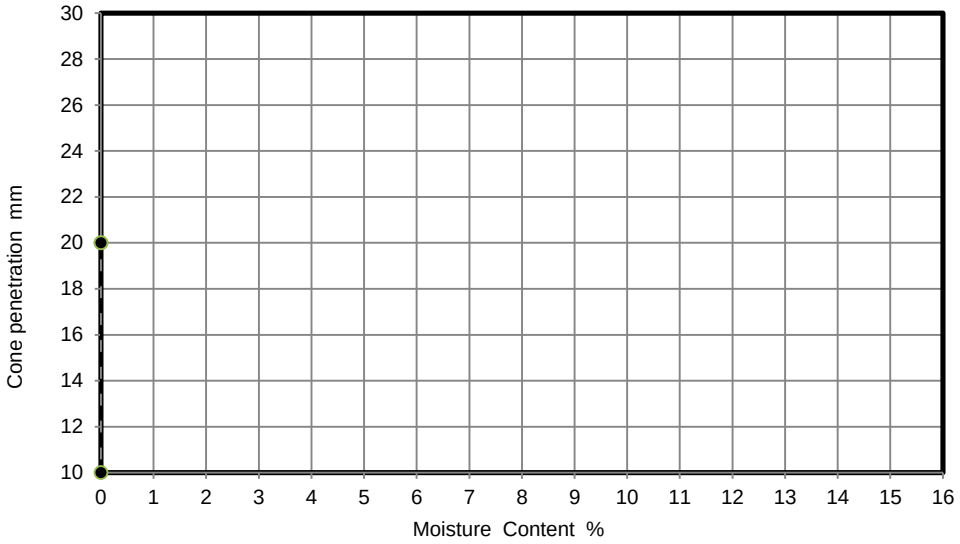
2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

Site Name	Longcross Studios			Sample No.	
Project No.	200576	Client	Paragon	Depth Top	24.00 m
Soil Description	Grey slightly clayey silty SAND			Depth Base	24.10 m
				Sample Type	D
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
				Project Started	15/07/2020
				Date Tested	04/08/2020

Job No.	28476
Borehole/Pit No.	BH05

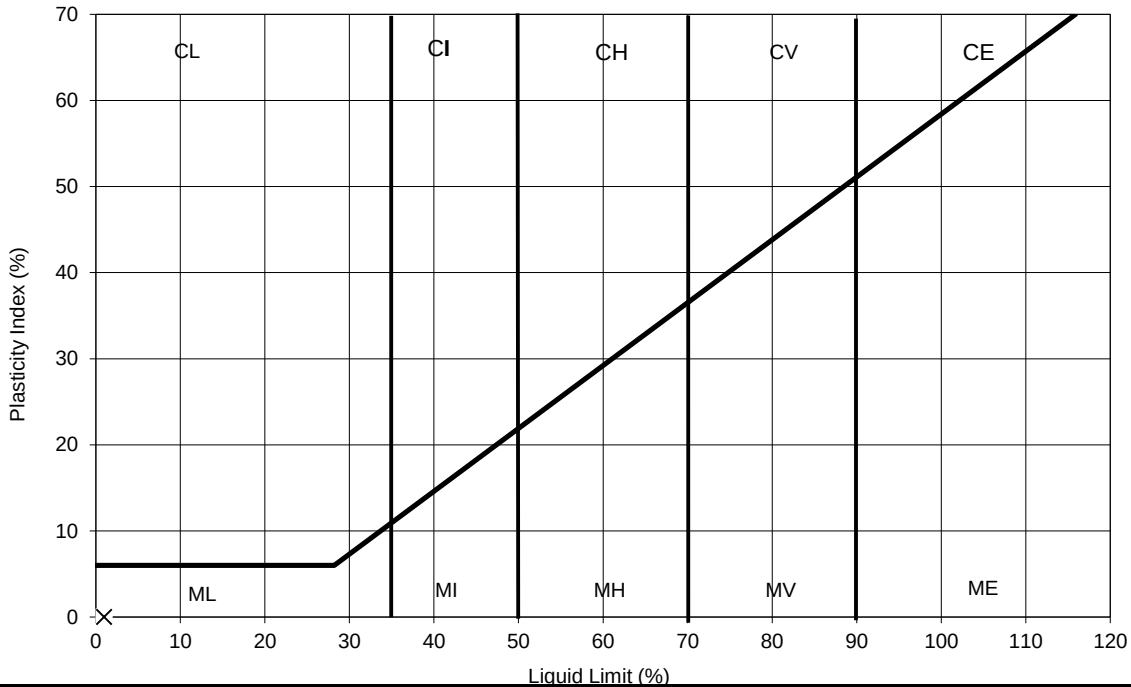


NATURAL MOISTURE CONTENT	**27**	**%**
% PASSING 425µm SIEVE	**-**	**%**
LIQUID LIMIT	**-**	**%**
PLASTIC LIMIT	**-**	**%**
PLASTICITY INDEX	**-**	**%**

Remarks

Non Plastic

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying method

Checked and Approved

Initials: J.P
Date: 05/08/2020

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

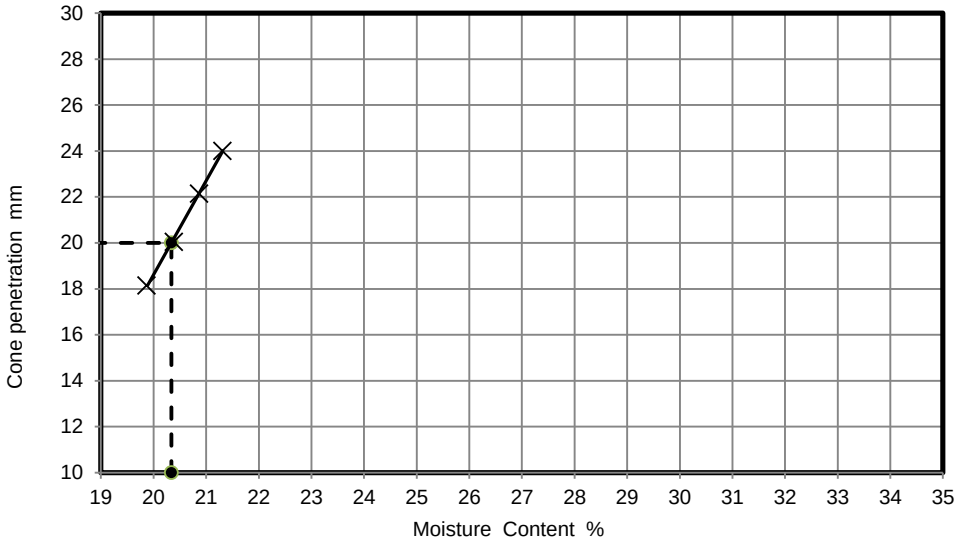
2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

Site Name	Longcross Studios			Sample No.	
Project No.	200576	Client	Paragon	Depth Top	3.50 m
Soil Description	Light brownish grey silty clayey SAND			Depth Base	4.00 m
				Sample Type	U
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
				Project Started	15/07/2020
				Date Tested	04/08/2020

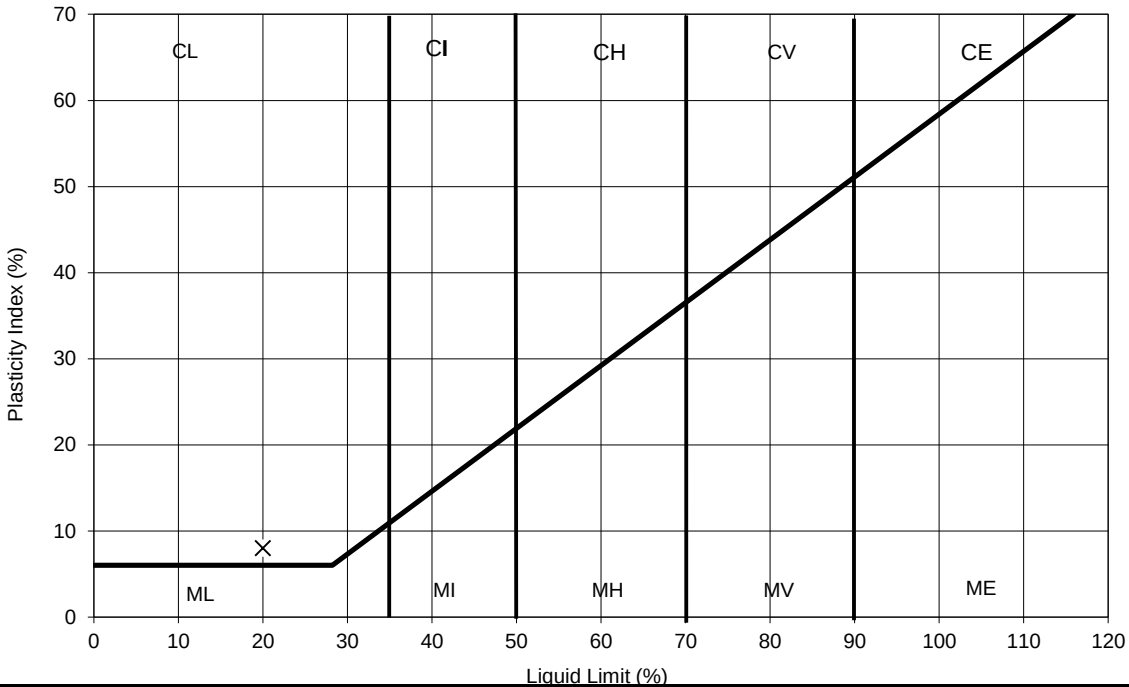
Job No.	28476
Borehole/Pit No.	BH06



NATURAL MOISTURE CONTENT	**13**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**20**	**%**
PLASTIC LIMIT	**12**	**%**
PLASTICITY INDEX	**8**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying method

Checked and Approved

Initials: J.P
Date: 05/08/2020

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

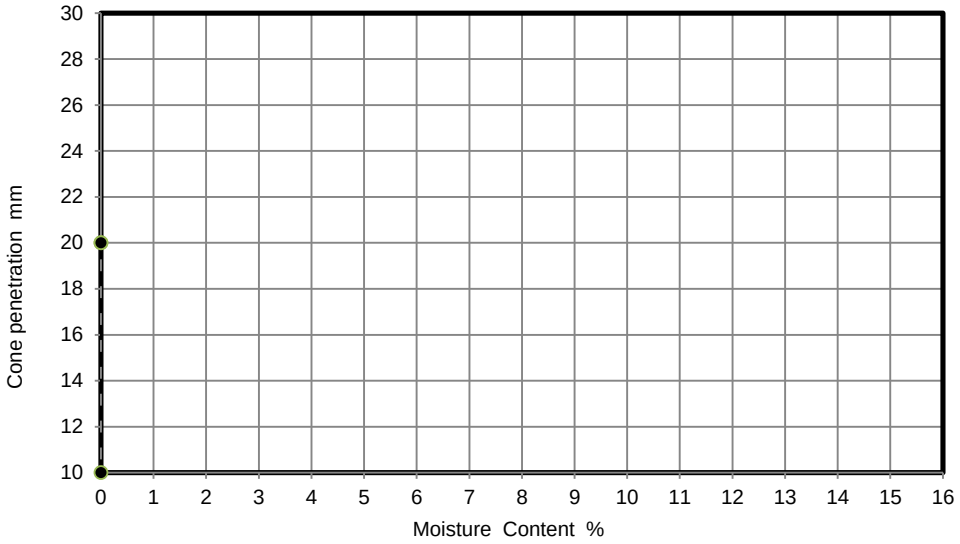
UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

Site Name	Longcross Studios			Sample No.	
Project No.	200576	Client	Paragon	Depth Top	6.50 m
Soil Description	Light grey slightly clayey silty SAND			Depth Base	6.70 m
				Sample Type	D
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
				Project Started	15/07/2020
				Date Tested	04/08/2020

Job No.	28476
Borehole/Pit No.	BH06

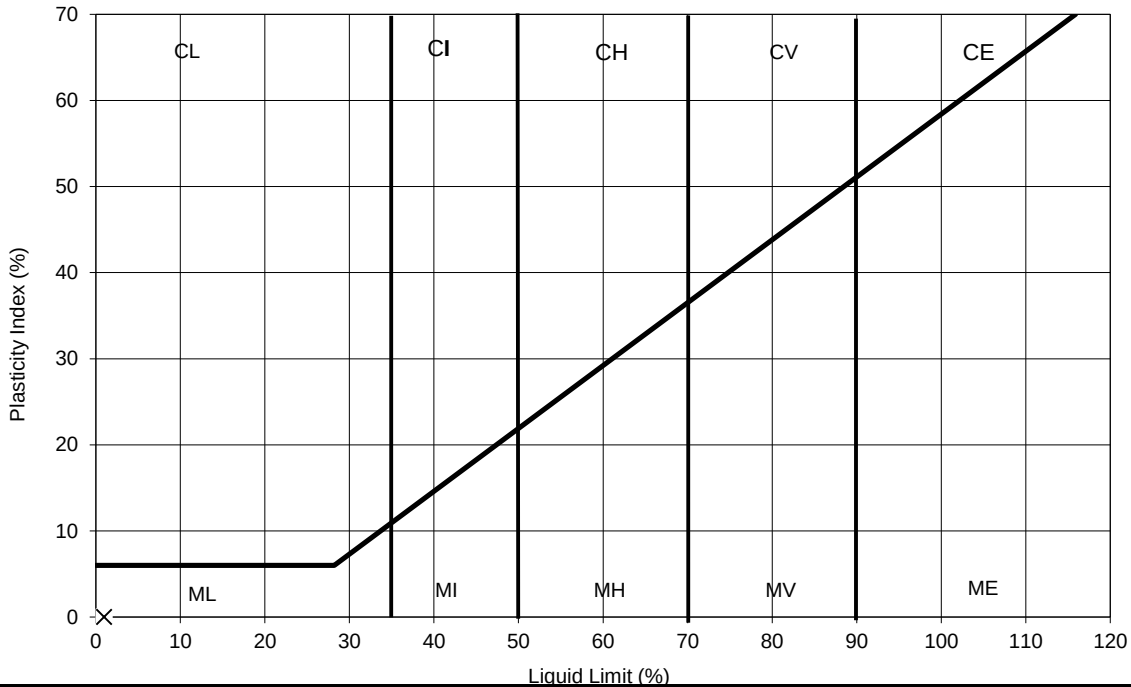


NATURAL MOISTURE CONTENT	**17**	**%**
% PASSING 425µm SIEVE	**-**	**%**
LIQUID LIMIT	**-**	**%**
PLASTIC LIMIT	**-**	**%**
PLASTICITY INDEX	**-**	**%**

Remarks

Non Plastic

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying method

Checked and Approved

Initials: J.P
Date: 05/08/2020

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
28476	Longcross Studios	Samples received	23/06/2020 - 08/07/2020
		Schedule received	14/07/2020
Project No.	Client	Project started	15/07/2020
200576	Paragon	Testing Started	04/08/2020

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
BH05	-	3.00	3.45	D	Dark greenish grey sandy silty CLAY	21	100	50	18	32	
BH05	-	24.00	24.10	D	Grey slightly clayey silty SAND	27	-	-	-	-	Non Plastic
BH06	-	3.50	4.00	U	Light brownish grey silty clayey SAND	13	100	20	12	8	
BH06	-	6.50	6.70	D	Light grey slightly clayey silty SAND	17	-	-	-	-	Non Plastic

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3, 4.4 and 5.0

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

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Email: James@k4soils.com

Checked and Approved

Initials **J.P**

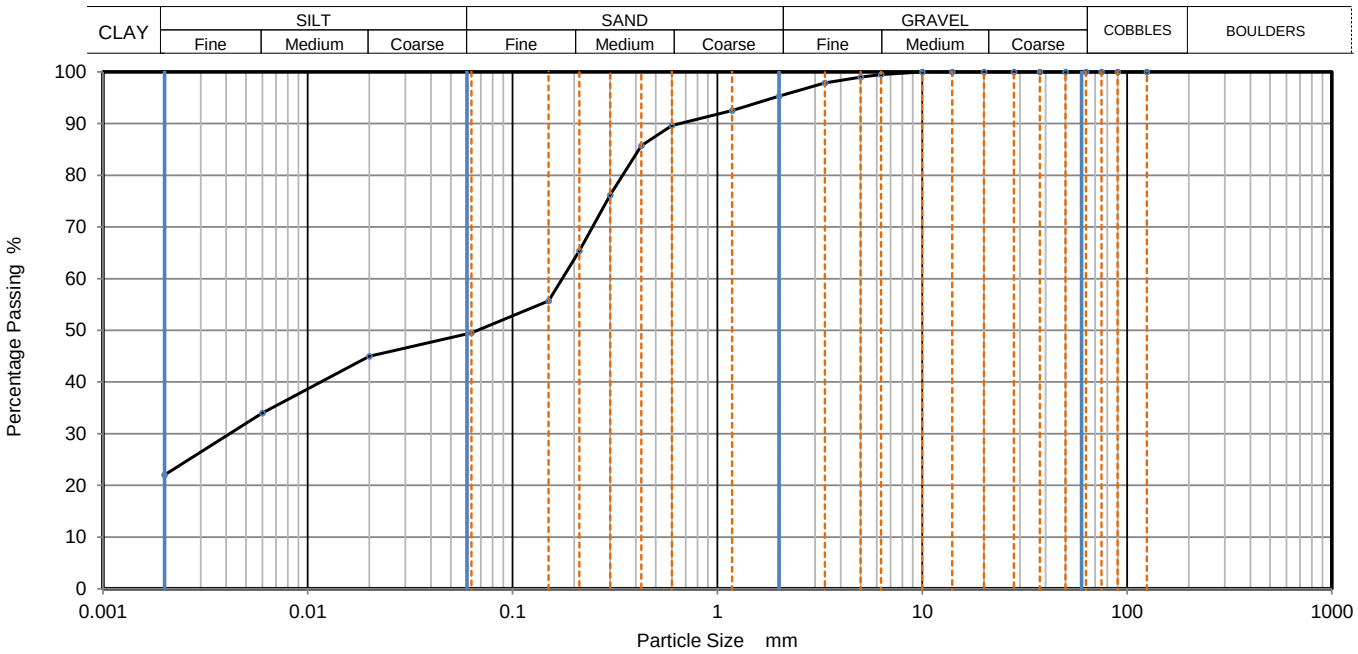
Date: 05/08/2020

UKAS TESTING
2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH01
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	3.00 m
Soil Description	Reddish brown slightly gravelly sandy silty CLAY with occasional pockets of greenish brown sand (gravel is fine)			Depth Base	4.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	45
90	100	0.0060	34
75	100	0.0020	22
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	98		
2	95		
1.18	93		
0.6	90	Particle density	(assumed)
0.425	86	2.70	Mg/m3
0.3	76		
0.212	65		
0.15	56		
0.063	50		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	4.7
Sand	45.7
Silt	27.2
Clay	22.4

Grading Analysis		
D100	mm	
D60	mm	0.175
D30	mm	0.00403
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

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Checked and Approved

Initials: **J.P**

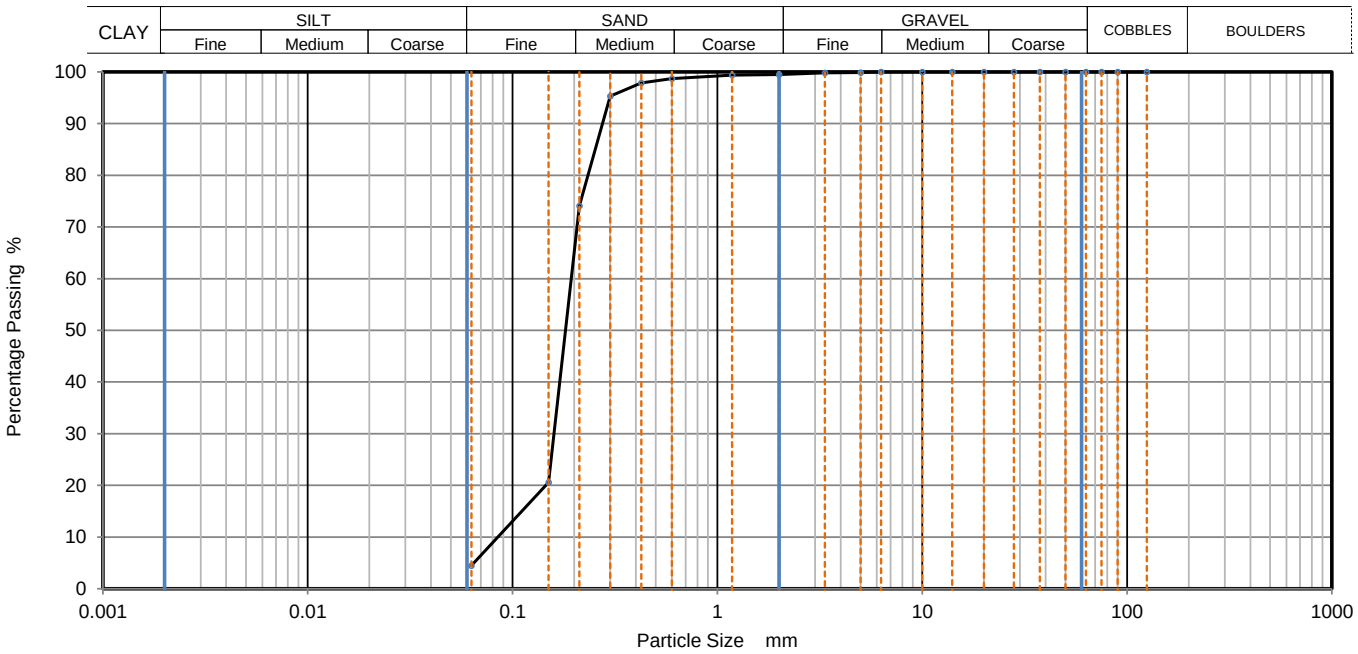
Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH01
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	12.50 m
Soil Description	Brown slightly mottled grey slightly clayey slightly silty SAND with rare fine rootlets			Depth Base	13.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



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	99		
0.425	98		
0.3	95		
0.212	74		
0.15	21		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.5
Sand	95.0
Fines <0.063mm	4.5

Grading Analysis		
D100	mm	
D60	mm	0.194
D30	mm	0.159
D10	mm	0.0848
Uniformity Coefficient		2.3
Curvature Coefficient		1.5

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UKAS TESTING 2519

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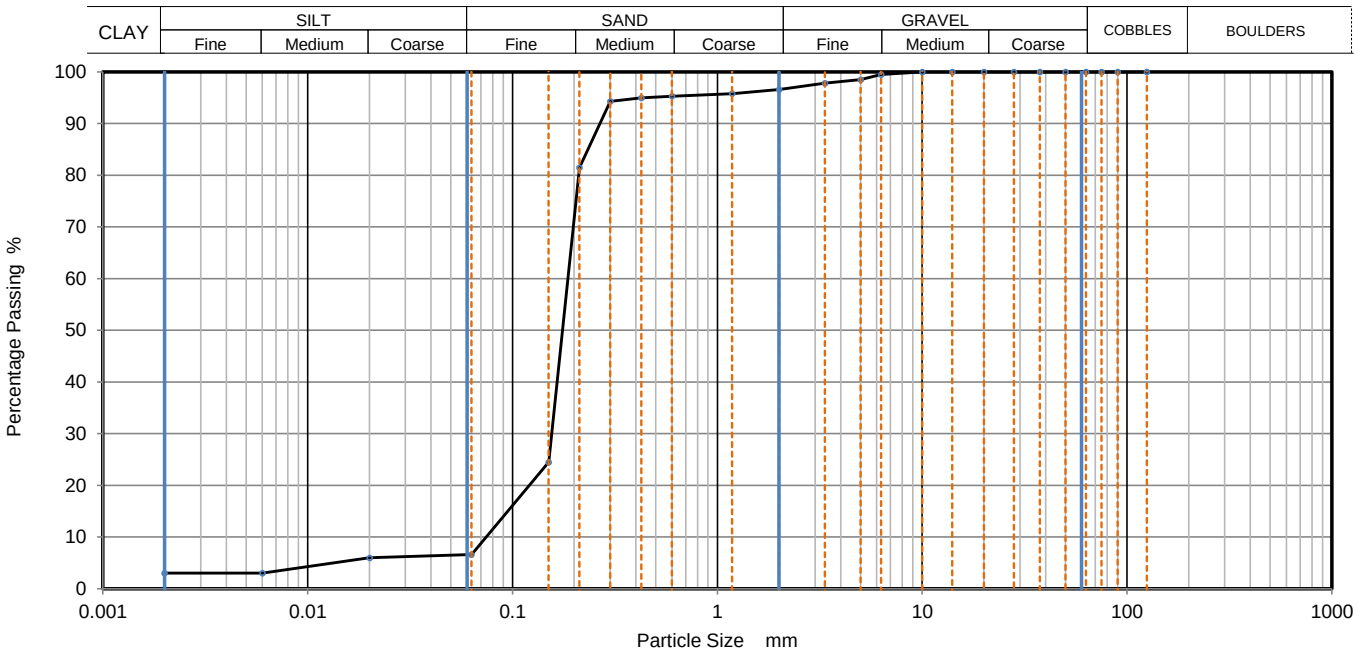
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH01
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	18.50 m
Soil Description	Greyish brown slightly clayey slightly silty slightly gravelly SAND (gravel is fine and sub-angular)			Depth Base	19.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	3
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	95	Particle density	(assumed)
0.425	95	2.70	Mg/m3
0.3	94		
0.212	82		
0.15	25		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	3.4
Sand	90.0
Silt	3.7
Clay	2.9

Grading Analysis		
D100	mm	
D60	mm	0.186
D30	mm	0.155
D10	mm	0.0742
Uniformity Coefficient		2.5
Curvature Coefficient		1.7

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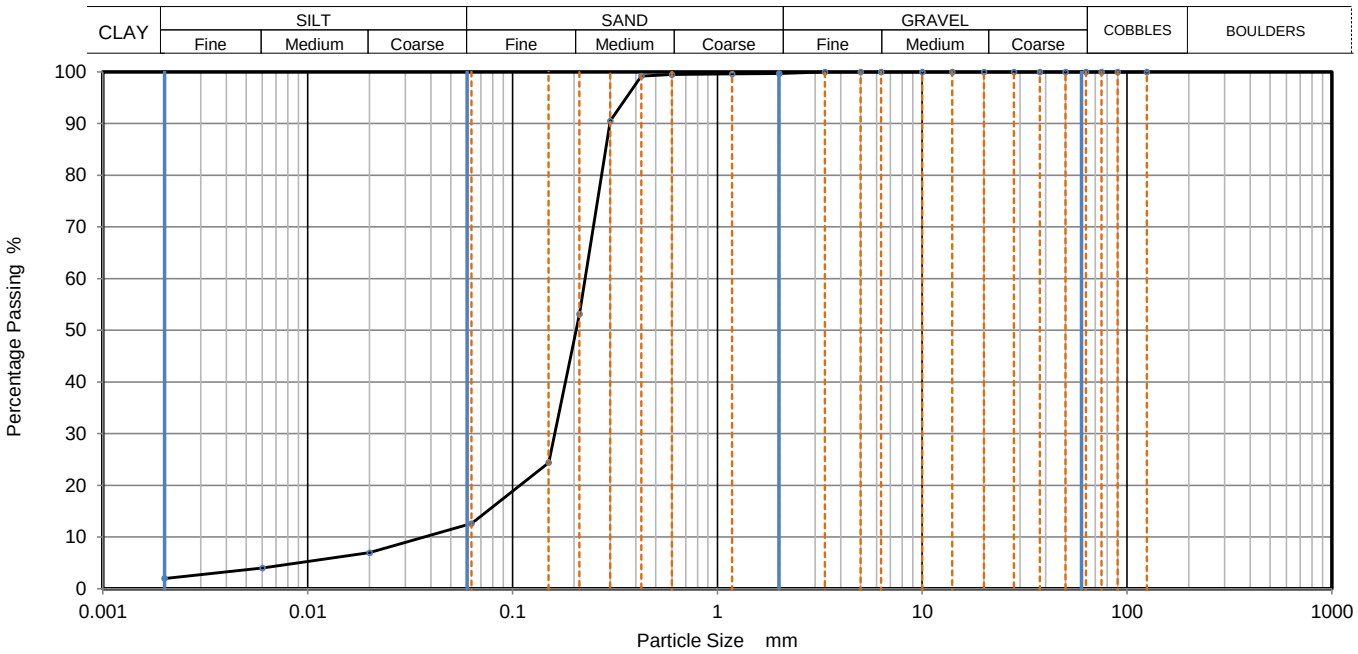
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH02
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	6.50 m
Soil Description	Orangish brown silty SAND with rare lumps of sandy silty clay			Depth Base	7.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	4
75	100	0.0020	2
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	Particle density	(assumed)
0.425	99	2.70	Mg/m3
0.3	91		
0.212	53		
0.15	24		
0.063	13		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.3
Sand	87.1
Silt	11.1
Clay	1.5

Grading Analysis		
D100	mm	
D60	mm	0.226
D30	mm	0.161
D10	mm	0.0361
Uniformity Coefficient		6.3
Curvature Coefficient		3.2

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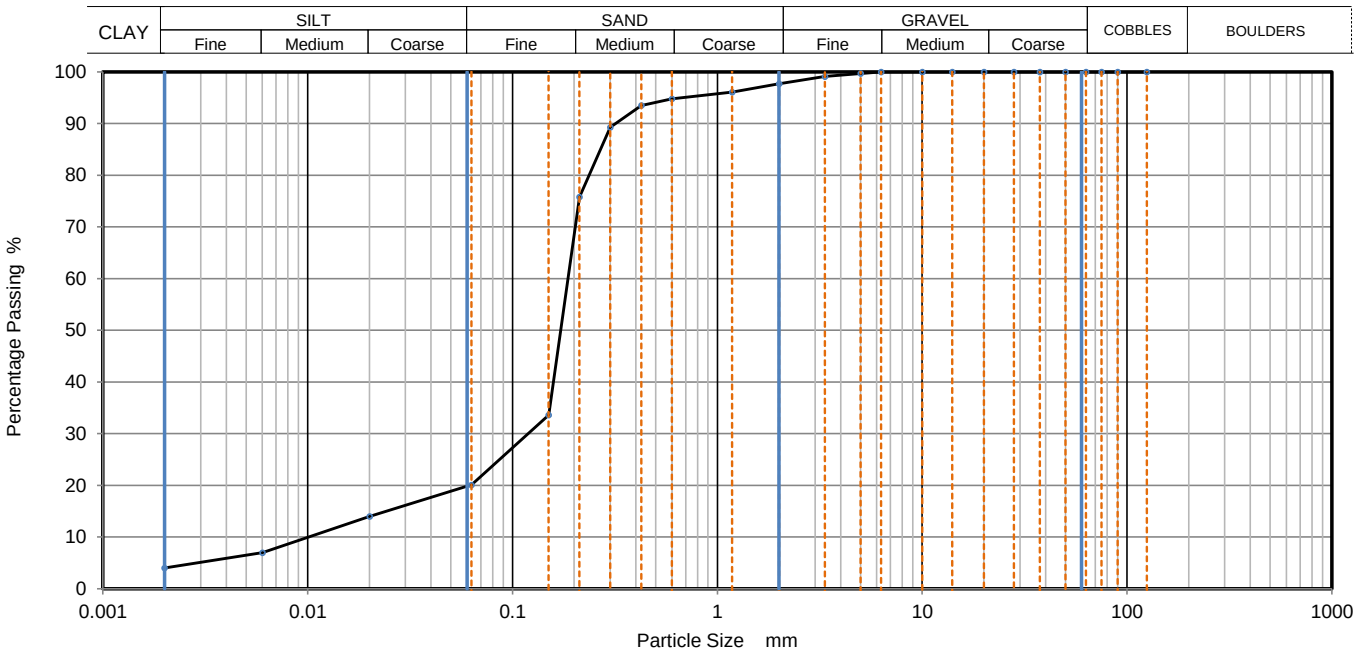
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH02
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	17.50 m
Soil Description	Dark grey and greenish grey slightly gravelly slightly clayey silty SAND (gravel is fine)			Depth Base	18.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	14
90	100	0.0060	7
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	96		
0.6	95	Particle density	(assumed)
0.425	94	2.70	Mg/m3
0.3	89		
0.212	76		
0.15	34		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	2.3
Sand	77.6
Silt	16.6
Clay	3.5

Grading Analysis		
D100	mm	
D60	mm	0.186
D30	mm	0.119
D10	mm	0.0106
Uniformity Coefficient		18
Curvature Coefficient		7.2

Remarks

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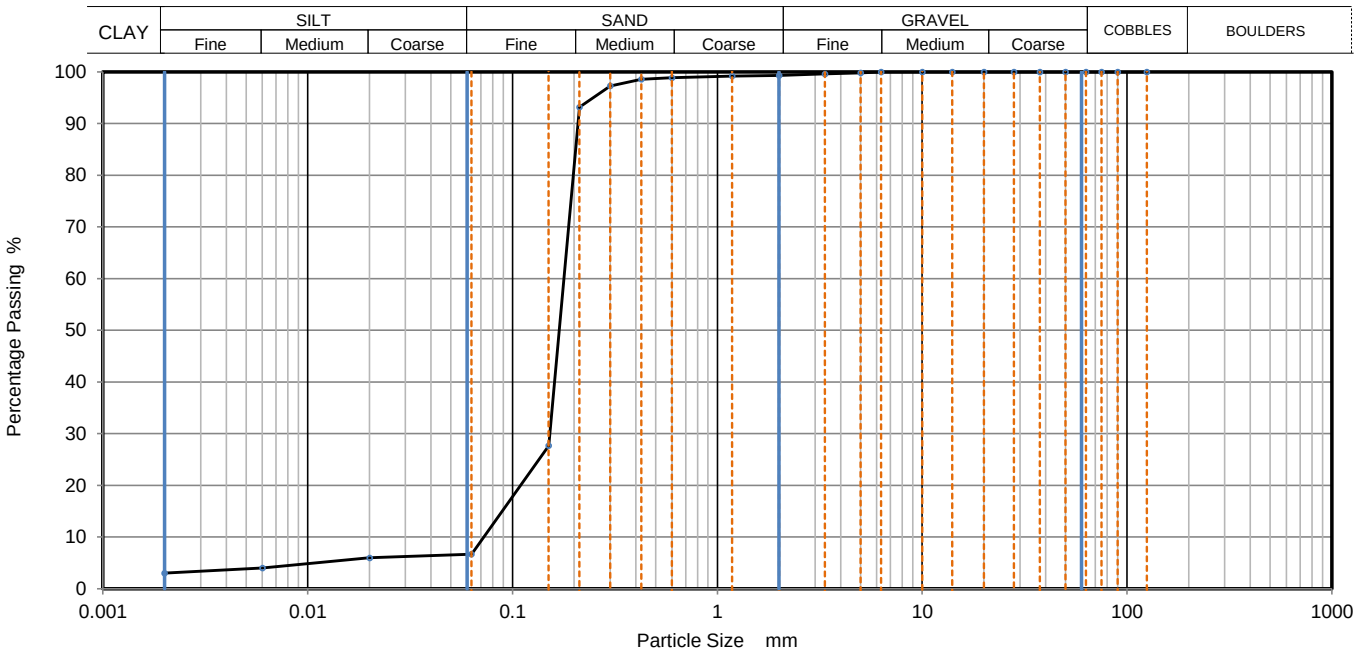
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH02
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	21.50 m
Soil Description	Grey mottled brown slightly clayey slightly silty SAND with rare fine gravel			Depth Base	22.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	4
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	99	Particle density	(assumed)
0.425	99	2.70	Mg/m3
0.3	97		
0.212	93		
0.15	28		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.7
Sand	92.6
Silt	3.5
Clay	3.2

Grading Analysis		
D100	mm	
D60	mm	0.178
D30	mm	0.152
D10	mm	0.0723
Uniformity Coefficient		2.5
Curvature Coefficient		1.8

Remarks

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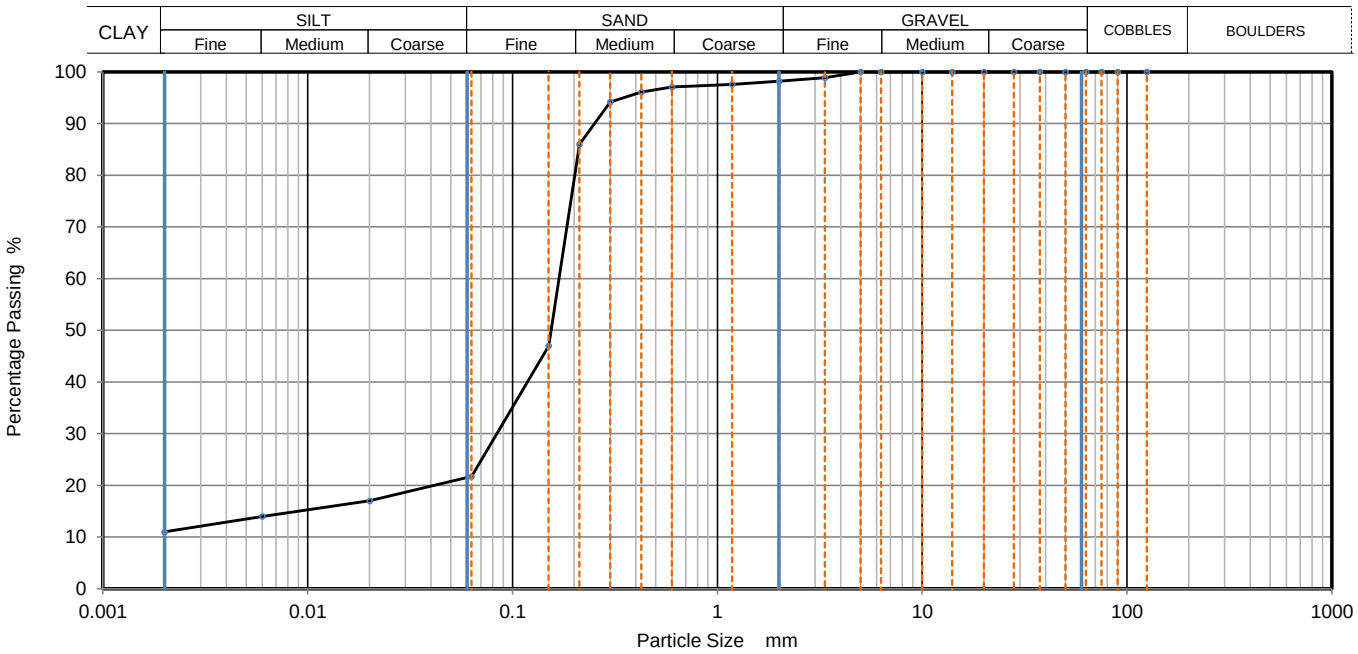
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Sample No.	-
Project No.	200576	Client	Paragon	Depth Top	4.50 m
Soil Description	Orangish brown mottled light grey silty clayey SAND with rare fine gravel			Depth Base	5.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	17
90	100	0.0060	14
75	100	0.0020	11
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	98		
0.6	97	Particle density	(assumed)
0.425	96	2.70	Mg/m3
0.3	94		
0.212	86		
0.15	47		
0.063	22		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	1.8
Sand	76.5
Silt	10.3
Clay	11.4

Grading Analysis		
D100	mm	
D60	mm	0.168
D30	mm	0.0837
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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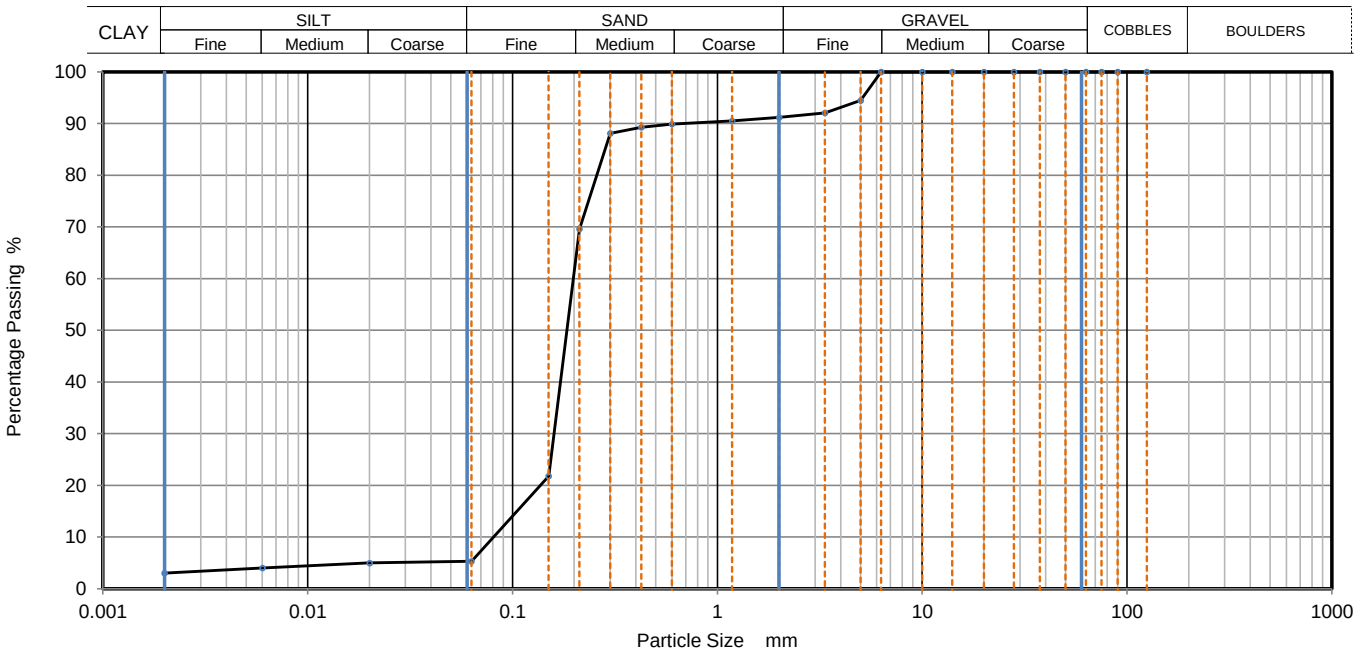
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Sample No.	-
Project No.	200576	Client	Paragon	Depth Top	14.50 m
Soil Description	Brownish grey slightly silty slightly clayey gravelly SAND (gravel is fine)			Depth Base	15.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	5
90	100	0.0060	4
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	95		
3.35	92		
2	91		
1.18	91		
0.6	90	Particle density	(assumed)
0.425	89	2.70	Mg/m3
0.3	88		
0.212	70		
0.15	22		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	8.8
Sand	86.0
Silt	2.2
Clay	3.0

Grading Analysis		
D100	mm	
D60	mm	0.198
D30	mm	0.159
D10	mm	0.0808
Uniformity Coefficient		2.4
Curvature Coefficient		1.6

Remarks

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UKAS TESTING 2519

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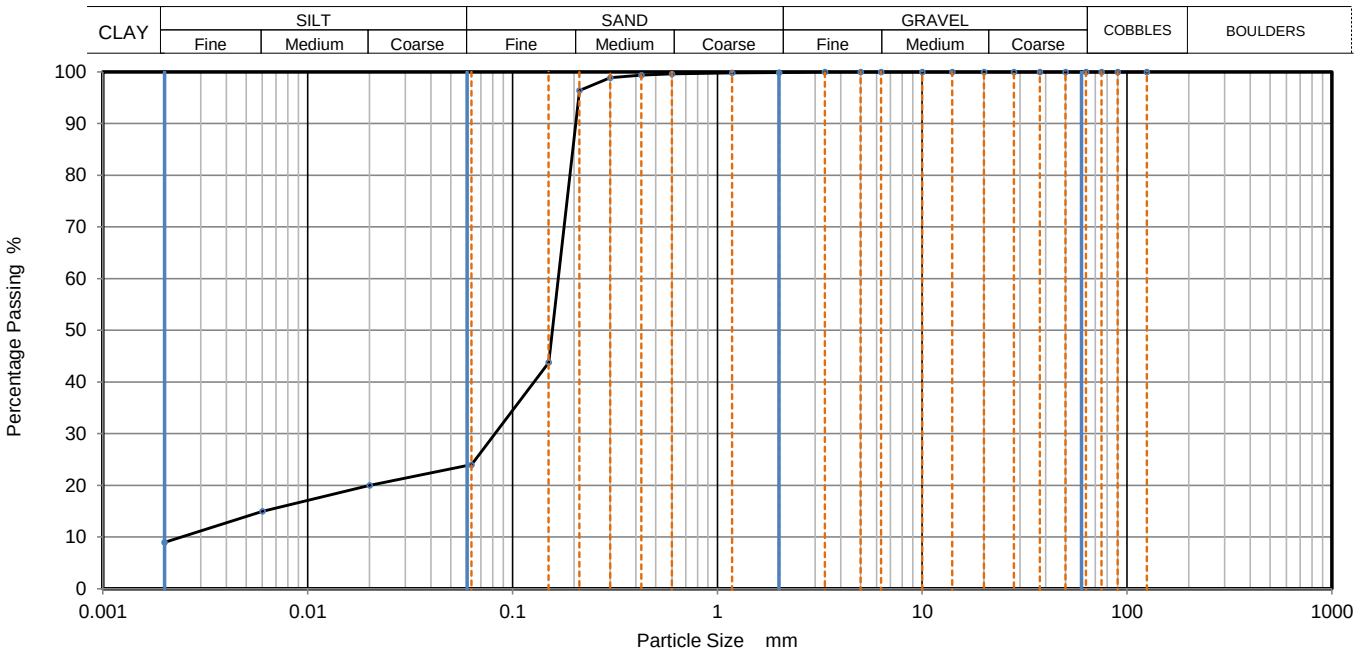
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH03
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	22.50 m
Soil Description	Grey mottled dark greenish brown clayey silty SAND			Depth Base	23.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	20
90	100	0.0060	15
75	100	0.0020	9
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	Particle density	(assumed)
0.425	99	2.70	Mg/m3
0.3	99		
0.212	96		
0.15	44		
0.063	24		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.1
Sand	75.9
Silt	14.5
Clay	9.5

Grading Analysis		
D100	mm	
D60	mm	0.167
D30	mm	0.0819
D10	mm	0.00222
Uniformity Coefficient		75
Curvature Coefficient		18

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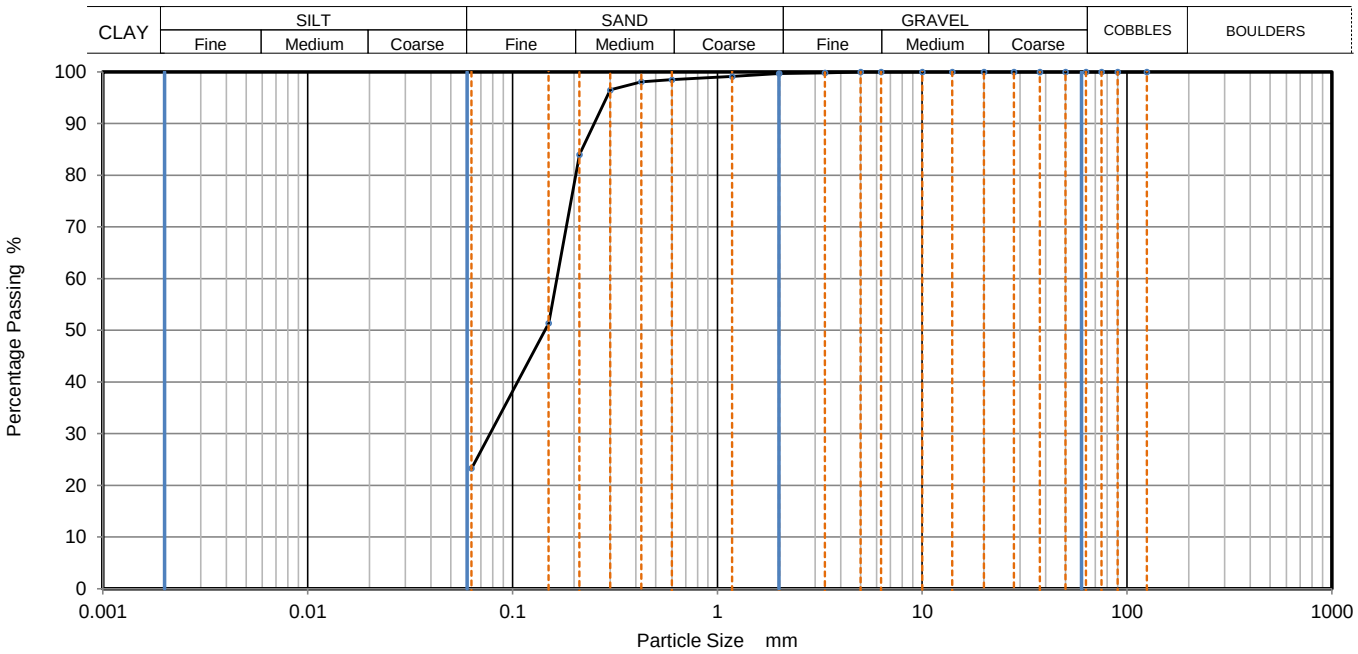
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH04
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	3.50 m
Soil Description	Light brown mottled orangish brown clayey silty SAND			Depth Base	4.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



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	99		
0.425	98		
0.3	97		
0.212	84		
0.15	51		
0.063	23		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.3
Sand	76.4
Fines <0.063mm	23.3

Grading Analysis		
D100	mm	
D60	mm	0.164
D30	mm	0.0776
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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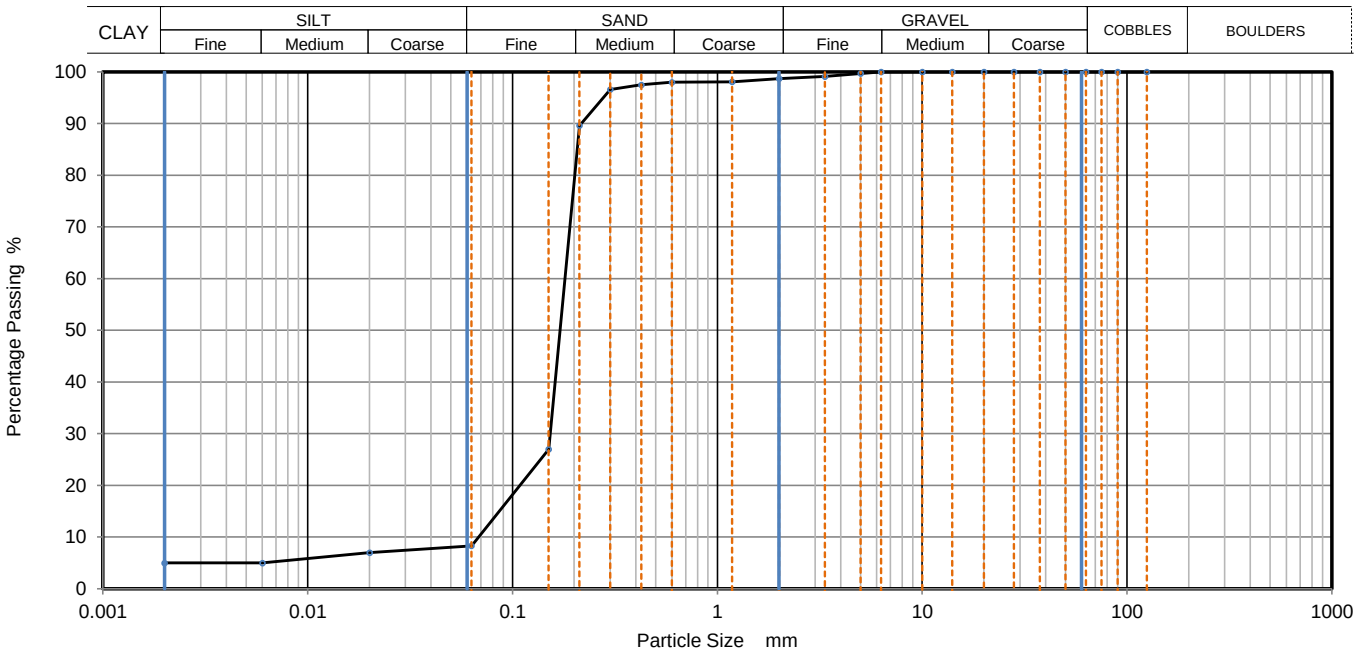
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Sample No.	-
Project No.	200576	Client	Paragon	Depth Top	14.50 m
Soil Description	Brown mottled orangish brown slightly silty slightly clayey SAND with rare fine gravel			Depth Base	15.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	5
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	99		
1.18	98		
0.6	98	Particle density	(assumed)
0.425	98	2.70	Mg/m3
0.3	97		
0.212	90		
0.15	27		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	1.3
Sand	90.4
Silt	3.8
Clay	4.5

Grading Analysis		
D100	mm	
D60	mm	0.18
D30	mm	0.153
D10	mm	0.0682
Uniformity Coefficient		2.6
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377 unless noted below

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Checked and Approved

Initials: **J.P**

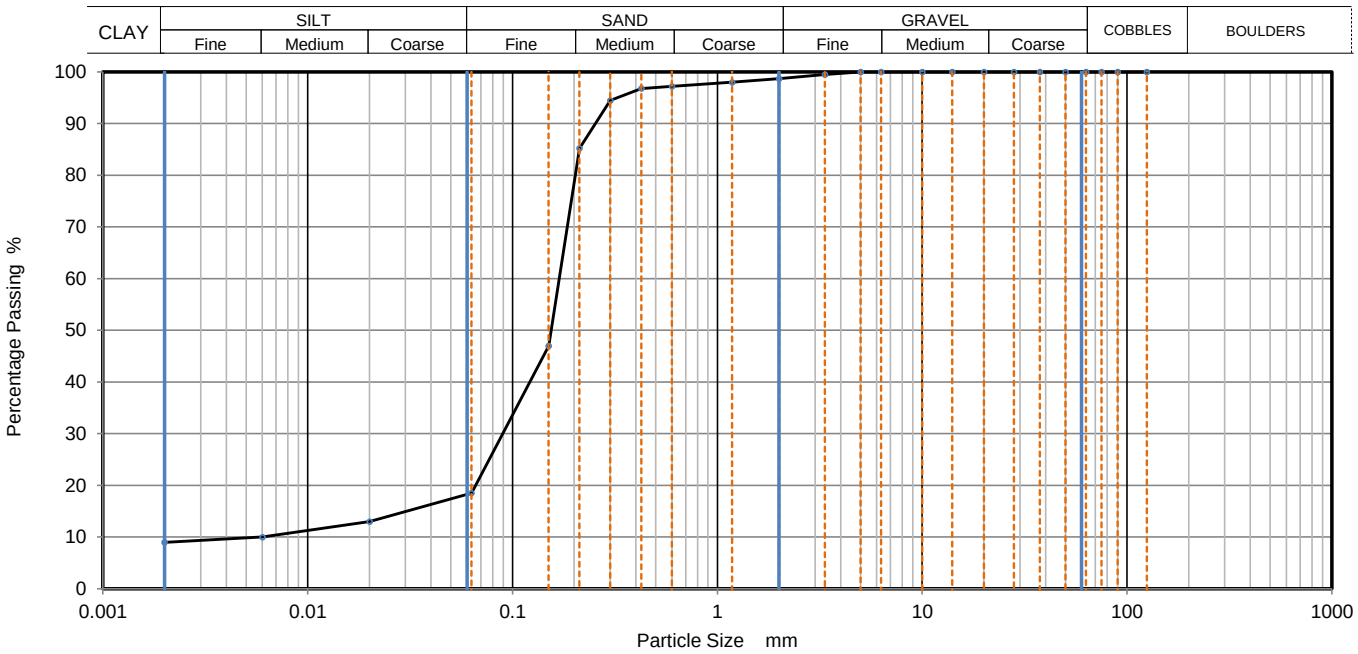
Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH05
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	2.50 m
Soil Description	Brownish grey clayey silty SAND with rare fine gravel			Depth Base	3.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	13
90	100	0.0060	10
75	100	0.0020	9
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	98		
0.6	97	Particle density	(assumed)
0.425	97	2.70	Mg/m3
0.3	95		
0.212	85		
0.15	47		
0.063	19		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	1.3
Sand	80.1
Silt	9.9
Clay	8.7

Grading Analysis		
D100	mm	
D60	mm	0.169
D30	mm	0.0893
D10	mm	0.00453
Uniformity Coefficient		37
Curvature Coefficient		10

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Date: 05/08/2020

UKAS TESTING 2519

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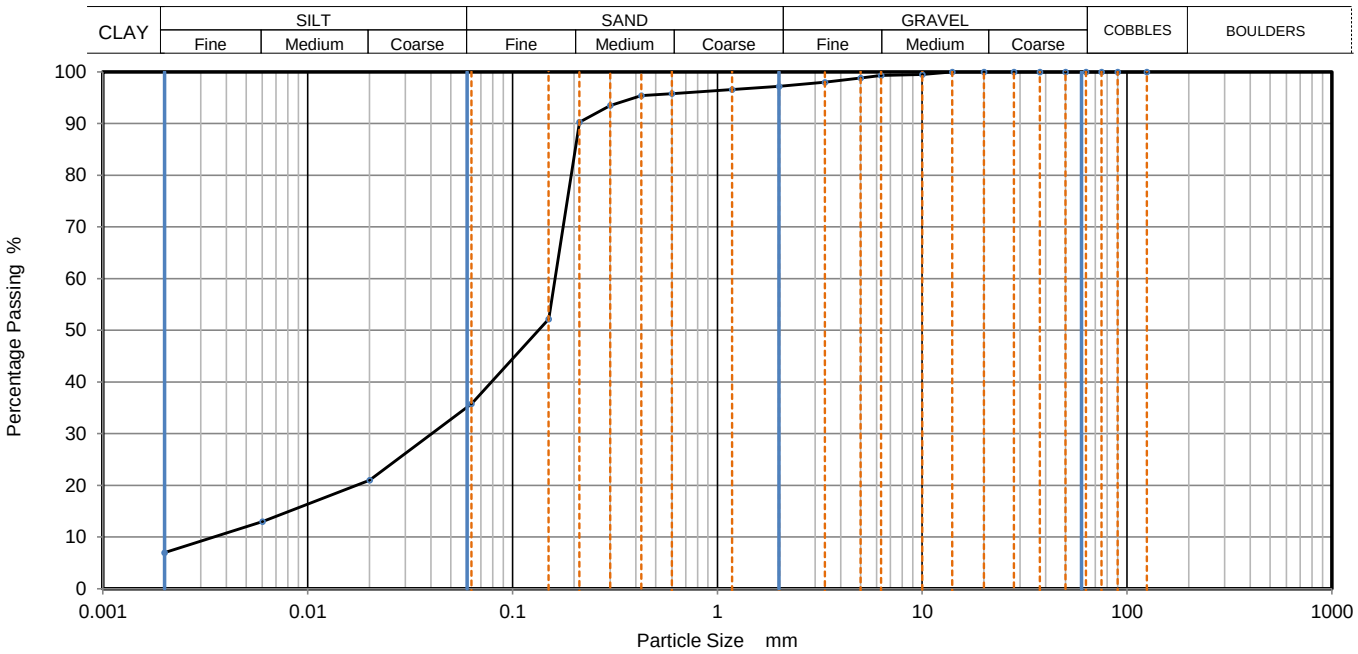
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH05
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	20.00 m
Soil Description	Brown slightly gravelly silty SAND with occasional pockets of grey silty clay (gravel is fm and sub-rounded to rounded)			Depth Base	20.40 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	21
90	100	0.0060	13
75	100	0.0020	7
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	97		
0.6	96	Particle density	(assumed)
0.425	95	2.70	Mg/m3
0.3	94		
0.212	90		
0.15	52		
0.063	36		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	2.8
Sand	61.4
Silt	29.1
Clay	6.7

Grading Analysis		
D100	mm	
D60	mm	0.161
D30	mm	0.0399
D10	mm	0.00345
Uniformity Coefficient		47
Curvature Coefficient		2.9

Remarks

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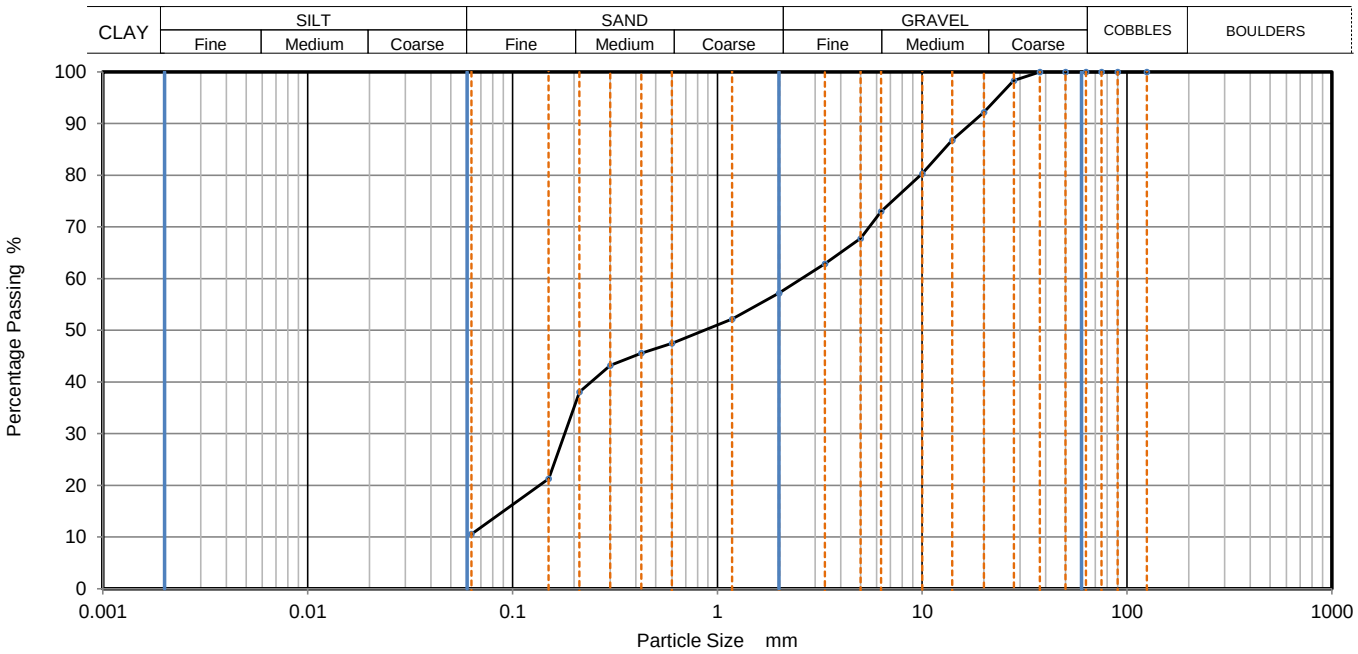
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH06
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	1.50 m
Soil Description	Brown clayey very gravelly SAND (gravel is fmc and rounded to angular)			Depth Base	2.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	92		
14	87		
10	80		
6.3	73		
5	68		
3.35	63		
2	57		
1.18	52		
0.6	48		
0.425	46		
0.3	43		
0.212	38		
0.15	21		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	42.8
Sand	46.7
Fines <0.063mm	10.6

Grading Analysis		
D100	mm	
D60	mm	2.58
D30	mm	0.179
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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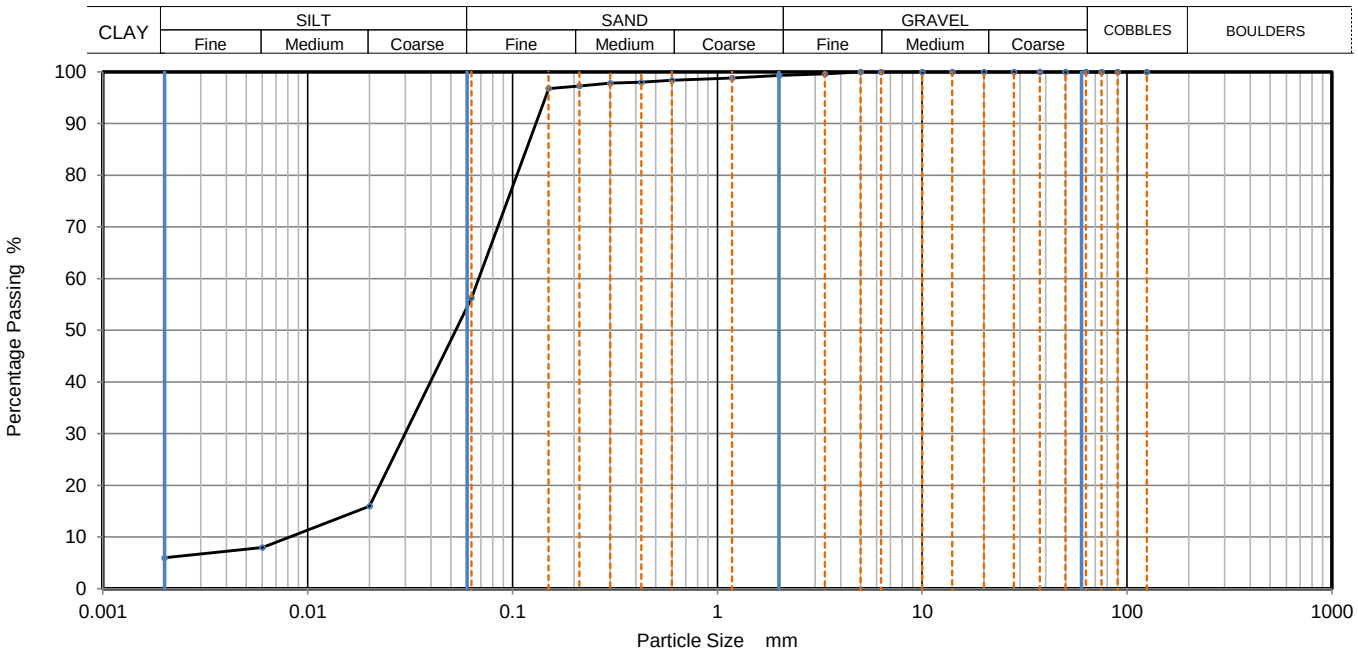
PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Sample No.	-
Project No.	200576	Client	Paragon	Depth Top	5.40 m
Soil Description	Light brown clayey very sandy SILT			Depth Base	6.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	16
90	100	0.0060	8
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98	Particle density	(assumed)
0.425	98	2.70	Mg/m3
0.3	98		
0.212	97		
0.15	97		
0.063	56		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.7
Sand	43.1
Silt	50.6
Clay	5.6

Grading Analysis		
D100	mm	
D60	mm	0.0682
D30	mm	0.0299
D10	mm	0.00826
Uniformity Coefficient		8.3
Curvature Coefficient		1.6

Remarks

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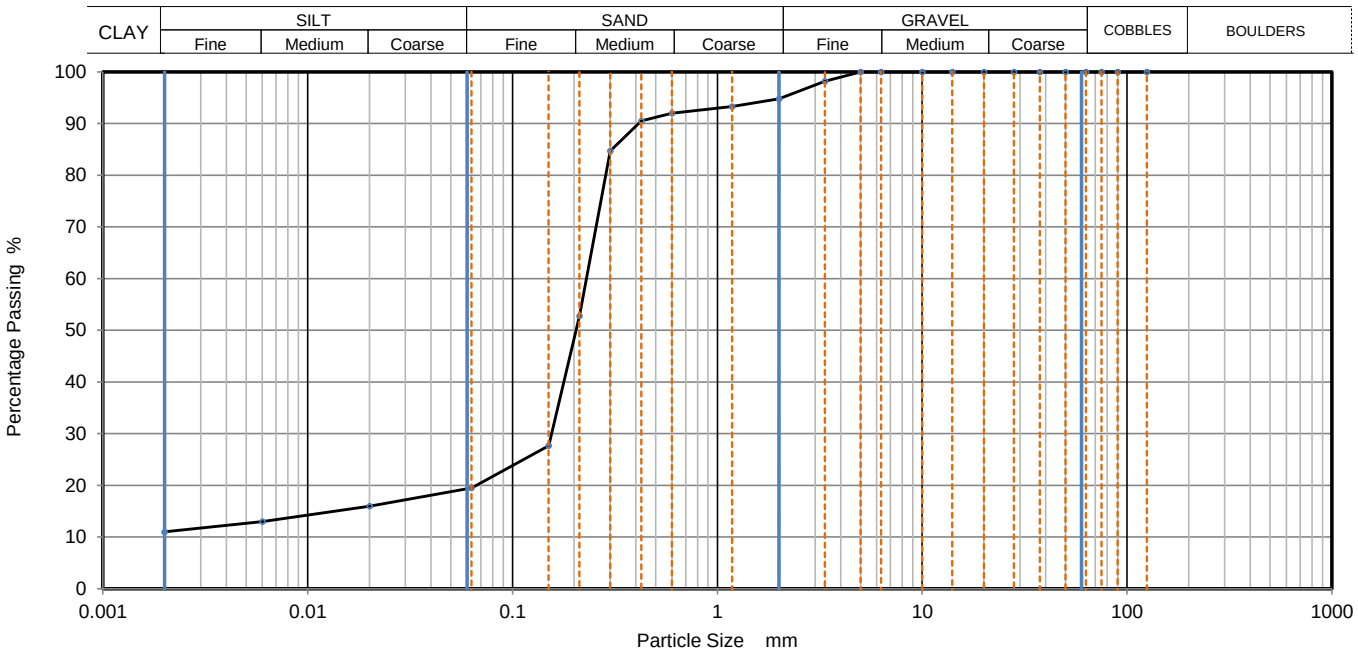
Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH06
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	11.50 m
Soil Description	Grey slightly mottled orangish brown gravelly silty clayey SAND (gravel is fine)			Depth Base	12.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	16
90	100	0.0060	13
75	100	0.0020	11
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	98		
2	95		
1.18	93		
0.6	92	Particle density	(assumed)
0.425	91	2.70	Mg/m3
0.3	85		
0.212	53		
0.15	28		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	5.2
Sand	75.3
Silt	8.9
Clay	10.6

Grading Analysis		
D100	mm	
D60	mm	0.229
D30	mm	0.155
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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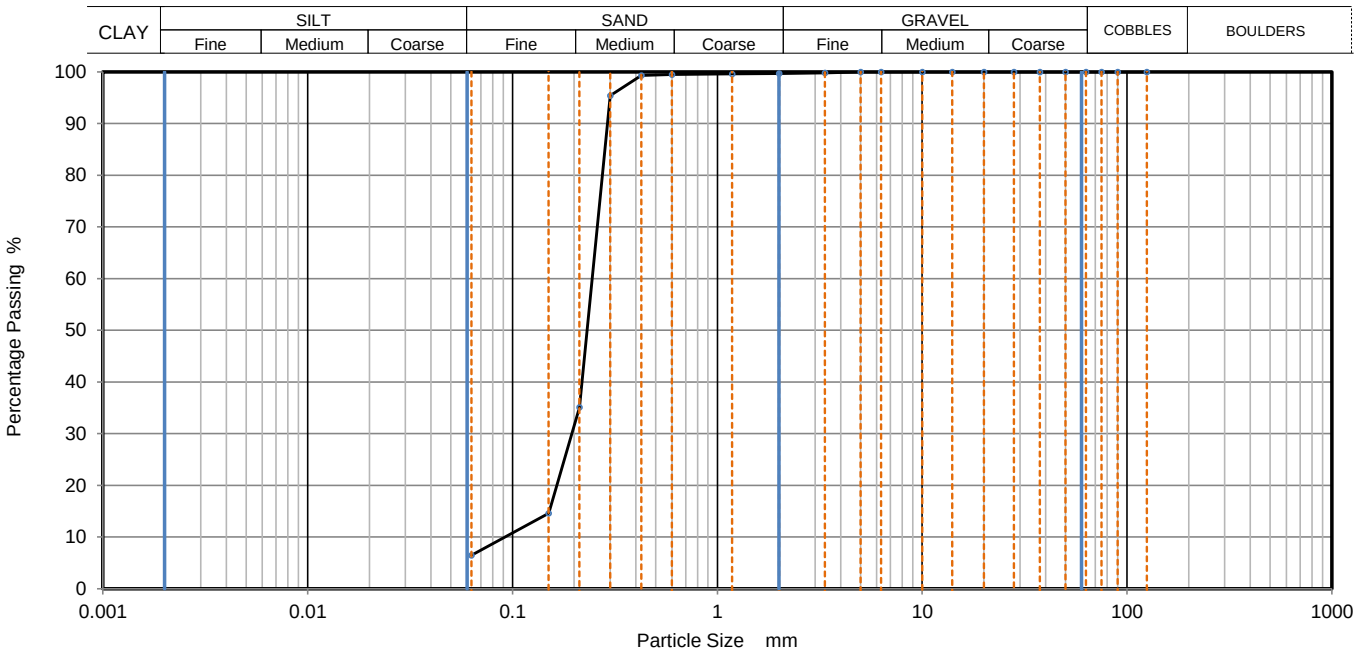
Date: 05/08/2020

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH06
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	23.50 m
Soil Description	Grey slightly clayey slightly silty SAND			Depth Base	24.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



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	95		
0.212	35		
0.15	15		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.3
Sand	93.2
Fines <0.063mm	6.5

Grading Analysis		
D100	mm	
D60	mm	0.245
D30	mm	0.195
D10	mm	0.0919
Uniformity Coefficient		2.7
Curvature Coefficient		1.7

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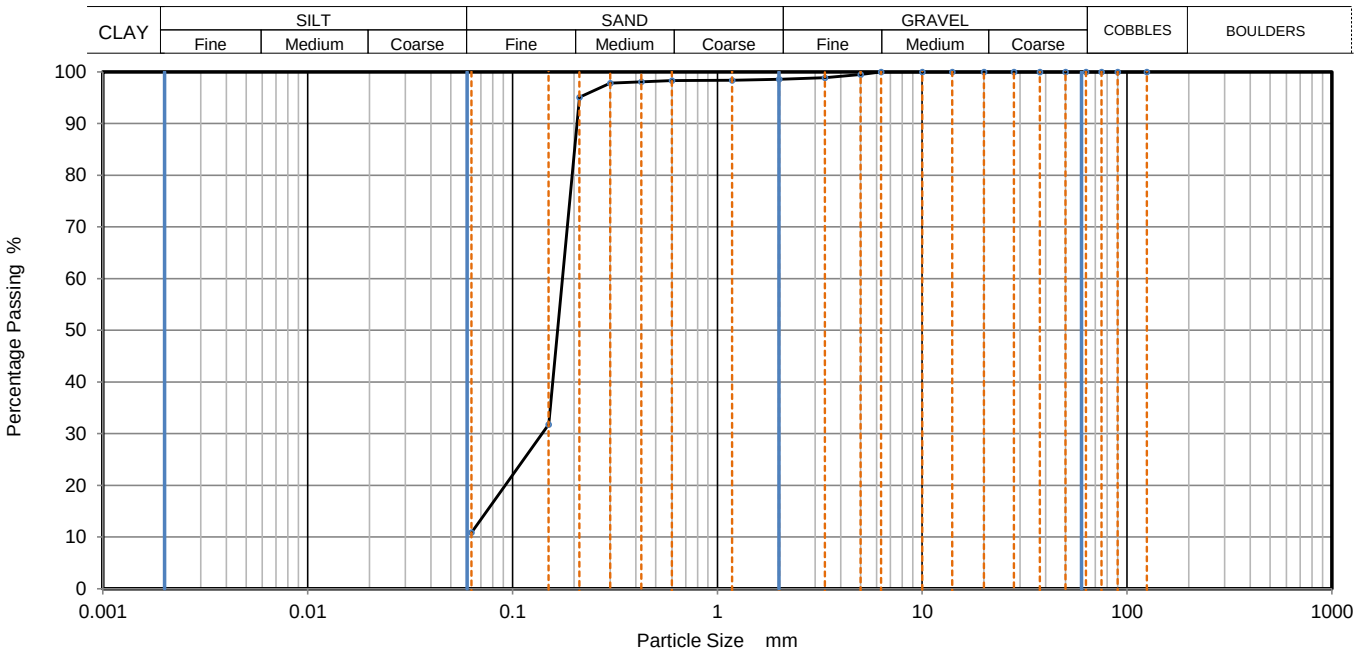
Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Job Ref	28476
				Borehole/Pit No.	BH07
Project No.	200576	Client	Paragon	Sample No.	-
				Depth Top	9.50 m
Soil Description	Grey mottled brown slightly clayey silty SAND with rare fine gravel			Depth Base	10.00 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	04/08/2020



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	99		
2	99		
1.18	98		
0.6	98		
0.425	98		
0.3	98		
0.212	95		
0.15	32		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	1.4
Sand	87.7
Fines <0.063mm	11.0

Grading Analysis		
D100	mm	
D60	mm	0.175
D30	mm	0.139
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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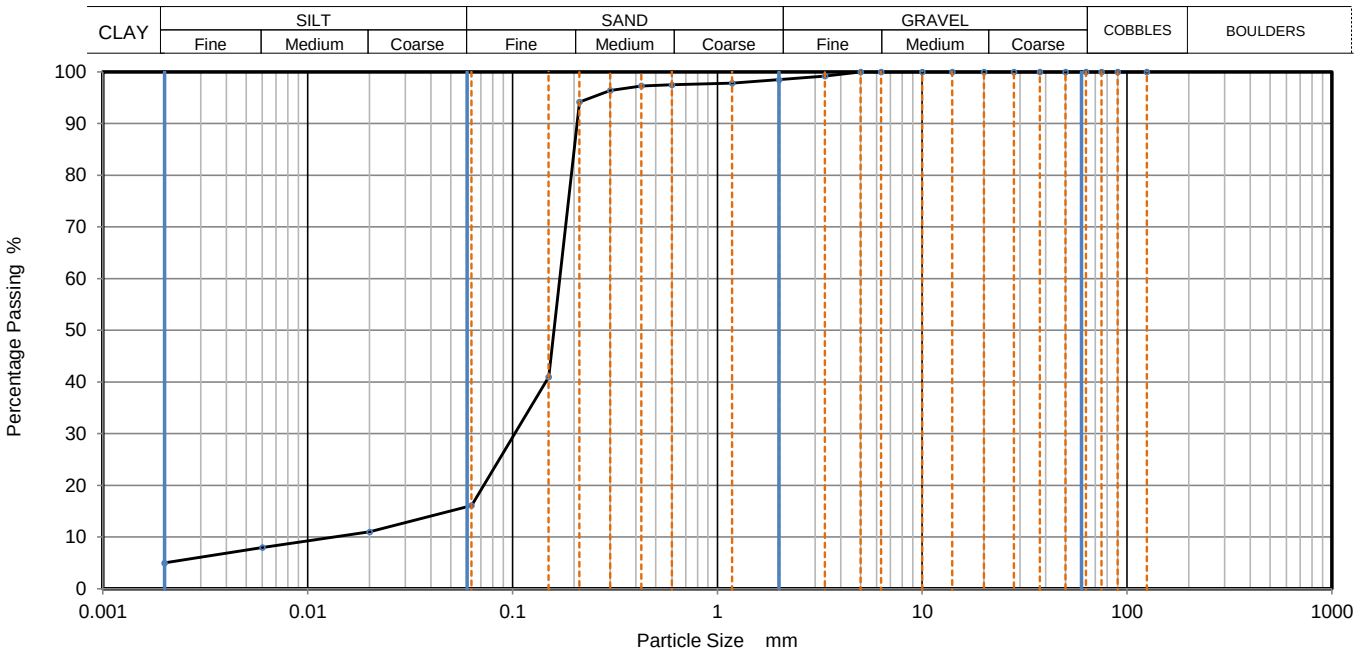
Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Longcross Studios			Sample No.	-
Project No.	200576	Client	Paragon	Depth Top	19.00 m
Soil Description	Grey mottled brown slightly clayey silty SAND with rare fine gravel			Depth Base	19.50 m
				Sample Type	B
				Samples received	23/06/2020 - 08/07/2020
				Schedules received	14/07/2020
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/07/2020
				Date tested	03/08/2020



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	8
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	99		
1.18	98		
0.6	98	Particle density	(assumed)
0.425	97	2.70	Mg/m3
0.3	96		
0.212	94		
0.15	41		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	1.5
Sand	82.3
Silt	11.3
Clay	4.9

Grading Analysis		
D100	mm	
D60	mm	0.17
D30	mm	0.102
D10	mm	0.0128
Uniformity Coefficient		13
Curvature Coefficient		4.8

Remarks

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Initials: **J.P**

Date: 05/08/2020

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Sulphate Content (Gravimetric Method) for 2:1 Soil: Water Extract and pH Value - Summary of Results
Tested in accordance with BS1377 : Part 3 : 2018, Clause 7.6 & Clause 12

Job No.	Project Name	Programme	
28476	Longcross Studios	Samples received	23/06/2020 - 08/07/2020
		Schedule received	14/07/2020
Project No.	Client	Project started	15/07/2020
200576	Paragon	Testing Started	31/07/2020

Hole No.	Sample Ref	Top m	Base m	Type	Soil description	Dry Mass passing 2mm %	SO4 Content mg/l	pH	Remarks
BH01	-	5.00	5.45	D	Reddish brown slightly sandy silty CLAY	100	130	7.56	
BH02	-	22.20	22.40	D	Dark grey coating in greenish brown fine sandy silty CLAY	100	260	7.45	
BH03	-	9.50	10.00	B	Brownish grey clayey SAND	100	220	7.33	
BH04	-	16.20	-	D	Orangish brown clayey SAND	100	240	7.43	
BH05	-	27.00	27.10	D	Grey clayey SAND	100	400	7.33	
BH06	-	13.50	14.00	B	Brownish grey clayey SAND	100	100	7.45	
BH07	-	4.40	4.50	D	Greyish brown very sandy CLAY	100	230	7.52	

Test Report by K4 SOILS LABORATORY
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Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials J.P
Date: 05/08/2020

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R29

APPENDIX 11: GENERIC ENVIRONMENTAL RISK ASSESSMENT

GENERIC ENVIRONMENTAL RISK ASSESSMENT

11.1	**Introduction**
11.1.1	This appendix provides additional background information on certain approaches and methods used by Paragon in the preparation of this report.
11.1.2	This report uses the term 'geoenvironmental' to describe aspect relating to ground related environmental issues, such as contamination. The term 'geotechnical' is used to describe aspects relating to the physical nature of the site, such as foundation requirements.
11.1.3	A two-staged approach is used to classify land: • The first stage is referred to as a Phase 1 Investigation which includes a desk study and site walkover. Following this a preliminary conceptual site model (CSM) is developed to identify geotechnical and geoenvironmental risks. • The second stage is referred to as Phase 2 Site Investigation, which comprises the intrusive ground investigation, laboratory testing and provision of a risk assessment whereby the CSM identified in the CSM is updated based on the site conditions.
11.1.4	The Geoenvironmental Phase 1 and Phase 2 Investigations have been completed in general accordance with BS10175:2011+A1:2017.
11.1.5	The Geotechnical aspects of the report have been broadly written in general accordance with Eurocode 7 (BS EN 1997-2:2007) and are written with the intention of fulfilling the general requirements of a Ground Investigation Report (GIR) outlined in Section 6.
11.2	**Phase 1 Investigation**
11.2.1	The preliminary risk assessment is made of both geotechnical and geoenvironmental hazards identified at the desk study stage. This is then updated based on the findings of the Phase 2 Investigation. The risk associated with hazards uses a matrix of probability of occurrence vs the consequence. Geotechnical risks are assessed using a ground model.
11.2.2	In the context of geoenvironmental risks, in order for there to be a risk there must be a viable pollutant linkage, which means there must be a source of contaminations, a potential receptor and a pathway linking the two. The purpose of the Preliminary Conceptual Site Model is to identify all of the potential contaminant linkages and qualitatively assess the potential risks associated with these linkages. Contaminant linkages are potentially unacceptable risks in terms of current contaminated land regime legal framework and require either further assessment through the ground investigation. Should one of the three linkages be absent then there is no linkage and no further action is required.

11.2.3 Geoenvironmental risks are also outlined within Environmental Protection Act 1990, Part 2A which uses the term 'significant harm or significant possibility of significant harm (SPOSH)', where the term 'harm' is significant.

11.2.4 Paragon has adopted a classification level based on definitions within CIRIA Report C552 and professional judgement. Paragon's Rationale for Risk Ratings is presented in Table A. The classification for the probability of harm is presented in Table B. This information feeds into a matrix in Table C, which is used to assign a risk rating.

11.2.5 ***Table A. Rationale for Risk Ratings***

Risk Rating	Risk Rating	Rationale	Examples
High	H	Contaminants very likely or known to represent an unacceptable risk, SPOSH. Equivalent to EA Category 1 pollution incident including persistent and/or extensive detrimental effects on water quality, closure of a potable abstraction point. Site not suitable for proposed use Enforcement action possible Urgent action required	Significant short-term effects to humans is defined as serious injury, defects or death. Die-back of plants in landscaped areas. Short term pollution of controlled waters, major fish kill. Elevated contaminants close to potable abstraction. Major damage to buildings i.e. explosion
Medium to High	M H	Contaminants likely or known to represent an unacceptable risk Action required.	Possible short-term effects and likely long-term effects to humans is defined as serious injury, defects or death. Buildings unsafe to occupy. Ingress of contaminants through plastic pipes. Stress or dead plants in landscaped areas. Pollution of sensitive water resources
Medium	M	Contaminants likely to exceed assessment criteria and may to represent an unacceptable risk. Some damage to property (crops, buildings etc). Some action required.	Significant long-term effects to humans is defined as serious injury, defects or death. Buildings unsafe to occupy. Potential ingress of contaminants through plastic pipes. Stress or dead plants in landscaped areas. Pollution of sensitive water resources
Low to Medium	L M	Contaminants may exceed assessment criteria but no harm as no unacceptable intake or contact. Minor or short-lived damage to property, ecosystems. Site likely to be suitable for proposed use Action unlikely whilst in current use	Harm not significant, pollutant linkage broken. Minor damage to plants in landscaped areas. Minor damage to buildings.
Low	L	Contaminants likely or known to have no risk of harm. Site likely to be suitable for proposed use Repairable effects to damage to property etc. No further action required	No measurable effects. No significant impact to property, plants, ecosystems.

11.2.6 ***Table B. Classification of Probability of Geoenvironmental Risks***

Classification	Risk Rating
High Likelihood	There is a contaminant 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 contaminant linkage and all the elements are present, which means that it is probable that an event will occur.
Low Likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is no means certain that even over a longer period such event could take place and is less likely in the shorter term.
Unlikely	There is a contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

11.2.7 ***Table C. Probability / Consequence Graphic***

		Consequence				
		High	**Moderate to High**	**Moderate**	**Low to Moderate**	**Low**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Low / Moderate Risk	Low Risk
	Likely	High Risk	Moderate Risk	Low / Moderate Risk	Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Low / Moderate Risk	Low Risk	Low Risk	Very Low Risk
	Unlikely	Low / Moderate Risk	Low Risk	Very Low Risk	Very Low Risk	Very Low Risk
	No Linkage	No Risk				

11.3 Contaminant Analysis

11.3.1 The procedures set out in DEFRA/Environmental Agency Report: Land Contamination: Risk Management (LCRM) 2019, ISO 10381-5:2005 Soil Quality – Sampling and the DoE Industry Profiles provide good summaries of priority pollutants for UK sites. These have been used during the Phase 1 assessment to scope the analysis of chemicals of concern.

11.4	**Generic Tier 1 Human Health Risk Assessment**
11.4.1	Generic Assessment Criteria (GAC) are used as the limit at which exceedances would cause harm. GAC are developed based on assumptions of characteristics and behaviours or sources, pathways and receptors. These are largely conservative and are calculated using the Contaminated Land Exposure Assessment (CLEA) model, which uses exposure to the receptor and toxicology data of the contaminant in the assessment. Published and industry recognised GACs have been produced for a range of environments: • Residential with homegrown produce • Residential without homegrown produce • Commercial • Allotments • Public Open Space – Park (POS_{park}) • Public Open Space – Residential (POS_{Resi}).
11.4.2	The results of the chemical laboratory testing were screened using GACs based on two sources: • Category 4 Screening Levels (C4SLs) including cadmium, Benzo(a)pyrene, benzene, arsenic, lead and chromium VI, produced by LQM CIEH. • Suitable 4 Use Levels (S4UL) produced by LQM CIEH (2015).
11.4.3	Category 4 Screening Levels were developed to screen out land affected by contamination under Part 2A of the EPA 1990. They represent a low level of risk whilst still being protective of human health.
11.4.4	In general accordance with Health Protection Agency (HPA) guidance for the risk assessment approaches for Polycyclic Aromatic Hydrocarbons (PAH), 2010, benzo(a)pyrene has been used as a surrogate marker for carcinogenic PAHs. The threshold PAHs have been assessed individually.
11.4.5	Statistical analysis has been carried out on populations of greater than six results. Where the population is less than six, statistical analysis has been deemed inappropriate. Therefore, the maximum concentration of each contaminant has been recorded. The Upper Confidence Level or U_{95} has been calculated to present the level at which we would be 95% confident that the true mean is less than the GAC. All non-detect values have been treated as being equal to half the limit of detection.
11.4.6	These results have been used to carry out a Level 1: Quantitative Human Health Assessment for the ground contamination present against standards for the proposed commercial use of the property. These results can also be used for a preliminary assessment for off-site disposal classification.

11.5 Controlled Waters Risk Assessment

11.5.1 The Environment Agency Groundwater Protection Policy (GP3) outlines the legal framework, detailed policies, technical background and the tools to be used in the protection of groundwater. The Water Framework Directive (2000/60/EC) set out the protocol for controlling water quality of the whole water environment. During Groundwater Risk Assessments the impact on controlled waters is outlined. Controlled waters include groundwater, surface water, coastal waters, inland waters and reservoirs.

11.5.2 Aquifers are classified based on their sensitivity. The following aquifer definitions are adopted.

- Principal Aquifers - These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
- Secondary Aquifers - These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:
    - Secondary A - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers; and
    - Secondary B - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
- Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
- Unproductive Strata - These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

11.5.3 To determine the impact of contaminants on groundwater and surface water Environmental Quality Standards (EQS) have been used as screening criteria.

11.6 Gas Risk Assessment

11.6.1 The pragmatic approach to ground gas risk assessment by Card et al 2012 has been followed to determine the gas risk of the site. This method compares the Total Organic Content (TOC) of the Made Ground, and the age and depth of the fill to provide a basis to determine the Characteristic Situation of the site.

11.6.2 The risks associated with methane and carbon dioxide are assessed using BS8485:2015 and guidelines from CIRIA (Wilson et al 2007), the NHBC (Boyle and Witherington 2007) and CL:AIRE RB17 (Card et al 2012).

11.6.3 These methods use the gas monitoring results to produce a Gas Screening Value, which is compared to Tables set out within the guidance. Information on the proposed development is then used to determine the level of gas protection required via a scoring system. Each gas protection measure is assigned a score and combinations of the measures are used to meet the score required. The following tables are used to assess the gas risk.

11.6.4 ***Table D. BS8485:2015 CS Classification***

CS	Hazard Potential	Site Characteristic GSV (l/hr)	Additional Factors
CS1	Very Low	<0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider and increase to CS2)
CS2	Low	0.07 to <0.7	Typical measured flow rate <70l/hr (otherwise consider an increase to CS3)
CS3	Moderate	0.7 to <3.5	
CS4	Moderate to High	3.5 to <15	
CS5	High	15 to <70	
CS6	Very High	>70	

11.6.5 ***Table E. BS8485:2015 Building type***

Building Types				
	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/public, possible multiple	Commercial / public	Commercial / industrial
Control (change of use, structural alterations, ventilation)	None	Some but not all	Full	Full
Room sizes	Small	Small/medium	Small to large	Large industrial / retail park style

11.6.6 ***Table F. BS8485:2015 Gas Protection Score by CS and type of building***

CS	Minimum Gas Protection Score			
	High Risk		**Medium Risk**	**Low Risk**
	Type A Building	**Type B Building**	**Type C Building**	**Type D Building**
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 [A]	5.5	4.5	6.5
5	[B]	6.5[A]	5.5	4.5
6	[B]	[B]	7.5	6.5

Notes:

[A] Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

[B] The gas hazard is too high for this empirical method to be used to define the gas protection measure.

11.7 Property – Water Supply Pipes

11.7.1 Standard Water Supply Pipe Assessment has been undertaken in general accordance with UK Water Industry Research (UKWIR) Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. Ref 10/WM/03/21, published 2010. The results of soil testing have been used to identify which pipes should be used, from options including, ductile iron, steel, polyethylene (PE), PE barrier, PVC and copper.

11.7.2

Table G. Thresholds for pipe material

Test Group	Testing Required	PE (mg/kg)	PVC (mg/kg)	Barrier Pipe (PE-Al-PE) (mg/kg)	Wrapped Steel	Wrapped Ductile Iron	Copper
Total VOCs	Where Preliminary Risk ssessment (PRA) has identified land potentially affected by contamination	0.5	0.125	Pass	Pass	Pass	Pass
Total BTEX & MTBE		0.1	0.03	Pass	Pass	Pass	Pass
Total SVOCs		2	1.4	Pass	Pass	Pass	Pass
EC5–EC10 aliphatic and aromatic hydrocarbons		2	1.4	Pass	Pass	Pass	Pass
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass	Pass	Pass	Pass	Pass
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass	Pass	Pass	Pass	Pass
Phenols		2	0.4	Pass	Pass	Pass	Pass
Creosols and chlorinated phenols		2	0.04				
Ethers	Only where identified	0.5	1	Pass	Pass	Pass	Pass
Nitrobenzene		0.5	0.4	Pass	Pass	Pass	Pass
Ketones		0.5	0.02	Pass	Pass	Pass	Pass
Aldehydes		0.5	0.02	Pass	Pass	Pass	Pass
Amines		Fail	Pass	Pass	Pass	Pass	Pass
Corrosive	Conductivity Redox pH	Pass	Pass	Pass	*Corrosive if pH <7 and conductivity >400us/cm*	*Corrosive if pH<5, Eh not neutral and conductivity >400us/cm*	*Corrosive if pH<5 or >8 and Eh positive*

APPENDIX 12: ELECTRICAL RESISTIVITY SURVEY

Soil Environment Services Ltd

ELECTRICAL RESISTIVITY SURVEY

Paragon

Longcross Studios

Celebrating 20 years delivering SOIL SURVEY

Soil Environment Services Ltd
July 2020

Our Ref: SES/PA/LS/#1 **Date: 03rd July 2020**

Client:
Paragon
The Harlequin Building
65 Southwark Street
London
SE1 0HR

ELECTRICAL RESISTIVITY SURVEY

Longcross Studios

A report prepared on behalf of ***Soil Environment Services*** by:

Rowan Davies BEng MSc AMIMechE
Consultant Engineer

Approved by:

Dr Robin S Davies BSc PhD (Soil Physics) MISoilSci
Managing Director

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CONTENTS

1. INSTRUCTION

Soil Environment Services Ltd have been instructed by Paragon to undertake a ground electrical resistivity (ER) survey at Longcross Studios, Cobham Ln, Longcross, Chertsey, KT16 0EE (Drawing 1).

2. METHODOLOGY

2.1 ER testing

The survey uses the Wenner four point method with a Metrohm E1612 earth tester. Serial number: 1333320.

The survey was carried out on the 26th June 2020. The ground surface varied at each location.
BH1 – Top soil
BH2 – Concrete pad
BH3 – Top soil
BH4 – Tarmac
BH5 – Concrete surface
BH6 – Top soil
BH7 - Top soil (Very wet from adjacent drilling rig)

Steel spikes were inserted to ~ 10 cm depth below the ground surface. In areas with concrete surface holes were drilled to insert the spikes.

The test lines were carried out in the locations marked on Drawing 1. Two transects were undertaken at right angles to each other where possible.

The ER was measured at the following depths:

BH1

- T1: 1, 3, and 6 m
- T2: 1 and 3 m (Transect length reduced due to location area)

BH2

- T1: 1, 3 and 6 m
- T2: 1 and 3 m (Transect length reduced due to location area)

BH3

- T1: 1, 3 and 6 m
- T2: 1, 3 and 6 m

BH4

- T1: 1, 3 and 5.3 m (Max transect length possible in location)

BH5

- T1: 1, 3, and 6 m
- T2: 1 m (Transect length reduced due to access)

BH6

- T1: 1, 3 and 6 m (Transect moved due to active drilling rig)

BH7

- T1: 1, 3, and 6 m
- T2: 1, 3, and 6 m

2.2 Specifications

Maximum Current	2kΩ typical on 20Ω range
Spike* dimensions	10 mm square x 500 mm
Spike Resistance	5kΩ typical on 200Ω range 50kΩ typical on 2000Ω range
Maximum Potential	2.2kΩ typical on 20Ω range
Spike Resistance	22kΩ typical on 200Ω range 52kΩ typical on 2000Ω range
Maximum Output Voltage:	30V rms
Response Time:	3secs nominal
Voltage Withstand:	240V AC between any two terminals
Temperature Coefficient:	±0.05%/°C
Interference:	Interference voltages of 5V rms nominal 50/60Hz in the potential circuit will not affect the reading by more than ±0.5%
Earth Resistance Ranges	
Range:	0 to 20Ω in steps of 0.01Ω 0 to 200Ω in steps of 0.1Ω 0 to 2000Ω in steps of 1Ω
Accuracy:	2% of reading ±3 dgts
Test Current:	10mA a.c. rms nominal on 20Ω range 1mA a.c. rms nominal on 200Ω range 0.1mA a.c. rms nominal on 2000Ω range
Test Frequency:	820Hz

*Load conductor

3. RESULTS

3.1 ER testing

The ER testing was completed (results below) at locations as detailed on Drawing 1. All results are synonymous with the known strata to depth: Made Ground over Clayey Sand and Silt.

BH1

Table 1. BH1 Transect 1

BH1 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	14.10	88.59
3.0	3.0	3.50	65.97
6.0	6.0	1.33	50.14

Table 2. BH1 Transect 2

BH1 T2: L = 9 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	5.10	32.04
3.0	3.0	3.30	62.20

BH2

Table 3. BH2 Transect 1

BH2 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	4.90	30.79
3.0	3.0	6.00	113.10
6.0	6.0	5.20	196.04

Table 4. BH2 Transect 2

BH2 T2: L = 9m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	2.20	13.82
3.0	3.0	7.90	148.91

BH3

Table 5. BH3 Transect 1

BH3 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	4.90	30.79
3.0	3.0	3.60	67.86
6.0	6.0	2.17	81.81

Table 6. BH3 Transect 2

BH3 T2: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	4.20	26.39
3.0	3.0	3.54	66.73
6.0	6.0	2.23	84.07

BH4

Table 7. BH4 Transect 1

BH4 T1: L = 16 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	6.10	38.33
3.0	3.0	1.85	34.88
5.3	5.3	1.32	44.21

BH5

Table 8. BH5 Transect 1

BH5 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	2.11	13.26
3.0	3.0	1.24	23.38
6.0	6.0	1.74	65.60

Table 9. BH5 Transect 2

BH5 T2: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	2.27	14.26

BH6

Table 10. BH6 Transect 1

BH6 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	52.00	326.77
3.0	3.0	12.10	228.11
6.0	6.0	11.20	422.28

BH7

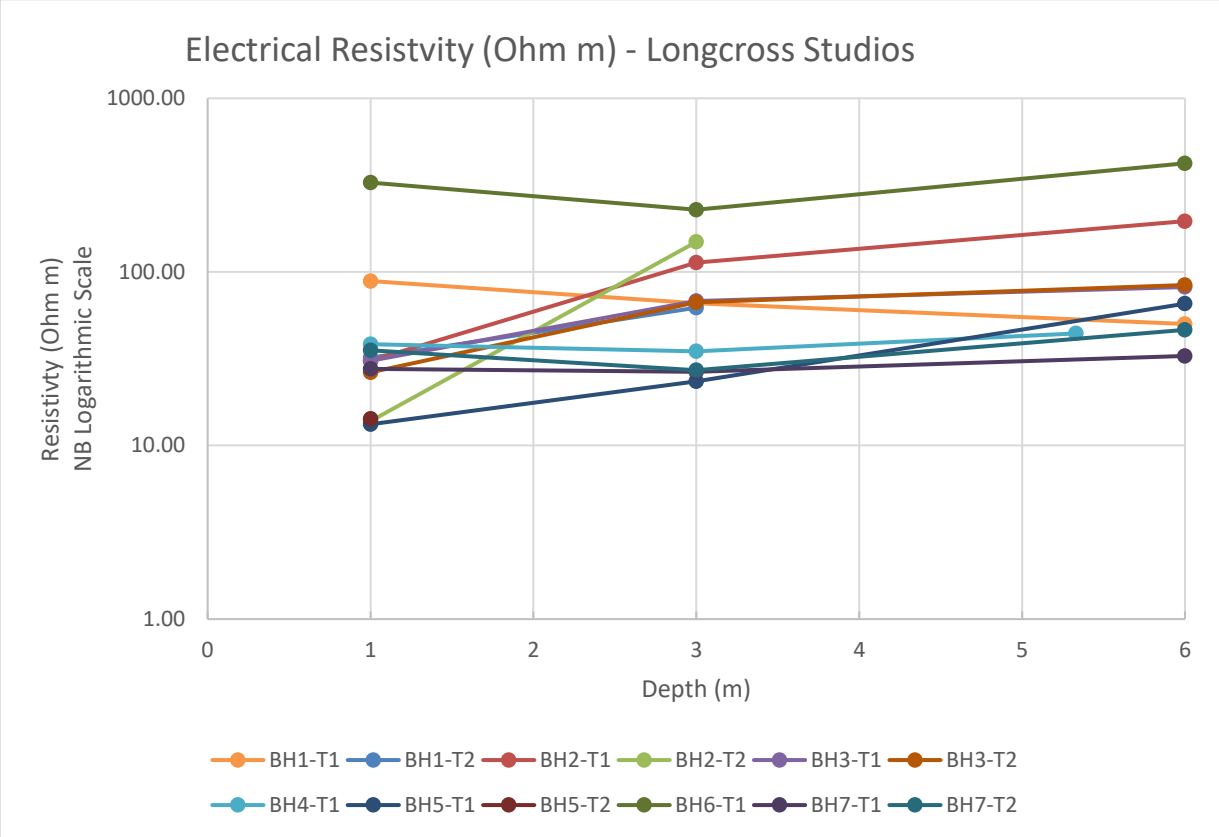
Table 11. BH7 Transect 1

BH7 T1: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	4.40	27.65
3.0	3.0	1.41	26.58
6.0	6.0	0.87	32.80

Table 12. BH7 Transect 2

BH7 T2: L = 18 m		Reading	Resistivity
Spacing	Depth	Ohm	Ohm m
1.0	1.0	5.63	35.38
3.0	3.0	1.44	27.15
6.0	6.0	1.23	46.38

Figure 1: ER (Ohm m) vs Depth



3. SITE STRATA & POSSIBLE INTERFERENCE

Site strata as mapped by the BGS.

Bedrock Geology: Bagshot Formation - Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by shallow seas.

A desktop survey containing BH information was supplied by Paragon. BH's recorded a mixture of clayey sand and silt to 3 m depth.

Interference

Some anomalies may be affecting measurements at this site:

BH1: Location was moved North ~15 m due to construction work at BH location.

BH2: Test was located on a concrete pad. This may have affected results to depth due to lack of moisture. A lack of moisture increases electrical resistivity.

BH4: Test was located on tarmac surface. This may have affected results to depth due to lack of moisture. Only one transect was carried out to a max depth of 5.3 m due to access.

BH5: Transect 2 was reduced in length due to access.

BH6: Location was moved North ~15 m as a drilling team were actively working at proposed location. Transect 2 was not carried out due to narrow location. The elevated ER is possibly due to the Silty and Sandy strata and proximity to a steep slope to the East.

BH7: The ground was saturated due to drilling works. This may have affected results to depth due to increased moisture resulting in reduced electrical resistivity.

Drawing 1

Survey Locations

NOTES:

Soil Environment Services

Drawing Number	1
Drawing Title:	Survey locations
Scale:	NA
Date	26/06/2020

APPENDIX 13: EXTENT OF SURVEY LIMITATIONS AND DEFINITIONS

EXTENT OF SURVEY AND LIMITATIONS

This report is for your sole use, and consequently no responsibility whatsoever is undertaken or accepted to any third party for the whole or any part of its contents. Paragon accept no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned or a third party with whom an agreement has not been executed. Should any third party which to use or rely upon the contents of the report, written approval must be sought from Paragon, a charge may be levied against such approval.

The report has been designed to address potential source, pathway and receptor pollutant linkages associated with the proposed development, by means of intrusive investigation. The content and findings of the report are based on data obtained by employing site assessment methods and techniques, considered appropriate to the site as far as can be interpreted from desk-based materials and a visual walkover of the site. Such techniques and methods are subject to limitations and constraints set out in the report. The findings and opinions are relevant at the time of writing, and should not be relied upon at a substantially later date as site conditions can changes. For example, seasonal groundwater levels, natural degradation of contaminants etc.

No liability can be accepted for the conditions that have not been revealed by the exploratory hole locations, or those which occur between each location. Whilst every effort will be made to interpolate the conditions between exploratory locations, such information is only indicative and liability cannot be accepted for its accuracy. By their nature, exploratory holes provide a relatively small and localised snapshot of the ground conditions relative to the size of the site.

Specific comment is made regarding the site's status under Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012. Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

The opinions given within this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. If additional information or data becomes available which may affect the opinions expressed in this report, Paragon reserves the right to review such information and, if warranted, to modify the opinions accordingly. Paragon reserves the right to charge additional fees for; un-anticipated second opinion reviewing of previous reports.

Paragon has prepared this report with reasonable skill, care and diligence. The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices at this time. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources. We cannot provide guarantees or warranties for the accuracy of third-party data, which is reviewed in good faith and assumed to be representative and accurate.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed. No liability can be accepted for the effects of any future changes to such guidelines and legislation. In the event that guidance / legislation changes it may be necessary for Paragon to update or modify reports. The risk assessment is completed in line with the relevant land use agreed for the site and the time of completing the works. Changes to site conditions or land use may require a reassessment.

DEFINITIONS

For the avoidance of doubt, Paragon Building Consultancy Limited (Paragon) has prepared the following alphabetical list of definitions and reservations to aid the client in understanding the content of our advice and or written reports(s):

Accuracy	Level of agreement between true value and observed value.
ACM's	Asbestos Containing Materials
Conceptual site model	Textual and or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the base of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. **Note 1:** The conceptual exposure model is initially derived from the information obtained by the preliminary investigation. This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of the field investigation can provide additional data that can be used to further refine the conceptual model.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. **Note 1:** There is no assumption in this definition that harm results from the presence of the contamination. **Note 2:** Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. **Note 3:** Contamination may relate to soils, groundwater or ground gas.
Controlled water	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters. **Note 1:** See Section 104 of The Water Resources Act 1991.
Enquiries	Any enquiries undertaken by Paragon of local authorities and statutory undertakers are made verbally in respect of environmental issues. Local searches are not undertaken and no responsibility is accepted for any inaccurate information provided.
Harm	It is further assumed unless otherwise stated that all necessary licences, permits etc either run with the property or are transferable to a new occupier as appropriate. Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case humans, including property.
Hazard	Inherently dangerous quality of a substance, procedure or event.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
Precision	Level of agreement within a series of measurements of a parameter.
Receptor	Persons, living organisms, ecological systems, controlled water, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).

Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
Soil	Upper layer of the earth's crust composed of mineral parts, organic substance, water, air and living matter. **Note 1:** In general accordance with BS 10175:2001 the term soil has the meaning ascribed to it through general use in civil engineering and includes topsoil and subsoil; deposits such as clays, silt, sand, gravel, cobbles, boulders and organic deposits such as peat; and material of natural or human origin (e.g. fills and deposited wastes). The term embraces all components of soil, including mineral matter, organic matter, soil gas and moisture, and living organisms.
Source	Location from which contamination is, or was, derived. **Note 1:** This could be the location of the highest soil or groundwater concentration of the contaminant(s).
Uncertainty	Parameter, associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement.