

**STAGE 1 TIER 1 PRELIMINARY GEO-ENVIRONMENTAL RISK ASSESSMENT**

**PROPOSED REDEVELOPMENT:**

**ASHBY FARM, DUCKS HILL ROAD, NORTHWOOD HA6 2SS**



**Client:** **HOLLAND & HOLLAND**  
**Ducks Hill Farm**  
**Harefield**  
**Northwood HA6 2ST**

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<b>Rev 1</b>	<b>12/11/25</b>	<b>Slight revision to text and appendix</b>	<b>James Williams MSc, Beng (Hons), FGS</b>	<b>Stuart Wagstaff BSc (Hons), MSc, FGS, CGeol, RoGEP</b>

*This investigation has been undertaken within the constraints of the client's instruction/contract, together with those set out in the 'General information, limitations and exceptions' section at the end of this report. The Soil Consultants Limited (SCL) 'Standard Terms of Appointment' are also included at the end of this report and these identify the contractual arrangements for the investigation. Conclusions or recommendations made in this report are limited to those which can be reasonably based upon the research and/or intrusive investigation work carried out. Any comments which rely on third-party information which has been provided to us are made in good faith and on the assumption that such information is accurate. SCL have not carried out independent validation of any third-party information. Any views or recommendations made by the authors are expressed solely on behalf of SCL and not as individuals.*

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### **APPENDIX A**

#### **Plans, drawings and photographs**

- ✚ Site Location Map
- ✚ Site Plan
- ✚ Site walkover photographs
- ✚ Historical borehole logs
- ✚ Proposed layout plan
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### **APPENDIX B**

- ✚ GroundSure historical maps (Ref SCL-GOE-PCT-N4A-HBQ)
- ✚ GroundSure Enviro+Geo Insight Report (Ref SCL-NQI-Y11-67P-6A6)

## 1.0 INTRODUCTION

Consideration is being given to the demolition of the majority of the existing structures on site and construction of a new light industrial building of two storey height, which will incorporate part of a retained historical barn. In connection with the proposed redevelopment, Soil Consultants Ltd (SCL) were commissioned by MHA Structural Design Ltd on behalf of the client, Holland and Holland, to carry out a Stage 1 Tier 1 Preliminary Risk Assessment (PRA) to include the following elements:

- ✚ A review of historical and current land-use and potential contaminated land risks
- ✚ Development of an initial Conceptual Site Model (CSM) identifying potential sources, pathways and receptors and environmental risks
- ✚ Summary of geotechnical risks
- ✚ Considerations for a Stage 1 Tier 2 intrusive investigation

This assessment is generally based upon current UK guidance, primarily the Environment Agency's "Land contamination: risk management" (2023).

## 2.0 SITE DESCRIPTION

A summary description of the site and its general setting is as follows:

Element	Description
Site location and setting	<ul style="list-style-type: none"> <li>✚ Located on the western side of Ducks Hill Road, within a rural area about 2km south-west of Northwood town centre.</li> <li>✚ NGR 507655E, 189995N at its centre.</li> </ul>
Site dimensions	<ul style="list-style-type: none"> <li>✚ The site is irregular in shape, measuring about 115m (E-W) x 45m (N-S) at its centre.</li> </ul>
Site boundaries	<ul style="list-style-type: none"> <li>✚ The majority of the site is bounded by a mixture of hedgerows and fences with fields and areas of dense brambles beyond (Photos 1 to 3).</li> <li>✚ The northern boundary falls within the northern part of the existing farm and comprises a mixture of fence lines, grassed areas and groups of trees/shrubs, with a dilapidated farmhouse and fields beyond (Photo 4).</li> </ul>
Site description	<ul style="list-style-type: none"> <li>✚ The site comprises an operational livery yard and adjacent field/paddock.</li> <li>✚ The main yard forms the eastern half of the site and comprises a timber framed barn at its centre (Photo 5) surrounded by a number of other barns, stable buildings, sheds and ancillary structures (Photos 6 to 12); a single-track concrete access road connects the site to the A4180 at its eastern extent (Photo 13). The existing surfacing generally comprises concrete hardstanding at its centre, with a mixture of unmade ground and soft-scaping around the periphery.</li> <li>✚ The majority of the buildings have suspected Asbestos Sheet (ACMs) roof construction with several of the smaller ancillary structures also utilising this material as external wall cladding. While the central barn structure and stables generally appear to be in satisfactory structural condition, some of the ancillary structures are disused and in a state of dilapidation/disrepair.</li> <li>✚ The southern periphery of the site contains a number of storage containers, horse boxes and vehicles (Photo 15 and 16).</li> <li>✚ A manure heap is present at its western end of the main yard (Photo 17) and an area of general waste storage at its south-western corner, containing a skip of burnt waste (Photo 18) and other disused/discarded items including timber, carpets and ACM panels (Photo 19).</li> <li>✚ General items/materials pertaining to the sites use as a livery yard are present throughout including bins/containers (generally containing feed), tools/machinery, tyres and waste wood/pallets. No obvious fuel/chemical storage or containers were observed within the accessible areas.</li> <li>✚ The western half of the site comprises a field/paddock (Photos 20 to 22), with a manège within its north-eastern corner (Photo 23). An elongated section of hedgerow extends from its north-western corner, which forms a western 'arm' to the wider site (Photo 24).</li> </ul>

Element	Description
Topography and site levels	<ul style="list-style-type: none"> <li data-bbox="491 275 1428 421">✚ CD Surveys Ltd Topographical Survey (drawing no. MA/2310018/2) indicates ground levels across the eastern half of the site to rise slightly to the west from between about +84.42mOD at the site gate and +86.40mOD adjacent to the manège.</li> <li data-bbox="491 432 1428 577">✚ The western paddock/field is shown to slope down to the west from +85.51mOD at the entrance gate to +81.94mOD within its south-western corner; ground level across the manège gently down to the west from between +85.42mOD and +86.27mOD.</li> <li data-bbox="491 589 1428 658">✚ The access road slopes down from +84.42mOD at the site gate to +81.25mOD at its junction with the A4180.</li> </ul>
Existing vegetation within site and adjacent properties	<ul style="list-style-type: none"> <li data-bbox="491 669 1428 728">✚ Areas of dense vegetation are present along the site boundary and around/between existing structures.</li> <li data-bbox="491 739 1428 884">✚ Along the southern boundary vegetation generally comprises areas of dense undergrowth containing both dead and young trees. Crown Tree Consultancy Tree Constraints Plan (drawing no. CCL 12409) indicates tree species present to generally comprise young hawthorn, sycamore, blackthorn and elder.</li> <li data-bbox="491 896 1428 1041">✚ A small group of ash trees (about 11m in height) is present to the south of the central barn, and several groups of young trees are present along the northern boundary, including (where identified) hawthorn, horse chestnut, willow, blackthorn, elder, elm.</li> <li data-bbox="491 1052 1428 1153">✚ Available information notes a Japanese Knotweed infestation around the perimeter of the existing off-site farmhouse (Photo 25 and 26). A secondary, smaller, infestation is noted within a discrete area northeast of the central barn.</li> </ul>

The current site features are shown on the Site Plan and Site Photographs which are included in Appendix A.

### 3.0 WALK-OVER SURVEY

A site walk-over survey was undertaken on 13<sup>th</sup> October 2025. A description of the general features of the site and the topography is provided in Section 2.0 above. From inspection of visible and accessible areas, a summary of specific features relevant to the land quality assessment is as follows:

Feature	Commentary
Electricity substations and transformers	<ul style="list-style-type: none"> <li>✚ None observed</li> <li>✚ Groundsure data indicates the nearest recorded energy feature to be &gt;500m from site.</li> </ul>
Fuel storage tanks	✚ None observed.
Fuel interceptors	✚ None observed.
General chemical storage/waste	✚ No readily identifiable chemical storage/waste.
Invasive species	✚ Infestation of Japanese Knotweed is recorded around the perimeter of the farmhouse immediately north of the site boundary (Photos 25 and 26). Another small infestation is recorded within a small area NE of the central barn; however, no obvious signs of Knotweed were observed.
Evidence of gas protection	✚ None observed.
Surface water contamination	<ul style="list-style-type: none"> <li>✚ No surface/pooled water were observed; however, drinking troughs were present</li> <li>✚ Concrete drainage channels and ditches were noted on site; however, these were observed to be either dry, blocked/infilled or densely overgrown (Photos 27 and 28).</li> </ul>
Waste storage	✚ Skip within south-western corner containing unidentified burnt waste (Photo 18). other items present within a heap adjacent including carpets, wood and corrugated asbestos-cement roof panels (Photo 19).
ACMs	✚ All the buildings on site are of pre-2000 construction, and the majority are observed to contain ACM in the form of corrugated asbestos-cement roof panels (Photos 6 to 12).

The current site features are shown on the site plan and photographs which are included in Appendix A.

#### 4.0 GEOLOGY AND GROUNDWATER

Published BGS geological maps indicate that the site is underlain by the London Clay Formation. A site investigation report was provided to SCL for a separate development immediately to the north-west of site. Based on this investigations, the anticipated ground and groundwater conditions are summarised in the table below. The relevant borehole records are presented in Appendix A.

Stratum	Depth to base	Level at base	General description
Made ground	<1mbgl	N/A	➤ Unknown
Head	≤1.20mbgl	N/A	➤ Orange brown, brown and grey mottled slightly gravelly silty CLAY
Weathered London Clay Formation	Between about 5.0m and 6.0mbgl	N/A	➤ Orange brown and grey mottled CLAY with silt and sand partings
London Clay Formation	>15.00mbgl	N/A	➤ Stiff, fissured, dark brown, becoming dark grey, silty CLAY with silt and sand partings
Groundwater:			
➤ Shallow groundwater seepages should be expected within the made ground, head deposits and shallow weathered London Clay Formation			

## 5.0 SUMMARY OF HISTORICAL MAPS AND DATABASE REPORT

The following reports have been commissioned for this assessment:

- ✚ Groundsure report ref SCL-GOE-PCT-N4A-HBQ, 07/10/25: historical maps
- ✚ Groundsure Ref: SCL-NQI-Y11-67P-6A6, 07/10/25: database report which includes information of local activities encompassing a range of subjects related to land use, pollution, and geological/hydrological conditions

These reports are included as Appendix B and should be read and understood fully in conjunction with this summary.

### 5.1 Review of historical maps

The following table details the development of the site and surrounding area including notable points of interest and potential significance in line with current guidance.

Historical development of site and surrounding area		
Map date	The site	Significant development / features in surrounding area
✚ 1865/68	✚ The eastern part of the site is already developed, containing three buildings at its centre. The western part of the site comprises an undeveloped field.	<ul style="list-style-type: none"> <li>✚ Two detached buildings are present within a small, wooded area immediately to the north.</li> <li>✚ Ponds 7m and 27m N</li> <li>✚ Well 13m N</li> <li>✚ The wider surrounding area comprises fields/farmland.</li> <li>✚ Ducks Hill Copse is present 15m E</li> </ul>
✚ 1894/1920	<ul style="list-style-type: none"> <li>✚ The eastern part of the site has been redeveloped/reconfigured with the main buildings now present in their current (2025) configuration.</li> <li>✚ From 1911 a small glass house is present within the eastern part of the site</li> </ul>	✚ A single detached building is present immediately to the north.
✚ 1934/1955	<ul style="list-style-type: none"> <li>✚ The site is now labelled 'Ashby'</li> <li>✚ A row of stables is present along the eastern boundary</li> </ul>	<ul style="list-style-type: none"> <li>✚ An area to the NW has been developed as 'Badminton Shooting Ground', which borders the site along its western arm.</li> <li>✚ Significant residential development of the area &gt;500m N</li> </ul>

<b>Historical development of site and surrounding area</b>		
<b>Map date</b>	<b>The site</b>	<b>Significant development / features in surrounding area</b>
✚ 1960/2001	✚ The site is labelled 'Ashby Farm'	✚ Further residential development >500m N/NE
✚ 2003/2010	✚ Three further buildings have been constructed immediately to the west of the central barn	✚ No significant changes apparent
✚ 2025	✚ No significant changes apparent	✚ The ponds to the north are no longer shown

## 5.2 Database information

The database report includes information of local activities encompassing a range of subjects related to land use, pollution, and geological/hydrological conditions. Our assessment of contaminative uses and other environmental issues relevant to the site and its surroundings is provided below. The full database report (Groundsure Ref: SCL-6753702, 01/05/20) is included as Appendix B and this should be read and understood fully in conjunction with this summary. The following summaries detail the key data from the Groundsure report and associated maps.

### Past land use

- ✚ Historical industrial land uses (within 250m): Butts 207m W (1989)
- ✚ Historical tanks: unspecified tanks 233m SE (1972) and 321m N (1961)
- ✚ Historical energy features: none within 500m
- ✚ Historical garages/petrol stations: none within 500m

### Waste and landfill

- ✚ Active and historical landfills: none within 500m
- ✚ Waste exemptions: Youngwood Farm, 253m SE; disposing of waste exception - burning waste in the open.

### Current industrial land use

- ✚ Recent industrial land uses: Shooting Grounds 45m W. Butt 153m W and Holland and Holland 171m N (both Shooting Facilities)
- ✚ Current or recent petrol stations: none within 500m
- ✚ Licensed Discharges to controlled waters: one incident related to Shooting Club 156m NW for discharge of final/treated effluent

## Hydrogeology

- Superficial aquifer: None on site. Nearest is Secondary A 317m SE
- Bedrock aquifer: Unproductive on site
- Groundwater vulnerability: Unproductive aquifer on site; Leaching class 'Low'
- Groundwater abstractions: none within 1km
- Source Protection Zones: Type 3 Total Catchment on site. Type 2 Outer catchment 305m N

## Hydrology

- Water Network (OS MasterMap): Inland river (not influenced by normal tidal action) present on site. Others 122m to 230m S
- Surface water features: six within 250m – see appended Hydrology map
- WFD Surface water body catchments: on site is Pinn 'Water Body Catchment', part of Colne Management catchment
- WFD Surface and Groundwater bodies: none within 250m

## River and coastal flooding

- Risks of flooding (RoFRaS), historical flooding and flood defences: none identified within 250m
- No Zone 2 or 3 floodplains or flood defences within 50m

## Surface water and groundwater flooding

- Surface water flooding: the highest risk on site (and within 50m) is 1 in 30 year – 0.1m-0.3m
- Groundwater flooding: the highest risk on site (and within 50m) is 'negligible'

## Environmental designations

- SSSI: Ruislip Woods 15m NE
- National Nature Reserves: Ruislip Woods 15m NE
- Designated Ancient Woodland: nearest is Unknown 15m NE (presumably related to Ruislip Wood)
- Green Belt: London Green Belt on site
- Nitrate Vulnerable Zones: the site does not lie within a NVZ

## Visual and cultural designations

- None within 250m

## Agricultural designations

- The majority of the site is designated 'Grade 3' agricultural land, with the exception of the easternmost part which is designated 'Non-Agricultural'

## Habitat designations

- Priority Habitat Inventory: numerous records of Deciduous woodland within 250m, the nearest being 11m E

## Geology

- Superficial geology: none mapped on site. Nearest recorded is 318m SE (Sand and Gravel)
- Bedrock geology: London Clay Formation (very low to moderate permeability) mapped on site
- BGS boreholes: 1no 228m SE
- Natural ground subsidence: low risk from shrink-swell clays. Very low to Negligible risks for all other categories, where identified

## Mining, ground workings and natural cavities:

- Surface ground workings: none within 250m
- No mining risks identified

## Radon

- Less than 1% of properties affected, Radon protection measures not required

## Soil chemistry

- BGS estimated background soil chemistry, extract as follows:

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	No data	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	No data	No data
On site	No data	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	No data	No data
On site	No data	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	No data	No data
18m N	No data	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	No data	No data

✚ BGS estimated urban soil chemistry, extract as follows:

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	15	2.6	106	73	0.4	79	16	19	4
On site	16	2.8	128	88	0.7	92	25	23	6
On site	16	2.8	132	91	0.6	89	22	22	5
On site	16	2.8	114	78	0.5	86	19	20	5
On site	16	2.8	163	112	0.5	85	19	20	5

### Railway infrastructure and projects

✚ None within 250m

## 6.0 PRELIMINARY RISK ASSESSMENT AND INITIAL CONCEPTUAL SITE MODEL

The information in the preceding sections has been used to undertake the Preliminary Risk Assessment and to compile the Initial Site Conceptual Model below in accordance with current LCRM (EA2021) guidance. The assessment follows a risk-based approach, with the potential risks determined qualitatively using the 'source-pathway-receptor' linkage concept. Potential harm may only exist where a plausible, rational and justified linkage is present between all factors of the linkage.

The following assessment pro-forma methodology has been formulated from existing guidance using a standard modified consequence and probability matrix:

		Consequences			
		Severe (4)	Medium (3)	Mild (2)	Minor (1)
Probability	High likelihood (4)	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely (3)	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood (2)	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely (1)	Moderate/low risk	Low risk	Very low risk	Very low risk

Definitions of Consequence:

- ✚ Severe (4): Significant damage or harm to buildings/property/services, short-term (possibly immediate) acute direct risks to controlled waters, human and ecological receptors via pollution and direct exposure.
- ✚ Medium (3): Direct pollution of controlled waters and possible chronic or acute risks of significant harm to human health, buildings/services and/or ecological receptors via exposure.
- ✚ Mild (2): Indirect pollution of controlled waters and possible chronic risks to human health, building/service and/or ecological receptors over the longer term causing potential harm.
- ✚ Minor (1): Negligible potential for damage or harm to be significant to identified receptors but may still be present which may result in actions being required by appropriate regulators.

### Definitions of Probability:

- ✚ High likelihood (4): There is, or it is inevitable that there will be, an identified and/or confirmed potential pollution linkage or incident capable of causing harm in the immediate to medium term.
- ✚ Likely (3): There is, or it is inevitable that there will be, an identified and/or confirmed potential pollution linkage or incident capable of causing harm in the medium or longer term.
- ✚ Low likelihood (2): There is, or could be, an identified and/or confirmed potential pollution linkage or incident potentially capable of causing harm over time, but it is not inevitable.
- ✚ Unlikely (1): There is, or could be, an identified and/or confirmed potential pollution linkage or incident potentially capable of causing harm over the longer term, but it is improbable that it will be significant.

Definitions of the final linkage risks are summarised as follows:

- ✚ **Very high:** high probability that severe harm could occur, or there is evidence that it is currently occurring. If realised, the risk could result in substantial liability. Urgent investigation/remediation
- ✚ **High:** harm is likely to occur, realisation is likely to present substantial liability. Urgent investigation required. Remedial works may be required in short-term, will be in long-term
- ✚ **Moderate:** possible that harm could arise, but unlikely to be severe. Investigation normally required to clarify risk and liability. Remedial works may be necessary in long-term
- ✚ **Low:** possible that harm could occur, but this would at worst be mild
- ✚ **Very low:** low possibility of harm, unlikely to be severe

The following initial assessment has been carried out by identifying and evaluating the potential sources of contamination, the potential receptors and the plausible pathways for contamination migration. These have been determined from the available data using current guidance at the time of writing and will be subject to re-evaluation if or when additional data becomes available.

### ***Potential sources of contamination***

A summary of potential sources identified by our review of the above information is as follows:

- ✚ **Farm/Livery Yard:** the site has historically comprised a farm and is currently in use as a livery yard. While no significant potential contamination sources were identified there is a potential risk associated with unknown/unrecorded historical and current on-site activities/processes. The existing buildings are of pre-2000 construction with asbestos-cement roofing, presenting asbestos risk both in the buildings and surrounding land.
- ✚ **Infilled ponds:** two potentially infilled ponds to the north of site, presenting a potential risk of (including ground gas) depending on the source/composition of infill material.

- ✚ **Shooting range:** there is a potential contamination risk from the neighbouring shooting range, including elevated heavy metals associated with ammunition in particular lead.

It should be noted that any developed, non-greenfield land is likely to contain made ground. This will probably be of uncertain or unknown origin and may contain contaminants that have not been specifically identified.

The assessed risks from these potential sources are summarised in the Initial Conceptual Site Model below.

### ***Potential receptors***

In the context of the proposed development, the following potential receptors have been identified:

- ✚ Human health: inhabitants/users of building, construction workers, adjacent site users
- ✚ Controlled waters: 'Unproductive' aquifer present beneath the site, which is of 'low' vulnerability with regards to pollutant discharge. A surface stream is present on site, running along its western arm. Overall, the site is assessed as being of **low environmental sensitivity**
- ✚ Building fabric and services: buried foundations, basement wall, potable water pipes

### ***Plausible pathways***

- ✚ Ingestion of soil, dust or water
- ✚ Inhalation of dust, gas or vapours
- ✚ Direct physical contact with contaminated soil/water
- ✚ Vertical and lateral migration of contamination including leaching
- ✚ Chemical attack of building infrastructure, including water supply pipes
- ✚ Migration of ground gas/vapour through permeable soils or open pathways

The Initial Conceptual Site Model and an estimate of the risk associated with each potential linkage is shown in the following table:

Source	Pathway	Receptor	Assessed risk and commentary/justification
On-site: contaminated soil and groundwater	Ingestion, contact, inhalation	End user, construction workers and infrastructure	<p><b>Probability: 2</b> <b>Consequence: 2/3</b> <b>Potential Contaminant Linkage risk: Moderate/Low (asbestos risk High)</b></p> <p>No specific significant contamination sources identified on site with the exception of pre-2000 buildings, presenting an asbestos risk. There will also be a potential risk from any made ground present (which is of unknown origin), and any unknown historical/current processes associated with the site usage</p>
	Leaching from contaminated soils and migration in groundwater	Aquifer and surface water	<p><b>Probability: 2</b> <b>Consequence: 2</b> <b>Potential Contaminant Linkage risk: Low</b></p> <p>There is a Unproductive Aquifer beneath the site, which is of 'low' vulnerability; a surface stream runs through the western arm of the site. No potential onsite contamination sources were, however, identified and therefore the risk to the aquifer and surface water is expected to be low</p>
Off-site: contaminated soil	Lateral migration of contaminants to site in groundwater	End user	<p><b>Probability: 1/2</b> <b>Consequence: 2</b> <b>Potential Contaminant Linkage risk: Low</b></p> <p>No significant potential off-site contamination sources were identified in close proximity to the site; however, there will be a theoretical risk associated with the nearby shooting facility (heavy metals) and infilled ponds. The site is underlain by low permeability clay soils which will inhibit migration; thus, the risk is considered low.</p>
On-site and off- site: ground gas and vapours	Lateral and vertical migration of gas/vapour	End-user and buildings	<p><b>Probability: 2</b> <b>Consequence: 2</b> <b>Potential Contaminant Linkage risk: Low</b></p> <p>There will be a risk of ground gas/vapours associated with potentially infilled ponds present to the north of site; however, the site is underlain by low permeability clay soils which will inhibit gas migration. Thus, the risk is considered low. The site is not in a radon affected area</p>

The overall risk rating for the site is assessed as being **moderate**; however, there will be a **high** risk associated with the presence of asbestos within the fabric of the existing buildings and surrounding soil.

## 7.0 GEOTECHNICAL RISK ASSESSMENT

In view of the expected soil sequence, we anticipate that the London Clay Formation, below any superficial Head deposits, could be suitable to support the proposed structure via traditional spread foundations. It should be noted, however, that deeper pockets of made ground could be expected and buried foundations/obstructions should be expected within the footprint of existing buildings and desiccation may be an issue; a suitable contingency should be in place in this regard for any initial costings.

Areas of dense vegetation are present along and, sporadically, within the site boundaries. Trees present generally include young medium water demand species such as sycamore, blackthorn, ash and horse chestnut, with occasional high water demand hawthorn and low water demand elder. Within the influencing distance of trees, consideration will have to be given to potential clay desiccation/root influence. Whilst the proposed development is not for residential end use, the NHBC Standards Chapter 4.2 'Building near trees' is considered the industry standard with regards to the determination of safe founding depths, and we recommend that all foundations be constructed in full accordance with these guidelines. Based on our experience a 'high volume change potential' classification should be adopted for the London Clay when determining safe foundation depths. If/where either deep zones of desiccation/tree root influence are identified, or 'safe' foundations depths are deemed uneconomical/impractical for the construction of traditional spread foundations, then piled foundations may present a practical and economical alternative. Based on the expected ground sequence, we consider CFA piles would present the appropriate type; however other pile types could be considered.

The shallow soil sequence is expected to comprise a layer of made ground of unknown composition/origin, resting on shrinkable clay soils. Thus, at this stage, we anticipate suspended floor slabs will be adopted, supported by the main foundations and with suitable void or compressible medium beneath to accommodate clay heave. Alternatively, the made ground/shallow clay soils could be removed to a sufficient depth and replaced with compacted granular material, to allow ground bearing floor slabs to be adopted.

A Japanese Knotweed infestation has been noted immediately to the north of the site. While not currently identified within the site boundaries, this invasive species can quickly spread and can cause significant delays and cost to development as well as structural damage. Thus, we recommend that, where identified, full remediation should be undertaken by suitably qualified professional/specialists prior to construction. Any intrusive investigation works must be undertaken a suitable distance from any known Japanese Knotweed infestation; typically, 5m is considered acceptable.

Of course, all foundations and services will need to be appropriately designed and approved by the regulators, particularly if any concentrations of contaminants are found which may affect sensitive receptors, such as the groundwater.

## 8.0 RECOMMENDATIONS FOR INTRUSIVE INVESTIGATION

The Initial Conceptual Site Model identified potential pollution linkages resulting in the overall assessed risk rating of moderate. The following programme of intrusive investigation is recommended:

- ✚ Intrusive investigation to confirm the ground sequence, allow soil/water sampling and the installation of monitoring pipes
- ✚ The PRA has not identified any significant potential contamination sources with the exception of ACMs within the existing buildings; any unknown current and historical on and off-site uses/processes will also present a risk. Thus, the investigation should provide general coverage of the site.
- ✚ Soil and groundwater samples should be recovered where relevant and be analysed for a range of general contaminants to include heavy metals/semi-metals, petroleum hydrocarbons, pesticides/herbicides, asbestos screening and quantification.
- ✚ A programme of groundwater and gas monitoring

The Initial Conceptual Site Model should then be revised to include complete pollution linkages and outline mitigation/remedial measures should be identified, together with any requirements for additional investigation.

Whilst it is considered that traditional spread foundations could be feasible, if unfavourable ground conditions exist and/or deep desiccation dictates that piling would be required, then deeper boreholes would be needed to provide parameters for pile design.



## GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in EN1997-2. Any 'design' recommendations which are provided are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme.

The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access and space limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique we have adopted a practical technique to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition, Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata between the exploratory points, below the maximum depth of the investigation or where site conditions have changed since the exploratory work; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

Comments made relating to ground-water or ground-gas are based upon observations made during our investigation unless otherwise stated. Ground-water and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as (but not limited to) areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where a specific risk of ground dissolution features has been identified in our Report (anything above a 'low' risk rating), reference should be made to the local building control to establish whether there are any specific local requirements for foundation design and appropriate allowances should be incorporated into the design. If such a risk assessment was not within the scope of our investigation and where it is deemed that the ground sequence may give rise to such a risk (for example near-surface chalk strata) it is recommended that an appropriate assessment should be undertaken prior to design of foundations.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of sources such as previous desk studies, investigations or chemical analyses. Soil Consultants Limited cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report. No liability will be accepted for changes to the ground and groundwater conditions which occur post investigation.

Our Report is written in the context of an agreed scope of work between Soil Consultants Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

We will identify tree and plant species if possible, but a suitably qualified arboriculturalist/botanist should be consulted to provide definitive identification

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**STANDARD TERMS OF APPOINTMENT OF SOIL CONSULTANTS LTD FOR GEOTECHNICAL SERVICES**

- 1 Unless previously withdrawn, our offer remains valid for a period of sixty days from date of offer. If an instruction is given after the sixty days we reserve the right to reasonably adjust any cost associated with the project to reflect any variance on the original offer. In placing an instruction to proceed with exploratory work, whether directly from the Client or Client's representative, the Client is deemed to have accepted our Terms of Appointment.
- 2 Our offer is on the basis that free, unhindered access and working conditions are available and that the investigation can be completed in one visit, if applicable. Delays beyond our control will incur additional charges. If additional works outside our offer are required to facilitate the investigation these will be advised and any costs will be passed on to the Client.
- 3 In our quotation we will provide an estimate of any mobilisation period following an instruction to proceed. This estimate will be accurate at the time of quotation, but it should be noted that the mobilisation period may vary at a later date due to factors such as sub-contractor availability and workload.
- 4 In commissioning this work, the Client has a responsibility for the health, safety and welfare of operatives invited to undertake work on their site. The Client shall indemnify us in respect of any failure to fulfil their obligations in connection with all relevant and current Health and Safety Regulations.
- 5 The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access, space and budgetary limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique, or where a non-compliant technique has been specified, we will adopt practical and appropriate techniques to obtain indicative soil parameters.
- 6 Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in BS EN1997-2. Any interpretation which is provided is for guidance only and must not be regarded as design or design recommendation.
- 7 Where excavation is required as part of the exploratory work, the Client shall provide drawings or plans showing accurate and complete locations of all underground services and structures. In performing our service, we shall take reasonable precautions to avoid damage to underground services or structures. We will not be responsible for any damage caused to underground services or structures and will not be liable for any claims for damage, expenses arising or losses unless the location of all underground services or structures are accurately shown on drawings and those plans have been provided to us in good time prior to commencement of the exploratory work. Risk to the Client can be further reduced by undertaking a scan of the site using a specialist underground scanning service which would be intended to identify traceable services at shallow depth.
- 8 With some sites, especially those in certain areas of London and other large towns and cities, there may be a risk of unexploded ordnance (UXO) being present. Unless otherwise stated our offer is on the basis that the Client or their representative provides a preliminary UXO risk assessment for the site. It should be noted that if the site is deemed to be in an area of risk then further measures will be required. These would normally comprise either a more detailed risk assessment and/or specialist site attendance by an EOD engineer. These measures can be commissioned either by the Client or Soil Consultants Ltd. If the Client requires, we would be pleased to obtain a preliminary risk assessment at cost+10%.
- 9 The Client will supply a site plan (to a rational scale), an indication of the scope and type of the proposed development and an indication of any relevant structural loading information.
- 10 Should the Client terminate the contract after instruction, we reserve the right to recover costs associated to work carried out between the time of instruction and the point of termination. Cancellation fees, and material costs shall be charged at cost plus 20% (+VAT). Engineer/technician time shall be charged at £95+VAT per hour and principal consultant/director time shall be charged at £125+VAT per hour.

- 11 The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during the investigation. In addition Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.
- 12 If and when instructed, an agreed number of contamination tests will be carried out to give an outline assessment of potential contaminants. In some circumstances it may be necessary to recommend further monitoring, contamination testing and assessment and the scope of this work would be agreed with the Client. Notwithstanding this additional scope, local regulatory authorities may have specific requirements which need to be addressed. Unless otherwise agreed or stated our reporting will constitute neither a Quantitative Risk Assessment nor a Remediation Statement or Strategy.
- 13 Our reports are counter-checked by one of our suitably qualified and experienced engineers/geologists.
- 14 Notwithstanding anything to the contrary contained in these terms, our liability under or in connection with these terms whether in contract or in tort, in negligence, for breach of statutory duty or otherwise (other than in respect of personal injury or death) shall not exceed the sum equivalent to ten times our contract fee or £100,000 whichever is less in the aggregate for geotechnical and environmental matters unless otherwise agreed.
- 15 Without prejudice to any other exclusion or limitation of liability, damages, loss, expense or costs our liability for any claim or claims under this agreement be further limited to such sum as it would be just and equitable for us to pay having regard to the extent of our responsibility for the loss or damage giving rise to such claim or claims ("the loss and damage") and on the assumptions that:
- (a) All other consultants, contractors, sub-contractors, project managers or advisers engaged in connection with the Project have provided contractual undertakings to the Client on terms no less onerous than those set out in the original contracts in respect of the carrying out of their obligations in connection with the Project; and
  - (b) There are no exclusions of or limitations of liability nor joint insurance or co-insurance provisions between the Client and any other party referred to in this clause and any such other party who is responsible to any extent for the loss and damage is contractually liable to the Client for the loss and damage; and
  - (c) All such other consultants, contractors, sub-contractors, project managers or advisers have paid to the Client such proportion of the loss or damage which it would be just and equitable for them to pay having regard to the extent of their responsibility for the loss and damage.
- 16 Further and notwithstanding anything to the contrary contained in this agreement and without prejudice to any provision in this agreement whereby liability is excluded or limited to a lesser amount, our liability under or in connection with this agreement whether in contract or in tort, in negligence, for breach of statutory duty or otherwise for any claim shall not exceed the amount, if any, recoverable by us by way of indemnity against the claim in question under professional indemnity insurance taken out by us and in force at the time that the claims or (if earlier) circumstances that may give rise to the claim is or are reported to the insurers in question. The limitation shall not apply if no such amount is recoverable due to us having been in breach of our obligations or the terms of any insurance maintained in accordance therewith or having failed to report any such claim or circumstances to the Insurers in question timeously.

- 17 Whilst our investigation may include asbestos screening/quantification on selected samples, this must not be deemed to constitute a full asbestos survey or be taken as sufficient to definitively identify the presence or quantity of asbestos within or on the ground. We will not accept responsibility if asbestos is encountered during any subsequent construction or development works and in placing a contract with us the Client accepts this condition. Where the fabric of a building is to be disturbed, the Client shall provide an appropriate asbestos survey to us prior to exploratory work and make adequate provision to allow us to provide relevant protective/remedial measures to progress the work safely.
- 18 The Client agrees that they shall not bring any claim personally against any director/employee of Soil Consultants Ltd or consultant to us in respect of loss or damage suffered by the Client arising out of this contract.
- 19 Our appointment shall be under simple agreement and our liability under this contract shall be for a period of six years from date of appointment.
- 20 Our reports are non-assignable and are prepared for the benefit of the Client. No reliance can be assumed by others without written agreement from Soil Consultants Ltd. We will provide a letter of reliance at our discretion and this will be subject to payment of our fee, which will be 10% of contract value, subject to a minimum fee of £750 plus VAT. The terms of our letter of reliance are non-negotiable and the beneficiary should be aware that the information shall only apply to the scheme for which the report was originally produced and the original rights and benefits will apply.
- 21 A VAT invoice (at current rate) will be presented in respect of the work undertaken. Payment of our account is to be made within twenty-eight days of issue of our invoice unless otherwise agreed. On no account shall payment be on a 'pay-when-paid' basis. The information contained within our report remains the property of Soil Consultants Ltd and no reliance may be assumed by any party with an interest in the project until payment has been received in full. After one calendar month interest shall be chargeable at 10% above the Bank of England Rate and compensation claimed in accordance with 'Late Payments of Commercial Debts (Interest) Act 1998 and subsequent revisions. If the debt is referred to a debt collection agency then we have the right to recover associated fees under the terms of our contract.

## **APPENDIX A**

### **Plans, drawings and photographs**

- ✚ Site Location Map
- ✚ Site Plan
- ✚ Site walkover photographs
- ✚ Historical borehole logs
- ✚ Proposed layout plan
- ✚ Tree Constraints Plan



Site Plan

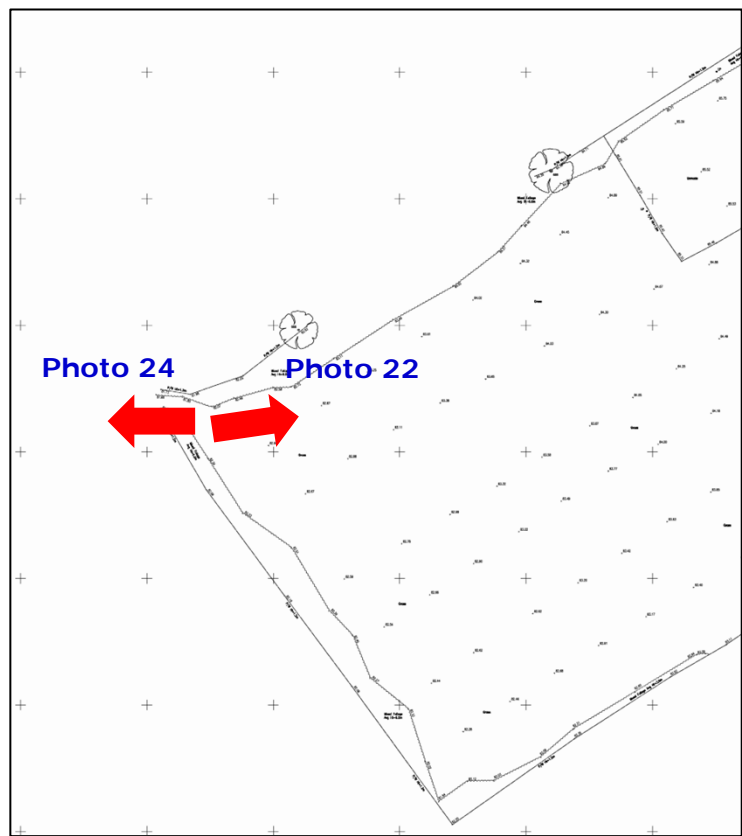
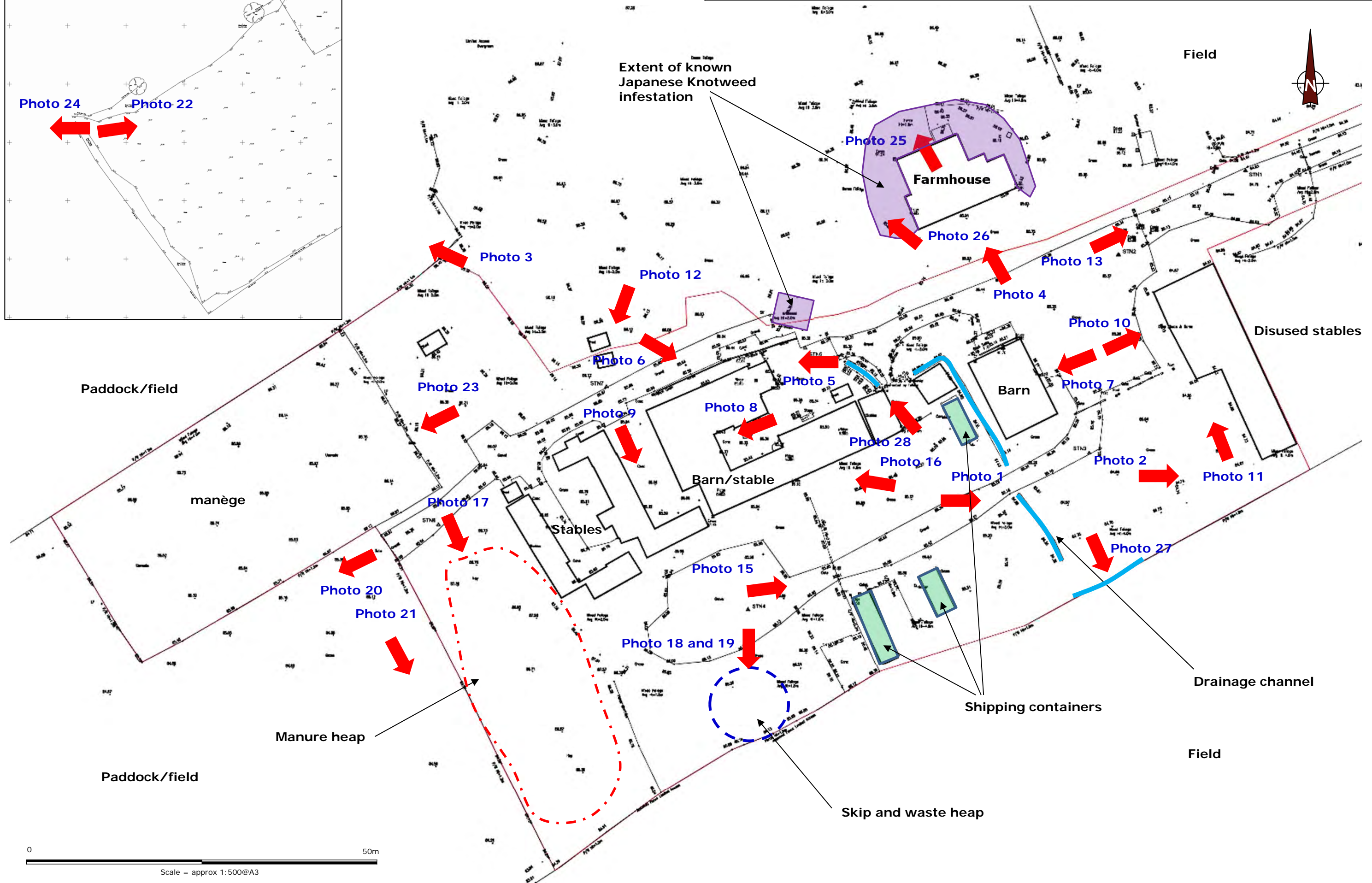


Photo 24      Photo 22



0      50m

Scale = approx 1:500@A3

**Site photographs**

**Photo No 1**

**Description:**  
**Vegetation/  
southern site  
boundary**

**Direction:**  
**Looking E**

**Date:**  
**13/10/25**



**Photo No 2**

**Description:**  
**Vegetation/  
eastern site  
boundary**

**Direction:**  
**Looking E**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 3**

**Description:**  
Fields to the  
north of site

**Direction:**  
Looking NW

**Date:**  
13/10/25



**Photo No 4**

**Description:**  
Farmhouse  
immediately  
north of site

**Direction:**  
Looking NNW

**Date:**  
13/10/25



**Site photographs**

**Photo No 5**

**Description:**  
Central  
barn/stables

**Direction:**  
Looking W

**Date:**  
13/10/25



**Photo No 6**

**Description:**  
Stables

**Direction:**  
Looking SE

**Date:**  
13/10/25



Site &  
Location

**Ashby Farm.**  
**Ducks Hill Road, Northwood HA6 2SS**

Report No:

**11079/JW**

**Site photographs**

**Photo No 7**

**Description:**  
**Barn/stable**

**Direction:**  
**Looking WSW**

**Date:**  
**13/10/25**



**Photo No 8**

**Description:**  
**Stables**

**Direction:**  
**Looking WSW**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 9**

**Description:**  
**Stables**

**Direction:**  
**Looking SSE**

**Date:**  
**13/10/25**



**Photo No 10**

**Description:**  
**Disused stables**

**Direction:**  
**Looking ENE**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 11**

**Description:**  
**Disused**  
**stables**

**Direction:**  
**Looking NNW**

**Date:**  
**13/10/25**



**Photo No 12**

**Description:**  
**Storage shed**

**Direction:**  
**Looking SSW**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 13**

**Description:**  
**Access road**

**Direction:**  
**Looking ENE**

**Date:**  
**13/10/25**



**Photo No 14**

**Description:**  
**General items associated with site use**

**Direction:**  
**Looking NNE**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 15**

**Description:**  
General view  
of E part of  
site

**Direction:**  
Looking ENE

**Date:**  
23/02/23



**Photo No 16**

**Description:**  
Central barn  
and  
surrounding  
trees/  
undergrowth

**Direction:**  
Looking WNW

**Date:**  
13/10/25



**Site photographs**

**Photo No 17**

**Description:**  
**Manure heap**

**Direction:**  
**Looking SSW**

**Date:**  
**13/10/25**



**Photo No 18**

**Description:**  
**Skip**  
**containing**  
**burnt waste**

**Direction:**  
**Looking S**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 19**

**Description:**  
**Waste heap**  
**containing**  
**carpets, wood**  
**and asbestos-**  
**cement roof**  
**panels**

**Direction:**  
**Looking S**

**Date:**  
**13/10/25**



**Photo No 20**

**Description:**  
**View of main**  
**field/paddock**

**Direction:**  
**Looking SW**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 21**

**Description:**  
**View of main  
field/paddock**

**Direction:**  
**Looking SE**

**Date:**  
**13/10/25**



**Photo No 22**

**Description:**  
**View of main  
field/paddock**

**Direction:**  
**Looking NE**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 23**

**Description:**  
**View of**  
**manège**

**Direction:**  
**Looking SW**

**Date:**  
**13/10/25**



**Photo No 24**

**Description:**  
**Hedgerow**  
**forming the**  
**western 'arm'**  
**of the site**

**Direction:**  
**Looking W**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 25**

**Description:**  
**Japanese**  
**Knotweed**

**Direction:**  
**Looking NNW**

**Date:**  
**13/10/25**



**Photo No 26**

**Description:**  
**Japanese**  
**Knotweed**

**Direction:**  
**Looking NW**

**Date:**  
**13/10/25**



**Site photographs**

**Photo No 27**

**Description:**  
**Overgrown**  
**drainage ditch**

**Direction:**  
**Looking SSE**

**Date:**  
**13/10/25**



**Photo No 28**

**Description:**  
**Drainage**  
**channel**

**Direction:**  
**Looking NW**

**Date:**  
**13/10/25**









**GROUND ENGINEERING**  
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Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**BOREHOLE BH3**

Date: 14/04/14 Hole Size: 150mm dia to 12.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows					
0.10	D1			TOPSOIL - Firm, friable, dark brown, slightly gravelly SILT/CLAY. Gravel is angular to sub-angular flint.			
0.35	D2			Firm, brown/orange brown/grey mottled, slightly sandy, slightly gravelly CLAY. Gravel of sub-angular to rounded flint. (HEAD DEPOSIT)		0.35	
0.90	D3			Soft, becoming firm below 1.50m, brown/orange brown/grey mottled CLAY.  (WEATHERED LONDON CLAY)		0.90	
1.20-1.50	U1	25	1.20				
1.60	D4						
2.20-2.60	U2	30	1.50				
2.70	D5			Stiff, closely fissured to firm, brown/orange brown/grey mottled CLAY.  (WEATHERED LONDON CLAY)		3.20	
3.20-3.60	U3	35	1.50				
3.70	D6						
4.20-4.50	U4	40	1.50				
4.60	D7						
5.20-5.60	U5	40	1.50				
5.70	D8			Stiff, closely fissured, brown CLAY with orange brown stained fissures. Occasional selenite crystals below 6.20m and occasional light brown silt partings.  (WEATHERED LONDON CLAY)		5.20	
6.20	D9						
6.70-7.10	U6	50	1.50				
7.20	D10						
7.70	D11						
8.20-8.60	U7	55	1.50				
8.70	D12						
9.20	D13						
9.70-10.10	U8	55	1.50	Very stiff, closely fissured, dark grey/dark brown CLAY, with occasional grey silt partings and rare gravel size pyrite nodules.  (LONDON CLAY)		9.00	
						10.00	

REMARKS 1. Excavating a pit from 0.00m to 1.20m for 1 hour  
2. Fibrous roots observed to 0.40m depth  
3. Borehole cased to 1.50m depth

Project No 13262

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- KEY**
- D - Disturbed Sample
  - B - Bulk Sample
  - U - Undisturbed Sample
  - W - Water Sample
  - S/C - SPT Spoon/Cone
  - ∇ - Water Strike
  - ∇ - Water Rise
  - N - SPT Blows for 0.3m
  - \* - Blows for quoted penetration
  - V - Vane Shear Test Cohesion ( ) kPa
  - ∇c - Level on completion
  - c∇w - Level casing withdrawn
  - ∇s - Standpipe Level

Groundwater Strikes						Groundwater Observations			
Depth m						Depth m			
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						14/04/14	12.00	1.50	dry
						14/04/14	12.00	0.00	dry



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



Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**TRIAL PIT TP1**

Date: 24/04/14

Pit Size: 0.60m L x 0.44m W x 1.70m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.06	D1			MADE GROUND - BARK CHIPPINGS.		0.03	
0.25	D2			MADE GROUND - Soft, brown/dark brown mottled, slightly sandy, slightly gravelly CLAY. Gravel of sub-rounded to angular flint and quartzite. Occasional ash fragments.		0.35	
0.40	D3			MADE GROUND - Yellow brown/brown mottled, clayey SAND AND GRAVEL. Gravel of sub-rounded to sub-angular flint and rare brick.		0.65	
0.75 0.76	D4 V1	(57)		Firm, brown/orange brown, slightly sandy, slightly gravelly CLAY. Gravel of sub-angular flint. (HEAD DEPOSIT)		1.00	
1.20	D5			Firm, brown/orange brown/grey mottled CLAY.		1.70	
1.50	D6			(WEATHERED LONDON CLAY)			
				Pit completed at 1.70m depth			

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

**REMARKS**

1. Pit hand excavated
2. Live roots observed to 0.65m depth
3. Pit sides stable
4. Groundwater met at 0.57m depth
5. Water stood at 0.60m depth on completion

Project No 13262	
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



Site: HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD

TRIAL PIT TP2

Date: 24/04/14

Pit Size: 0.40m L x 0.35m W x 0.38m D.  
Hole Size: 70mm dia to 1.00m

Ground Level:

Samples and In-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m	
Depth m	Type	Result						
0.06	D1		1 ∇	MADE GROUND - BARK CHIPPINGS. MADE GROUND - Soft, dark brown/brown, slightly sandy, slightly gravelly CLAY. Gravel of angular to sub-rounded flint, glass and ceramic tile fragments.		0.03		
0.25	D2					0.40		
0.45	D3				Firm, brown/orange brown mottled, slightly gravelly CLAY. gravel of sub-angular to sub-rounded flint. (HEAD DEPOSIT)		0.50	
0.70	D4				Firm, brown/orange brown/grey mottled, CLAY with occasional fine gravel size calcareous concretions. (WEATHERED LONDON CLAY)			
1.00	D5							
1.00	V1	(42)		Pit completed at 1.00m depth		1.00		

- KEY**
- D - Disturbed Sample
  - B - Bulk Sample
  - U - Undisturbed Sample
  - R - Root Sample
  - W - Water Sample
  - J - Jar Sample
  - ∇ - Water Strike
  - ∇ - Water Rise
  - ∇c - Level on completion
  - MP - Mackintosh Probe
  - P( ) - Hand Penetrometer
  - Cohesion ( ) kPa
  - V - Vane Shear Test
  - Cohesion ( ) kPa

- REMARKS**
1. Pit hand excavated
  2. Live roots observed to 0.40m depth
  3. Pit sides stable
  4. Water seepage at 0.20m depth

Project No  
13262

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Site: HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD

TRIAL PIT  
TP3

Date: 24/04/14

Pit Size: 1.90m L x 0.50m W x 1.95m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m	
Depth m	Type	Result						
0.05	D1		1 ∇	MADE GROUND - Firm, dark brown, slightly gravelly, sandy CLAY. Gravel of sub-angular to rounded flint and brick fragments.		0.08		
0.15	D2					0.20		
0.30	D3			MADE GROUND - Black, silty SAND AND GRAVEL. Gravel of angular to sub-rounded flint, clinker, asphalt, brick, glass and ash fragments. Soft, brown/orange brown mottled, slightly gravelly CLAY. Gravel is sub-angular flint. (HEAD DEPOSIT)		0.50-0.70		
0.60	D4					0.80		
0.80	V1 (33)					0.90		
0.90	D5			Firm, light brown/orange brown/grey mottled CLAY with a cobble size concretionary limestone nodule at 1.40m depth.  (WEATHERED LONDON CLAY)		1.10		1.95
1.20	D6					1.20		
1.40	V3 (46)					1.40		
1.50	D7					1.50		
1.70	V4 (58)		1.70					
1.80	D8		Pit completed at 1.95m depth		1.80			
1.95	V5 (72)				1.95			
2.00	D9							

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- R( ) - Hand Penetrometer  
Cohesion ( ) kPa
- V - Vane Shear Test  
Cohesion ( ) kPa

**REMARKS**

1. Live roots observed to 0.70m depth
2. Water seepage at 0.20m depth
3. Pit sides stable
4. Soakaway test undertaken between 0.92m and 1.95m depth

Project No 13262	
Scale 1:25	Page 1/1

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








Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**TRIAL PIT TP4**

Date: 24/04/14

Pit Size: 2.00m L x 0.50m W x 1.94m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m	
Depth: m	Type	Result						
0.10	D1			TOPSOIL - Soft, dark brown, slightly sandy, slightly gravelly CLAY. Gravel of sub-angular to sub-rounded flint.		0.20		
0.30	D2			Soft, becoming firm, orange brown/grey mottled, slightly gravelly CLAY. Gravel is rounded flint.				
0.50-0.70	B1	(42)			(HEAD DEPOSIT)			0.80
0.50	V1							
0.60	D3							
0.90	D4	(54)			Firm, light brown/orange brown/grey mottled CLAY with occasional cobble size mudstone concretions.			1.60
1.00	V2							
1.20	D5	(71)			(WEATHERED LONDON CLAY)			1.94
1.50	D6							
1.50	V3	(86)		Firm, becoming stiff below 1.80m, grey/brown/orange brown mottled CLAY, with occasional orange-brown silt partings. Becoming fissured below 1.80m. (WEATHERED LONDON CLAY)				
1.70	D7							
1.90	D8	(86)		Pit completed at 1.94m depth				
2.00	V4							

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer
- Cohesion ( ) kPa
- V - Vane Shear Test
- Cohesion ( ) kPa

**REMARKS**

1. Live roots observed to 0.80m depth
2. Pit sides stable
3. Water seepage at 0.80m depth
4. Soakaway test undertaken between 0.85m and 1.94m depth
5. Pit side partially collapsed during soakaway test

Project No 13262	
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Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**TRIAL PIT TP5**

Date: 24/04/14

Pit Size: 1.11m L x 0.40m W x 1.50m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.05	D1			TOPSOIL - Soft, dark brown, slightly sandy, slightly gravelly, silty CLAY. Gravel of angular to sub-angular flint.		0.09	
0.30	D2			Soft, orange brown, slightly gravelly, sandy CLAY. Gravel of angular to sub-rounded flint. (HEAD DEPOSIT)		0.50	
0.75	D3			Firm, brown/orange brown/grey mottled CLAY.		1.50	
1.25	D4			(WEATHERED LONDON CLAY)			
				Pit completed at 1.50m depth			

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

**REMARKS**

1. Pit hand excavated
2. Live roots observed to at least 1.50m depth
3. Pit sides stable
4. Pit dry on completion
5. Soakaway test undertaken between 0.59m and 1.50m depth

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Site: HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD

TRIAL PIT  
TP6

Date: 24/04/14

Pit Size: 1.65m L x 0.50m W x 2.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			TOPSOIL - Soft, dark brown, slightly gravelly, sandy CLAY. Gravel is sub-rounded flint.		0.20	
0.30	D2			Firm, brown/orange brown/grey mottled, slightly sandy, slightly gravelly CLAY. Gravel of sub-angular to rounded flint.			
0.50	V1	(42)		(HEAD DEPOSIT)			
0.60	D3					0.75	
0.90	D4			Firm, brown/grey/orange brown mottled CLAY with occasional calcareous concretions.			
1.00	V2	(45)					
1.20	D5			(WEATHERED LONDON CLAY)			
1.40	D6						
1.50	V3	(66)				1.60	
1.70	D7			Firm, becoming stiff, closely fissured, orange brown/grey/brown mottled CLAY.			
1.90	D8			(WEATHERED LONDON CLAY)			
2.00	V4	(82)				2.00	
				Pit completed at 2.00m depth			

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- R( ) - Hand Penetrometer  
Cohesion ( ) kPa
- V - Vane Shear Test  
Cohesion ( ) kPa

**REMARKS**

1. Live roots observed to 1.40m depth
2. Pit sides stable
3. Pit dry
4. Soakaway test undertaken between 0.95m and 2.00m depth

Project No 13262	
Scale 1:25	Page 1/1

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





Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**TRIAL PIT TP7**

Date: 24/04/14

Pit Size: 0.60m L x 0.50m W x 1.20m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Firm, dark brown, slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-rounded flint and quartzite.		0.20	
0.35	D2			MADE GROUND - CONCRETE.		0.25	
0.55	D3			MADE GROUND - Firm, light brown, slightly sandy, gravelly CLAY. Gravel is angular to sub-rounded flint with timber, concrete, coal and ash fragments.		0.65	
0.70 0.75	V1 D4	(39)		Soft, becoming firm below 1.00m, brown/orange brown CLAY with occasional gravel size calcareous concretions.		1.20	
0.95	D5			(WEATHERED LONDON CLAY)			
1.15 1.20	D6 V2	(69)					
				Pit completed at 1.20m depth			

**KEY**

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- R( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

**REMARKS**

1. Pit hand excavated
2. Metal pipe met at 0.22m depth
3. Live roots observed to 1.00m depth
4. Pit sides stable
5. Groundwater met at 0.93m depth
6. Water stood at 0.95m depth on completion

Project No 13262	
Scale 1:25	Page 1/1

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Site: **HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD**

**TRIAL PIT  
CBR2**

Date: **24/04/14**

Pit Size: **0.25m L x 0.25m W x 0.60m D.**

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.05	D1			<p>MADE GROUND - Soft, friable, dark grey, slightly gravelly, sandy SILT. Gravel is angular to rounded flint, brick, asphalt and ash fragments.</p> <p>MADE GROUND - Dark grey, silty SAND AND GRAVEL. Gravel is angular to sub-rounded asphalt, flint and brick fragments, and cobbles of angular asphalt.</p> <p>Firm, brown/orange brown mottled, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to rounded flint. (HEAD DEPOSIT)</p>		0.10	
0.20	D2					0.25	
0.25-0.60	B1						
0.50	D3					0.60	
				Pit completed at 0.60m depth			

- KEY**
- D - Disturbed Sample
  - B - Bulk Sample
  - U - Undisturbed Sample
  - R - Root Sample
  - W - Water Sample
  - J - Jar Sample
  - ∇ - Water Strike
  - ∇ - Water Rise
  - ∇c - Level on completion
  - MP - Mackintosh Probe
  - P( ) - Hand Penetrometer
  - Cohesion ( ) kPa
  - V - Vane Shear Test
  - Cohesion ( ) kPa

- REMARKS**
1. Pit hand excavated
  2. Live roots observed to at least 0.60m depth
  3. Pit sides stable
  4. Pit dry

# GROUND ENGINEERING

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Site: HOLLAND & HOLLAND SHOOTING GROUND, DUCKS HILL ROAD, NORTHWOOD

TRIAL PIT  
CBR3

Date: 24/04/14

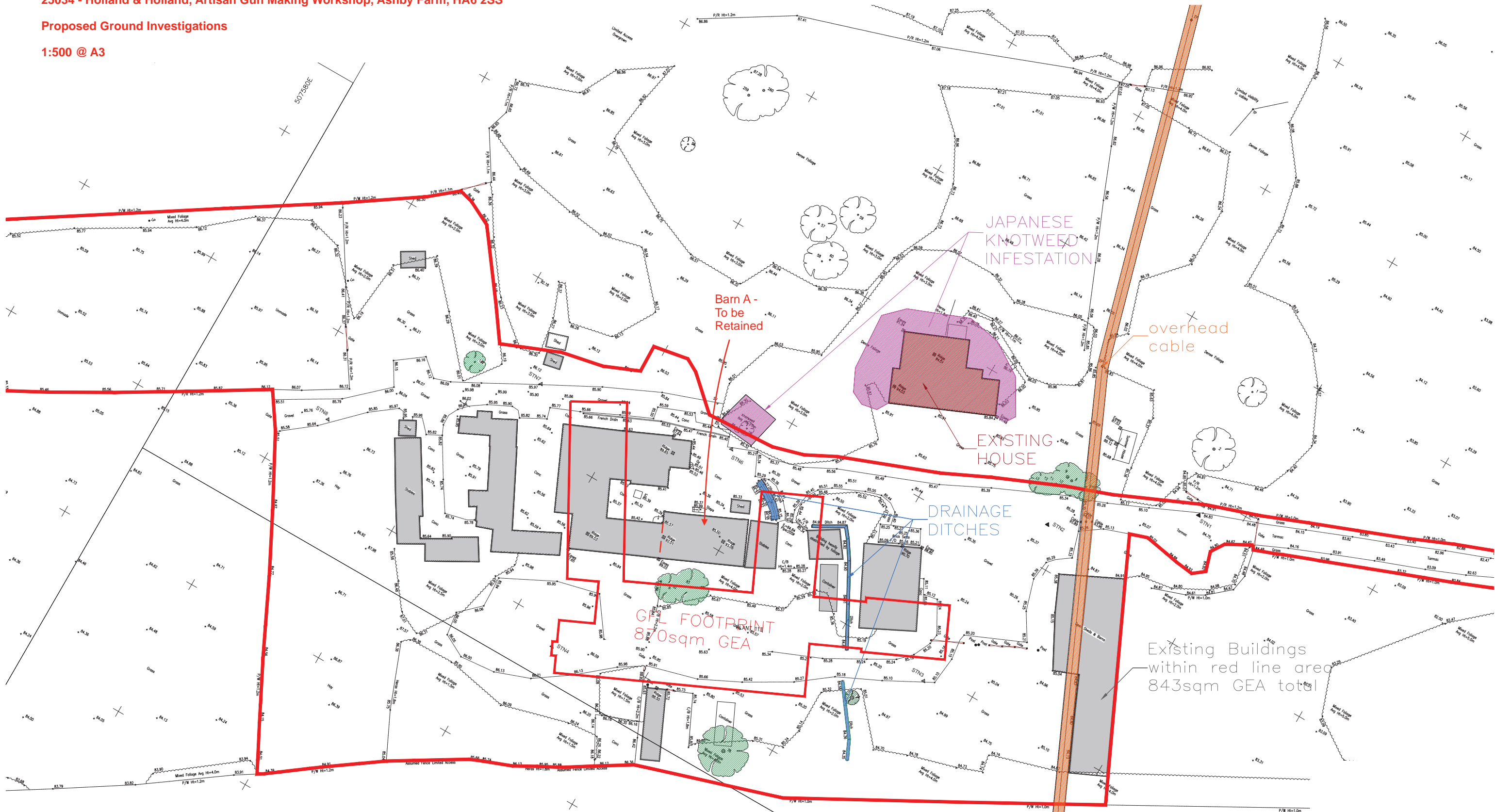
Pit Size: 0.25m L x 0.25m W x 0.70m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Soft, friable, brown and dark brown, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to rounded flint and brick fragments.		0.20	
0.30	D2			Firm, brown/orange brown mottled, slightly gravelly, sandy CLAY. Gravel is sub-angular to rounded flint. (HEAD DEPOSIT)		0.40	
0.40-0.70	B1			Firm, orange brown CLAY. (WEATHERED LONDON CLAY)		0.70	
0.60	D3			Pit completed at 0.70m depth			

- KEY**
- D - Disturbed Sample
  - B - Bulk Sample
  - U - Undisturbed Sample
  - R - Root Sample
  - W - Water Sample
  - J - Jar Sample
  - ∇ - Water Strike
  - ∇ - Water Rise
  - ∇c - Level on completion
  - MP - Mackintosh Probe
  - P( ) - Hand Penetrometer  
Cohesion ( ) kPa
  - V - Vane Shear Test  
Cohesion ( ) kPa




- REMARKS**
1. Pit hand excavated
  2. Live roots observed to at least 0.70m depth
  3. Pit sides stable
  4. Pit dry



Note:  
 - All buildings within the red line are to be demolished, apart from Barn A.

- Outline for proposed new building has slightly changed (see Appendix E).

The extent of site investigations has been suggested in this specification. However, the Site Investigation Contractor is responsible for clearly confirming the scope of the site investigations, soils sampling and laboratory testing as part of their tender return.

-  - Denotes location of proposed CBR testing. Test location on tarmac driveway is to include a trial pit to determine the road build-up, down to virgin soil.
-  - Denotes location of proposed borehole. First number denotes borehole reference; second denotes proposed depth. One day envisaged.
-  - Denotes trial pits. Contractor is to allow for one day of trial pitting and is to complete as many as possible. Priority is one to the external structure of the historic barn (A) and one to an internal supporting post. Trial pits to determine the existing footing profile, the soil at formation level and the bearing capacity. Additional trial pits to be undertaken across the site to show footing profile (for accurate estimation of demolition costs).

C	NY1	Layout Revised. Issued for Pre-App
B	18/04/24	Team Issue
/	15/03/24	Draft Issue to landscape Architects
A	03/04/24	Team Issue
REV	DATE	DESCRIPTION

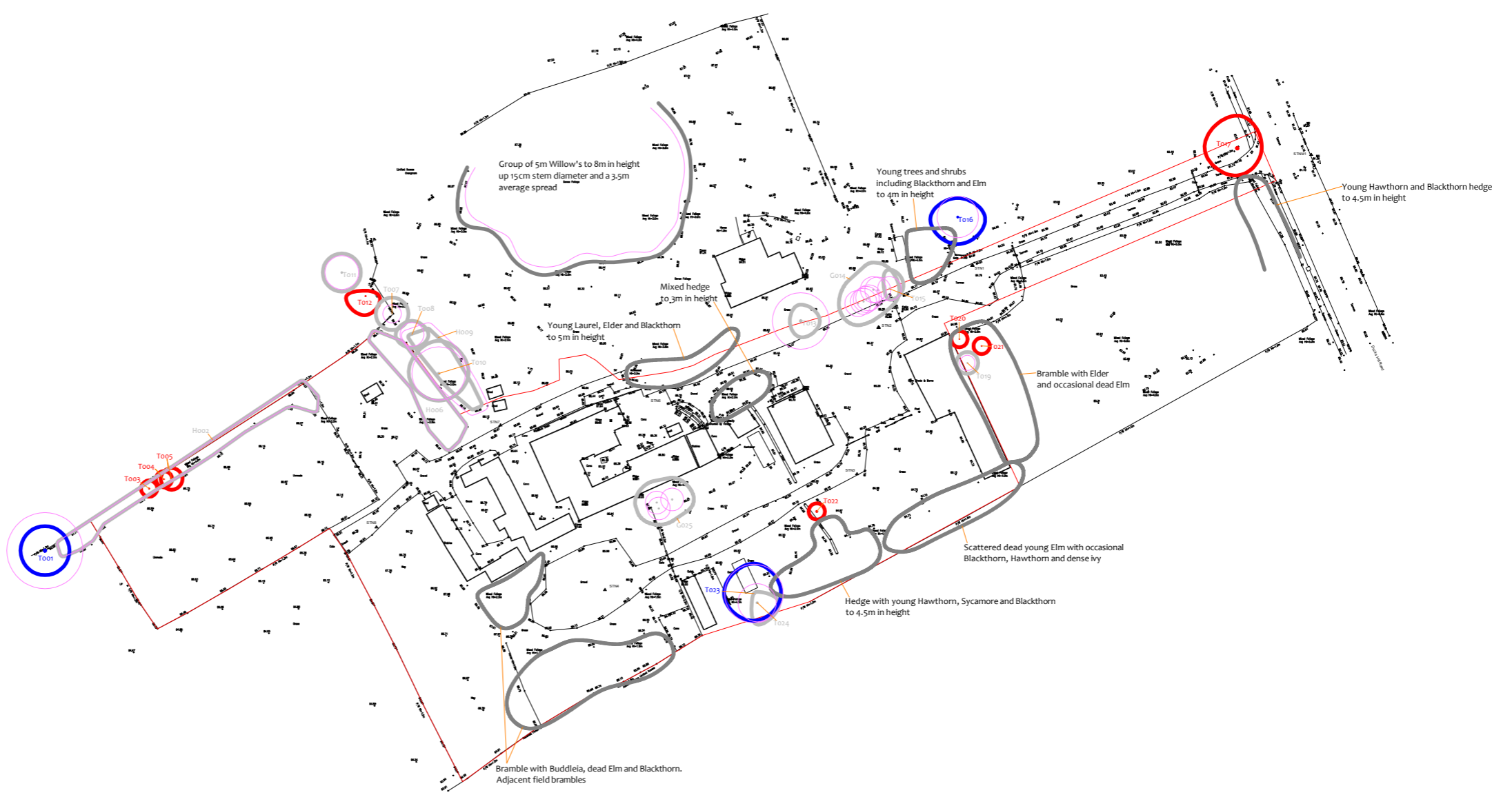
HOLLAND AND HOLLAND  
 PROPOSED ARTISAN GUNMAKING FACILITY  
 FOOTPRINT PLAN

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DATE	REVISED	DF	—	2022	SCALE	1:250 @ A1
DATE	REVISED	BM		1469-008	PROJECT	C

Tree Data Schedule

Tree Ref.	Species	Age Class	Health	Retention Category	Notes
T001	Pedunculate Oak	10	Good	A	Significant overhead low target occupancy
H002	Mixed Species	5	Good	B	Significant overhead low target occupancy
T003	Elm	7	Good	A	Significant overhead low target occupancy
T004	Elm	7	Good	A	Significant overhead low target occupancy
T005	Elm	7	Good	A	Significant overhead low target occupancy
T006	Elm	7	Good	A	Significant overhead low target occupancy
T007	Hawthorn	4	Good	B	Significant overhead low target occupancy
T008	Horse Chestnut	8	Good	A	Significant overhead low target occupancy
T009	Mixed Species	5	Good	B	Significant overhead low target occupancy
T010	Willow	4.5	Good	B	Significant overhead low target occupancy
T011	Blackthorn	5	Good	B	Significant overhead low target occupancy
T012	Black Elder	3.5	Good	B	Significant overhead low target occupancy
T013	Hawthorn	5	Good	B	Significant overhead low target occupancy
T014	Horse Chestnut	8	Good	A	Significant overhead low target occupancy
T015	Willow	4.5	Good	B	Significant overhead low target occupancy
T016	Common Ash	12	Good	A	Significant overhead low target occupancy
T017	Elm	5.5	Good	A	Significant overhead low target occupancy
T018	Elm	5.5	Good	A	Significant overhead low target occupancy
T019	Elm	5.5	Good	A	Significant overhead low target occupancy
T020	Elm	5.5	Good	A	Significant overhead low target occupancy
T021	Elm	5.5	Good	A	Significant overhead low target occupancy
T022	Elm	5.5	Good	A	Significant overhead low target occupancy
T023	Lime	12	Good	A	Significant overhead low target occupancy
T024	Sycamore	6	Good	A	Significant overhead low target occupancy
G025	Common Ash	11	Good	A	Significant overhead low target occupancy



Drawing No: CCL12409 /TCP Rev:1  
 Title: Tree Constraints Plan (Existing Layout)  
 Site: Abbey Farm 1046,255  
 Scale: 1:500  
 Paper Size: A1

**Tree Retention Categories**  
 Stems & canopies shown

- Category A tree (Green circle)
- Category B tree (Blue circle)
- Category C tree (Pink circle)
- Category U tree (Red circle)

Trees of high quality with an estimated life expectancy of 60+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.

Trees of moderate quality with a life expectancy of 30+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees.

Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.

Trees unsuitable for retention due to their very poor condition.

# Tree Constraints Plan

Status: Final

- 85.587 Root Protection Area (radius = 12xstem diameter)
- Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.
- Root Protection Area having been amended to account for site conditions

T1 = Tree No 1    G2 = Group No 2    H3 = Hedge No 3

MN = Measured North  
 Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area Radius (m)	Area (sq. m)
T001	Pedunculate Oak	10	7.0	152
H002	Mixed Species	5	1.0	3
T003	Elm	7	2.0	13
T004	Elm	7	1.4	7
T005	Elm	7	2.6	22
H006	Mixed Species	4	1.6	8
T007	Hawthorn	4	1.7	10
T008	Horse Chestnut	8	2.2	15
H009	Mixed Species	5	1.4	7
T010	Willow	4.5	4.9	75
T011	Blackthorn	5	3.1	31
T012	Black Elder	3.5	1.9	11
T013	Hawthorn	5	6.2	84
G014	Horse Chestnut	9	2.4	18
T015	Hawthorn	5	2.2	15
T016	Willow	12	3.8	45
T017	Common Ash	12	7.8	191
T019	Elder	4.5	1.4	6
T020	Elm	5.5	1.2	5
T021	Elm	5.5	1.2	5
T022	Elm	5.5	3.6	41
T023	Lime	12	6.4	90
T024	Sycamore	6	3.5	38
G025	Common Ash	11	2.1	14