



GROUNDTECH
CONSULTING

37-39 WEST ROAD, TOTTENHAM

GEO-ENVIRONMENTAL APPRAISAL

HE5 UK ENTERPRISES 25 GP LIMITED

NOVEMBER 2025

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SUMMARY

Site Details	
Site Location	<i>The site is located circa 0.6km from central Tottenham and is approximately centred on National Grid Reference 534610, 191580.</i>
Site Area	<i>The site is approximately square in nature covering an area of circa 0.85 hectares and generally topographical level.</i> <i>The site is predominantly occupied by a preexisting wholesaler industrial building including offices and a warehouse space for a distribution wholesalers. The buildings are adjoining and are primarily of brick construction with metal sheeting also present. The buildings consist of a mixture of both corrugated metal and glass roofing and asbestos sheet roofing. The north eastern extent of the building is a mixture of two and three storeys and comprises the offices for the wholesaler distribution warehouse. The offices in the west reach a total of three storeys in height.</i> <i>An annex adjoining to the main warehouse is present in the west of the site, constructed of corrugated metal sheeting. A large mechanical shutter door is located on the northern face of the annex allowing access.</i> <i>In the north west of the site there is a car park area surfaced by tarmac and concrete hardstanding, several cracks were present in the car park area associated with heavy traffic.</i> <i>An access road is present across the north of the site, running from the entrance in the east of the site to the car park area in the north west.</i> <i>To the east of the existing building, this area is utilised as further parking alongside West Road. There is an overhanging roof leading from the main warehouse building over the parking area.</i>
Ground Model	
Made Ground	<i>Concrete was encountered in all exploratory hole locations to a maximum depth of between 0.2m and 0.43m begl.</i> <i>Made Ground has been encountered beneath the site to a maximum depth of 2.0m begl and comprised granular subbase comprising Sand and Gravel with minor constituents of concrete and brick underlying dark brown to black cohesive Made Ground with minor constituents of brick, concrete and coal.</i>
Natural Soils	<i>Superficial deposits comprising brown sandy angular to subangular fine to coarse Gravel of flint and firm brown slightly sandy occasionally gravelly Clay was encountered in all exploratory hole locations from minimum depths of between 0.8m and 2.0m begl to a maximum depth of 5.0m bgl.</i>
Bedrock	<i>Bedrock was not encountered during the Ground Investigation.</i>
Groundwater	<i>Groundwater seepages were encountered in all boreholes at depths of between 1.5m and 2.4m begl in the natural granular Gravel deposits.</i>
Ground Engineering Assessment	
Foundations	<i>The most suitable foundations for the proposed development are considered to be pads for the steel structure and strip trench foundations for the walls constructed in the medium dense to very dense Gravel. Based on the high anticipated loadings, the cohesive deposits will not be suitable bearing stratum. Better coverage and deeper investigation is required to validate the design.</i>

	Preliminary foundation design has been undertaken by calculation, a safe Allowable Bearing Pressure (ABP) of 200kN/m² is provided for ultimate limit state design based on a pad foundation constructed in the granular deposits. The safe ABP will vary based on the dimensions of the pads and the preliminary foundation design should be revisited when the dimensions of the pads are confirmed.
Highways	CBR values of 2% to 3% are likely to be achieved in undisturbed natural cohesive soils and CBR values of greater than 5% in granular soils for pavement design purposes, unless proven otherwise by in-situ testing at sub-base level by a specialist geotechnical engineer. Untreated Made Ground should be assumed to have a CBR value of <2.5%, unless proven otherwise.
SuDS	The use of SuDS drainage is not considered to be suitable for the site due to the shallow groundwater encountered in the boreholes which would not provide the required 1.0m freeboard. Shallow drainage may be a possibility, it is recommended that soil percolation testing is undertaken to confirm.
Constraints	The main limitation of the site is the limited coverage obtained from the Ground Investigation due to the existing warehouse building which remained operational at the time of the Ground Investigation. It is recommended that further investigation is carried out post demolition to confirm the ground conditions and achieve better coverage across the site. Evidence of hydrocarbon contamination was identified during the Ground Investigation in the form of black staining and a strong hydrocarbon odour in WS01, and faint to moderate hydrocarbon odour in WS02 and WS03 within the natural gravel deposits. As a minimum, any free phase product should be removed. Loose Gravel was encountered in WS01 at 2.0m begl and soft Clay was encountered in WS03 at 2.0m begl and WS04 at 1.2m begl. Loose and soft deposits are not considered to be a suitable bearing stratum.
GQRA and Revised (PL) Assessment	
Human Health	The risk to Human Health is considered to be Low as no elevated CoC have been recorded by the laboratory testing. The CoC identified in the soils is indicated to be associated with the groundwater as part of the smear zone. The risk from vapours is considered to be Moderate as the vapour saturation limit for aliphatic C10-12 has been exceeded and high methane concentrations have been recorded in the monitoring wells associated with degrading volatile vapours from the offsite diesel groundwater source. PIDs of up to 52ppm have also been recorded in the granular natural soils.
Controlled Waters	The risk to controlled waters is considered to be Moderate to Low as elevated concentrations were recorded in groundwater in WS01 and WS02. As a minimum free product should be removed prior to development.
Permanent Ground Gas	The risk from ground gas is considered to be Moderate to High based on the interim GSV placing the site in CS3 and gas protection measures are required for the proposed development.
Final Appraisal	

The following further work is considered necessary to progress the site to construction phase:

- Completion of gas monitoring programme
- Issue gas assessment
- Intrusive site investigation, monitoring and possibly remediation following demolition of existing warehouse building
- Demolition Asbestos survey



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- *Tree survey by qualified arboriculturist*
 - *Detailed Foundation design*
 - *Confirmation of recommendations made in this appraisal with regulators*
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Plans

<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
GRO-25311-P01	-	Project Location Plan
GRO-25311-P02	-	Exploratory Hole Location Plan
GRO-25311-P03	-	Generalised Ground Model
GRO-25311-P04	-	Contamination Plan
GRO-25311-P05	-	Revised Illustrative Conceptual Site Model (CSM)

1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by I&L Consulting Ltd on behalf of HE5 UK Enterprises 25 GP Limited to undertake a Geo-Environmental Investigation for a site at 37-39 West Road, Tottenham.

A Preliminary Risk Assessment has previously been carried out for the site by TRC Companies Limited referenced 577557.0000.0000 and dated 15 December 2023. The relevant information is summarised in *Section 3.0*.

A main investigation was undertaken in accordance with BS 5930:2020, BS 10175:2017, BS 8576:2013 and Eurocode 7 to revise the Conceptual Site Model (CSM) and quantify the level of risk identified in the Phase 1 Preliminary Risk Assessment (PRA). The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

The report has been undertaken to fulfil the requirements of a risk assessment in accordance with current LCRM risk assessment guidance

1.2 Proposed Development

The details of the proposed development are not available at this stage. It is understood that the site is to be redeveloped for continued industrial use with the demolition of existing buildings and construction of new industrial building.

1.3 Limitations

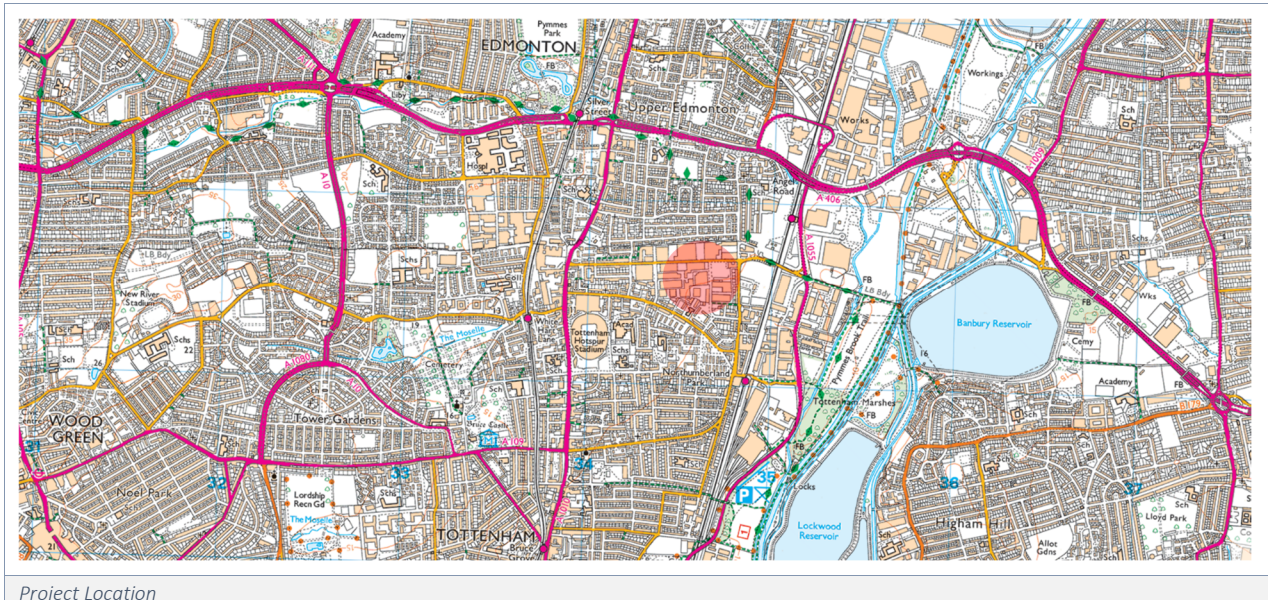
Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 0.6km from central Tottenham, as shown on the Project Location Plan *GRO-25311-P01*. The site is approximately centred on National Grid Reference 534610, 191580.



Access to the site is gained off West Road to the east of the site.

2.2 Site Description

The site is approximately square in nature covering an area of circa 0.85 hectares and generally topographical level.

Site Features

The site is predominantly occupied by preexisting wholesaler industrial building including offices and a warehouse space for a distribution wholesalers. The buildings are adjoining and are primarily of brick construction with metal sheeting also present.

The north eastern extent of the building is a mixture of two and three storeys and comprises the offices for the wholesaler distribution warehouse, the structures contain corrugated asbestos sheet roofing. The roofing of the centre of the main warehouse consists of corrugated metal and glass. The east of the building is flat roofed also of metal corrugated roofing. The offices in the west extend to a total of three storeys in height.

An annex adjoining to the main warehouse is present in the west of the site constructed of corrugated metal sheeting. A large mechanical shutter door is located on the northern face of the annex allowing access.

In the north west of the site, there is a car park area surfaced by tarmac and concrete hardstanding, several cracks were present in the car park area associated with heavy traffic.



An access road is present across the north of the site, running from the entrance in the east to the car park area in the north west.

The area to the east of the existing building is utilised as further parking alongside West Road. There is an overhanging roof extending from the main warehouse building over the parking area.

Site Boundaries and Surrounding Area

The north and west of the site is bounded by a mixture of a circa 2m high brick and concrete walls. The east of the site is unbounded and fronts onto West Road. The south of the site is bound by a circa 2m high concrete fence.

The site is surrounded by following features/land uses:

- *North* - *Surrounding industrial usage followed by residential housing*
- *East* - *Surrounding industrial usage followed by a sports complex*
- *South* - *Surrounding industrial usage followed by residential housing*
- *West* - *Surrounding industrial usage followed by residential housing*

Site photographs are presented in *Appendix 2*.

3.0 SUMMARY OF PREVIOUS INVESTIGATION

3.1 Introduction

A Preliminary Risk Assessment has previously been undertaken for the site by TRC Companies Limited (Ref. 577557.0000.0000, dated 15 December 2023) and the relevant information is summarised below.

3.2 Site History and Consultations

Earliest historical records from 1864 indicate that the site was undeveloped land and remained unchanged until 1935 where the site is shown to be developed with an unidentified building in the west, adjoining onto a building to the west of site. A manufactory building is shown in the north east and a box manufactory building is shown to have been constructed in the south east on this date, several small buildings are also shown around the manufactories. Maps from 1955/64 show expansion of the two factory buildings into the centre of the site and by 1964 the two buildings were adjoined, creating one large warehouse across the site. No change is indicated since this date and the site remains unchanged.

The immediate surrounding area is shown to have been used as industrial units surrounding the site with uses such as electrical manufacturers, furniture manufacturers, chocolate manufacturer, automobile and sheet metal manufacturer, dress manufacturer and engineering works throughout their history. Several tanks and electricity substations were recorded in the surrounding area. Most recently the industrial units to the east are labelled as part of 'Hotspur Industrial Estate' and those to the south as part of 'Royal London Estate'. Further afield, residential dwellings are shown on historical maps from 1935, with expansions to the estates since this date.

The following environmental information was obtained for the site:

- *Six pollution prevention and control measures were recorded within 500m of the site, the closest being 39m south west relating to the authorisation of wood coating at Morris Mirrors*
- *Two recorded pollution incidents within 500m of the site, the closest being 297m north east relating to unknown oils being released into an unknown receiving water which was categorised as a Category 2 significant incident*
- *One licenced waste facility located 120m north east relating to a vehicle depollution facility*
- *One petrol filling station located 406m south east*
- *The site is in an area categorised as being Nitrate Vulnerable*
- *A landfill is recorded 156m from site*
- *A detailed UXO Risk Assessment indicated the site was at a Low Risk from UXO*
- *The site is in an area where less than 1% of homes are affected by Radon*
- *The site is not in a coal mining consultation area*

3.3 Geology and Hydrogeology

Made Ground is anticipated to be present beneath the site due to past and current developments.

The superficial deposits in this area are indicated to be the Enfield Silt Member which comprise Clay and the Kempton Park Gravel Member which characteristically consists of Sand and Gravel. The Enfield Silt Member is characterised as a Unproductive Aquifer and the Kempton Park Gravel Member is characterised as a Secondary A Aquifer.

The bedrock deposits are indicated to be the London Clay Formation which is characterised as an Unproductive Aquifer.

The site is indicated to lie within a Source Protection Zone (Zone II) Outer Catchment. The nearest active groundwater abstraction well is located 416m north east of site relating to a pump and treat pollution remediation. The nearest potable water abstraction point is 1573m east of the site relating to Greaves Pumping Station. The Source Protection Zone is related to a borehole at Coca Cola Enterprises circa 999m north east of the site from within the Upper Chalk bedrock at circa 40.0m begl. The SPZ is not related to the pumping station.

3.4 Hydrology

The nearest named surface water feature is the Pymmes Brook located 706m south east of the site.

The nearest surface water abstraction point is 1381m north east of the site relating to evaporative cooling using water from Salmons Brook.

The Site is predominantly within Flood Zone 1, which has a low probability of flooding. Along the eastern and southern boundary of the Site, the Site lies within Flood Zone 2, which has a medium probability of flooding from rivers and the sea. A Flood Risk Assessment is recommended for the Site.

3.5 Preliminary Conceptual Site Model

The following risks were identified by TRC:

Receptor	Risk	Discussion
<i>Risk to Human Health</i>	<i>Low</i>	<i>Made Ground anticipated beneath the site due to the past developments which may be contaminated with a range of Contaminants of Concern (CoC) including heavy metals, speciated Polycyclic Aromatic Hydrocarbons (PAHs), asbestos, and Total Petroleum Hydrocarbons (TPH) however it is likely the site will be covered entirely by hardstanding which will minimise the contact with potentially contaminated soils.</i>
<i>Risk of Vapours</i>	<i>Moderate</i>	<i>Potential onsite and offsite sources of volatile vapours have been identified which can enter and accumulate in new buildings.</i>
<i>Risk to Controlled Waters</i>	<i>Low</i>	<i>The site is underlain by unproductive strata and the site is relatively flat and a significant distance is present to the nearest receptor.</i>
<i>Risk from Ground Gas</i>	<i>Moderate</i>	<i>Ground gases may be generated from potential organics in the Made Ground anticipated beneath the site.</i>

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site
Maintain watching brief for visual and olfactory evidence of contamination
Obtain samples using methodology in current guidance for contamination and geotechnical testing
Identify realistic pollution linkages to groundwater
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions
Determine if targeted supplementary investigation in areas of concern is required
Install monitoring standpipes for gas monitoring
Assess the identified pollution linkages in the Conceptual Site Model (CSM)

4.2 Scope of Works

The following scope of works was completed on the 4th October 2025.

- 4 No. Windowless sample boreholes (WS01 to WS04) were drilled to depths of between 1.8m and 5.0m bgl

The exploratory hole locations are presented on Groundtech Plan GRO-25311-P02 and the exploratory hole logs are in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site and target any areas of concern as summarised in the table below:

Location	Target Rationale
WS01	Existing warehouse building
WS02, WS03, WS04	Coverage

The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- BS 5930 'Code of Practice for Site Investigations' 2020
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
<i>Environmental Sample</i>	<i>16</i>
<i>Disturbed Sample</i>	<i>12</i>

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for geo-environmental testing were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature

The sample locations and depths are recorded on the exploratory logs.

4.4 Laboratory Testing

To inform the Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations during the Ground Investigation.

Contaminant of Concern (CoC)	Matrix	Number
<i>Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc, sulphate and pH</i>	<i>Soil</i>	<i>7</i>
<i>Total Petroleum Hydrocarbons including BTEX (TPH CWG)</i>	<i>Soil</i>	<i>5</i>
<i>Speciated Polycyclic Aromatic Hydrocarbons (PAHs)</i>	<i>Soil</i>	<i>7</i>
<i>Volatile Organic Compounds (VOCs)</i>	<i>Soil</i>	<i>5</i>
<i>Semi-volatile Organic Compounds (SVOCs)</i>	<i>Soil</i>	<i>5</i>
<i>Asbestos Screening</i>	<i>Soil</i>	<i>3</i>
<i>Arsenic, Cadmium, Chromium (total and hex), Copper, Nickel, Mercury, Lead, Zinc, Selenium, organic matter, sulphate and Ph</i>	<i>Groundwater</i>	<i>3</i>
<i>Speciated Polycyclic Aromatic Hydrocarbons (PAHs)</i>	<i>Groundwater</i>	<i>3</i>
<i>Total Petroleum Hydrocarbons including BTEX (TPH CWG)</i>	<i>Groundwater</i>	<i>3</i>
<i>Polychlorinated Biphenyl's (PCBs)</i>	<i>Groundwater</i>	<i>3</i>
<i>Volatile Organic Compounds (VOCs)</i>	<i>Groundwater</i>	<i>3</i>
<i>Semi-volatile Organic Compounds (SVOCs)</i>	<i>Groundwater</i>	<i>3</i>
<i>DOC and CaCO₃</i>	<i>Groundwater</i>	<i>3</i>
<i>Ammonia/Ammoniacal Nitrogen</i>	<i>Groundwater</i>	<i>3</i>

The Geo-Environmental Laboratory Testing Results for soil are presented in *Appendix 4* and the groundwater testing results are presented in *Appendix 5*.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

British Standard	Test Method	Number
<i>Part 2</i>	<i>Water Content</i>	<i>4</i>
<i>Part 2</i>	<i>Plasticity Index Analysis</i>	<i>4</i>
<i>Part 3</i>	<i>pH Value</i>	<i>4</i>
<i>Part 3</i>	<i>Water Soluble Sulphate Content</i>	<i>4</i>

The Geotechnical Laboratory Testing Results are presented in *Appendix 6*.

4.5 Gas and Groundwater Monitoring/Sampling

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of high-density polyethylene (HDPE) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth	Response Zone (m bgl)	Targeted Strata	Reason
<i>WS01</i>	<i>3.00</i>	<i>1.00 - 3.00</i>	<i>Granular Made Ground/Natural Granular</i>	<i>Gas, Groundwater</i>
<i>WS02</i>	<i>1.80</i>	<i>1.00 - 1.80</i>	<i>Natural Granular</i>	<i>Gas, Groundwater</i>
<i>WS03</i>	<i>3.00</i>	<i>1.00 - 3.00</i>	<i>Natural Cohesive/Natural Granular</i>	<i>Gas, Groundwater</i>
<i>WS04</i>	<i>3.00</i>	<i>1.00 - 3.00</i>	<i>Natural Cohesive/Natural Granular</i>	<i>Groundwater</i>

Permanent gas and flow rate monitoring was carried out using GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- *Oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) as the percentage volume in air (%v/v)*
- *Hydrogen sulphide (H₂S) and carbon monoxide (CO) as the percentage volume in air (%v/v)*
- *Lower Explosive Limit (%LEL) of methane*
- *Atmospheric and borehole pressure, including pressure trend*
- *Flow measurements (l/hr)*
- *Weather and ground surface conditions*

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes or steady state was reached .

Permanent gas and groundwater monitoring results are presented in *Appendix 7*.

4.6 Groundwater Sampling

Well development was carried out to ensure no cross contamination from the drilling activities remained in the water column in the well. During the return visit, the installations were purged to a minimum three times the volume of the water column in the borehole prior to sampling, samples were taken between 7 and 21 days after installation.

Purging was undertaken at a slower rate than the well development, and the sampling at a slower rate again. The method of sampling selected was using low flow pump due to the contamination identified during the Ground Investigation.



Where possible a water meter was used to test the pH, temperature and conductivity before sampling until equilibrium conditions were met in accordance with BS 10175 guidelines.

Samples were sent to the UKAS Accredited laboratory the same day, sampling was carried out in general accordance with BS 5930 and BS 5667.

4.7 Vapour Survey - Photo Ionisation Detector

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation. Soil was collected for onsite testing, a plastic bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for Total Volatile Organic Compounds (TVOCs) using a Photo Ionisation Detector (PID).

Results of the PID readings are presented on the exploratory hole logs. The onsite monitoring was carried out in line CIRIA C665 to aid targeting samples for VOC laboratory analysis.