Geo-Environmental

GROUND APPRAISAL REPORT

for the site at

HURST FARM, TURNERS HILL ROAD

CRAWLEY DOWN, WEST SUSSEX

RH10 4HN

on behalf of

WATES LAND AND DEVELOPMENT

Report:	GROUND APPRAISAL REPORT
Site:	HURST FARM, TURNERS HILL ROAD, CRAWLEY DOWN, WEST SUSSEX
Client:	WATES LAND AND DEVELOPMENT
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EXECUTIVE SUMMARY		
Site Details	Site Address	Hurst Farm, Turners Hill Road, Crawley Down, West Sussex, RH10 4HN
	Form of Development	Care home, access road, soft landscaping, with associated infrastructure.
	Scope of Works	An intrusive investigation to confirm the ground and groundwater conditions and support the development by providing geotechnical and geo-environmental assessments of the site in relation to the proposed redevelopment.
Encountered Conditions	Ground Conditions	The ground conditions comprised a Topsoil and Made Ground overlying the Upper Tunbridge Wells Sand Formation.
	Groundwater	Groundwater was not encountered during the intrusive investigation. Monitoring wells were installed within WS01, WS05-WS06 and WS08-WS10 to depths of between 1.0m to 2.90m bgl with twelve visits planned between October 2025 and March 2026. An initial visit was undertaken on 11th August 2025; groundwater was recorded at depths of between 1.26m and 1.80m bgl.
	Ground Gases & Vapours	Dual-purpose gas and groundwater depth monitoring standpipes were installed within WS01, WS05-WS06, WS08-WS10 to depths of between 1.00m and 2.90m bgl. An initial return monitoring visit has undertaken on 11th August 2025 with a further five visits planned from October 2025. Methane was recorded between 0.0% v/v to 0.2% v/v, whilst carbon dioxide and oxygen have been recorded within the range of 0.0% v/v and 5.0% v/v, and 16.2% v/v to 20.0% v/v respectively. VOC concentrations of between 0.5ppm and 39.4ppm were recorded during the monitoring visit, whilst atmospheric pressure has been recorded between 1008mb and 1009mb. A maximum steady flow of 0.0l/hr was recorded during the monitoring period. The results of all six visits will be interpreted once all monitoring visits have been completed.
Geotechnical Considerations	Traditional Foundations	Based on the ground and groundwater conditions encountered within the intrusive locations it is considered that traditional foundations would likely be suitable for the proposed low-rise development on site. However, within the zone of moisture demand of any nearby past, present or proposed trees foundation depths would require deepening. The results of the Atterberg Limit tests, in conjunction with the field observations indicated the Upper Tunbridge Wells Sand Formation ranged between non-shrinkable and medium volume change potential as defined by NHBC Standards, Chapter 4.2 and BRE Digest 240. Therefore, it is recommended that en masse the Upper Tunbridge Wells Sand Formation be treated as medium volume change potential and a minimum foundation depth remote from trees of 0.90m is recommended. A minimum foundation width of 450mm is recommended. Although not strictly applicable to the form of construction, within the zone of moisture demand of any existing, proposed or recently felled trees it is recommended that foundation depths be calculated in accordance with the NHBC Standards, Chapter 4.2 for medium volume change potential soils. Foundations should also be taken through any major root zone and desiccated clay soils, should this be found at greater depth. It should be noted that the NHBC stipulate that foundations cast at depths greater than 2.5m should be "engineer designed". Where this is the case, an alternative foundation solution such as piles may prove more economical. Heave protection measures such as a void former are required against the side of foundations for medium volume change potential soils where calculated foundation depths on account of trees exceed 1.50m.

		Based on the typical settlement parameters for the types of soil encountered, a maximum net allowable bearing capacity of 125kPa is applicable for trench, strip or isolated pad foundations up to 1.50m in width taken through any Topsoil, Made Ground, soft or loose zones, desiccated or disturbed soils and placed wholly into or onto the firm to very stiff sandy clay and silt of the Upper Tunbridge Wells Sand Formation. Under the above loadings the settlements should remain within tolerable limits for the proposed scheme. Where foundations span between cohesive and granular horizons, nominal reinforcement will be required.
	Excavations	Excavations within any shallow Made Ground should remain relatively stable in the short term. Longer deeper excavations within any deeper areas of Made Ground are likely to be prone to instability, particularly where left open for prolonged periods or where water is encountered, and should be battered back to a safe angle, or suitable shoring techniques should be adopted to provide stability. Pumping from sumps would also be required where water is encountered. Shallow excavations within the Upper Tunbridge Sand should remain relatively stable in the short to medium term. Longer deeper excavations may be prone to instability, particularly where more granular horizons containing perched water are encountered. In such circumstances, excavations should be battered back to a temporary safe angle of repose, or suitable shoring techniques should be adopted to provide stability. Pumping from sumps would also be required where water is encountered.
	Pavements	Made Ground of various composition was encountered on site. The engineering characteristics of such soils are variable and unpredictable and the CBR value of Made Ground does not predict the overall settlements that may occur in such materials. Due to the variability of the Made Ground it would be prudent to assume the material to be deemed frost susceptible throughout thus a minimum pavement thickness of 450mm would be appropriate. Based on the TRRL report, a preliminary CBR value of 4.5% is recommended. Based on the geotechnical results, the near surface Upper Tunbridge Wells Sand Formation should be considered as being frost susceptible for pavement design purposes. If the estate roads are to be adopted West Sussex County Council's Highways Department will likely require further four-point Atterberg Limit tests at close centres along the routes of the roads.
	Soakaways	Soakage testing in general accordance with BRE Digest 365 was undertaken within the trial pits TP01-TP04 at depths of between 1.10m and 2.30m bgl. It should be noted that the rests were run for 22.5 hours and none of the tests achieved 25% empty to enable an infiltration rate to be calculated.
Environmental Considerations	Human Health	<u>Soils Below Ground Level</u> All of the laboratory results were either below the laboratory detection limits or below the relevant thresholds however, asbestos was encountered within WS02 (0.001%) at a depth of 1.0m bgl and within WS10 (3.546%) at a depth of 0.30m bgl both within Made Ground. Where Made Ground is present within any proposed soft landscaped areas, it is recommended that the Made Ground is removed with the implementation of a cover

		system. Any impacted soils within the footprint of proposed buildings can be left in-situ however, any fragments will need to handpicked. In addition, the results of the Pesticide screening were all below the laboratory detection limits. With regards to the remainder of the site, three buildings were noted to be constructed with materials including asbestos, one of which was within a very dilapidated condition. Post demolition, further testing within the footprint and immediate surrounds will be required to confirm that there is no contamination from asbestos or other contaminants within those locations. <u>Stockpiles</u> All of the laboratory results were either below the laboratory detection limits or below the relevant thresholds with the exception of Arsenic (41mg/kg) within TP102, Benzo(a)pyrene (5.6mg/kg and 8.6mg/kg) within TP101 0.2m and TP103 at 0.20m respectively and Naphthalene (1.1mg/kg) within TP101 at 0.2m. Asbestos was also encountered within TP101 and TP102 at 0.20m bgl for both samples. It is considered that the stockpiles will require removing as waste prior to the commencement of the development. With regards to adjacent land users, the surrounding land uses were identified to mostly comprise residential properties, woodland and fields. No significantly elevated mobile contamination was encountered during the intrusive investigation and subsequent laboratory analysis, and the entire site is proposed to be encapsulated within the building footprint or beneath permanent hardstanding. Therefore, no remedial action is considered necessary with regards to risk from soil contamination to human health.
	Groundwater	Specific remedial measures to protect groundwater from soil contamination on site are not considered necessary.
	Built Environment	Barrier pipe should not be required for potable water supply pipes on site.
	Waste Disposal	The results of the screening revealed that all samples tested were categorised as either Non- Hazardous and Hazardous. However, it is likely that a proportion of the Topsoil will be re-used on site. Any excess Topsoil may be used on other sites subject to a Material Management Plan being in place. Asbestos was identified in the sample by the testing. It must be noted that any waste classification assessment is indicative only and actual classification would depend on permit status of the final disposal facility. Once soils for disposal have been identified it is recommended that further testing of these specific soils be undertaken in order to confirm the above assessment.
	Discovery Strategy	A discovery strategy must be maintained during development such that any abnormal conditions (geotechnical or potential contamination) are identified and their potential impact on the proposed development assessed prior to determining any potential mitigation measures.
Further Action: • Removal of stockpiles and testing of the sub-grade beneath.		

• Testing within the footprint of existing buildings and immediate surrounds post demolition. • Removal of Made Ground from communal garden areas, with a cover system implemented. • Confirmation from the utility supplier that barrier pipe protection is not required. • Submit chemical testing results to appropriate waste facility to confirm waste classification, assuming that site won soils from arisings are not to be retained to achieve a required development level.
This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For further information, reference should be made to the main report ref. GE23261 – GARv2APJAN26.

1.0 INTRODUCTION

1.1 General

Geo-Environmental Services Limited (Geo-Environmental) was instructed by Wates Land and Development to undertake an investigation of the geotechnical and geo-environmental factors pertaining to proposed redevelopment of the site at Hurst Farm, Turners Hill Road, Crawley Down, West Sussex, RH10 4HN (herein referred to as 'the site'). The site's location is presented in Figure 1.

1.2 Form of Development

The site is proposed to be developed with a care home with communal gardens and soft landscaping, access road and associated infrastructure.

1.3 Site Walkover/Description

At the time of the site walkover, the site comprised an irregular shaped parcel of land centred on NGR 533607, 138077 and extending to c.2.22 hectares. The site appeared mostly flat and level although the easternmost part of the site sloped down gently to a farmyard with a change in height of between 0.5m and 1.0m. The southeastern side was cut to create a level area for the farmyard buildings. The northwesternmost portion sloped down gently towards the north-west. Within the westernmost and northwesternmost portions, adjacent properties were c.0.5m to 1.0m lower than that part of the site.

The site consisted of residential properties with gardens and parking along with the main access within the eastern portion. To the west there was an area fenced off as a chicken run along with a chicken coop, directly opposite was a modern steel barn with a rusty sign 'Pauls Stationary Power Museum', however the contents included a telehandler, tractors, a few items of old machinery and a conveyor.

To the west of the chicken run and museum were two large rectangular buildings, which had formerly been used for rearing chickens. The northern building had been partly converted into a country store although it was understood this had closed down twelve months previous. Behind the shop were toilets, a preparation area and a large walk-in refrigerator. Adjacent to the former shop was an area of hardstanding that had been used for car parking. Inside, to the rear of the shop, various vehicles were stored, no staining of the concrete floor was noted. The western part of the building was dilapidated with a potential corrugated asbestos cement roof, guttering and some side panels. This area was not entered due to its condition however, looking through a doorway a trailer, tyres and a small amount of scrap metal were noted to be stored within it.

The southern rectangular building was in a derelict condition with parts of the potential corrugated asbestos cement roof, asbestos guttering and asbestos side panels having collapsed within its footprint. The eastern and westernmost ends of the building were still in use by the landowner however, due to the buildings condition these areas were not entered. Immediately east of the building was a small outbuilding made of potential asbestos cement board, this was in better condition but was locked. The contents of the building were unknown. Between the southern building and outbuilding was a refrigerated trailer and scrap farm equipment. Between these buildings and the museum was a lawned area, a poly tunnel, former poly tunnel and a small dry pond. To the south of the southern building was a lawned area with mostly scrap machinery, empty oil drums and many pallets. Between the two central buildings was a portacabin, former HGV trailer, scrap machinery and empty drums. One of the drums was labelled Gas Oil. Dividing the two buildings was an access track leading to the west.

To the west of the two main buildings was a more recent open sided barn with machinery stored including an old excavator, tractor, wood splitter and tractor forks. In addition, there were tonne sacks of split firewood, stacked lengths of timber and various scrap items. Immediately in front of the barn were several large overgrown stockpiles with bits of scrap machinery and an old storage container. Beyond the stockpiles was a bonfire area and more scrap machinery. The northern portion was formed of a field with three large empty chicken coops. Some drainage covers were noted, it was believed that these storm drains discharged to a ditch to the north, a pond was also noted within the northwestern portion within a wooded area. A cesspit was also noted immediately northeast of the farmyard. The westernmost portion was formed of woodland and was part of a greater area of woodland.

The surrounding area comprised a strip of woodland with a ditch and residential properties beyond to the north, Turners Hill Road and residential properties to the east, and new residential housing estate, woodland and fields to the south and woodland to the west.

The site was bound by mature trees, hedges, fencing and temporary electric fencing, site access was via Turners Hill Road to the east.

1.4 Objectives

The investigation was to comprise an intrusive investigation to be undertaken into the geotechnical and geo-environmental conditions pertaining to the site.

The data from the geotechnical investigation was to form the basis of an interpretation with respect to foundation design, concrete specification, pavement design and excavation stability.

In terms of the environmental investigation a Preliminary Risk Assessment (PRA) was undertaken as part of the desk study in accordance with LCRM, in order to identify any specific requirement for and scope of any further assessment. The objective of the risk assessments was to evaluate the risks posed to the proposed redevelopment, adjacent land uses and the wider environment, in the context of likely planning requirements, immediate liabilities under the Environmental Protection Act 1990 and risks posed to Controlled Waters under the Water Resources Act from the current status of the site and in line with the proposed redevelopment.

1.5 Standards and Guidance

Where practicable, the ground investigation and subsequent geotechnical and environmental assessments were undertaken in accordance with the following documents and guidance:

- British Standards Institute - Code of Practice for Earth Retaining Structures (BS8002:2015).
- British Standards Institute - Code of Practice for Site Investigations (BS5930:2015+A1:2020).
- British Standards Institute - Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings (BS8485:2015+A1:2019).
- British Standards Institute - Eurocode 7 - Geotechnical Design - Parts 1 & 2 (BS EN1997-1:2004 & BS EN1997-2:2007).
- British Standards Institute - Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs) (BS8576:2013).
- British Standards Institute - Investigation of Potentially Contaminated Sites - Code of Practice (BS10175:2011+A2:2017).
- British Standards Institute - Soils for Civil Engineering Purposes (BS1377:1990).
- British Standards Institute - Specification for Topsoil and Requirements for Use (BS3882:2015).
- Building Research Establishment - Soakaway Design - DG 365 (2016).
- Building Research Establishment - The Performance of Building Materials in Contaminated Land (BRE255) (1994).
- Construction Industry Research and Information Association - Assessing risks posed by hazardous ground gases to buildings (C665) (2007).

- Department for Environment Food and Rural Affairs and CL:AIRE - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination (SP1010) (2014).
- Department of Environment - Industry Profiles (1995 - 1996).
- Environment Agency - Guidance for waste destined for disposal in landfills (2006).
- Environment Agency - Guidance on Requirements for Land Contamination Reports (2005).
- Environment Agency - Land Contamination Risk Management (LCRM) (2025).
- London Borough of Hammersmith and Fulham - The Local Plan (2018)
- Ministry of Housing, Communities and Local Government - National Planning Policy Framework (2023).
- National House Building Council, Environment Agency & Chartered Institute of Environmental Health - Guidance for the Safe Development of Housing on Land Affected by Contamination (R&D Publication 66) (2008).
- National House Building Council - Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present (10627-R01[04]) (2007).
- National House Building Council - Standards, Chapter 4.1 Land Quality - Managing Ground Conditions (2025).
- National House Building Council - Standards, Chapter 4.2 Building Near Trees (2025).

1.6 Conditions

This report does not purport to be a “Geotechnical Design Report” as defined in Clause 2.8 of Eurocode 7 (Geotechnical Design BS EN 1997-1:2004) and some of the data used to support this preliminary geotechnical assessment may not be fully compliant with that design code. It is considered possible that further detailed ground investigations could be required to facilitate the detailed geotechnical design process and should be carried out on a structure specific basis if necessary.

The data collected from the investigations have been used to provide an interpretation of the geotechnical and/or environmental conditions pertaining to the site. The recommendations and opinions expressed in this report are based on the data obtained. Geo-Environmental takes no responsibility for conditions that either have not been revealed in the available records, or that occur between or under points of physical investigation. Whilst every effort has been made to interpret the conditions, such information is only indicative and liability cannot be accepted for its accuracy.

It should be noted that in particular the concentrations and levels of mobile liquid and gaseous materials are likely to vary with time. Additionally, the absence of asbestos noted during the site walkover or within any soil samples analysed does not guarantee the absence of asbestos within buildings, within or bonded to concrete, as discrete burials, or within the soil mass elsewhere within a site. This report must not be taken as, or assumed to imply, any guarantee that a site is free of hazardous or potentially contaminative materials.

Information contained in this report is intended for the use of the Client and Geo-Environmental can take no responsibility for the use of this information by any party for uses other than that described in this report. Geo-Environmental makes no warranty or representation whatsoever express or implied with respect to the use of this information by any third party. Geo-Environmental does not indemnify the Client or any third parties against any dispute or claim arising from any finding or other result of this investigation report or any consequential losses.

Assessment criteria or other parameters developed for the evaluation of contamination on this site are based on a number of assumptions regarding exposure and toxicology. Exposure to contaminants and levels of adverse effects may therefore vary. Whilst reasonable care and expertise has been employed in the development of such criteria, no liability is accepted in this respect. Other criteria or guidance on the development of assessment criteria may be published in the future, and no liability is accepted in this respect.

This report remains the property of Geo-Environmental and the Client has no rights to, or reliance upon this document or supporting documents until such time as payment has been received in full for all invoices for works undertaken in connection with this report.

2.0 Previous Ground Investigations

Geo-Environmental was not made aware of any previous investigations into the subject site however, Geo-Environmental has previously undertaken investigations of the adjacent site for which site is to adjoin to. For further details please refer to reports desk study GE21953/DSR/DEC23, ground appraisal GE21953-GAR-JAN24, letter report GE21953 – LRv1AP240203, and ground investigation report GE22817-GIR-APR25.

A desk study report prepared by Geo-Environmental on behalf of Wates Land and Development in September 2025, updated January 2026 (ref: GE23261 – DSRv2AP260130)

The desk study was historically formed woodland and part of a filed c.1874, prior to a residential property was build in the field c.1937, the woodland was cleared c.1959 and poultry house constructed c.1974. Various agricultural buildings were constructed between 1959 and 2010. The surrounding area was initially formed of woodland, farmland, a scattering of residential properties and a nursery c.1874. Some residential development was noted c.1937, c.1959 and c.2025. A garage was noted 130m southeast c.1987, due to the small-scale mapping from c.2001, it was unclear at the time of the site walkover if the garage was still in use.

The site is anticipated to be underlain by the Upper Tunbridge Wells Sand Formation. Given the site's development history, the presence of significant depths of Made Ground cannot be discounted.

The site walkover identified the site to comprise residential properties with gardens and parking along with the main access within the eastern portion. To the west there was an area fenced off as a chicken run along with a chicken coop, directly opposite was a modern steel barn with a rusty sign 'Pauls Stationary Power Museum'. rectangular buildings onsite were noted as dilapidated with a potential corrugated asbestos cement roof, guttering and some side panels. The risk assessment identified risk ranging between very low and moderate. Moderate risk has been assigned in relation to on-site shallow contaminated soils and end users.

Based on the findings of the desk study and preliminary risk assessment the following was recommended to inform the contamination assessment, to confirm the findings of the Preliminary Risk Assessment (PRA) and Conceptual Site Model (CSM) and detailed design works in relation to the proposed development.

• Completion of an Intrusive Phase 2 Investigation including gas and groundwater monitoring to assess, BRE365 soakage testing, environmental sampling and laboratory testing and geotechnical laboratory testing.

Geotechnical recommendation included:

- Conventional foundations may be suitable for a low-rise development on the site depending on depth of Made Ground and competence of the underlying strata. For medium to high rise developments or structures with higher loadings, a piled foundation solution may be required.
- The viability of soakaways is likely to be limited on site given the potential cohesive nature of the underlying near surface soils (Upper Tunbridge Wells Sand Formation). However, deeper soakaways may be viable within the sandstone of the Upper Tunbridge Wells Sand Formation, depending on the depth of groundwater within the rock.

3.0 Intrusive Investigation

The following section details the scope and rationale for the investigation undertaken in September 2025.

3.1 Scope of Works

The scope of works for the investigation comprised:

- Provision of a Construction Phase Plan and RAMS pack presenting a risk assessment and method statement(s) specific to the proposed investigation.
- EOD Engineer support during investigation. The previous investigations of the adjacent site identified the requirement for UXO support.
- Attendance of a specialist surveyor to undertake a detectable buried utilities survey of the proposed exploratory hole locations using radio-detection and ground penetrating radar techniques. Provision of Heras Fencing to cordon off soakage pits.
- Attendance of a Geo-Environmental Engineer to set out and supervise the intrusive investigation, undertake sampling, in-situ testing and logging of recovered soils from exploratory holes.
- The construction of 4No. machine dug trial pits to provisional depths of up to 3m bgl. An additional 4No. pits were to be excavated into the stockpiles within the west of the site to obtain samples
- Attendance of a road towable 500gallon water bowser to supply water and crew for trial pit soakage tests.
- Undertake trial pit soakage tests in 4No. pits in general accordance with BRE Digest 365. BRE Digest 365 requires three consecutive filling and drainage cycles to be completed. In many UK soils, it is not possible to complete three test cycles within a single day. Construction of 12No. dynamic sampler boreholes with Standard Penetration Tests (SPTs) at regular intervals to depths of up to 4m bgl, depending on drilling conditions, using a self-propelled track mounted rig.
- Installation of 6No. groundwater monitoring wells to a depth of 4m to facilitate return monitoring on six occasions. The wells would be completed with a lockable cover fitted flush with adjacent ground.
- Ground gas monitoring (spot monitoring) of well installations on 6 occasions at fortnightly intervals. Wherever possible, the monitoring would target periods of low or rapidly falling atmospheric pressure.
- Winter groundwater monitoring on six occasions. It has been assumed that the ground gas monitoring and WGWM will be undertaken consecutively over the winter period so that in total, 12 groundwater records can be collated.
- Geotechnical laboratory testing to support the geotechnical assessment for foundations, ground floor construction and buried concrete design.
- Geochemical laboratory testing of 20No. samples for a suite of commonly occurring brownfield contaminants.
- Additional geochemical testing of 3No. samples for a pesticide suite along with 6No. samples for asbestos screening and quantification.
- Provision of a preliminary report following completion of the intrusive investigation. Provision of a Ground Appraisal Report detailing the findings of the desk study and preliminary risk assessment; the ground and groundwater conditions encountered; the results of in-situ and laboratory testing; a geotechnical assessment for foundations, drainage and buried concrete; contamination assessment and recommendations for further action (if required).

2.3 Investigation Strategy

The positioning of exploratory holes were determined to provide general coverage of the site and to target specific current and proposed features. Tables 3.1 and 3.2 summarise the strategy of the environmental and geotechnical investigations.

Environmental Area of Concern	Investigation	Positions
General background chemical quality of the near surface soils	Dynamic sampler boreholes and trial pits located across the site, coupled with sampling and laboratory analysis	All
Ground Gases and Vapours	Installation of ground gas monitoring wells coupled with return monitoring	WS01, WS05-WS06, WS08-WS10
Existing Stockpiles	Trial pits into the stockpiles	TP101-TP104

Table 3.1 Summary of Environmental Investigation Strategy

Geotechnical Area of Concern	Investigation	Positions
Lateral changes in ground conditions	Dynamic sampler boreholes and trial pits located across the site, coupled with sampling and laboratory analysis	All
Shrinkable soils	Dynamic sampler boreholes and trial pits located across the site, coupled with sampling and laboratory analysis	All
Significant depths of Made Ground	Dynamic sampler boreholes and trial pits located across the site	All
Aggressive chemical ground conditions (sulphates)	Laboratory analysis of samples obtained from dynamic sampler boreholes from across the site	All
Shallow Groundwater	Observations within dynamic sampler boreholes located across the site, and monitoring wells installed for return monitoring	WS01, WS05-WS06, WS08-WS10
Viability of SUDS	BRE 365 Soakage Tests within proposed attenuation basins	TP01-TP04

Table 3.2 Summary of Geotechnical Investigation Strategy

4.0 ENCOUNTERED CONDITIONS

A factual record of the conditions encountered during the physical investigation of the site is presented in the following sections.

For further details of the encountered ground conditions, reference should be made to the exploratory hole logs presented in Appendix B, the geotechnical testing results in Appendix C, the chemical testing results in Appendix D and ground gas and groundwater monitoring in Appendix E.

The physical ground investigation works were undertaken in July 2025. Both geotechnical and contamination testing was undertaken by UKAS accredited laboratories.

Unless stated otherwise, all depths are reported as metres below ground level (m bgl).

4.1 Soils

During the investigation, Topsoil was encountered within TP01-TP02, TP04, WS01, WS04-WS08, WS11 and WS12 to depths of between 0.05m and 0.30m bgl and comprised brown sandy silt, silty clay, sandy clay and clayey silt with frequent rootlets and occasional roots 1-4mm diameter.

Made Ground was encountered within TP02-TP03, WS02-WS03, WS09-WS10 to depths of between 0.15m and 2.30m bgl (excluding TP101-TP104 as these formed raised stockpile locations) and comprised a mixed composition of brown, dark brown and dark grey very clayey silt, organic very silty clay, grey and black stained silty clay with a hydrocarbon malodour (TP02 only), silty gravelly sand, silty sand, slightly sandy silty clay, very sandy silty friable clay, tarmacadam gravel (WS03 only), concrete underlain by a plastic membrane (WS09 only). Gravels comprised flint, brick and concrete, rare cobbles. A rare piece of possible asbestos containing material was found within WS10 at a depth of between 0.20m and 0.40m bgl. Some rotting wood and a mild organic odour was noted within WS02 at a depth of between 0.55m and 1.30m bgl.

Underlying the Topsoil and Made Ground within locations TP01, TP03-TP04, WS01-WS12 the Upper Tunbridge Wells Sand Formation was encountered to depths of up to 2.90m bgl (maximum achievable depth of the investigation) and comprised firm to very stiff brown, light brown and yellowish brown clayey silt, slightly clayey silt, silty clay, gravelly silty clay, very silty clay/clayey silt, slightly clayey gravelly silt and sandy silt. Gravels comprised fine to coarse angular to sub-angular siltstone and sandstone. Rare roots were noted to a maximum depth of 1.10mbgl.

All positions refused at depths of between 1.10m and 2.90m bgl on very stiff clayey gravelly silt of the Upper Tunbridge Wells Formation.

For further details of the ground conditions encountered, reference should be made to the borehole logs and sections presented in Appendix B.

4.2 Groundwater

Groundwater was not encountered during the intrusive investigation. Monitoring wells were installed within WS01, WS05-WS06 and WS08-WS10 to depths of between 1.0m to 2.90m bgl with twelve visits planned between October 2025 and March 2026. An initial visit was undertaken on 11th August 2025; groundwater was recorded at depths of between 1.26m and 1.80m bgl.

It should be noted that changes in groundwater and perched water levels do occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a series of standpipes or piezometers installed within appropriate response zones.

4.3 Ground Gases

Dual-purpose gas and groundwater depth monitoring standpipes were installed within WS01, WS05-WS06, WS08-WS10 to depths of between 1.00m and 2.90m bgl. An initial return monitoring visit has undertaken on 11th August 2025 with a further six visits planned from October 2025. Methane was recorded between 0.0% v/v to 0.2% v/v, whilst carbon dioxide and oxygen have been recorded within the range of 0.0% v/v and 5.0% v/v, and 16.2% v/v to 20.0% v/v respectively. VOC concentrations of between 0.5ppm and 39.4ppm were recorded during the monitoring visit, whilst atmospheric pressure has been recorded between 1008mb and 1009mb. A maximum steady flow of 0.0l/hr was recorded during the monitoring period. For further details, reference should be made to the ground gas assessment sheet in Appendix E.

4.3 Obstructions

Whilst no artificial obstructions were encountered during the intrusive investigation, all intrusive locations refused prematurely at depths of between 1.10m and 2.90m bg on very stiff clayey gravelly silt.

Furthermore, given the former and current development nature of the site, obstructions elsewhere on site should not be discounted.

4.4 Geotechnical Testing

The results of geotechnical testing undertaken as part of the ground investigation are summarised in Table 4.1, with test results presented in Appendix C.

Parameter	Upper Tunbridge Wells Sand Formation
Moisture content (%)	9.2-21.5
Plasticity Index (%)	5-20
Modified Plasticity Index (%)	4-20
Volume Change Potential (NHBC)	Non-Shrinkable to Medium
pH	5.3-6.7
Water soluble sulphate (mg/l)	12.7-51.2

NOTE: Modified plasticity index is defined in NHBC Standards Chapter 4.2

Table 4.1 Summary of Geotechnical Laboratory Test Results

4.5 Geochemical Analysis

In order to assess the general chemical quality of the strata encountered, samples of soils recovered from the exploratory holes were submitted for analysis for a range of potential contaminants selected on the basis of the findings of the desk study and supported by the joint National House Building Council (NHBC), Environment Agency (EA) and Chartered Institute of Environmental Health (CIEH) publication, '*Guidance for the Safe Development of Housing on Land Affected by Contamination*' (2008).

Soil samples were placed into plastic containers for general inorganic analysis and into amber jars for organic analysis. Samples were stored in temperature-controlled conditions from sampling until receipt at the laboratory from which time sample preparation and storage was determined by testing requirements and in line with the laboratory's protocols.

Twenty-three soil samples from across the site (12No. of Made Ground, 6No. of Topsoil and 5No. of Upper Tunbridge Wells Sand Formation) were submitted for analysis for an analytical suite based upon determinands listed within the above guidance including heavy metals and semi-metals, cyanide, speciated petroleum hydrocarbon analysis, polycyclic aromatic hydrocarbons (PAH), phenols and asbestos screens.

Three samples of the near surface soils were also submitted for analysis of pesticides.

Furthermore, asbestos quantification was undertaken on six samples where asbestos was identified.

For further details reference should be made to the laboratory results in Appendix D.

5.0 ENGINEERING CONSIDERATIONS

Subsequent to intrusive investigation of the site and receipt of the laboratory test results, the following geotechnical assessments have been made.

5.1 Conventional Foundations

Based on the ground and groundwater conditions encountered within the intrusive locations it is considered that traditional foundations would likely be suitable for the proposed low-rise development on site. However, within the zone of moisture demand of any nearby past, present or proposed trees foundation depths would require deepening. The results of the Atterberg Limit tests, in conjunction with the field observations indicated the Upper Tunbridge Wells Sand Formation ranged between non-shrinkable and medium volume change potential as defined by NHBC Standards, Chapter 4.2 and BRE Digest 240. Therefore, it is recommended that en masse the Upper Tunbridge Wells Sand Formation be treated as medium volume change potential and a minimum foundation depth remote from trees of 0.90m is recommended. A minimum foundation width of 450mm is recommended.

Although not strictly applicable to the form of construction, within the zone of moisture demand of any existing, proposed or recently felled trees it is recommended that foundation depths be calculated in accordance with the NHBC Standards, Chapter 4.2 for medium volume change potential soils. Foundations should also be taken through any major root zone and desiccated clay soils, should this be found at greater depth. It should be noted that the NHBC stipulate that foundations cast at depths greater than 2.5m should be "engineer designed". Where this is the case, an alternative foundation solution such as piles may prove more economical.

Heave protection measures such as a void former are required against the side of foundations for medium volume change potential soils where calculated foundation depths on account of trees exceed 1.50m.

Based on the typical settlement parameters for the types of soil encountered, a maximum net allowable bearing capacity of 125kPa is applicable for trench, strip or isolated pad foundations up to 1.50m in width taken through any Topsoil, Made Ground, soft or loose zones, desiccated or disturbed soils and placed wholly into or onto the firm to very stiff sandy clay and silt of the Upper Tunbridge Wells Sand Formation. Under the above loadings the settlements should remain within tolerable limits for the proposed scheme. Where foundations span between cohesive and granular horizons, nominal reinforcement will be required.

5.2 Floor Slabs

Based on the laboratory testing results and shrinkable soils, it is recommended that suspended ground floor slabs be adopted. The void space beneath the suspended floor must be designed in accordance with the NHBC Standards, Chapter 4.2.

5.3 Excavations

Excavations within any shallow Made Ground should remain relatively stable in the short term. Longer deeper excavations within any deeper areas of Made Ground are likely to be prone to instability, particularly where left open for prolonged periods or where water is encountered, and should be battered back to a safe angle, or suitable shoring techniques should be adopted to provide stability. Pumping from sumps would also be required where water is encountered.

Shallow excavations within the Upper Tunbridge Sand should remain relatively stable in the short to medium term. Longer deeper excavations may be prone to instability, particularly where more granular horizons containing perched water are encountered.

In such circumstances, excavations should be battered back to a temporary safe angle of repose, or suitable shoring techniques should be adopted to provide stability. Pumping from sumps would also be required where water is encountered.

It should be noted that some relatively shallow groundwater levels were recorded in the boreholes and subsequent return monitoring for the adjacent site. In addition, an initial monitoring visit undertaken on-site in August 2025 encountered groundwater at depths of between 1.26m and 1.80m bgl, with shallower water anticipated during the winter months. It is anticipated that the water recorded represented perched water within the more granular layers overlying less permeable horizons. There is a risk of excavation instability and running sand where these are encountered.

Ground works should always be designed in such a manner to avoid man entry into excavations. However, in the event that such works cannot be avoided or designed out, they should only be undertaken in accordance with a safe system of work, following an appropriate risk assessment and in accordance with any legislative requirements, e.g. Confined Spaces Regulations.

5.4 Sulphates

Four pH and Sulphate tests were undertaken on the Upper Tunbridge Wells Sand Formation. The results for the Upper Tunbridge Wells Sand Formation corresponded to design classes of DS-1 as defined within the BRE Special Digest 1 (2005). The pH analyses indicate the ACEC class to be AC-1s. It is recommended that a design class of DS-1 and an ACEC class of AC-1s be applied to all sub-surface concrete within these strata.

5.5 Pavements

Made Ground of various composition was encountered on site. The engineering characteristics of such soils are variable and unpredictable and the CBR value of Made Ground does not predict the overall settlements that may occur in such materials. Due to the variability of the Made Ground it would be prudent to assume the material to be deemed frost susceptible throughout thus a minimum pavement thickness of 450mm would be appropriate.

The Transport and Road Research Laboratory Report (LR1132) entitled '*The Structural Design of Bituminous Roads*' (1984) cites an estimated equilibrium suction index of between 4.5-5% for plasticity Indices between 4%-20% under average construction conditions and a low groundwater level.

Based on the TRRL report, a preliminary CBR value of 4.5% is recommended. Based on the geotechnical results, the near surface Upper Tunbridge Wells Sand Formation should be considered as being frost susceptible for pavement design purposes.

If the estate roads are to be adopted West Sussex County Council's Highways Department will likely require further four-point Atterberg Limit tests at close centres along the routes of the roads.

5.6 Soakaways

Soakage testing in general accordance with BRE Digest 365 was undertaken within the trial pits TP01-TP04 at depths of between 1.10m and 2.30m bgl. The results of the soakage tests are presented below. It should be noted that the tests were run for up to 22.5 hours and none of the tests achieved the 25% empty mark to enable an infiltration rate to be calculated:

TP01 (1.60mbgl)	TP02 (2.30mbgl)	TP03 (1.30mbgl)	TP04 (0.81mbgl)

Time (min)	Water Depth (m)	Time (min)	Water Depth (m)	Time (min)	Water Depth (m)	Time (min)	Water Depth (m)
0.0	1.00	0.0	1.48	0.0	0.77	0.0	0.60
1.0	1.00	1.0	1.49	1.0	0.78	1.0	0.60
2.0	1.00	3.0	1.49	3.0	0.78	3.0	0.60
5.0	1.00	10.0	1.50	5.0	0.78	30.0	0.60
10.0	1.02	15.0	1.50	60.0	0.79	60.0	0.61
25.0	1.04	30.0	1.50	1140.0	0.86	90.0	0.62
40.0	1.05	60.0	1.50			1148.0	0.66
60.0	1.07	120.0	1.51			1247.0	0.68
90.0	1.09	1153.0	1.51			1289.0	0.70
120.0	1.10					1352.0	0.71
150.0	1.11						
180.0	1.11						
210.0	1.11						
1036.0	1.38						
1134.0	1.40						
1177.0	1.40						
1260.0	1.40						

Table 5.1: Infiltration Test Results

6.0 ENVIRONMENTAL CONSIDERATIONS

A Generic Quantitative Risk Assessment (GQRA) incorporating the results of the desk study and ground investigation was undertaken, the findings of which are presented in the following sections.

6.1 Environmental Risk Assessment

Based on a visual assessment of the soils encountered, in conjunction with the Desk Study and the proposed end use, twenty-three soil samples were submitted for a suite of commonly occurring contaminants including metals, metalloids, inorganic compounds, TPH, PAH and asbestos with a further three samples submitted for pesticide screening and three for asbestos quantification as outlined in Table 6.1 below.

Location	Depth (m bgl)	Testing Suite				Stratum
		GESL/4	Asbestos Identification	Asbestos Quantification	Pesticides	
WS01	0.10	X				Topsoil
WS02	0.10	X				Made Ground
WS02	1.00		X	X		Made Ground
WS03	0.20	X				Upper Tunbridge Wells Sand Formation
WS04	0.50	X				Upper Tunbridge Wells Sand Formation
WS05	0.10	X			X	Topsoil
WS06	0.10	X			X	Topsoil
WS07	0.20	X				Upper Tunbridge Wells Sand Formation
WS08	0.10	X				Topsoil
WS09	0.50	X				Upper Tunbridge Wells Sand Formation
WS10	0.30	X		X		Made Ground
WS11	0.10	X				Topsoil
WS12	0.50	X				Upper Tunbridge Wells Sand Formation
TP01	0.50	X				Upper Tunbridge Wells Sand Formation
TP02	0.50	X				Made Ground
TP02	1.00	X				Made Ground
TP02	1.50	X				Made Ground
TP03	0.10	X				Made Ground
TP04	0.10	X			X	Topsoil
TP101	0.20	X		X		Made Ground
TP102	0.20	X		X		Made Ground
TP103	0.20	X				Made Ground
TP104	0.20	X				Made Ground

Table 6.1: Soils Submitted for Laboratory Analysis

6.2 Soil Contamination vs. Human Health

The presence of a possible contaminant does not necessarily imply that a site or area is contaminated or that there is any unacceptable risk to human health. A Preliminary Quantitative Risk Assessment has been undertaken in order to evaluate any unacceptable risks posed to human health with respect to the proposed redevelopment. It should be noted that this assessment is protective of the chronic long-term effects of contaminants, which is also likely to be protective of any possible immediate acute effects.

A quantitative risk assessment has been undertaken initially by comparing the results of the laboratory chemical testing of non-targeted shallow soils in each area against Soil Guideline Values (SGVs), DEFRA Category 4 Screening Levels (C4SLs) or Atkins' ATRISK^{soil} Site Specific Screening Values (SSSVs) for a residential end use without plant uptake. Any results that may have been greater than the guideline values or where there are no comparable values, the results have subsequently been compared against Land Quality Management Suitable 4 Use Levels (Subscription No. S4UL3453) (LQM S4UL) and Category 4 Screening Levels (C4SL). If any screening values are exceeded, further statistical assessment is required.

Benzo(a)pyrene has been used in the assessment as a surrogate marker for PAH contamination.

Visual or olfactory evidence of soil contamination was encountered during the intrusive investigation with a hydrocarbon malodour noted within the Made Ground of Trial Pit TP02. In Addition, a fragment of asbestos was noted in the Made Ground Within WS10.

The results of the chemical testing have been compared directly with the generic assessment criteria for a residential end use without plant uptake – this is considered conservative given that the site will form a care home. The results have been divided between the results of the soils from below ground level (bgl), and those from the raised stockpiles within the southwestern portion of the site.

Soils Below Ground Level

All of the laboratory results were either below the laboratory detection limits or below the relevant thresholds with the exception of the results summarised in Table 6.2. Both recorded instances of asbestos were within the Made Ground. The locations of the exceedances are presented in Figure 4.

Contaminant	Concentration Range	Unit	Range of Exceedances	No. of Exceedances	Locations reporting Exceedances	Criteria
Asbestos by hand picking/weighing	0.001 - 3.546	%	0.001 - 3.546	2	WS02 (1m), WS10 (0.3m)	ATRISK Soil Screening Values (SSVs) Residential without consumption of home-grown vegetables - 1% SOM Sand (NAD)

Table 6.2 Summary of exceedances.

Where Made Ground is present within any proposed soft landscaped areas, it is removed with the implementation of a cover system. Any impacted soils within the footprint of proposed buildings can be left in-situ however, any fragments will need to handpicked.

In addition, the results of the Pesticide screening were all below the laboratory detection limits.

With regards to the remainder of the site, three buildings were noted to be constructed with materials including asbestos, one of which was in a very dilapidated condition. Post demolition, further testing within the footprint and immediate surrounds will be required to confirm that there is no contamination from asbestos or other contaminants within those locations.

For further details reference should be made to the laboratory results and screening table in Appendix D.

Stockpiles

All of the laboratory results were either below the laboratory detection limits or below the relevant thresholds with the exception of the results summarised in Table 6.3. The locations of the exceedances are presented in Figure 6.3.

Contaminant	Concentration Range	Unit	Range of Exceedances	No. of Exceedances	Locations reporting Exceedances	Criteria
Arsenic	9.7 - 41	mg/kg	41 - 41	1	TP102 (0.2m)	ATRISK Soil Screening Values (SSVs) Residential without consumption of home-grown vegetables - 1% SOM Sand (39.9)
Benzo(a) pyrene	1.1 - 8.6	mg/kg	5.6 - 8.6	2	TP101 (0.2m), TP103 (0.2m)	ATRISK Soil Screening Values (SSVs) Residential without consumption of home-grown vegetables - 1% SOM Sand (5.33)
Naphthalene	0.05 - 1.1	mg/kg	1.1 - 1.1	1	TP101 (0.2m)	ATRISK Soil Screening Values (SSVs) Residential without consumption of home-grown vegetables - 1% SOM Sand (0.851)
Asbestos by hand picking/weighing	<0.001	%	<0.001	2	TP101 (0.2m), TP102 (0.2m)	ATRISK Soil Screening Values (SSVs) Residential without consumption of home-grown vegetables - 1% SOM Sand (NAD)

Table 6.3 Summary of exceedances.

For further details reference should be made to the laboratory results and screening table in Appendix D.

It is considered that the stockpiles will require removing as waste prior to the commencement of the development.

With regards to adjacent land users, the surrounding land uses were identified to mostly comprise residential properties, woodland and fields. No significantly elevated mobile contamination was encountered during the intrusive investigation and subsequent laboratory analysis, and the entire site is proposed to be encapsulated within the building footprint or beneath permanent hardstanding. Therefore, no remedial action is considered necessary with regards to risk from soil contamination to human health.

In addition, it is recommended that dust suppression techniques, e.g. damping down exposed soils, are employed during the demolition and construction phases on site to minimise the potential for airborne migration of specific hazards and to manage potential nuisance issues for adjacent land users.

Notwithstanding the above, a discovery strategy should be implemented on site throughout the demolition and construction works to allow for assessment of any conditions that may not have been revealed by the intrusive investigation (see Discovery Strategy in Section 6.11).

6.3 Soil Contamination vs. Building Materials

The current guidance on selection of materials for water supply pipes to be laid in contaminated land is contained in UK Water Industry Research's (UKWIR) report reference 10/WM/03/21 (re-issued 2010). However, the guidance is not mandatory and there have been concerns raised by various industry technical associations regarding the document and the methodologies proposed.

Although there are concerns regarding the document, in lieu of any further guidance in the first instance the results of this investigation have been compared with the proposed thresholds published in UKWIR Table 3.1. The analysis undertaken on samples of encountered Made Ground and natural soils have not identified any exceedances for both PE and PVC pipe with respect to proposed water supply pipes. It is likely that all water supply pipes will be laid wholly within natural soils.

As a matter of good practice, and to maximise the protection to utilities, it is recommended that clean, granular backfill is used in service runs and that marker tapes are used for all buried services.

6.4 Soil Contamination vs. Surface Water

Given that significant concentrations of potentially mobile contamination were not encountered within the soils beneath the site, and the relative impermeability of the soils the risk to surface water features in the surrounding area from soil contamination originating on site is considered to be negligible.

As such, remedial measures to protect surface water features from soil contamination on site are not considered necessary.

Notwithstanding the above, a discovery strategy should be implemented on site throughout the demolition and construction works to allow for assessment of any conditions that may not have been revealed by the intrusive investigation (see Discovery Strategy in Section 6.11).

6.5 Soil Contamination vs. Groundwater

The Upper Tunbridge Wells Sand Formation beneath the site is indicated to be a Secondary A Aquifer. This site is not within a groundwater Source Protection Zone (SPZ), and no SPZ were identified within a 1km radius of the site boundary.

Given that no significant concentrations of potentially mobile contamination were not encountered within the soils beneath the site, and the relative impermeability of the soils the risk to groundwater features in the surrounding area from soil contamination originating on site is considered to be negligible.

As such, specific remedial measures to protect groundwater from soil contamination on site are not considered necessary.

Notwithstanding the above, a discovery strategy should be implemented on site throughout the demolition and construction works to allow for assessment of any conditions that may not have been revealed by the intrusive investigation (see Discovery Strategy in Section 6.11).

6.6 Ground Gases & Vapours vs. End Users

Dual-purpose gas and groundwater depth monitoring standpipes were installed within WS01, WS05-WS06, WS08-WS10 to depths of between 1.00m and 2.90m bgl. An initial return monitoring visit has undertaken on 11th August 2025 with a further five visits planned from October 2025. Methane was recorded between 0.0% v/v to 0.2% v/v, whilst carbon dioxide and oxygen have been recorded within the range of 0.0% v/v and 5.0% v/v, and 16.2% v/v to 20.0% v/v respectively. VOC concentrations of between 0.5ppm and 39.4ppm were recorded during the monitoring visit, whilst atmospheric pressure has been recorded between 1008mb and 1009mb. A maximum steady flow of 0.0l/hr was recorded during the monitoring period. The results of all six visits will be interpreted once all monitoring visits have been completed.

For further details, reference should be made to the ground gas assessment sheet in Appendix E.

6.7 Waste Disposal

6.7.1 Reuse of Material

In accordance with CL:AIRE Code of Practice (2011) materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded by the holder'.

The Code of Practice therefore allows soils to be reused on site where the following criteria are met:

- Pollution of the environment and harm to human health is prevented in reusing the excavated materials;
- The material is suitable for use (without any further processing);
- There is certainty of use; and
- The quantity that is absolutely necessary (and no more) is used.

In order to comply with the Code of Practice, a material management plan that confirms the above criteria are met has to be prepared. The material management plan must be reviewed by a 'Qualified Person' who then issues a declaration to the Environment Agency. Geo-Environmental can provide this service should it be required.

Where materials do not meet the required criteria, it may be possible to treat them under an environmental permit so that they may be re-used on site.

6.7.2 Reuse of Waste

Where material is discarded as waste, it may still be possible to reuse the waste on site under a standard rules environmental permit or a U1 waste exemption. However, strict limits on the volumes that can be reused apply in these cases.

6.7.3 Disposal to Landfill

Under current legislation, where wastes are to be disposed of to landfill they may, depending on their classification, require pre-treatment. Pre-treatment shall comprise a chemical, physical (including sorting), thermal or biological process. The pre-treatment is required to change the characteristics of the waste, reduce its volume, reduce its hazardous nature, and facilitate its handling and enhance its recovery.

6.7.4 Waste Classification

The following information is provided for preliminary guidance purposes, as different facilities or operators may have differing acceptance criteria and Waste Acceptance Criteria (WAC) analysis may be required to confirm the exact classification. In addition, if the intention is to retain excess spoil/arisings on site for specific purposes, then these soils would not comprise waste, although this is subject to confirmation and relevant declaration under the Definition of Waste Code of Practice.

Where waste soil is being disposed to landfill it must first be classified as either Hazardous or Non-Hazardous. The classification is carried out in accordance with the Environment Agency's publication WM3 'Waste Classification- Guidance on the classification and assessment of waste'. Waste that is classified as Non-Hazardous in accordance with WM3 may be disposed without further testing to a Non-Hazardous landfill. Alternatively, once the waste soils have been identified, Waste Acceptance Criteria (WAC) testing can be undertaken to establish whether the material can be disposed to an Inert landfill, a subgroup of Non-Hazardous landfill. It should be noted that inert wastes are typically from a consistent source that meet a number of qualifying criteria, and thus Made Ground commonly will not meet the requirements to be disposed as Inert.

The laboratory results and WAC analysis for the samples of the recovered soils were assessed using the HazWasteOnline software which determines whether a generated waste is hazardous or non-hazardous based on standard laboratory analysis and are based on the chemical properties of the sample and therefore the appropriate indicative List of Waste code is '17 05 04 Soil and stones other those mentioned in 17 05 03*'.

Sample	Geology	HazWasteOnline Classification
WS01 0.10m	Topsoil	Non-Hazardous
WS02 0.10m	Made Ground	Non-Hazardous
WS02 1.00m	Made Ground	Non-Hazardous
WS03 0.20m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
WS04 0.50m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
WS05 0.10m	Topsoil	Non-Hazardous
WS06 0.10m	Topsoil	Non-Hazardous
WS07 0.20m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
WS08 0.10m	Topsoil	Non-Hazardous
WS09 0.50m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
WS10 0.30m	Made Ground	Hazardous (HP5, HP7)
WS11 0.10m	Topsoil	Non-Hazardous
WS12 0.50m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
TP01 0.50m	Upper Tunbridge Wells Sand Formation	Non-Hazardous
TP02 0.50m	Made Ground	Non-Hazardous
TP02 1.00m	Made Ground	Non-Hazardous
TP02 1.70m	Made Ground	Non-Hazardous
TP03 0.10m	Made Ground	Hazardous (HP3(i), HP7, HP11)
TP04 0.10m	Topsoil	Non-Hazardous
TP101 0.20m	Made Ground	Non-Hazardous
TP102 0.20m	Made Ground	Non-Hazardous
TP103 0.20m	Made Ground	Non-Hazardous

TP104 0.20m	Made Ground	Non-Hazardous

Table 6.4 Summary of HazWasteOnline Assessment

The results of the screening revealed that all samples tested were categorised as either non-hazardous and Hazardous. However, it is likely that a proportion of the Topsoil will be re-used on site. Any excess Topsoil may be used on other sites subject to a Material Management Plan being in place.

It must be noted that any waste classification assessment is indicative only and actual classification would depend on permit status of the final disposal facility. Once soils for disposal have been identified it is recommended that further testing of these specific soils be undertaken in order to confirm the above assessment.

In accordance with the CL:AIRE Definition of Waste Code of Practice (2011) materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded by the holder'.

The Code of Practice therefore allows soils to be reused on site where the following criteria are met:

- The re-use of the soils will not present an unacceptable or increased risk to controlled waters, the environment and human health;
- The soils are suitable both in terms of chemical and geotechnical properties for the intended use without prior treatment;
- Only the required volume is used and no more;
- There is a required use and a certainty of use not just a possibility.

In order to comply with the Code of Practice, a Materials Management Plan (MMP) that confirms the above criteria are met must be prepared. The MMP must be reviewed by a 'Qualified Person' who then issues a declaration to the Environment Agency. The MMP and declaration must be in place before soils are excavated and it cannot be applied retrospectively. Geo-Environmental can provide this service should it be required.

Where materials do not meet the required criteria, it may be possible to treat them under an environmental permit so that they may be re-used on site. In addition, where material is discarded as waste, it may still be possible to reuse the waste on site under a standard rules environmental permit or a U1 waste exemption. However, strict limits on the volumes that can be reused apply in these cases.

Under current legislation, where wastes are to be disposed of to landfill, they may, depending on their classification, require pre-treatment. Pre-treatment shall comprise a chemical, physical (including sorting), thermal or biological process. The pre-treatment is required to change the characteristics of the waste, reduce its volume, reduce its hazardous nature, and facilitate its handling and enhance its recovery.

Other materials disposed of from site as part of the development of the site may require disposal separately. All materials containing dangerous substances e.g. tar or bitumen, asbestos, mercury, hydrocarbons, PCBs and asbestos are likely to be classified as Hazardous Waste and therefore susceptible to the relevant legislative controls.

Furthermore, asbestos was identified by the testing.

Should it be proposed to dispose of any of the material the results should be forwarded to the proposed receiving landfill for confirmation of this assessment as it is their decision on whether they will accept the waste material.

6.8 Updated Preliminary Risk Assessment

Based on the findings of the investigation, a revised risk assessment has been prepared excluding ground gases, which will be reassessed once all monitoring visits have been completed.

Potential Source/media	Potential Receptors	Potential Pathways	Likelihood	Severity	Risk and Justification	Mitigation Measures	Residual Risk
Contaminants of Concern **(Made Ground and Shallow Soils)**	End users	Direct contact, Inhalation	Low	Medium	**Moderate to Low** Soils were not chemically suitable or physically suitable.	Mitigation measures required.	**Very low**
	Soft Landscaping	Root uptake	Low	Mild	**Low** No evidence of harm to the existing soft landscaping on-site was identified. The laboratory results found not elevated concertation's that would affect soft landscaping.	No mitigation measures required.	**Very Low**
	Adjacent land users	Direct contact, Inhalation	Low	Minor	**Very Low** Mobile contaminants within soils were unlikely to pose a risk to adjacent land users. The laboratory results did not identify any mobile contaminants that would affect adjacent land users.	Mitigation measures unlikely to be required to protect adjacent land users.	**Very Low**
	Water supply pipes	Direct contact	Likely	Minor	**Low**	Potable water supply pipes laid within the natural soils are	**Very Low**

Potential Source/media	Potential Receptors	Potential Pathways	Likelihood	Severity	Risk and Justification	M
					Soils were chemically suitable for standard water supply pipes.	u p C a b u
	Buildings and infra-structure	Direct contact	Low	Mild	**Low** Foundations will be placed within potentially aggressive soils. Results classified the buried concrete as DS-1 (AC-1z).	It tl sl C w o
	Groundwater	Vertical / Horizontal migration	Low	Mild	**Low** Groundwater was encountered during the monitoring at depths of between 1.26m and 1.80m; no mobile contamination encountered.	N m
Naturally occurring aggressive ground conditions	End Users	Direct contact and inhalation/ingestion of soil derived dust	Low	Minor	**Very Low** No naturally occurring potential sources which could harm human health have been identified.	N m

Potential Source/media	Potential Receptors	Potential Pathways	Likelihood	Severity	Risk and Justification	N
	Adjacent land users	Direct contact	Unlikely	Minor	**Very Low** No potential sources which could harm human health have been identified.	N m
	Water supply pipes	Direct contact	Likely	Minor	**Low** Services will be placed within soils which may be an aggressive environment which may require specific pipework. Sampling and chemical testing required to assess the risk.	N m
	Buildings and infrastructure	Direct contact	Likely	Minor	**Low** Foundations will be placed within soils which may be an aggressive environment for concrete. Sampling and chemical testing required to assess the risk.	N m

Table 6.5: Revised Plausible Pollutant Linkages & Qualitative Risk Assessment

6.9 Discovery Strategy

Whilst an intrusive investigation has been undertaken on the site, it remains possible that unexpected ground and/or groundwater conditions may be encountered during the process of construction.

Should previously undiscovered contamination or unforeseen ground conditions be encountered during construction by the ground workers, this must be reported to the Site Manager immediately in order that the Consultant is notified. Where deemed necessary, the Consultant shall attend the site to inspect the discovery and provide recommendations on the further actions required, if any. Where necessary the regulatory authority shall be informed. Post any additional investigation or laboratory testing the results and any proposed remedial measures shall be reported to the regulatory authority or other appropriate organisation for consent, before proceeding or implementing the remedial measures.

A copy of the discovery strategy must be lodged on site, and provisions made to ensure that all workers are made aware of their responsibility to observe, report, and act on any potentially suspicious, abnormal, unforeseen or contaminated ground and/or groundwater conditions they may encounter.

Depending on the type, nature and extent of any such 'discovery', it may be necessary to halt works in that location until such time as the assessment has been completed. This shall be reviewed on a 'discovery' specific basis and in conjunction with consultation with the client, other technical personnel and/or regulatory/approval organisations.

As a general guide, where such unexpected conditions are encountered the following approach is required as a minimum:

- All discoveries are to be reported to the Site Manager immediately and works at that location are to halt until further notice;
- The Site Manager is to report any such discoveries to the Client and the Consultant;
- Following notification from the Site Manager, the Consultant shall discuss the discovery with the Local Authority and/or other relevant parties and if considered necessary, arrange to meet on site to view the discovery;
- The Consultant shall attend the site to record the location, extent and nature of the discovery and implement an appropriate sampling and analysis regime, taking due account of the type and nature of the discovery, known and probable land uses in that area of the site;
- Where remedial action is required, regulatory consultation and approval will be sought;
- A record will be produced by the Consultant and held on site (with copies held by the Consultant, Client and Local Authority/other relevant organisation), detailing the discovery, assessment works undertaken, findings thereof, confirmation either of no action required or detailing the remedial action taken and validation thereof.

The process is shown below.

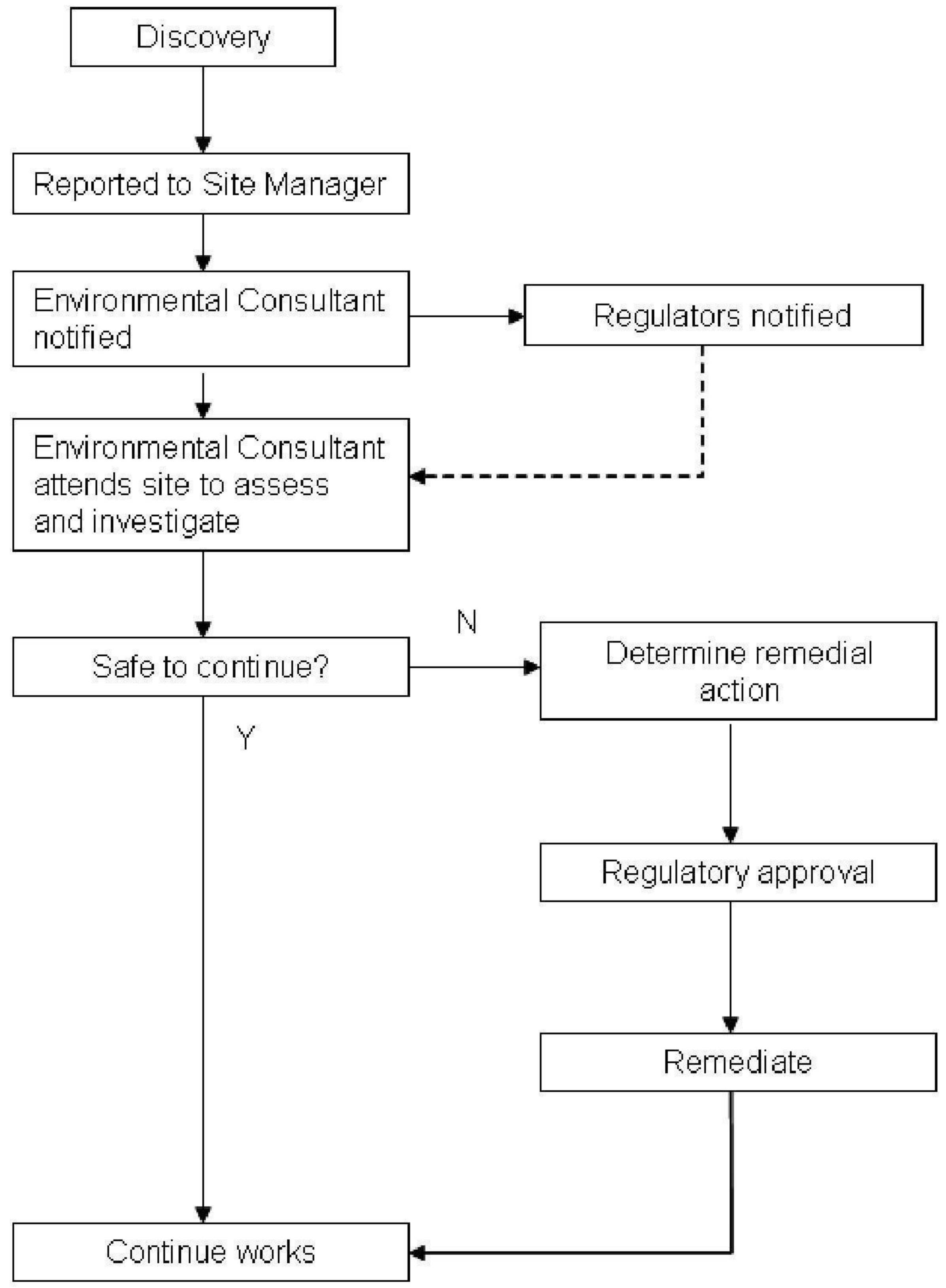
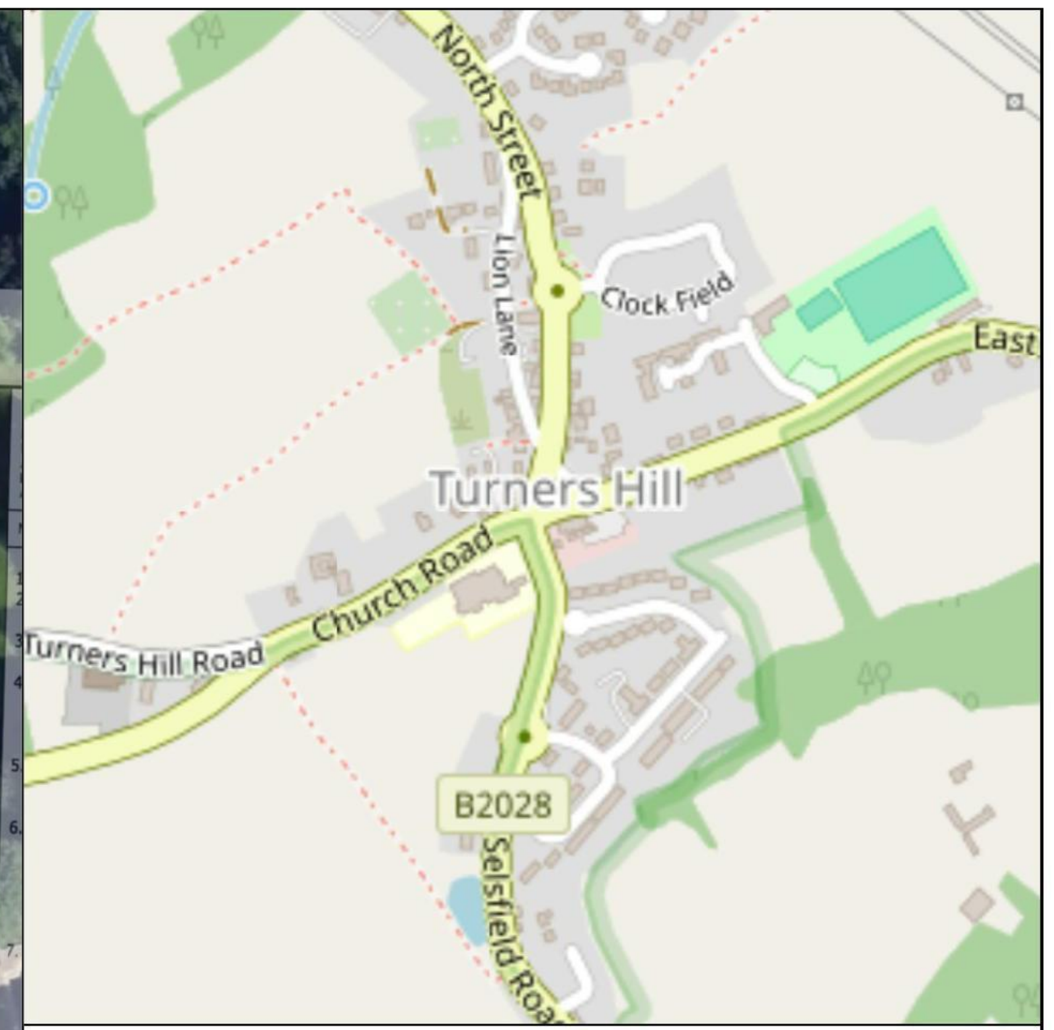


Chart 1 Discovery Strategy Process

A copy of the discovery strategy must be lodged on site and provisions made to ensure that all workers are made aware of their responsibility to observe, report and act on any potentially suspicious or contaminated materials they may encounter.

FIGURE 1

Site Location Plan



Legend

- Site Boundary
- Features
- Proposed

0 25 m 50 m

© Mapbox

Geo-Environmental

Produced by **Datanest.earth**

Title: site location Plan			
Client: Wates			Size: A3
Project: Hurst Farm, Crawley Down	Drawn: TD		Figure No.: 1
Date: 01-07-2025	Checked: RG		
Proj No: GE23261	Scale: 1:1300		Version: draft

FIGURE 2

Exploratory Hole Location Plan (Existing Layout)