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Hightown Housing Association Ltd

Phase 1 (Desk Study) Investigation Report

29 Broadwater Road
Welwyn Garden City
Hertfordshire
AL7 3BQ

Report No: 18.11.010
December 2018

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DOCUMENT RECORD

Report Title	Phase 1 (Desk Study) Investigation Report
Development	New Residential Development
Project Address	29 Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3BQ
Project Number	18.11.010
Client Name	Hightown Housing Association Ltd

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For and on behalf of ListersGeo, trading name of Listers Geotechnical Consultants Ltd

Issue No	Date	Status
1	13th December 2018	Draft
2	18th December 2018	Draft Rev 1
3	18th December 2018	Final

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EXECUTIVE SUMMARY

Project Reference	18.11.010
Site Location	29 Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3BQ
OS Grid Reference	524250, 212650
Development Proposals	Conversion of existing building to residential apartment block
Current Site Usage	Offices and car parking
Existing Buildings	Office block with undercroft car park and electricity sub-station
Topography	The site is essentially flat and level, with drainage gradients built into the car parking areas and a general, gentle, slope down to the north-east across the site
Vegetation	Vegetated areas of soft landscaping along the western (Broadwater Road) boundary and close to the eastern and southern site boundaries: including tall, mature, trees
Published Geology	Underlain by two Quaternary Superficial units: the Lowestoft Formation at the very southern end of the site; and the older (underlying) Kesgrave Catchment Subgroup (of the Dunwich Group) across most of the site. These Superficial deposits overlie the Cretaceous Bedrock White Chalk Subgroup (undifferentiated Lewes Nodular and Seaford Chalk Formations), formerly known as the Upper Chalk
Site History	Evidence of small-scale, late Nineteenth Century, clay extraction in north-eastern corner of the site, which was otherwise agricultural fields prior to development, as part of the growth of Welwyn Garden City, during the 1930s for factory units. The use of these factories has not been revealed and the factory use gave way to warehouse and depot during the 1960s and 1970s. The existing building is first shown on a map published in 1988. The surrounding area has a history of Twentieth Century industrial use: including chemical, pharmaceutical, electrical, mechanical and engineering works
Unexploded Ordnance	Low risk
Hydrology	The likely direction of hydraulic flow is down to the north-east and the nearest surface water course in that direction is Black Fan, which issues from a spring some 1.2km from the site and about 15m to 20m below the elevation of the site. There are no records of surface water abstraction licenses within 2km of the site.
Hydrogeology	The site lies within the Upper Lee Chalk groundwater body and local knowledge indicates that the direction of hydrogeological flow beneath the site is towards the east-south-east. The site is underlain by Superficial Secondary Aquifers above the Bedrock White Chalk Principal Aquifer and is within Source Protection Zone 3: likely to be protective of abstraction points in Hoddesdon, some 14km to the east-south-east.
Geotechnical Hazards	Surface collapse of below-ground cavities formed by either natural dissolution or mining of the Chalk. Shrink-swell of fine-grained near-surface soils. Thick Made Ground or disturbed ground following demolition or of pile foundation remaining in the ground.
Expected Ground Conditions	Surface Fill (in areas of hardstanding) or Topsoil above: localised Made Ground; Lowestoft Till (likely to less than 1m depth); sands and gravels of the Kesgrave to about 13m above White Chalk (with some variations in the interface depth due to karstic topography on the chalk).
Potential Risks to Human Health	A wide variety of potential contaminant sources from the industrial history of the site and surrounds have the potential to form pollutant linkages to both short-term exposure groups (ground and utility workers) and long-term exposure groups (site end-users) through solid- liquid- and vapour-phases.
Potential Risks to Controlled Waters	A wide variety of potential contaminant sources from the industrial history of the site and surrounds have the potential to form pollutant linkages to Controlled Water beneath the site.
Risk of Soil Gases	Migrating gases, arising from Made Ground on the site and surrounds, have the potential to form pollutant linkages.

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Potential Remediation Required	It may be necessary to remove contaminated source materials from the site and to provide the development with gas protection measures.
Conclusions and Recommendations for Further Work	The initial CSMs should be further assessed by means of a Phase 2 (Intrusive) investigation, which should seek to identify: • The thickness and nature of any Made Ground on site • The nature and extent of contaminated ground • The depth and condition of groundwater beneath the site • The gaseous-phase (landfill-type gases) linkages • Soil shrink-swell potential These requirements could be met by means of borehole and trial pit exploratory holes, with sampling, in-situ testing, well installation, and subsequent laboratory testing. The risk of mining cavities being present cannot be discounted and, so, it is further recommended that the potential for cavities (mining and natural) beneath the site be assessed by means of a geophysical survey. Phase 2 investigation conducted whilst the site remains operative will, necessarily, be somewhat limited in scope and subsequent, supplementary, investigation should be anticipated once the site is fully accessible.

This executive summary should be read in conjunction with the main report.

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PHASE 1 (DESK STUDY) INVESTIGATION REPORT

INTRODUCTION

A Phase 1 (Desk Study) Investigation has been undertaken at No.29, Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3BQ. A Site Location Plan is provided in Appendix A. The Ordnance Survey National Grid reference for the approximate centre of the site is 524250, 212650.

Instructions to undertake the investigation were received from the client, Hightown Housing Association Ltd, in their letter Budget Estimate Acceptance return, dated 12th November 2018.

This report describes the desk study investigation activities carried out by ListersGeo in order to provide a preliminary evaluation of the ground conditions and the potential for soil contamination on the site. On the basis of those findings, and with regard to the proposed development, the report presents: initial human health and groundwater risk assessments (using the source-pathway-receptor risk assessment methodology); and geotechnical assessment and recommendations.

This report has been prepared for the sole use of the client and their professional advisors. This report shall not be relied-upon by third parties without the express written authority of ListersGeo. If an unauthorised third-party comes into possession of this report they must not rely on it and the authors owe them no duty of care and skill.

PROPOSALS

It is proposed to convert the existing offices for residential use.

The preliminary geoenvironmental risk assessment has been prepared in support of a Prior Approval Planning Application for the development.

SITE INFORMATION AND WALKOVER SURVEY

A walkover survey of the site and its immediate surrounds was undertaken on the 16th November 2018. A selection of site photographs is provided in Appendix A, along with a plan showing the existing site layout annotated with the salient features identified.

The site is on the eastern side of Broadwater Road, within the Peartree district of Welwyn Garden City: a mixed industrial, commercial, retail and residential area. The site, which is approximately rectangular on plan, extends 80m along Broadwater Road and about 90m to the south-east, covering an area of around 7,000m².

Factory units housing motor repair workshops and retail outlets are present beyond a service road that runs alongside (and adjacent) the northern site boundary. There is a car park and depot to the east, a derelict car park to the south and, to the west, beyond Broadwater Road, is a derelict former factory site (with no above-ground structures remaining).

The site contains a four- to five-storey office building, with undercroft parking at ground level, areas of external, ground level, car parking and peripheral areas of soft landscaping.

The site lies at about +85m AOD (above Ordnance Datum) close to the head of Black Fan Valley, a north-east-draining dry valley above the south-east-draining River Mimram that lies some 2.5km to the north-east and about 25m below site level. The site is essentially flat and level, with drainage gradients built into the car parking areas and a general gentle slope down to the north-east across the site. The site does, however, seem to be slightly (<0.5m) raised above the level of the car parks to the east and south. Close inspection from within the site and access to the other sites was not possible but it seems as though there is an earth bank down to the car park to the east and a concrete-block retaining wall down to the car park to the south.

There are vegetated areas of soft landscaping along the western (Broadwater Road) boundary and close to the eastern and southern site boundaries: including tall, mature, trees.

The site contains numerous buried service inspection and manhole covers and contains an electricity sub-station close to the northern boundary. A sign on the sub-station warns that it contains sulphur hexafluoride (SF_6): an inorganic, colourless, odourless, non-flammable, heavy gas, used as a gaseous dielectric medium. The plant room, within the existing building, contained concrete plinths for plant (no longer present) that showed evidence of spills of petroleum hydrocarbons.

Two suspected monitoring well covers were identified on site: one on the northern footpath off Broadwater Road and the other within the rear, eastern, car park.

The building on site showed no evidence of structural distress and there were no signs of ground disturbance suggestive of cavities beneath the site or immediate surrounds (where viewable).

DESK STUDY AND BACKGROUND INFORMATION

A desk study review of the site and its history has been undertaken: to determine the former land usage and the potential for any historically-derived sources of chemical contamination, and to provide information to aid our geotechnical assessment. A copy of the desk study information is presented in Appendix B of this report.

The information provided is obtained from independent third-party sources. We have relied on this information, but no guarantee can be given as to the accuracy or completeness of the data used. It should be appreciated that such data is not exhaustive and is constantly being updated and reviewed in light of new information and procedures. In such an event, or if the development commences after expiry of one year from publication of this report, then we recommend this report be referred back to us for reassessment.

The desk study comprises a review of the following consultations and information sources:

- Environment Agency (EA)
- Natural England
- National Geoscience Information Service
- Public Health England
- Centre for Ecology & Hydrology
- British Geological Survey (BGS)
- Contemporary Trade Directories
- Peter Brett Associates' Cavities Database
- Historical Ordnance Survey maps
- Aerial Imagery
- Unexploded Ordnance (UXO) maps
- Hertfordshire Building Control

Information from the above-referenced sources has been utilised to develop a conceptual model of the site for use in the geotechnical appraisal and source-pathway-receptor risk assessment.

GEOLOGY

The site lies within the Vale of St Albans, some 14km from the north-eastern edge of the London Basin: represented by the Chiltern Hills Chalk escarpment around Luton. The Bedrock strata within this area dip gently down to the east-south-east.

Published Geology

Reference to the British Geological Survey 1:50,000 scale map, Sheet 239 (Hertford), dated 1978, and other published geological information on the area indicates that the site is underlain by two Quaternary Superficial units: the Lowestoft Formation at the very southern end of the site; and the older (underlying) Kesgrave Catchment Subgroup (of the Dunwich Group) across most of the site.

These Superficial deposits overlie the Cretaceous Bedrock White Chalk Subgroup (undifferentiated Lewes Nodular and Seaford Chalk Formations), formerly known as the Upper Chalk.

Superficial Deposits

The Lowestoft Formation is a glacial deposit, largely comprising chalky till but with subordinate outwash beds of sand, gravel, silt and clay. This unit is likely to be no more than about 1m thick on the site.

The Kesgrave Catchment Subgroup is a sedimentary deposit of fluvial origin generally characterised by sandy gravels but, locally, with clay-enriched upper layers. The likely thickness of this unit is discussed further, in the *BGS Archives* section.

It is possible that these two superficial units are, locally, interbedded.

Bedrock

The Seaford Chalk is described, by the BGS, as '*Firm white chalk with conspicuous...flint seams...hardgrounds and thin marls*' and the underlying (older) Lewes Nodular Chalk as, *'Hard to very hard nodular chalks and hardgrounds…with interbedded soft to medium hard chalks and marls'*. These units are difficult to distinguish and so, hereafter, will be referred-to as White Chalk.

Solution Features

Chalk, as a calcium-carbonate rich rock, is highly susceptible to dissolution by water containing carbon dioxide. This dissolution can create three common types of features within the chalk, grouped together under the generic term 'dissolution features'. These features include:

- **Sinkholes:** Depressions at the ground surface caused by the collapse of overlying chalk or superficial deposits into dissolution voids. The shape and size of the surface feature is dependent on the underlying void.
- **Solution pipes:** A feature in the surface of the chalk caused by increased dissolution in an area of closely spaced discontinuities. These features may, or may not, have a ground surface expression. They occur up to 20 metres diameter, though are commonly much smaller.
- **Swallow Holes and Swallets:** The point at which a stream disappears underground. A swallow hole is associated with near-instantaneous loss and a swallet usually refers to gradual loss along a stream bed (into a permeable deposit) with no apparent depression. These features often occur at the junction of impermeable strata and chalk. Infilled ancient swallow holes do exist where streams used to flow and may not have any surface expression. They can occur up to 14m in diameter, although they are commonly a few metres across.

Further, site-specific, information is provided in the Potential Geotechnical Hazards section of the report.

BGS Archive

Pertinent details from three borehole records from the British Geological Survey archive (converted from Imperial units, where necessary) are summarised below to aid the preliminary assessment of the ground conditions:

Borehole TL21SW…	Vector, from site	Depth to base (m)				Groundwater (m)
		Lowestoft	Kesgrave	White Chalk	Grey Chalk	
~22A	243mSW	7.9	13.7	77.7	>91.4	24.1 (rest depth)
~211	129mW	-	13.0	>30	-	22.4 (rest depth)
~21	317mNNE	-	9.3	>61	-	23.8 (strike and rest depth)
~105	401mNE	-	13.7	>18.3	-	Dry

These records indicate that the Kesgrave is likely to extend to around 13m depth beneath the site, although this will vary where karst topography had previously developed at the top of the chalk. The water table, at the time of the monitoring (between 1939 and 2008) was some 22m below ground level.

The record for borehole TL21SW211 (located on the former Polycell factory site on the opposite side of Broadwater Road) also includes notes that the borehole was sunk for *'Remediation of contaminated groundwater'* and that *'Significant volatile organic compound contamination* (was) *noted below 12.00m'*.

HISTORY OF THE SITE

The history of the site has been assessed by reviewing the historical Ordnance Survey and National Grid maps on-line information sources and aerial imagery of the area. This has revealed the following:

Time Period	Historical Use of the Site	Historical Use of the Surrounding Area
1881 to 1884	Part of a large agricultural field. Clay pit close to north-eastern corner: roughly circular on plan, *c*13m diameter and covering around 137m².	Largely agricultural area, with sparse and scattered tree cover. Farmstead (Peartree Farm) 50m east. Pond 95m south-east covering around 1,100m² and smaller ponds 240m south-east and 315m south-west. Great Northern Railway line, 285m west.
1897 to 1898	Clay pit no longer shown.	Orchard shown on field adjacent to Peartree Farm, some 10m east of the site. Extensive Brick Works 750m south-west, between Woodhall-lodge Farm and the railway (south of Twentieth Mile Bridge).

Time Period	Historical Use of the Site	Historical Use of the Surrounding Area
1922 to 1923	No significant changes shown.	Welwyn Garden City developing west of the railway line, with residential estates and industry >750m west of the site. Electric Power Station (Welwyn Garden City Ltd) 330m north-east (on what is later labelled as Bridge Road East). Brick Works to south-west no longer shown and the area is mapped as scrubland with some evidence of partial backfilling.
1929	No significant changes shown.	Louis de Soissons's 1929 map (on Hertfordshire County Council's 'Our Welwyn Garden City' website) shows on-going development around the site, including: factory units immediately to the north of the site (likely the retail outlets that remain to this date); the premises of British Instructional Films Ltd on the opposite side of Broadwater Road; and, further north from the site, various Engineering Works, The Broadwater Press (possibly a printing company); an Iron Foundry (Welwyn Foundry); a Gas Works (Welwyn & Hatfield Gas Company); various railway tracks linking these industries to the mainline railway; a Swimming Bath and the Shredded Wheat Factory; and residential development >200m south of the site. The two smaller ponds south of the site are no longer shown. There is evidence of further mineral extraction west and south of the former Brick Works south-west of the site.
1935 to 1946	The site is now shown (on the Ordnance Survey map) occupied by a terrace of four non-descript buildings that front onto Broadwater Road and with areas of open space to the rear. An unattributed map (dated 1935) and a contemporary photograph (both on the 'Our Welwyn Garden City' website) show that these are 'sectional factory units'.	The area around the site has been further developed: for industry to the north and for residential use to the east. New industries shown (on the 1935 map on the 'Our Welwyn Garden City' website) include Young Osmond & Young Ltd, manufacturers of electrical heating apparatus; a Laundry (Welwyn Garden City Laundry Ltd); plastics, chemical, mechanical, and motor engineering firms; a match factory, and a clothing factory. The Swimming Baths is no longer shown.
1960 to 1966	Occupied by a Warehouse, Works, Factory and Depot. The three northernmost of these include buildings within the areas to the rear of the premises: including one across the former Clay Pit. Trees along the western boundary and close to the east.	The industrial area, around the site, is shown to include various Factories, Works, Depots and Warehouses. On-line sources indicate that Polycell occupied much of the area on the opposite side of the Broadwater Road during this time. The area of the large pond south-east of the site is, now, shown as an excavation some 90m from the site covering an area of around 1,400m². Welwyn Garden City Maternity Hospital some 100m south-east and this is, later, shown as a Club.

Time Period	Historical Use of the Site	Historical Use of the Surrounding Area
1968 to 1976	The site is shown occupied by a Warehouse and three Depots.	The industrial area, around the site, is shown to include: Pharmaceutical Works (adjacent to the south); Printing Works (10m north); Garage (13m north); Engineering Works (30m north); a large Factory (30m west); Chemical Works (44m south-west, 46m south, and another, 48m north); and several other Factories, Works and Depots. A surface-mounted storage tank, just off-site, midway along the southern site boundary. The area of the large pond south-east of the site is, now, shown as an area of public open space with footpaths and trees around. The area of former woodland immediately east of the site now shown as a Car Park. The areas of mineral extraction south of Twentieth Mile Bridge are now shown redeveloped as the Burrowfield Estate (east of the railway line) and The Gosling Stadium (west of the railway line).
1988 to 2000	Now shown occupied by the present-day development.	No significant changes shown.
2000 (Aerial)	No significant changes shown.	The plot immediately south of the site, formerly occupied by a Pharmaceutical Works, is now in use as a car park and the storage tank is no longer present. The former pond area, to the south-east, is shown with a cover of grass and trees.
March 2012 (Aerial)	No significant changes shown.	The plot on the opposite side of Broadwater Road, formerly occupied by the Shredded Wheat and Polycell factory and others, has been levelled.
June 2018 (Aerial)	No significant changes shown.	The plot on the opposite side of Broadwater Road has been subject to groundworks. Local knowledge indicates this to be related to remediation of the area in preparation for redevelopment.

INTERVIEWS

Hertfordshire Building Control confirmed (by emails of 22nd November 2018) that, as the site was in an area of known dissolution features: any new development should be designed with cruciform foundations to span a 5m wide collapse zone; and that they would not allow the use of soakaways.

UNEXPLODED ORDNANCE AND BOMB SITES

The Zetica on-line bomb risk map shows the site located in an area where there is a Low risk of unexploded ordnance related to aerial bombing. Low-risk regions are those with a bombing density of up to 10 bombs per 1000 acres. In general, further action to mitigate the risk is considered prudent, but not essential.

Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity.

HYDROLOGY

The site lies close to the head of Black Fan Valley, a north-east-draining dry valley above the south-east-draining River Mimram that lies some 2.5km to the north-east and about 25m below site level.

The likely direction of hydraulic flow across the site is down to the north-east and the nearest surface water course in that direction is Black Fan, which issues from a spring some 1.2km from the site and about 15m to 20m below the elevation of the site.

The EA Catchment Data Explorer for the River Mimram (Codicote Bottom to Lee) records it to be of overall Moderate water body classification between 2015 (and the last reported year) 2016.

The site is recorded to lie outside of any flood impact zones. However, this information does not constitute a site-specific Flood Risk Assessment and we recommend further enquiries to determine if such an assessment would be required to support a development application for the site.

There are no records of surface water abstraction licenses within 2km of the site.

HYDROGEOLOGY

The EA records the Kesgrave as a Superficial Secondary A Aquifer and the Lowestoft as a Secondary (undifferentiated) Aquifer which is likely to be due to the possible presence of sheet-like coarse soil deposits that sometimes occur within the Lowestoft; rather than the predominantly fine-grained Till.

The underlying White Chalk is a Bedrock Principal Aquifer and is the main public water source in the region.

The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are divided into two different types of aquifer designation:

- **Superficial (Drift)** - permeable unconsolidated (loose) deposits. For example, sands and gravels
- **Bedrock** - solid permeable formations e.g. sandstone, chalk and limestone

For each type there are Principal, Secondary A, Secondary B and Unproductive Strata, each with a decreasing rank of importance.

There is one record of a groundwater abstraction license within 1km of the site: 232m south-west of the site: Process Water for George Wimpey Limited on Broadwater Road.

There are no records of potable water abstractions within 2km but the site is within Zone 3 of a Source Protection Zone (SPZ). An SPZ is a protection zone placed around a well or borehole (or group of such) that supplies groundwater of potable quality and is divided into three sub-zones, defined as follows:

- **Zone 1** – Travel time (of water) of 50 days or less to the groundwater source
- **Zone 2** – The greater of: 25% of the source area, or a travel time of 400 days
- **Zone 3** – The total area needed to support the discharge and abstraction from the source

The site lies within the Upper Lee Chalk groundwater body and local knowledge indicates that the direction of hydrogeological flow beneath the site is towards the east-south-east.

The SPZ is, therefore, likely to be protective of abstraction points in Hoddesdon, some 14km distant as indicated on the supplemental Hydrogeology – Source Protection Zone Plan presented in Appendix B.

The EA Catchment Data Explorer for the Upper Lee Chalk records it to be of overall Poor water body classification between 2009 (and the last reported year) 2016.

WASTE TREATMENT AND LANDFILL SITES

There are four records of landfills within 1.5km of the site and they all relate to areas of former mineral extraction south of Twentieth Century Bridge to the south-west of the site. The nearest is 1,047m from the site and the nature of the waste accepted is not recorded.

Local knowledge indicates that this landfill has, historically, been a significant source of landfill gas. However, the landfill is within the adjacent river catchment and given the distance and anticipated direction of hydrogeological flow (towards the east-south-east and, therefore, away from the site) we consider it very unlikely that these landfill sites could pose a significant risk to the subject site.

Reference to records from the BGS, the Environment Agency and the Local Authority indicates that there are no waste transfer, treatment or management facility sites within 500m of the site.

ENVIRONMENTAL PERMITS, INCIDENTS AND REGISTERS

There are several records of historical IPC (Integrated Pollution Control), Part A(1) or IPPC (Integrated Pollution Prevention and Control) licenses, and List 1 Dangerous Substances Inventory sites within 500m of the site but, given the anticipated directions of hydraulic surface water flow (to the north-east) and hydrogeologic groundwater flow (to the east-south-east), only the following activity has the potential to have significantly affected the site:

- Roche Products Ltd, 114m south, for organic chemical production between 1994 and 2000

There are no records of Part B Enforcements for this activity.

There are records of Category 3 or 4 Radioactive Substances Authorisations for Roche Products Ltd at the same address between 1991 and 2010.

There are no records of licensed discharge consents within 500m of the site.

There are no records of significant Pollution Incidents within 500m of the site.

INDUSTRIAL USAGE SITES

The site is located within an industrial area that was, formerly, much more active than present-day. The site is known to have been, formerly, occupied by various warehouses, works, factories and depots. The exact nature of the on-site activities, however, have not been revealed by this investigation. The on-site electricity sub-station is thought to date from the existing development, which post-dates the cessation of the use of PCBs (poly-chlorinated biphenyls) but does display a sign warning of the presence of the gas SF_6.

Several factories and works are known to have, historically, occupied the site and nearby addresses, including (for around 30 years) a large surface-mounted storage tank (unknown contents) along the southern site boundary; plastics, chemical, mechanical, and motor engineering firms; a match factory, a clothing factory.

The large factory on the opposite side of Broadwater Road (including the latest Polycell plant); the Roche organic chemicals facility further to the south, and the pharmaceutical works adjacent to the south are the most likely of these to have affected the site through the ground (other activities may have caused air-borne pollution that could have reached the site). These factories will, most likely, have included above-ground and below-ground tanks for fuels and chemicals storage; boiler houses; chemical processing areas, and electricity sub-stations.

There are thirty-nine records of current potentially contaminative industrial sites within 250m. Several of these, such as the one recorded on site, seem to refer to office locations but the more viable include: motor vehicle repairs and the storage tanks associated with some of the addresses, which may contain fuels or other chemicals.

The nearest active fuel-filling station is identified as the Esso garage 343m north-east of the site and the nearest inactive station is recorded 407m west.

WORKED GROUND AND ARTIFICIAL GROUND

There are no records of Worked Ground (areas where the ground has been cut away, such as quarries and road cuttings) within 1km of the site.

Artificial Ground was not formerly mapped by BGS. It became a common requirement of the applied geological mapping projects in the 1980s and is now routinely recorded but information is only available for parts of the country. There are no records of Artificial Ground within 50m of the site.

The, earlier, Site History section of this report details areas of possible Infilled Ground within influencing distance of the site.

RADON GAS

The site is shown to lie within an area where <1% of homes exceed the radon gas Action Level of 200Bq/m^3. Therefore, in accordance with BR 211, 'Radon: guidance on protective measures for new dwellings', radon gas protection measures are not necessary in the construction of new dwellings or extensions without underground rooms on this site.

POTENTIAL GEOTECHNICAL HAZARDS

Geological

The risks of naturally-occurring geotechnical hazards at the site is recorded, in the Groundsure report, as follows:

Ground Stability Hazard	Hazard Potential Rating	Comments
Ground dissolution	Very Low	See *Dissolution Feature Risk Assessment* section, below for further discussion
Shrinking and swelling	Low Negligible	Lowestoft Till Kesgrave Sand & Gravel
Collapsible deposits	Very Low	No such soils likely to be present
Landslides	Very Low	Relatively flat topography
Running sand	Very Low Negligible	Kesgrave Sand & Gravel Lowestoft Till
High compressibility	Negligible	No such soils likely to be present

Mining

The site does not lie within an area likely to be affected by coal mining activities.

Non-coal (clay) extraction is recorded on-site (see the Site History section for more details) but the BGS reports that Chalk mining may also have occurred on site and at three further locations within 1km of the site. There is a known association between clay extraction and chalk extraction for brick making. Whereas clay was, historically, generally extracted at surface, it was sometimes practiacble for chalk to be extracted (where present beneath the clay) from mines extending into the chalk. These mines were rarely recorded.

The national mining cavities database does not record any mining cavities on the site, or within 1km.

Natural Cavities Database

The national natural cavities database records one natural cavity on site and a further seven within 1km of the site: with three of them within 100m of the site.

All of these features are recorded as sinkholes.

Dissolution Feature Risk Assessment

The site was assessed for its susceptibility to dissolution features, using the risk assessment methodology published by Edmonds, 2001, *Predicting natural cavities in chalk*.

The geology of the site comprises Quaternary outwash glacial deposits (Kesgrave) and (indicated across, at least, the southern end of the site) glacial (Lowestoft) deposits over formations of the White Chalk Subgroup.

The site lies close to the head of a dry valley and drainage is direction into the Chalk through the Superficial deposits, with the permanent groundwater table anticipated to lie some 20m beneath ground level, below the Superficial/Chalk interface.

The assessment provided a Very High Subsidence Hazard category for the site, which differs from the Very Low rating in the Groundsure report but which ties-in with the number of reported natural cavities in the area.

BACKGROUND SOIL CHEMISTRY

The BGS estimates of background levels of some constituents of potential concern are summarised below:

Contaminant	Level in Rural Soil (mg/kg)
Arsenic	<15 to 25
Cadmium	<1.8
Chromium	60 to 90
Lead	<100
Nickel	15 to 30

POTENTIALLY SENSITIVE LAND USES

The site is not located in close proximity to any environmentally sensitive land uses but is within a broader nitrate vulnerable zone.

INITIAL CONTAMINATION CONCEPTUAL SITE MODEL

A preliminary qualitative risk assessment has been carried out using the source-pathway-receptor principle to create a conceptual model for the site. This method is predicated on the principle that a pathway must exist between a potential source of contamination and a potential receptor for there to be a risk to that receptor. Potential sources of contamination and potential receptors have been assessed using the Contaminated Land Exposure Assessment (CLEA) Guidelines and are detailed below, together with the possible pathways that might allow pollutant linkages.

We understand the development proposals are to convert the existing offices for residential use.

POTENTIAL SOURCES OF CONTAMINATION

Potential Solid-, Liquid- and Vapour-phase Contamination Sources

The results of the desk study and walkover indicate that the following potential sources of soil or groundwater contamination are present at, or near, the site:

Potential Source	Potential Contaminants
Factories, works and depots, on-site	Variable: may include heavy metals, metalloids, non-metals, polycyclic aromatic hydrocarbons, petroleum hydrocarbons, poly-chlorinated bi-phenyls and asbestos
Made Ground, on-site	Variable: may include heavy metals, metalloids, non-metals, polycyclic aromatic hydrocarbons, hydrocarbons and asbestos
Urban/industrial setting	Various air-borne; including lead and polycyclic aromatic hydrocarbons
Former factories and works (plastics, chemical, mechanical, and motor engineering)	Variable: may include heavy metals, metalloids, non-metals, petroleum hydrocarbons, organic solvents (including halogenated varieties), polycyclic aromatic hydrocarbons, acids, organic acids, alkalis, alcohols, esters, phenols, cyanide, poly-chlorinated bi-phenyls, sodium salts, asbestos and a variety of active pharmaceutical ingredients
Car servicing and repairs, adjacent to the north	Leakage, spills and dumping of petroleum hydrocarbons, oils and lubricants, Lead and battery acid, paints (volatile organic hydrocarbons)

Potential Gaseous-phase Contamination Sources

Two main groups of gaseous-phase contamination have been considered: the gases (including methane and carbon-dioxide) that result from organic decomposition of constituents in the ground and radon gas that results from the radioactive decay of thorium and uranium (found, in varying quantities, in most soils and rocks).

In consideration of the source-pathway-receptor methodology for ground gas risk assessment set out in CIRIA C665, the sensitivity of the development is considered to be high (residential).

We have provisionally assessed the risk of ground gas impacting the site, by reference to the CL:AIRE research bulletin RB17, “A pragmatic approach to ground gas risk assessment”, 2012.

The following potential sources have been assessed:

- No credible source of landfill gas migration to the site has been identified

- Made Ground may be present on the site, associated with the former clay pit and site development
- Made Ground may be present off-site, associated with former developments
- The site is not within an area of significant radon gas generation

Therefore, the following potential sources of gaseous-phase contamination have been identified for the site:

- Migrating gases, including methane and carbon-dioxide, from Made Ground beneath the site and nearby areas

RECEPTORS

The following most sensitive receptors have been identified at the site:

Human Health

- Long-term risk group: end users of the site - residents (all ages)
- Short-term risk group: construction workers (adult) and maintenance workers (adult)

Environmental

- Controlled Waters - the Superficial Secondary Aquifers (Lowestoft and Kesgrave) and the underlying Bedrock Principal Aquifer (White Chalk) beneath the site

The catchment rivers are considered to be too remote (1.2km away) to be at risk.

Infrastructure

- Substructures
- Water supply pipes

PATHWAYS

It is considered that a number of potential pathways exist between these potential sources and the above-identified receptors.

For the human receptors these include:

- Direct soil ingestion in areas of exposed soil
- Ingestion of soil attached to home-grown crops
- Ingestion of crops with contamination uptake
- Inhalation of indoor and outdoor vapours and dust
- Dermal contact with contaminated soil
- Inhalation of soil gases or vapours migrating through permeable strata into the building

For Controlled Waters, the pathways include:

- Migration of contaminants through the unsaturated zone
- Migration of contaminants through the groundwater

For the infrastructure the pathways include:

- Contact with leachable or corrosive contaminants within the soil
- Contact with leachable or corrosive contaminants within the groundwater

POTENTIAL LINKAGES

The relationship between a source, a pathway and a receptor is identified as the 'pollutant linkage' and if this is not complete then land does not present a risk to receptors. The potential linkages are summarised below, based on a proposed residential end use:

Potential Contaminants	Pathways	Receptors	Risk rating	Comment
Heavy metals, metalloids, non-metals, petroleum hydrocarbons, organic solvents (including halogenated varieties), polycyclic aromatic hydrocarbons, acids, organic acids, alkalis, alcohols, esters, phenols, cyanide, poly-chlorinated bi-phenyls, sodium salts, asbestos and a variety of active pharmaceutical ingredients in near-surface soils and shallow groundwater - from urban/industrial setting, former industrial site uses, possible Made Ground on-site and nearby industrial land-uses	Contact, ingestion, inhalation	Construction & maintenance workers	Low to Medium (Short-term)	Contaminants in soil may be disturbed during groundworks. Risks could be reduced with use of appropriate personal protective equipment
		Site users	Low to Medium (Long-term)	The linkage will only be complete through areas of soft landscaping
	Contact	Infrastructure	Medium (Long-term)	Risk could be reduced by corrective selection of materials
	Migration, run-off	Controlled Waters	Medium (Long-term)	Where the site has a cover of clay, this will, likely serve to inhibit migration but this is indicated to be across only a small portion of the site
Various volatile hydrocarbons - from former industrial site uses, including possible fuel-storage, and nearby industrial land-uses	Vapour inhalation	Construction & maintenance workers	Medium (Short-term)	Vapours could accumulate within buildings, trenches and manholes. Risks could be reduced with use of appropriate alarms and personal protective equipment

Potential Contaminants	Pathways	Receptors	Risk rating	Comment
Various volatile hydrocarbons - *continued*	Vapour inhalation	Site users	Medium (Long-term)	Vapours may migrate through cracks in the floor slabs or service entry points of the development and accumulate within the buildings
	Contact	Infrastructure	Medium (Long-term)	Risk could be reduced by corrective selection of materials
Ground gases, such as methane and carbon dioxide – from Made Ground beneath the site and nearby areas	Inhalation	Construction & maintenance workers	Low (Short-term)	Gases could accumulate within buildings, trenches and manholes. A thick cover of clay could inhibit gas migration on to the site. Risks could be reduced with use of appropriate alarms and personal protective equipment
	Explosion	Site users	Low (Long-term)	Gases could accumulate within buildings unless appropriate design is implemented. A thick cover of clay could inhibit gas migration
		Infrastructure		

Based on the desk study research alone, the sources, pathways and receptors listed in the CSM are considered to have the potential to be present as complete pollutant linkages.

INITIAL GEOTECHNICAL CONCEPTUAL SITE MODEL

The Lowestoft Till and any clay horizons of the Kesgrave present the potential for shrinkable soil conditions, which may present hazards for foundation design in relation to the vegetation on site.

The former industrial use (including mining) of the site may present hazards from the thickness of Made Ground, or in-ground obstructions, such as former foundations or service runs.

The presence, beneath the site, of Chalk may have resulted in the presence of natural and/or mining cavities beneath the site, which presents hazards for foundation and drainage design. The natural cavity hazard is assessed to be of significant risk and will warrant suitable design mitigation measures: including specialist foundations and an alternative to the use of soakaways.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

The initial contamination CSM has identified several potential pollutant linkages, from various potential sources.

The initial geotechnical CSM identified several ground-related hazards with potential to affect the proposed development.

These initial CSMs should be further assessed by means of a Phase 2 (Intrusive) investigation. The investigation should seek to identify:

- The thickness and nature of any Made Ground on site
- An initial assessment of the nature and extent of solid- and vapour-phase contaminated ground on site by means of sampling and subsequent laboratory testing
- Measurement of the depth to groundwater beneath the site and, if encountered, an initial assessment of groundwater quality
- Installations and monitoring to assess the gaseous-phase (landfill-type gases) linkages
- Soil shrink-swell potential
- The presence of cavities or evidence to suggest the presence of cavities (natural and mining)

These requirements could be met by means of borehole and trial pit exploratory holes, with sampling, in-situ testing, well installation, and subsequent laboratory testing.

Chemical laboratory testing should be for a broad range of determinands including:

- Heavy metals and metalloids
- Non-metals, including cyanide
- Petroleum hydrocarbons
- Organic solvents (including halogenated varieties)
- Polycyclic aromatic hydrocarbons
- pH (covering acids and alkalis)
- Phenols
- Poly-chlorinated bi-phenyls
- Asbestos

Testing for the presence of APIs (Active Pharmaceutical Ingredients) is only likely to be required should the intrusive investigation reveal macroscopic evidence to suggest their presence on site.

As the use of soakaways will not be permitted at the site there is no perceived need to perform infiltration testing.

The site is recorded to have been subject to clay extraction and there is a known association between clay extraction and chalk extraction for brick making. Therefore, although there is no record of chalk mining having occurred at the site, the risk of mining cavities being present cannot be discounted.

Thus, it is further recommended that the potential for cavities (mining and natural) beneath the site be assessed by means of a geophysical survey. The use of Electrical Resistivity Imaging would, likely, be the most applicable at this site but would require clear use of the external areas of the site to maximize the useful data (that is to say, the car parks would have to be substantially empty and subject to only infrequent use during the survey).

Phase 2 investigation conducted whilst the site remains operative will, necessarily, be somewhat limited in scope and subsequent, supplementary, investigation should be anticipated once the site is fully accessible.

The conclusions of this report should be approved by the Local Authority as soon as possible to avoid delays to the development.

REFERENCES

1. Site Investigations, Code of Practice, BS 5930:2015.
2. Investigation of Potentially Contaminated Sites – Code of Practice, BS 10175:2011+A2:2017.
3. Asbestos in soil and made ground, good practice site guide, CIRIA C765, 2017.
4. Building Research Establishment (BRE) BR 211, Radon: guidance on Protective Measures for New Buildings. 2015.
5. BRE Quick Guide 7, Reducing Radon, Underground Rooms – Cellars and Basements, 2015.
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7. National House Building Council (NHBC) Standards, Chapter 4.1 Land Quality – Managing Ground Conditions. 2018.
8. Environment Agency, The Model Procedures for the Management of Land Contamination, CLR 11, 2004.
9. Environment Agency, Human Health Toxicological Assessment of Contaminants in Soil (SR2), 2009.
10. Department for Environment, Food and Rural Affairs, SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document, March 2014.
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12. Engineering in Chalk, CIRIA C574, 2002.
13. Edmonds, Predicting Natural Cavities in Chalk, 2001.
14. Card G, Wilson S, Mortimer S, A Pragmatic Approach to Ground Gas Risk Assessment, 2012. CL:AIRE Research Bulletin RB17.
15. Assessing Risks Posed by Hazardous Ground Gases to Buildings, CIRIA C665, 2007.
16. Guidance on investigations for ground gases – Permanent gases and Volatile Organic Compounds (VOCs), BS 8576:2013.
17. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings, BS 8485:2015.

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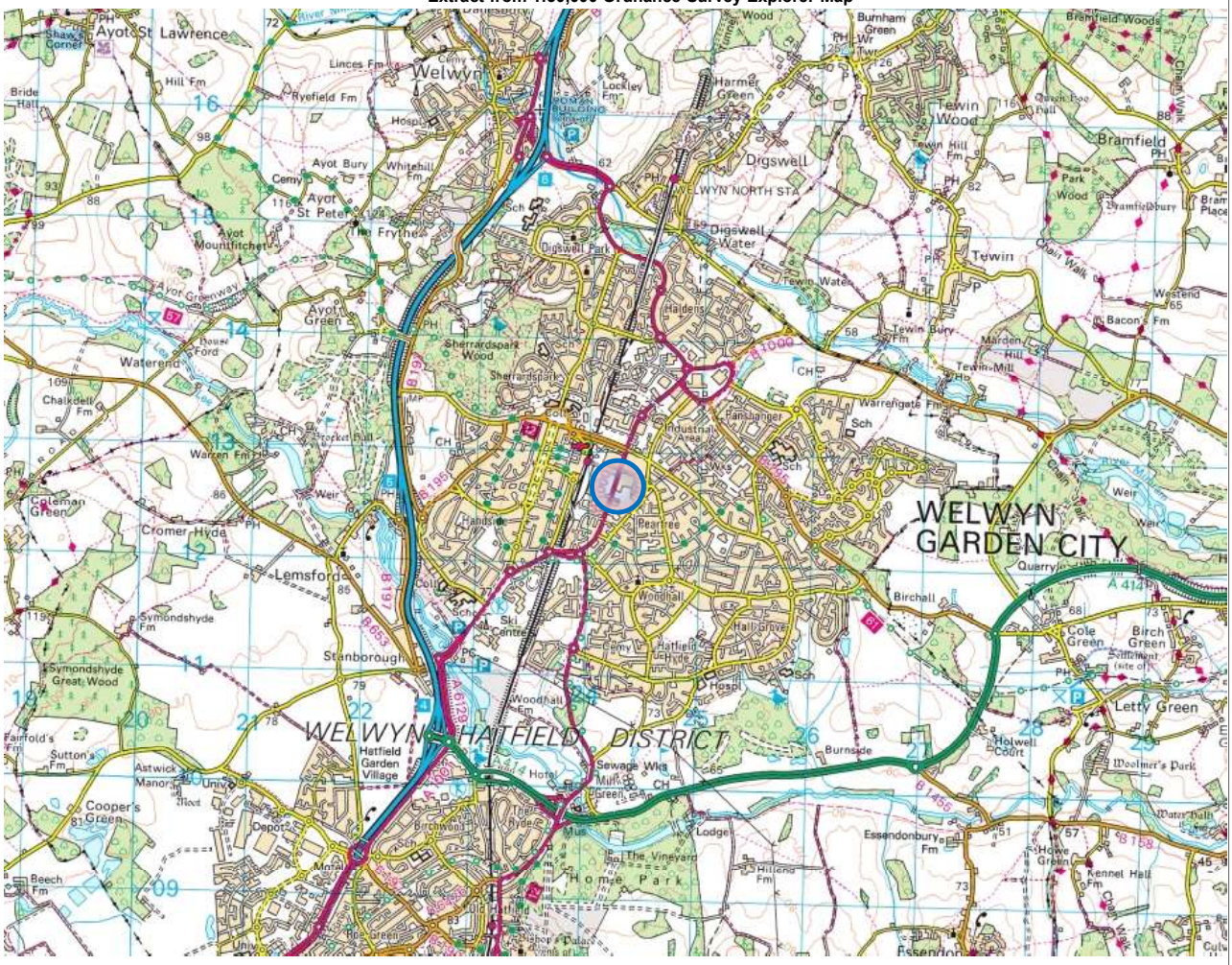
Geotechnical and Geoenvironmental Consultants

APPENDIX A
PLANS AND PHOTOGRAPHS

Extract from 1:50,000 Ordnance Survey Explorer Map



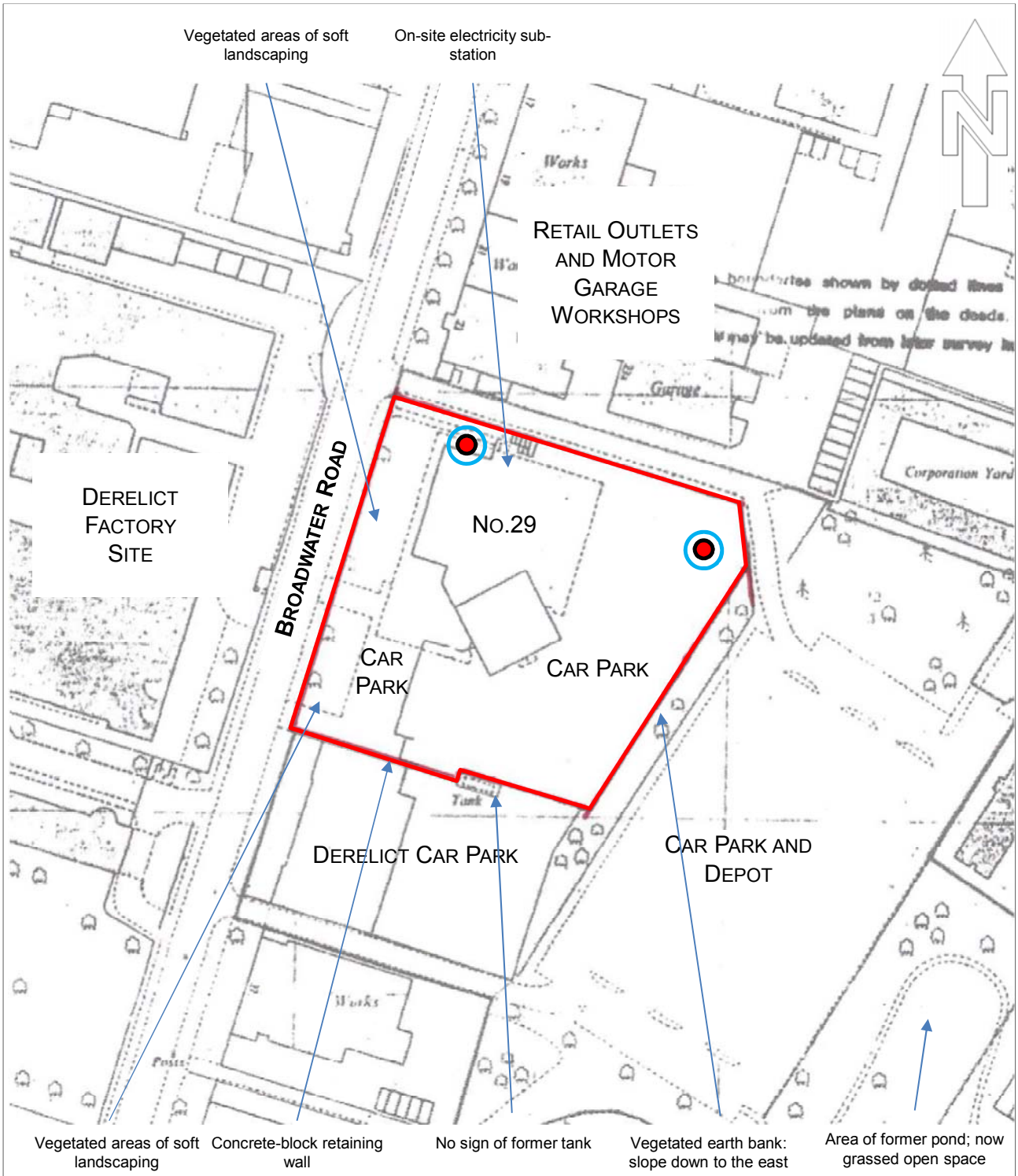
Key: Approximate site location

LISTERS GEO
Geotechnical and Geoenvironmental Consultants
Listers Geotechnical Consultants Ltd www.listersgeotechnics.co.uk Tel: 01327 860060

Title: Site Location Plan

Site: 29 Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3BQ

Scale: NTS **Job Number**: 18.11.010 **Drawn By**: MX



Extract from H.M. Land Registry plan, Title Number HD327341, dated October 1994

Key:

Approximate location of suspected monitoring well headworks

LISTERS GEO
Geotechnical and Geoenvironmental Consultants
Listers Geotechnical Consultants Ltd www.listersgeotechnics.co.uk Tel: 01327 860060

Title: Existing Layout

Site: 29 Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3BQ

Scale: NTS **Job Number**: 18.11.010 **Drawn By**: MX

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APPENDIX B
DESK STUDY INFORMATION

Listers Geotechnical Consultants Ltd

LISTERS GEOTECHNICAL CONSULTANTS LTD,
BLAKESLEY ROAD,
TOWCESTER, NN12 8QD

Groundsure Reference:	GS-5615780
Your Reference:	P19_11_010-745
Report Date	14 Nov 2018
Report Delivery Method:	Email - pdf

Enviro Insight

Address: 29 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

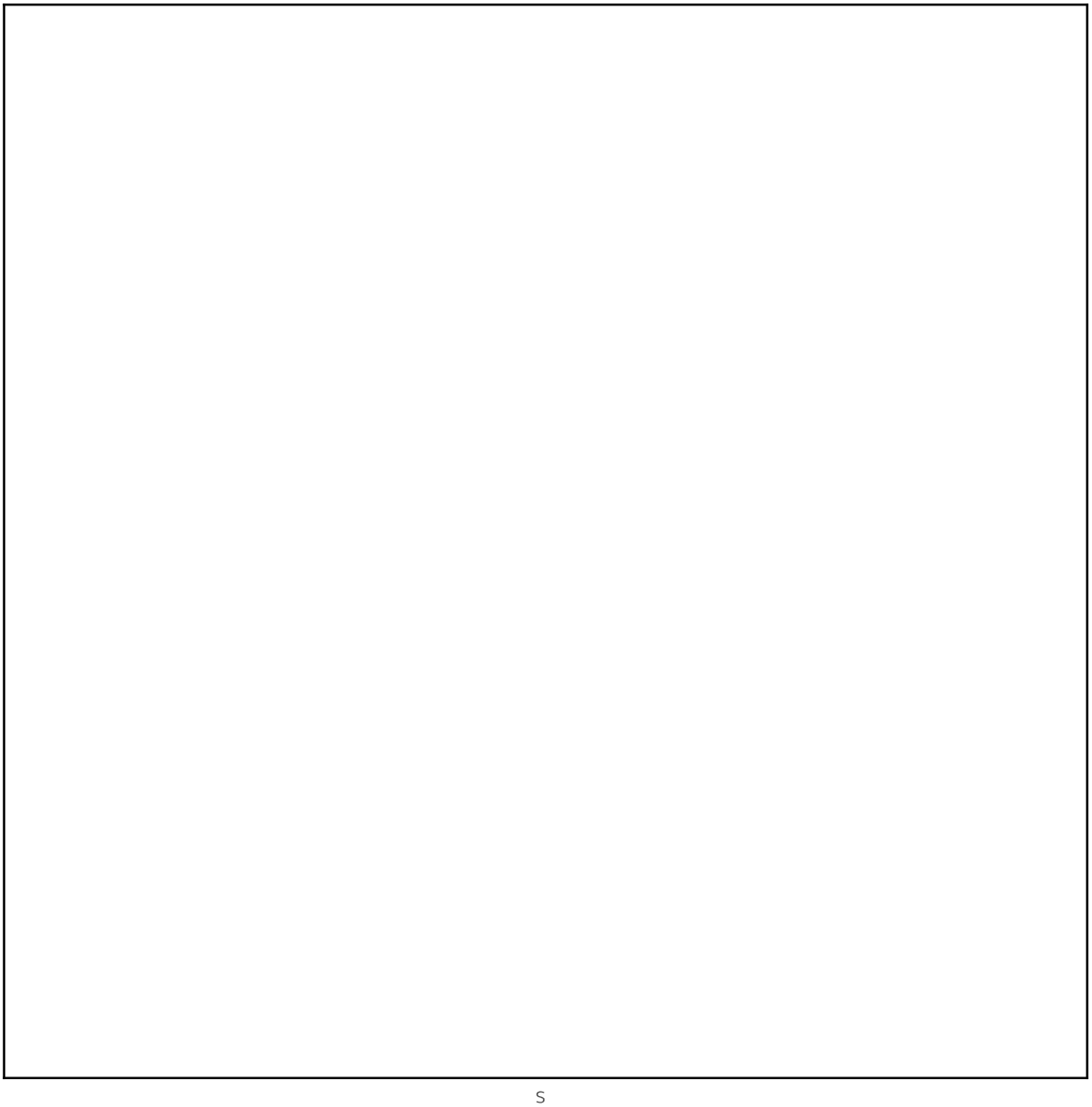
Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**29 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ**
Date:	**14 Nov 2018**
Reference:	**GS-5615780**
Client:	**Listers Geotechnical Consultants Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	23-Jul-2016
Grid Reference:	524250,212645
Site Size:	0.68ha

Report Reference: GS-5615780
Client Reference: P19_11_010-745

Contents Page

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	1	7	12	56
1.2 Additional Information – Historical Tank Database	2	0	53	36
1.3 Additional Information – Historical Energy Features Database	0	0	16	38
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	1	0	3
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	1	0	6	13

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	3	5
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	7
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	1
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	3	4
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	16	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	1
2.2 Records of COMAH and NIHHS sites	0	0	0	1
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	2
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	4
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	2	7

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	1	5	33	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	2
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	1	0	0	3
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	1	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	#250GWV#	#500GWV#	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	16	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Limited potential
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	High

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	3
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	4
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	3
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	0	0	0	1
8.14 Records of Green Belt land	0	0	0	0	0	1

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Low
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Very Low
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	Identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licences, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

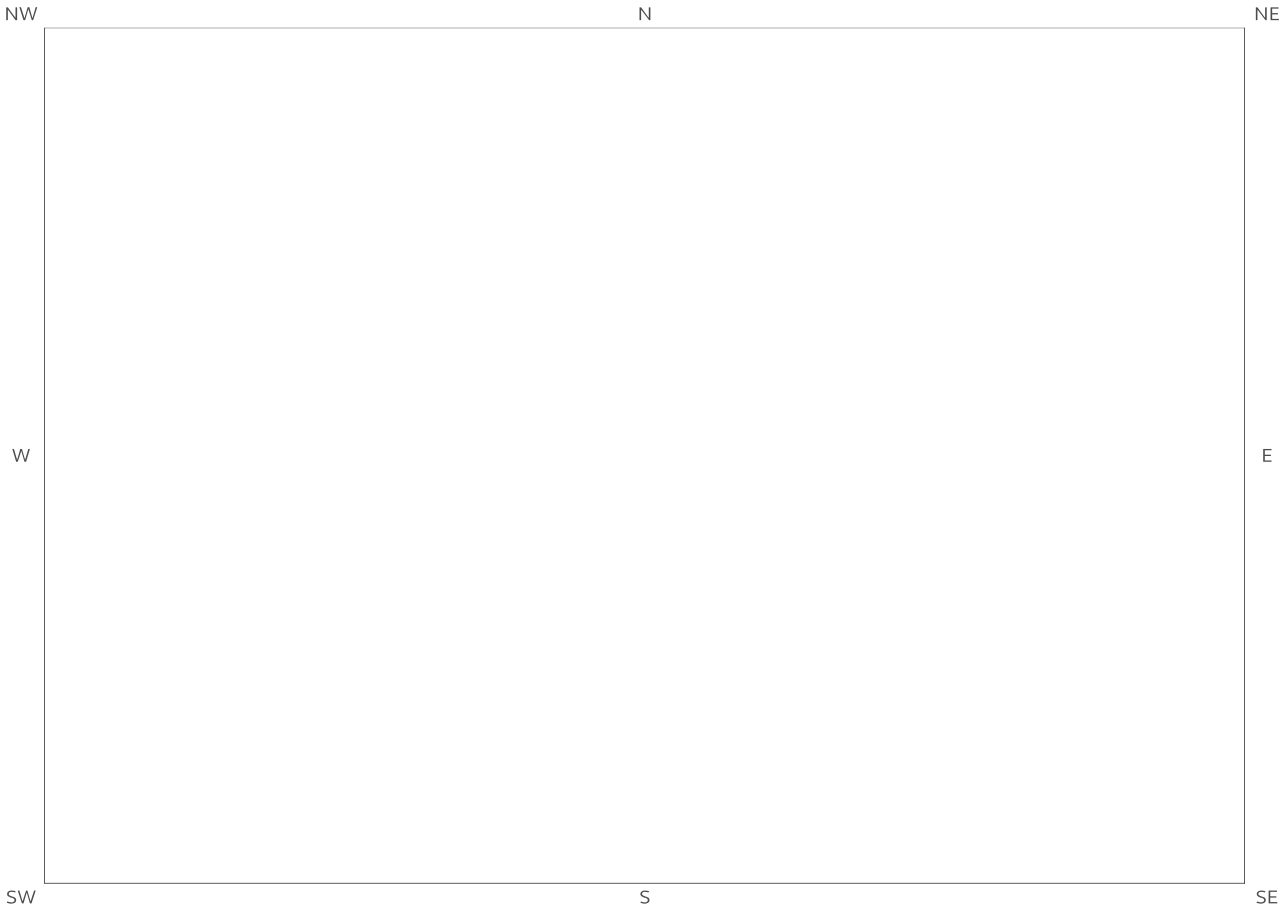
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 76

ID	Distance [m]	Direction	Use	Date
1AX	0	On Site	Unspecified Pit	1881
2A	15	W	Unspecified Commercial/Industrial	1946
3A	17	W	Unspecified Commercial/Industrial	1959
4V	18	W	Unspecified Commercial/Industrial	1938
5C	26	SW	Unspecified Works	1974
6B	31	W	Unspecified Factory	1974
7B	31	W	Unspecified Factory	1988
8C	38	SW	Unspecified Commercial/Industrial	1946
9D	75	N	Unspecified Factory	1974
10D	75	N	Unspecified Factory	1988
11F	98	NW	Railway Sidings	1946
12E	157	N	Unspecified Commercial/Industrial	1946
13	161	W	Railway Sidings	1959
14Z	162	W	Railway Sidings	1938
15	164	W	Railway Sidings	1974
16E	167	N	Unspecified Factory	1988
17E	167	N	Unspecified Factory	1974
18F	180	W	Freight Terminal	1988
19H	194	NW	Railway Station	1974
20	236	W	Railway Sidings	1988
21G	255	NW	Railway Building	1974
22G	255	NW	Railway Building	1988
23G	264	NW	Railway Building	1946
24H	264	NW	Railway Building	1959
25I	279	NW	Railway Station	1938
26I	280	NW	Railway Station	1988
27AZ	281	W	Cuttings	1881
28J	287	NW	Railway Station	1946
29J	287	NW	Railway Station	1959
30	310	W	Railway Building	1959
31AN	328	NE	Electricity Power Station	1922

32	336	NE	Iron Foundry	1946
33	338	N	Unspecified Works	1959
34K	338	N	Railway Sidings	1959
35	340	NE	Iron Foundry	1938
36	341	NE	Bakery	1974
37K	347	N	Railway Sidings	1946
38K	348	NE	Railway Sidings	1938
39L	350	N	Engineering Works	1946
40M	350	N	Railway Sidings	1959
41L	350	N	Unspecified Works	1959
42	355	NE	Unspecified Commercial/Industrial	1938
43	356	NW	Railway Building	1897
44M	360	N	Unspecified Works	1938
45N	360	SW	Cuttings	1946
46	364	N	Unspecified Works	1974
47	365	N	Unspecified Works	1988
48N	366	SW	Cuttings	1938
49N	366	SW	Cuttings	1897
50N	366	SW	Cuttings	1922
51O	366	SW	Cuttings	1974
52O	366	SW	Cuttings	1959
53	375	N	Railway Sidings	1946
54	379	NW	Railway Building	1922
55BB	380	SW	Cuttings	1988
56AG	382	N	Unspecified Warehouses	1988
57P	403	N	Unspecified Works	1988
58P	403	N	Unspecified Factory	1974
59	417	SW	Railway Sidings	1881
60	417	NW	Railway Buildings	1881
61	421	N	Unspecified Warehouse	1974
62Q	426	NE	Unspecified Commercial/Industrial	1959
63	426	NE	Railway Sidings	1959
64	439	NE	Unspecified Commercial/Industrial	1946
65Q	441	NE	Unspecified Works	1974
66	442	NE	Railway Sidings	1946
67	444	NE	Railway Sidings	1938
68	449	E	Unspecified Works	1974
69	462	NE	Railway Sidings	1938
70R	468	NE	Unspecified Commercial/Industrial	1974
71R	468	NE	Unspecified Commercial/Industrial	1988
72S	477	NE	Unspecified Tank	1974
73S	477	NE	Gas Holders	1988

74	477	N	Unspecified Factory	1974
75	483	NW	Railway Station	1922
76	498	NE	Unspecified Works	1988

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 91

ID	Distance (m)	Direction	Use	Date
77T	0	On Site	Unspecified Tank	1991
78T	0	On Site	Unspecified Tank	1986
79U	122	N	Unspecified Tank	1991
80U	122	N	Unspecified Tank	1986
81V	142	NW	Unspecified Tank	1986
82V	142	NW	Unspecified Tank	1991
83V	144	NW	Unspecified Tank	1993
84V	144	NW	Unspecified Tank	1993
85	146	SW	Tanks	1986
86X	206	SW	Unspecified Tank	1960
87W	211	W	Unspecified Tank	1993
88W	211	W	Unspecified Tank	1980
89W	211	W	Unspecified Tank	1991
90W	211	W	Unspecified Tank	1986
91	222	NW	Unspecified Tank	1938
92X	223	SW	Unspecified Tank	1986
93X	223	SW	Unspecified Tank	1991
94X	223	SW	Unspecified Tank	1993
95X	223	SW	Unspecified Tank	1993
96Y	225	SW	Tanks	1993
97Y	225	SW	Tanks	1980
98Y	225	SW	Tanks	1991
99Y	225	SW	Tanks	1986
100Y	228	SW	Unspecified Tank	1991
101Y	228	SW	Unspecified Tank	1986
102Y	228	SW	Unspecified Tank	1993
103Y	233	SW	Unspecified Tank	1994
104Y	233	SW	Unspecified Tank	1997
105Y	233	SW	Unspecified Tank	1996
106Y	233	SW	Unspecified Tank	1995
107Y	233	SW	Unspecified Tank	1995
108Y	233	SW	Unspecified Tank	1996

109Y	233	SW	Unspecified Tank	1995
110Y	233	SW	Unspecified Tank	1974
111Y	233	SW	Unspecified Tank	1987
112Y	233	SW	Unspecified Tank	1980
113Y	234	SW	Unspecified Tank	1991
114Y	234	SW	Unspecified Tank	1983
115Z	237	NW	Unspecified Tank	1991
116	238	W	Unspecified Tank	1980
117AA	243	SW	Unspecified Tank	1980
118AA	243	SW	Unspecified Tank	1987
119AA	243	SW	Unspecified Tank	1991
120AA	243	SW	Unspecified Tank	1983
121AA	243	SW	Unspecified Tank	1995
122AA	243	SW	Unspecified Tank	1994
123AA	243	SW	Unspecified Tank	1997
124AA	243	SW	Unspecified Tank	1996
125AA	243	SW	Unspecified Tank	1995
126AA	243	SW	Unspecified Tank	1996
127AA	243	SW	Unspecified Tank	1995
128AB	250	W	Unspecified Tank	1980
129AB	250	W	Unspecified Tank	1993
130AB	250	W	Unspecified Tank	1991
131AB	250	W	Unspecified Tank	1986
132	253	NE	Unspecified Tank	1986
133AC	305	N	Unspecified Tank	1986
134AC	308	N	Unspecified Tank	1986
135	330	N	Tanks	1938
136	389	NE	Unspecified Tank	1960
137AD	391	N	Unspecified Tank	1992
138AD	391	N	Unspecified Tank	1986
139AD	393	N	Unspecified Tank	1994
140AE	408	N	Unspecified Tank	1992
141AE	408	N	Unspecified Tank	1986
142AE	410	N	Unspecified Tank	1994
143AF	422	N	Tanks	1971
144AF	433	N	Tanks	1971
145AF	436	N	Tanks	1986
146AF	436	N	Tanks	1992
147AF	437	N	Tanks	1994
148AG	438	N	Unspecified Tank	1971
149AH	444	N	Tanks	1986
150AH	444	N	Tanks	1992
151AH	445	N	Tanks	1994
152AH	453	N	Tanks	1994
153AI	458	NE	Unspecified Tank	1992
154AI	458	NE	Unspecified Tank	1988

155AI	459	NE	Unspecified Tank	1997
156AH	460	N	Unspecified Tank	1986
157AH	460	N	Unspecified Tank	1992
158AH	462	N	Unspecified Tank	1994
159S	475	NE	Gas Holder	1994
160S	476	NE	Gasholder	1984
161S	477	NE	Gasholder	1984
162S	477	NE	Gasholder	1990
163	495	N	Unspecified Tank	1994
164AJ	495	E	Tanks	1988
165AJ	495	E	Tanks	1992
166AJ	497	E	Tanks	1997
167AJ	498	E	Tanks	1976

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 54

ID	Distance (m)	Direction	Use	Date
168D	110	NW	Electricity Substation	1993
169D	110	NW	Electricity Substation	1993
170AK	115	NE	Electricity Substation	1993
171AK	115	NE	Electricity Substation	1993
172	161	N	Electricity Substation	1986
173AL	166	N	Electricity Substation	1991
174AL	167	N	Electricity Substations	1993
175AL	167	N	Electricity Substations	1993
176AM	176	NE	Electricity Substation	1986
177AM	176	NE	Electricity Substation	1991
178AM	176	NE	Electricity Substation	1993
179AM	176	NE	Electricity Substation	1993
180	202	S	Electricity Substation	1988
181Z	223	NW	Electricity Substation	1991
182Z	234	NW	Electricity Substation	1993
183Z	234	NW	Electricity Substation	1993
184AN	323	NE	Electric Power Station	1923
185AO	340	NE	Electricity Substation	1986
186AO	340	NE	Electricity Substation	1991
187AN	342	NE	Electricity Substation	1993
188AN	342	NE	Electricity Substation	1993
189AP	357	N	Electricity Substation	1986

190AP	357	N	Electricity Substation	1971
191AP	358	N	Electricity Substation	1992
192AP	358	N	Electricity Substation	1994
193AQ	360	E	Electricity Substation	1992
194AQ	360	E	Electricity Substation	1988
195AQ	361	E	Electricity Substation	1997
196AQ	362	E	Electricity Substation	1976
197AR	413	NE	Electricity Substation	1984
198AR	413	NE	Electricity Substation	1990
199AR	413	NE	Electricity Substation	1984
200AR	414	NE	Electricity Substation	1994
201AS	417	S	Electricity Substation	1988
202AS	418	S	Electricity Substation	1986
203AT	434	SE	Electricity Substation	1990
204AT	435	SE	Electricity Substation	1996
205	445	E	Electricity Substation	1997
206AU	465	W	Electricity Substation	1993
207AU	465	W	Electricity Substation	1980
208AU	467	W	Electricity Substation	1991
209AU	467	W	Electricity Substation	1986
210R	467	NE	Gas Distribution Station	1994
211R	468	NE	Gas Distribution Station	1984
212R	468	NE	Gas Distribution Centre	1990
213R	468	NE	Gas Distribution Centre	1984
214	470	N	Electricity Substation	1994
215S	475	NE	Gas Holder	1994
216S	476	NE	Gasholder	1984
217S	477	NE	Gasholder	1984
218S	477	NE	Gasholder	1990
219	481	S	Electricity Substation	1988
220AV	499	N	Electricity Substation	1992
221AV	500	N	Electricity Substation	1986

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps

provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 4

ID	Distance (m)	Direction	Use	Date
222	12	N	Garage	1986
223AW	389	W	Garage	1965
224AW	390	W	Garage	1961
225AW	391	W	Garage	1970

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

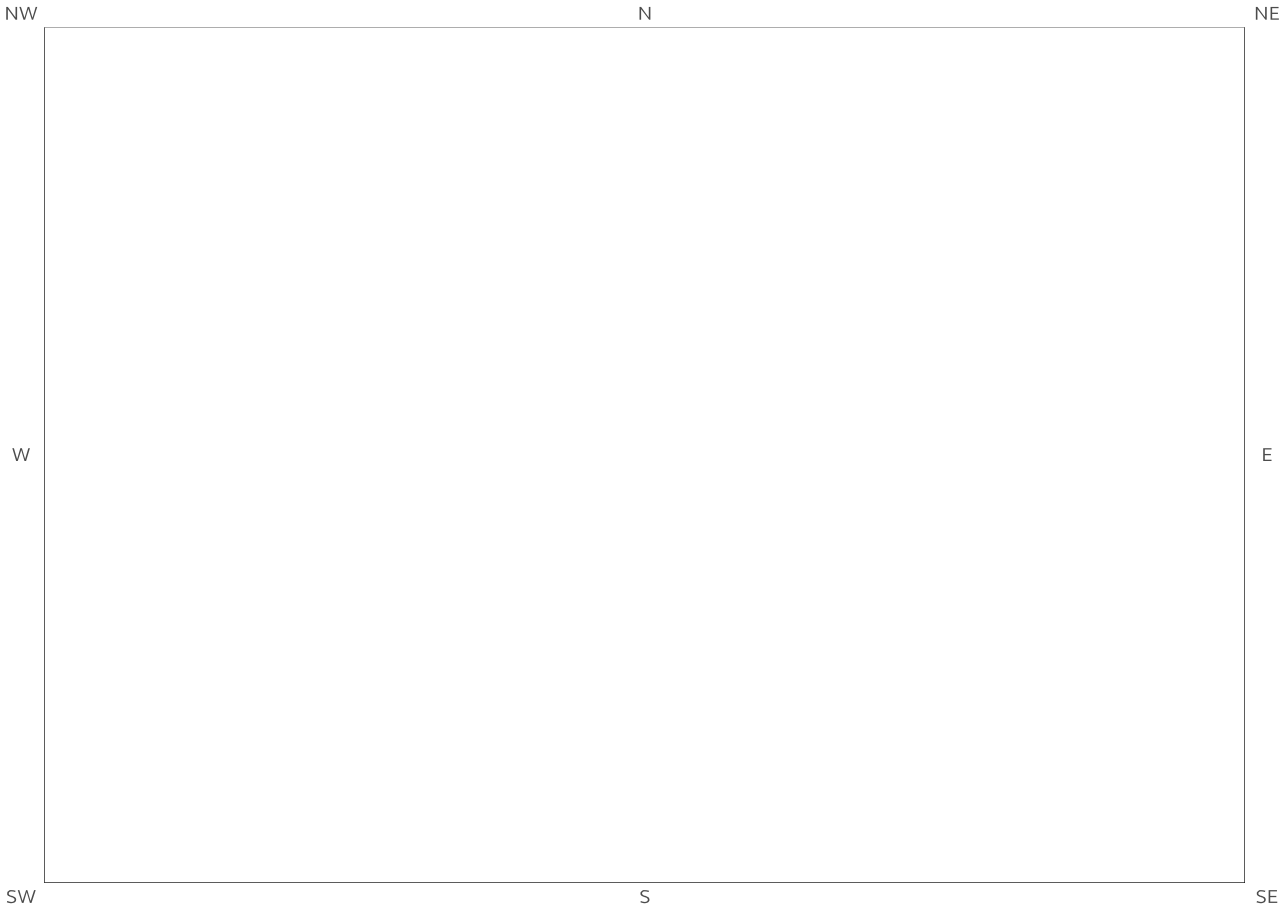
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 20

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
226AX	0	On Site	Unspecified Pit	1881
227AY	90	SE	Pond	1959
228AY	91	SE	Pond	1946
229AY	92	SE	Pond	1922
230AY	92	SE	Pond	1938
231AY	92	SE	Pond	1897
232	99	SE	Pond	1881
233	270	S	Ponds	1881
234AZ	281	W	Cuttings	1881
235BA	310	SW	Pond	1897
236BA	310	SW	Pond	1922
237BA	310	SW	Pond	1938
238BA	317	SW	Pond	1881
239N	360	SW	Cuttings	1946
240N	366	SW	Cuttings	1897
241N	366	SW	Cuttings	1938
242N	366	SW	Cuttings	1922

243O	366	SW	Cuttings	1974
244O	366	SW	Cuttings	1959
245BB	380	SW	Cuttings	1988

2. Environmental Permits, Incidents and Registers Map



2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

8

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
51A	114	S	524200 212500	Operator: Roche Products Ltd Address: 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY Process: Manufacture And Use Of Organic Chemicals	Permit Number: AJ9776 Original Permit Number: IPCAPP Date Approved: 14-2-1994 Effective Date: 14-2-1994 Status: Superseded By Variation
52A	114	S	524200 212500	Operator: Roche Products Ltd Address: 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY Process: Manufacture And Use Of Organic Chemicals	Permit Number: BG4844 Original Permit Number: IPCMAJVAR Date Approved: 29-2-2000 Effective Date: 1-3-2000 Status: Revoked
53A	114	S	524200 212500	Operator: Roche Products Ltd Address: 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY Process: Manufacture And Use Of Organic Chemicals	Permit Number: BC6241 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
54B	300	NE	524500 212900	Operator: British Lead Mills Ltd Address: Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UB Process: Non-ferrous Metals	Permit Number: BD1601 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
55B	300	NE	524500 212900	Operator: British Lead Mills Ltd Address: Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UB Process: Non-ferrous Metals	Permit Number: AR7009 Original Permit Number: IPCAIRAPP Date Approved: 15-9-1995 Effective Date: 1-10-1995 Status: Superseded By Variation
56B	300	NE	524500 212900	Operator: British Lead Mills Ltd Address: Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UB Process: Non-ferrous Metals	Permit Number: AW7371 Original Permit Number: IPCMINVAR Date Approved: 31-7-2001 Effective Date: 3-8-2001 Status: Revoked - Now Ippc
57C	384	NE	524470 213020	Operator: Catomance Technologies Ltd Address: 96 Bridge Road East, Welwyn Garden City, Hertfordshire, AL7 1JW Process: Pesticide Production	Permit Number: AK8210 Original Permit Number: IPCAIRAPP Date Approved: 15-3-1994

ID	Distance (m)	Direction	NGR	Details	
					Effective Date: 15-3-1994 Status: Superseded By Variation
58C	384	NE	524470 213020	Operator: Catomance Technologies Ltd Address: 96 Bridge Road East, Welwyn Garden City, Hertfordshire, AL7 1JW Process: Pesticide Production	Permit Number: BC7108 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

7

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
44B	300	NE	524500 212900	Operator: H J ENTHOVEN LIMITED Installation Name: BRITISH LEAD MILLS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS	Permit Number: XP3235JX Original Permit Number: BL8317IK EPR Reference: - Issue Date: 29/01/2018 Effective Date: 29/01/2018 Last date noted as effective: 2018-07-01 Status: EFFECTIVE
45B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: WGC LEAD RECOVERY PROCESS Process: NON-FERROUS METALS; PRODUCING ETC LEAD AND ALLOYS WITH RELEASE TO AIR	Permit Number: BL8317IK Original Permit Number: BL8317IK EPR Reference: - Issue Date: 20/12/2002 Effective Date: 20/12/2002 Last date noted as effective: 2018-07-01 Status: SUPERCEDED
46B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: WGC LEAD RECOVERY PROCESS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS	Permit Number: BX4739IA Original Permit Number: BL8317IK EPR Reference: - Issue Date: 18/06/2004 Effective Date: 23/06/2004 Last date noted as effective: 2018-07-01 Status: SUPERCEDED
47B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: WGC LEAD RECOVERY PROCESS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS	Permit Number: PP3138CR Original Permit Number: BL8317IK EPR Reference: - Issue Date: 15/10/2012 Effective Date: 15/10/2012 Last date noted as effective: 2018-07-01 Status: SUPERCEDED
48B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: WGC LEAD RECOVERY PROCESS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS	Permit Number: SP3034UX Original Permit Number: BL8317IK EPR Reference: - Issue Date: 27/03/2008 Effective Date: 27/03/2008 Last date noted as effective: 2018-07-01 Status: SUPERCEDED
49B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: -	Permit Number: BL8317 Original Permit Number: BL8317

ID	Distance (m)	Direction	NGR	Details	
				Process: NON-FERROUS METALS; PRODUCING ETC LEAD & ALLOYS WITH RELEASE TO AIR	EPR Reference: - Issue Date: 20/12/2002 Effective Date: 20/12/2002 Last date noted as effective: 2004-10-01 Status: SUPERSEDED BY PAS
50B	300	NE	524500 212900	Operator: BRITISH LEAD MILLS LTD Installation Name: - Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS	Permit Number: BX4739 Original Permit Number: BL8317 EPR Reference: - Issue Date: - Effective Date: - Last date noted as effective: 2004-10-01 Status: SUPERSEDED BY PAS

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

1

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
3	497	E	524800 212700	Name: Catomance Ltd, 88-89 Bridge Rd E, Welwyn Gdn City, Herts Al7 Status: Not Active Receiving Water: -	Authorised Substances: Pentachlorophenol

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

7

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
19	95	SW	524131 212553	Address: Roche Products, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY Process: Chemical & Acid Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
20	178	NE	524410 212816	Address: L J Whiteman & Son, 27A Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ Process: Waste Oil Burner <0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
21	215	NE	524439 212840	Address: British Lead Mills, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UB Process: Lead Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
22D	348	NE	524513 212951	Address: Esso Eastbridge Service Station, Bridge Road East, Welwyn Garden City, Hertfordshire, AL7 1LE Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
23D	362	NE	524513 212969	Address: Mark Tempest Autocentre, Unit, 1 Garden Court, Welwyn Garden City, Hertfordshire, AL7 1BH Process: Waste Oil Burner <0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
24	416	W	523823 212819	Address: Central Garage, Welwyn Garden City, Hertfordshire, AL8 6NE Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
25	444	W	523804 212853	Address: Johnsons Dry Cleaners, 43 Fretherne Road, Welwyn Garden City, Hertfordshire, AL8 6NY Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
59A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:9/1/1996 Effective from:16/2/1996 Last date of update:2015-01-01	Superseded By Variation
60A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:20/4/2000 Effective from:20/4/2000 Last date of update:2015-01-01	Superseded By Variation
61A	114	S	524200 212500	Antisoma Research Ltd, Biopark Hertfordshire, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AX	Antisoma Research Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	CE3230	Date of Approval:10/5/2010 Effective from:10/5/2010 Last date of update:2015-01-01	Revoked/cancelled
62A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AE5217	Date of Approval:20/4/2000 Effective from:20/4/2000 Last date of update:2015-01-01	Superseded By Variation
63A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:14/2/2002 Effective from:14/3/2002 Last date of update:2015-01-01	Superseded By Variation
64A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:28/10/1998 Effective from:25/11/1998 Last date of update:2015-01-01	Superseded By Variation

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
65A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:31/3/1991 Effective from:31/3/1991 Last date of update:2015-01-01	Superseded By Variation
66A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:19/9/2002 Effective from:17/10/2002 Last date of update:2015-01-01	Revoked/cancelled
67A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:18/7/1994 Effective from:18/7/1994 Last date of update:2015-01-01	Superseded By Variation
68A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:29/6/1992 Effective from:29/6/1992 Last date of update:2015-01-01	Superseded By Variation
69A	114	S	524200 212500	Heptares Therapeutics Ltd, Biopark Hertfordshire,broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AX	Heptares Therapeutics Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	CD1568	Date of Approval:24/11/2008 Effective from:24/11/2008 Last date of update:2015-01-01	Superseded By Variation
70A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AE5209	Date of Approval:26/3/1998 Effective from:23/4/1998 Last date of update:2015-01-01	Superseded By Variation
71A	114	S	524200 212500	Heptares Therapeutics Ltd, Biopark Hertfordshire, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AX	Heptares Therapeutics Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	CD1550	Date of Approval:24/11/2008 Effective from:22/12/2008 Last date of update:2015-01-01	Revoked/cancelled

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
72A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AE5217	Date of Approval:19/9/2002 Effective from:19/9/2002 Last date of update:2015-01-01	Revoked/cancelled
73A	114	S	524200 212500	Heptares Therapeutics Ltd, Biopark Hertfordshire,broad water Road, Welwyn Garden City, Hertfordshire, AL7 3AX	Heptares Therapeutics Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	CD1568	Date of Approval:3/6/2009 Effective from:3/6/2009 Last date of update:2015-01-01	Revoked/cancelled
74A	114	S	524200 212500	Roche Products Ltd, 40 Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3AY	Roche Products Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AE5217	Date of Approval:14/2/2002 Effective from:14/2/2002 Last date of update:2015-01-01	Superseded By Variation

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

1

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
75E	499	NE	N6/2000/07	524528	Historical	24/05/2000	Transco Plc,	Determination of	Enforcement: No

ID	Distance (m)	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
			52/HS	213120	Consent		Wlewyn Garden City Holder Station, Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BD	application for continuation of hazardous substances consent	Enforcements Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 1

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Company	Address	Operational Status	Tier
42	470	NE	British Gas	British Gas, Welwyn Garden City Holder Station, Tewin Road, Welwyn Garden City	Historical NIHHS Site	-

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

2

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	281	NE	524458 212909	Incident Date: 23-Oct-2002 Incident Identification: 116311 Pollutant: Inorganic Chemicals/Products Pollutant Description: Heavy Metals	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2	456	NE	524527 213071	Incident Date: 25-Aug-2002 Incident Identification: 102980 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site 0

Database searched and no data found.

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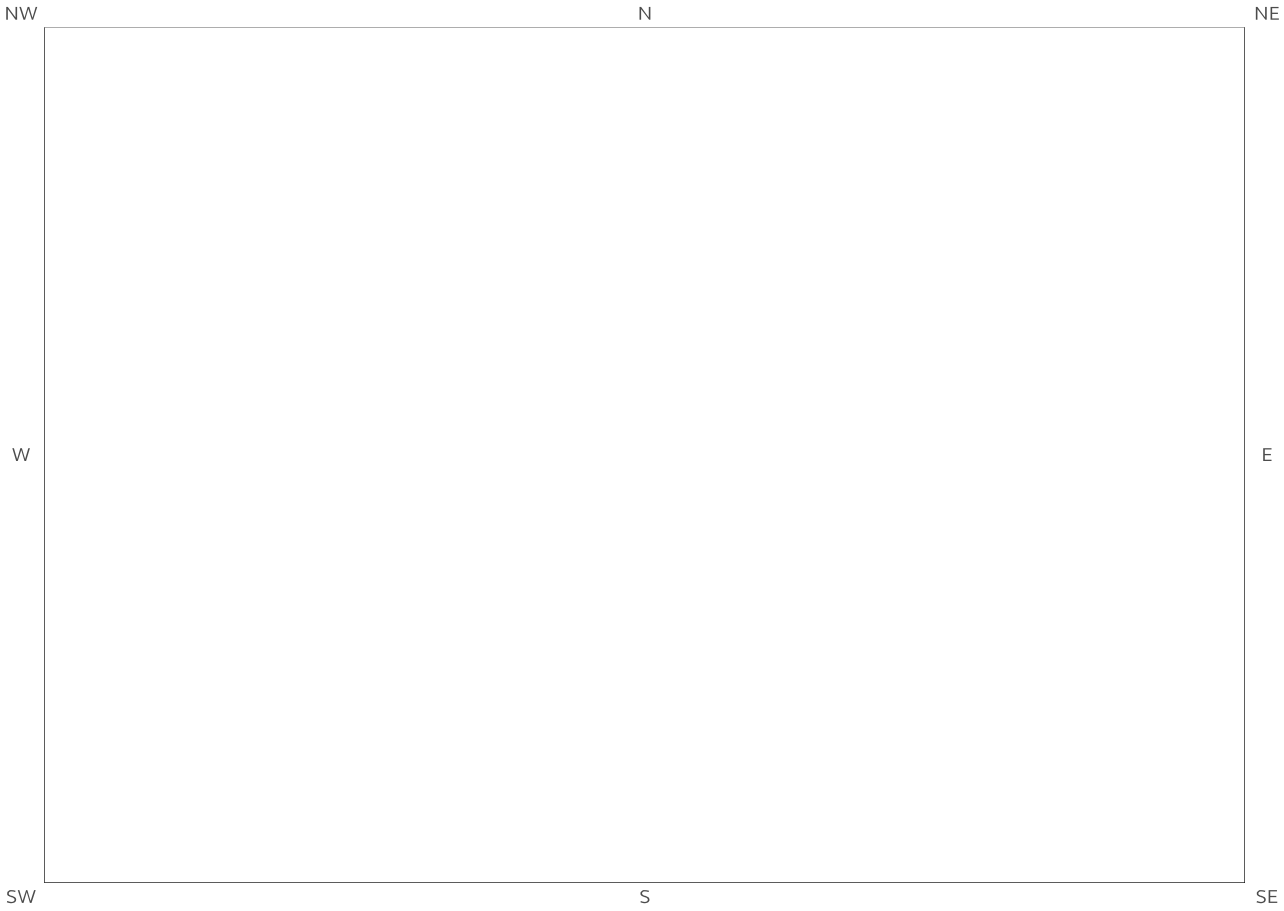
3. Landfill and Other Waste Sites Map



3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

4

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1047	S		Site Address: Chequersfield, Welwyn Garden City, Hertfordshire Waste Licence: - Site Reference: 0322, Ex/0001 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Hertfordshire County Council First Recorded: 31-Dec-1965 Last Recorded: -
Not shown	1347	SW		Site Address: Gosling Stadium, Welwyn Garden City, Hertfordshire Waste Licence: Yes Site Reference: 82/145 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 29-Oct-1982 Licence Surrendered: 31-Oct-1986 Licence Holder Address: - Operator: - Licence Holder: Gosling Stadium First Recorded: 29-Oct-1982 Last Recorded: 31-Oct-1986
Not shown	1381	S		Site Address: Chequersfield, Welwyn Garden City, Hertfordshire Waste Licence: - Site Reference: 3151 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Sweeney Demolition Limited First Recorded: 01-Jun-1993 Last Recorded: -
Not shown	1387	SW		Site Address: Gosling Stadium, Welwyn Garden City, Hertfordshire Waste Licence: Yes Site Reference: 85/177 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 22-Jan-1985 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: Welwyn Hatfield Sports Centre Trust Limited First Recorded: 22-Jan-1985 Last Recorded: 31-Dec-1986

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

9

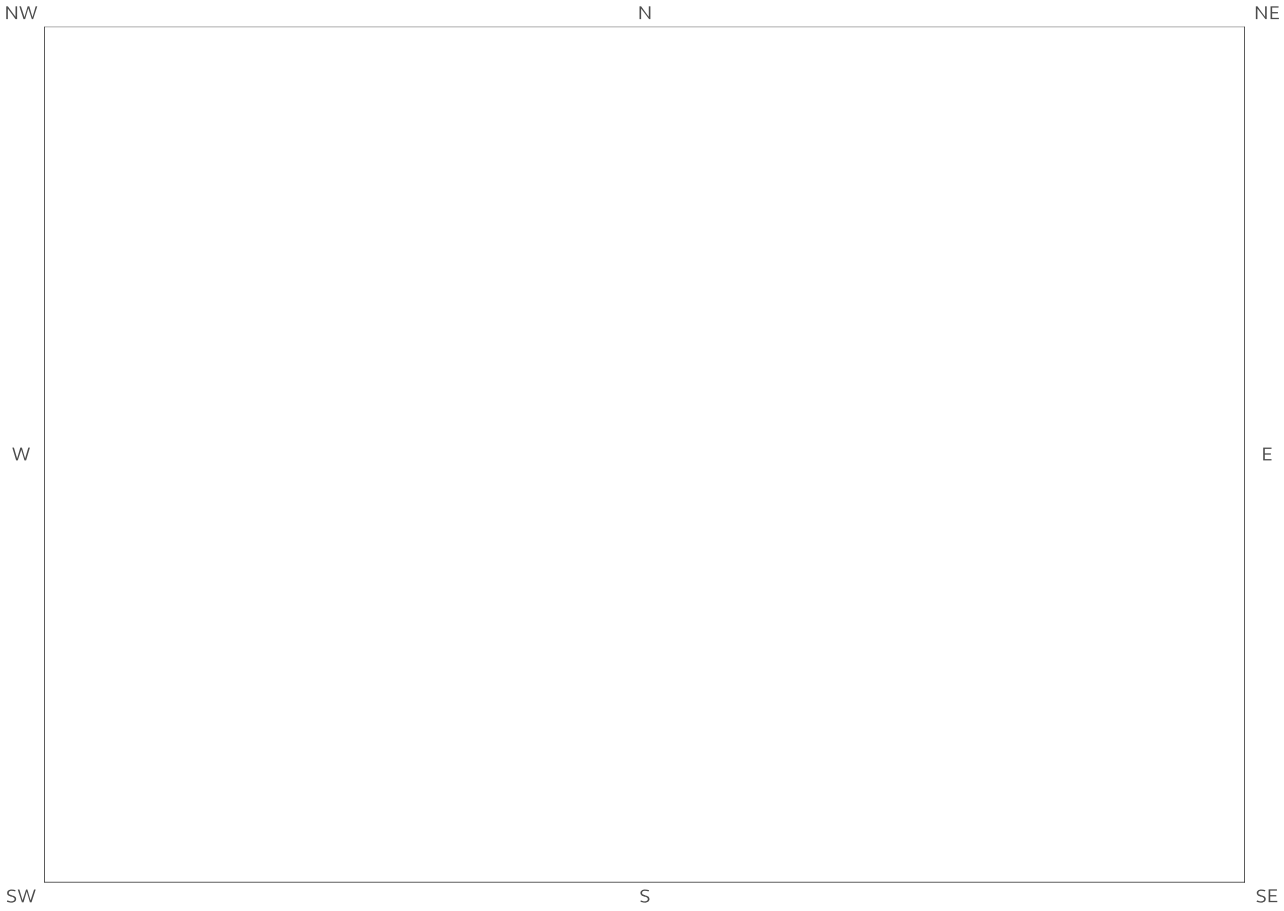
The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	622	NE	524550 213245	Site Address: Bridgefields, Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1RX Type: 75kte Vehicle Depollution Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WGC004 EPR reference: EA/EPR/TP3198VP/A001 Operator: W G C Metals Ltd Waste Management licence No: 102412 Annual Tonnage: 74999.0	Issue Date: 21/02/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Revoked Site Name: Bridge Works Correspondence Address: -
Not shown	835	NE	524691 213414	Site Address: Welwyn Hatfield District Council, Tewin Rd Depot, Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BD Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WEL002 EPR reference: EA/EPR/MP3791NG/V003 Operator: Welwyn Hatfield District	Issue Date: 20/05/1999 Effective Date: - Modified: 01/09/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Tewin Rd Depot, Welwyn Gc Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details	
				Council Waste Management licence No: 80190 Annual Tonnage: 24999.0	
Not shown	1046	SW	523700 211700	Site Address: John Dicks, 30, Burrowfields, Welwyn Garden City, Hertfordshire, AL7 4SR Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DIC001 EPR reference: - Operator: John L Dicks & R M Dicks Waste Management licence No: 80279 Annual Tonnage: 0.0	Issue Date: 30/08/1996 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Burrowfields (jl Dicks), Welwyn Garden City Correspondence Address: J L Dicks & R M Dicks (Honeywagon Co), 30, Burrowfields, Welwyn Garden City, Hertfordshire, AL7 4SR
Not shown	1056	SW	523713 211682	Site Address: John Dicks, 30, Burrowfields, Welwyn Garden City, Hertfordshire, AL7 4SR Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DIC001 EPR reference: EA/EPR/ZP3591NV/S003 Operator: John L Dicks & R M Dicks Waste Management licence No: 80279 Annual Tonnage: 0.0	Issue Date: 30/08/1996 Effective Date: - Modified: 18/06/2008 Surrendered Date: 10/08/2009 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Burrowfields (J L Dicks), Welwyn Garden City Correspondence Address: -
Not shown	1109	SW	523708 211625	Site Address: 34, Burrowfield, Welwyn Garden City, Hertfordshire, AL7 4SR Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HON001 EPR reference: EA/EPR/ZP3535TP/V009 Operator: The Honeywagon Co. Ltd Waste Management licence No: 404413 Annual Tonnage: 50000.0	Issue Date: 04/10/2017 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Welwyn Garden City Hazardous Waste Treatment And Transfer Facility Correspondence Address: -
Not shown	1255	SW	523608 211512	Site Address: 5052, Burrowfield, Welwyn Garden City, Hertfordshire, AL7 4SR Type: 75kte HCI Waste TS + treatment Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GWR001 EPR reference: EA/EPR/CB3202KY/A001 Operator: Ground Waste Recycling Ltd Waste Management licence No: 403619 Annual Tonnage: 74999.0	Issue Date: 14/12/2016 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Ground Waste Recycling Ltd Correspondence Address: -
Not shown	1257	SW	523607 211511	Site Address: 5052, Burrowfield, Welwyn Garden City, Hertfordshire, AL7 4SR Type: 75kte HCI Waste TS + treatment Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ACS018 EPR reference: EA/EPR/AB3503HP/T001 Operator: A & C Skips North London Limited Waste Management licence No: 100923 Annual Tonnage: 74999.0	Issue Date: 11/05/2009 Effective Date: 17/09/2013 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Revoked Site Name: Burrowfield Correspondence Address: -
Not shown	1265	SW	523632 211488	Site Address: 5052, Burrowfield Ind Est, Welwyn Garden City, Hertfordshire, AL7 4SR Type: 75kte HCI Waste TS + treatment Size: < 25000 tonnes	Issue Date: 11/05/2009 Effective Date: 05/10/2011 Modified: - Surrendered Date: - Expiry Date: -

ID	Distance (m)	Direction	NGR	Details	
				Environmental Permitting Regulations (Waste) Licence Number: BWS008 EPR reference: EA/EPR/BB3733AB/T001 Operator: Burrowfields Waste Solutions Limited Waste Management licence No: 100923 Annual Tonnage: 74999.0	Cancelled Date: - Status: Transferred Site Name: 50-52 Burrowfield Correspondence Address: -
Not shown	1270	SW	523600 211500	Site Address: Burrowfields Waste Ltd, 5052, Burrowfields, Welwyn Garden City, Hertfordshire, AL7 4SR Type: 75kte HCI Waste TS + treatment Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BUR089 EPR reference: EA/EPR/CP3199VT/A001 Operator: Burrowfields Waste Ltd Waste Management licence No: 100923 Annual Tonnage: 74999.0	Issue Date: 11/05/2009 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Burrowfields Waste Ltd Correspondence Address: -

4. Current Land Use Map



4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 39

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Bounty	524243 212677	29, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Distribution and Haulage	Transport, Storage and Delivery
2A	24	N	Super Tyres Motorists Centre	524298 212701	23a, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Vehicle Parts and Accessories	Motoring
3A	32	N	Hertz Car Hire	524291 212711	23, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Vehicle Hire and Rental	Hire Services
4	33	N	Uniclip Ltd	524285 212714	23b, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	General Construction Supplies	Industrial Products
5	40	N	Welwyn Services	524260 212729	21A, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Construction and Tool Hire	Hire Services
6B	45	NE	S G S Supplies	524338 212702	23, & 24 Peartree Farm Industrial Estate, Welwyn Garden City, Hertfordshire, AL7 3UW	Stationery, Stamps, Tags and Labels	Industrial Products
7B	52	NE	Prompt Fire Protection	524348 212698	Unit 25 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Special Purpose Machinery and Equipment	Industrial Products
8	66	E	P C Repairs Welwyn	524366 212691	Unit 28 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Electrical Equipment Repair and Servicing	Repair and Servicing
9	79	N	Thrifty Car & Van Rental	524272 212766	17, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Vehicle Hire and Rental	Hire Services
10	91	NE	F R E S C H	524366 212740	26-28, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ	Recycling, Reclamation and Disposal	Recycling Services
11D	95	E	Peartree Welding Centre	524398 212677	Unit 2 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Vehicle Repair, Testing and Servicing	Repair and Servicing
12C	99	N	Cleamax Engineering Ltd	524321 212772	24, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ	General Purpose Machinery	Industrial Products
13C	99	N	Lemsford Metal Products	524321 212772	24, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ	Metalworkers Including Blacksmiths	Construction Services

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
			1982 Ltd				
14D	101	E	Luk Motors Group	524404 212674	Unit 3 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Vehicle Repair, Testing and Servicing	Repair and Servicing
15	112	NW	Electricity Sub Station	524152 212787	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
16	113	N	The Self Storage Co	524271 212802	13-15, Broadwater Road, Welwyn Garden City, Hertfordshire, AL7 3BQ	Container and Storage	Transport, Storage and Delivery
17	115	NE	Electricity Sub Station	524359 212775	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
18	119	NE	Chimney	524402 212739	Hertfordshire, AL7	Chimneys	Industrial Features
19E	121	E	Aces Tyres	524425 212666	Unit 6 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Vehicle Repair, Testing and Servicing	Repair and Servicing
20	122	SE	Electricity Sub Station	524350 212511	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
21E	127	E	Lane Signs	524431 212663	Unit 8 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Signs	Industrial Products
22E	129	E	Welham Travel	524433 212662	Unit 9-12 Peartree Farm, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UW	Vehicle Hire and Rental	Hire Services
23	142	NW	Tank	524091 212755	Hertfordshire, AL7	Tanks (Generic)	Industrial Features
24	146	N	Factory	524173 212837	Hertfordshire, AL7	Unspecified Works Or Factories	Industrial Features
25F	162	N	Electricity Sub Station	524286 212848	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
26F	170	N	Electricity Sub Station	524281 212858	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
27	181	NE	Electricity Sub Station	524467 212750	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
28G	190	NE	Imedco	524405 212834	27, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
29G	190	NE	L J Whiteman & Son Welwyn Test Centre	524405 212834	27b, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3UQ	Vehicle Repair, Testing and Servicing	Repair and Servicing
30	202	W	Warehouse	524012 212706	Hertfordshire, AL7	Container and Storage	Transport, Storage and Delivery
31	204	S	Electricity Sub Station	524142 212423	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
32	220	NE	Factory	524445 212842	Hertfordshire, AL7	Unspecified Works Or Factories	Industrial Features
33H	220	N	I A M Road Smart	524351 212890	Albany Place, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3BT	Workwear	Industrial Products
34H	220	N	Continental Data Graphics Ltd	524351 212890	Albany Place, Hyde Way, Welwyn Garden City, Hertfordshire, AL7 3BT	Industrial Engineers	Engineering Services

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
35	223	NW	Chimney	524128 212902	Hertfordshire, AL7	Chimneys	Industrial Features
36	233	SW	Tanks	523994 212509	Hertfordshire, AL7	Tanks (Generic)	Industrial Features
37	236	NW	Electricity Sub Station	524043 212854	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities
38I	241	SW	Tank	523995 212490	Hertfordshire, AL7	Tanks (Generic)	Industrial Features
39I	248	SW	Electricity Sub Station	523987 212491	Hertfordshire, AL7	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
40	343	NE	524495 212958	ESSO	Bridge Road East, Welwyn Garden City, Hertfordshire, AL7 1LE	No	Open
41	407	W	523825 212796	OBSOLETE	Church Road, Welwyn Garden City, Hertfordshire, AL8 6PW	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
KGCA-XSV	KESGRAVE CATCHMENT SUBGROUP	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

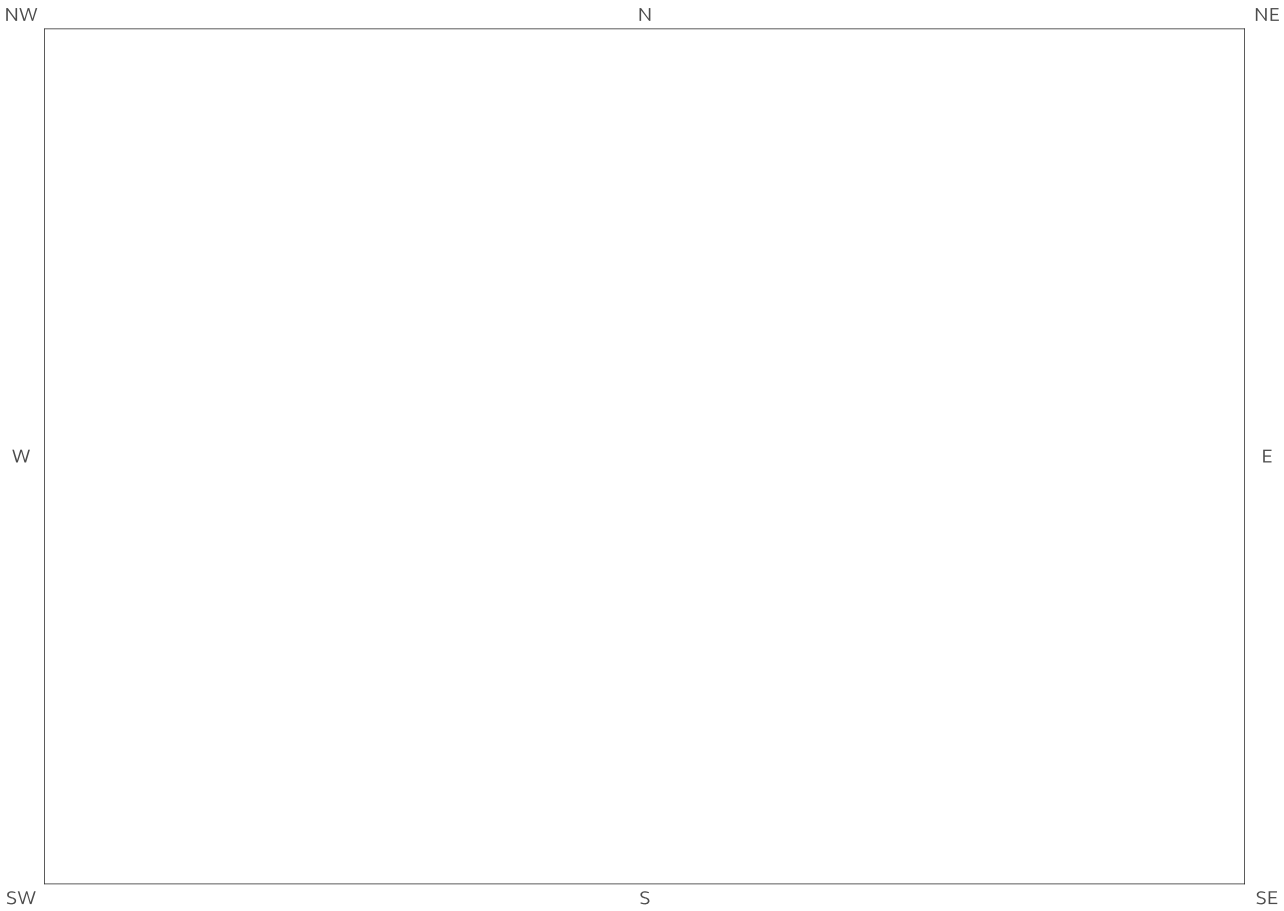
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LESE-CHLK	LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED)	CHALK

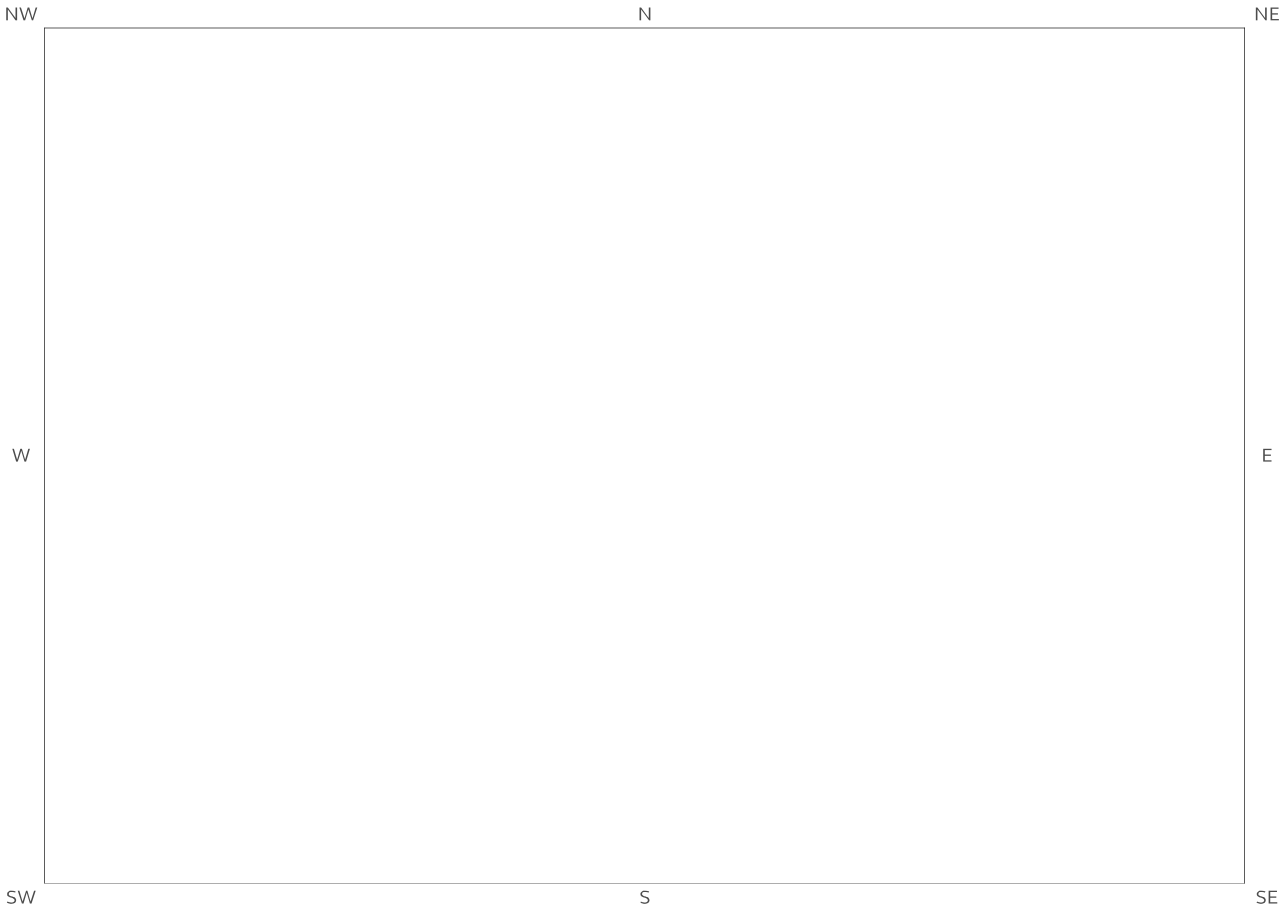
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

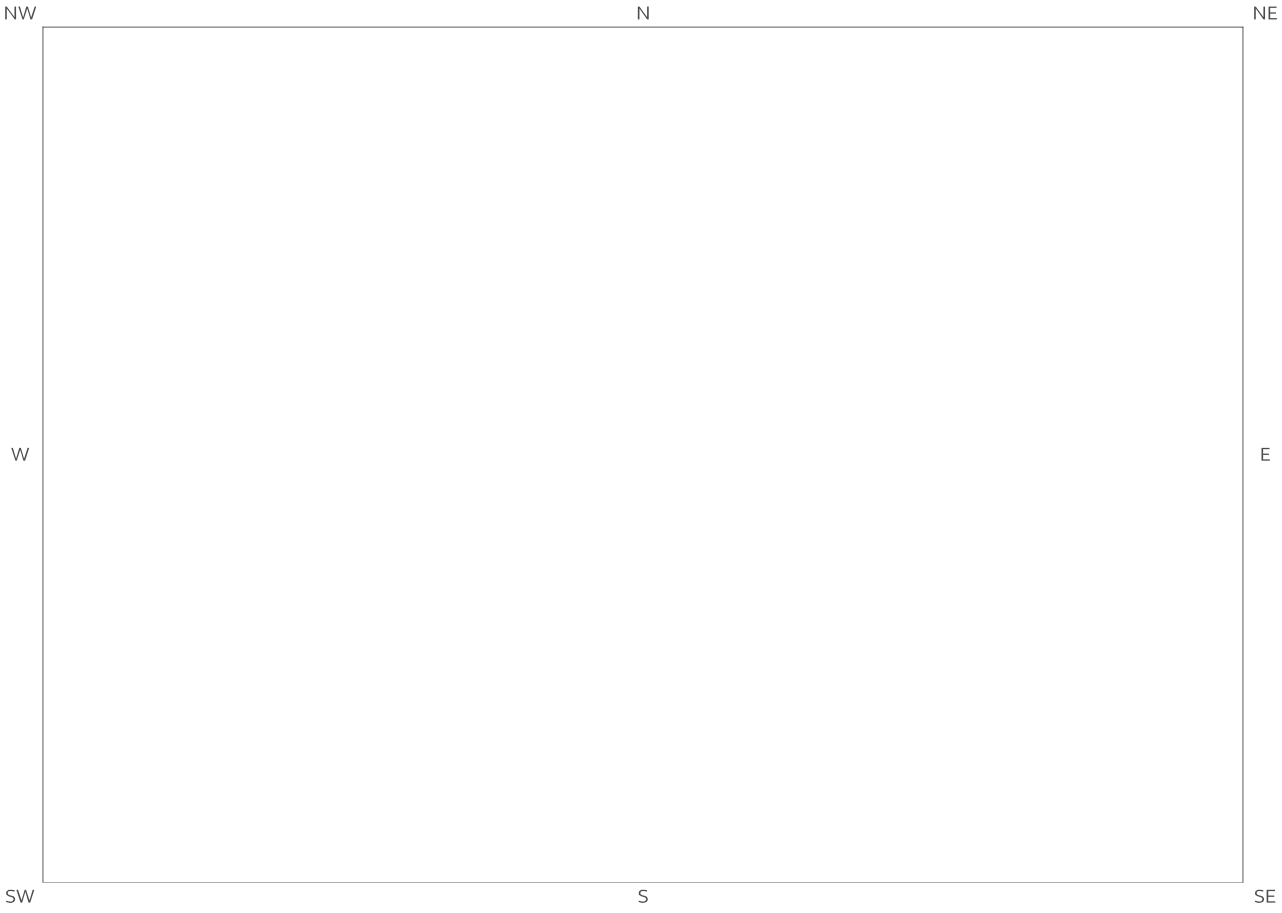
6a. Aquifer Within Superficial Geology



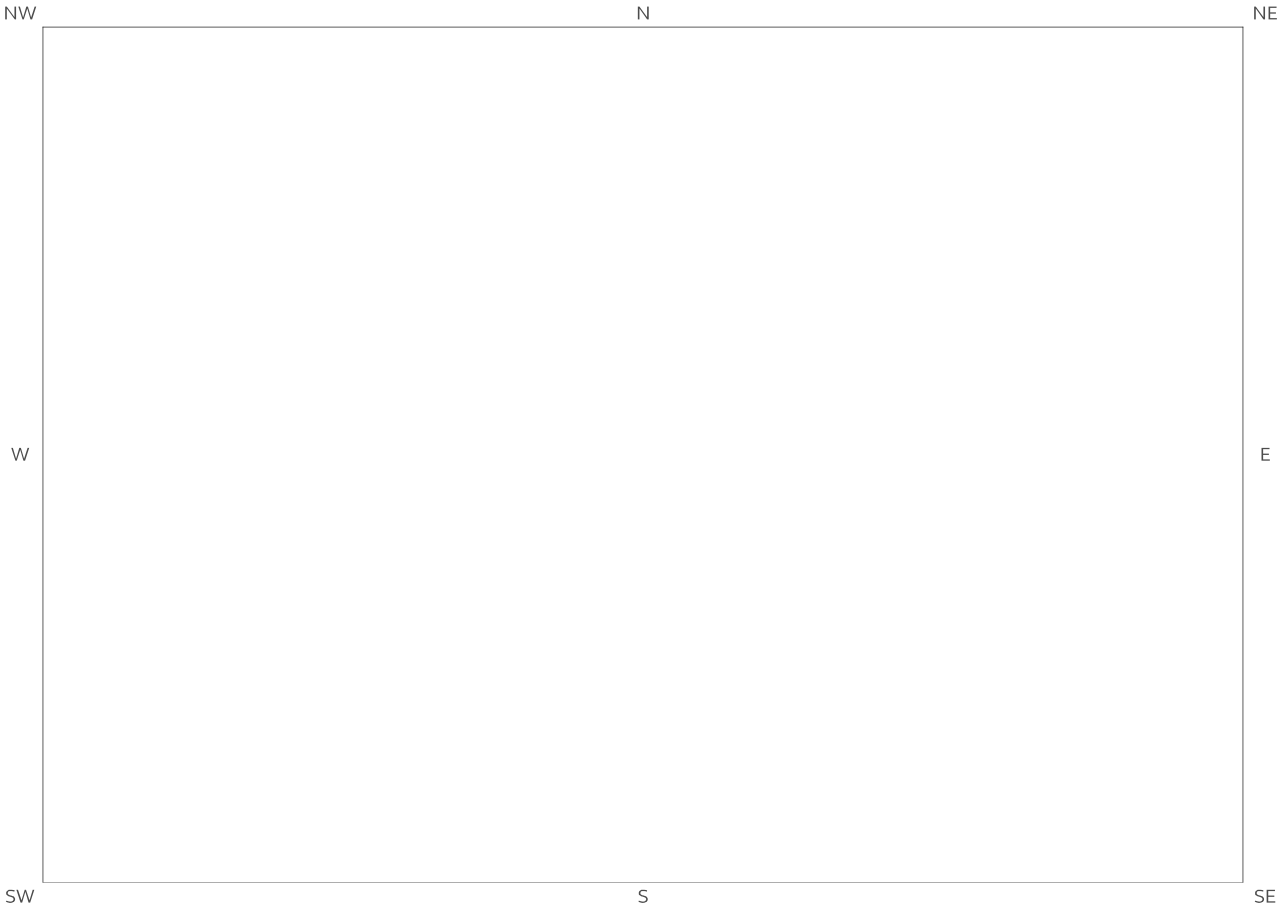
6b. Aquifer Within Bedrock Geology and Abstraction Licences



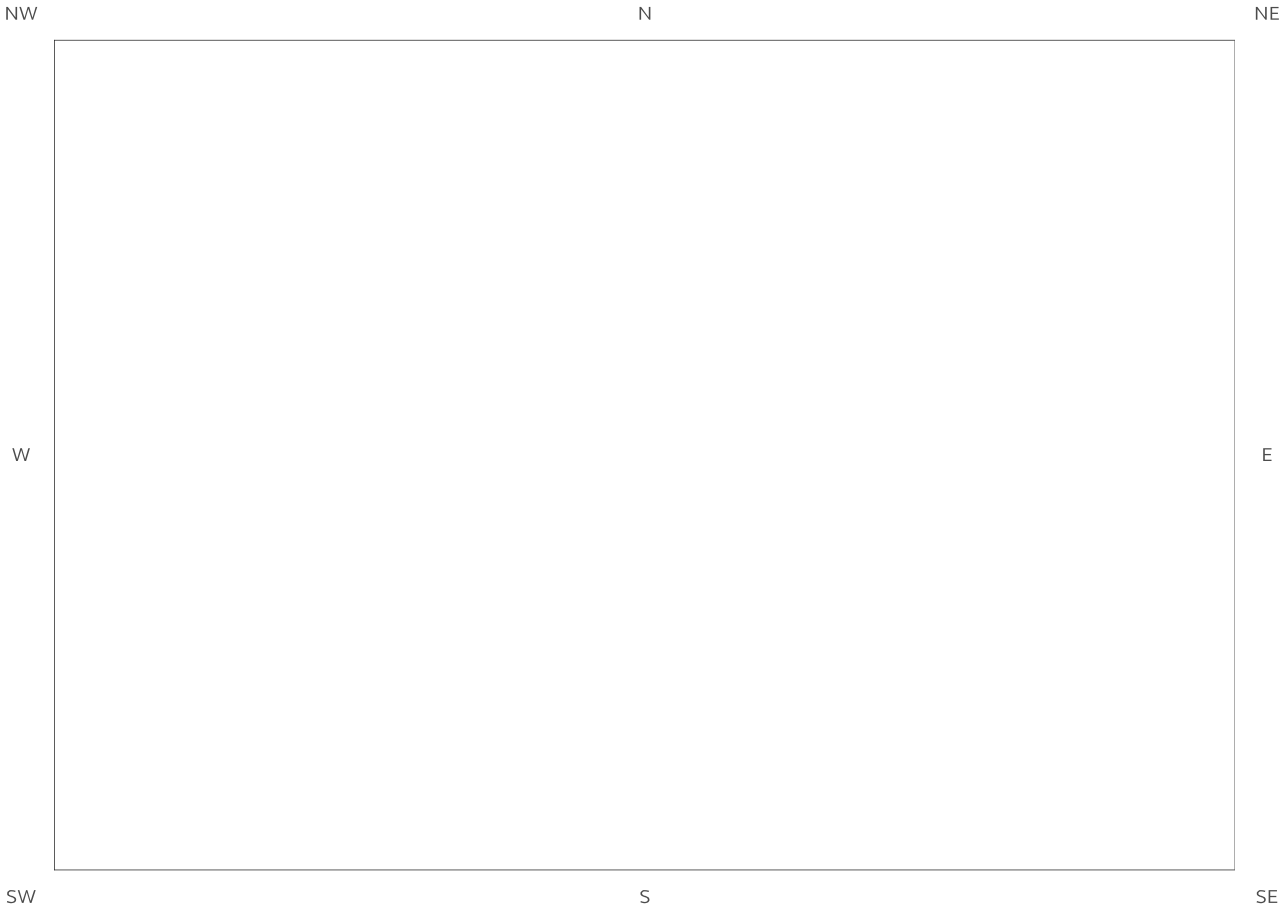
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



6d. Hydrogeology – Source Protection Zones within confined aquifer



6e. Hydrology – Watercourse Network and River Quality



6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	404	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site — Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
4	232	SW	524000 212500	Status: Historical Licence No: 29/38/02/0007 Details: Process Water Direct Source: THAMES GROUNDWATER Point: BROADWATER ROAD, WELWYN GARDEN CITY - 2 BOREHOLES GROUPED Data Type: Point Name: GEORGE WIMPEY UK LIMITED	Annual Volume (m^3): 318200 Max Daily Volume (m^3): 1364 Original Application No: - Original Start Date: 20/02/1966 Expiry Date: - Issue No: 102 Version Start Date: 07/02/2007 Version End Date:
Not shown	1670	NW	522720 213430	Status: Historical Licence No: 29/38/01/0093 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: WELWYN GARDEN CITY GC BOREHOLE Data Type: Point Name: WELWYN GARDEN CITY GOLF CLUB LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 16/10/1998 Expiry Date: 31/12/2003 Issue No: 100 Version Start Date: 16/10/1998 Version End Date:
Not shown	1670	NW	522720 213430	Status: Historical Licence No: 29/38/01/0101 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: WELWYN GARDEN CITY GC BOREHOLE Data Type: Point Name: WELWYN GARDEN CITY GOLF CLUB LTD	Annual Volume (m^3): 9895 Max Daily Volume (m^3): 118 Original Application No: - Original Start Date: 01/12/2003 Expiry Date: 31/12/2008 Issue No: 1 Version Start Date: 01/12/2003 Version End Date:
Not shown	1670	NW	522720 213430	Status: Historical Licence No: 29/38/01/0107 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: WELWYN GARDEN CITY GC - BOREHOLE Data Type: Point Name: WELWYN GARDEN CITY GOLF CLUB LTD	Annual Volume (m^3): 9895 Max Daily Volume (m^3): 118 Original Application No: - Original Start Date: 31/10/2008 Expiry Date: 31/03/2018 Issue No: 1 Version Start Date: 01/01/2009 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — Identified

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (6c):

ID	Distance (m)	Direction	Zone	Description
1	0	On Site	3	Total catchment

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site — None identified

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site — Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site — None identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	131 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	131 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	150 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	150 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
4	150 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
5	150 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
4	152 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	152 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				conditions) Average Width in Watercourse Section (m): Not Provided
5	153 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	153 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	154 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
8	154 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	165 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
9	165 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
8	167 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
10	167 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

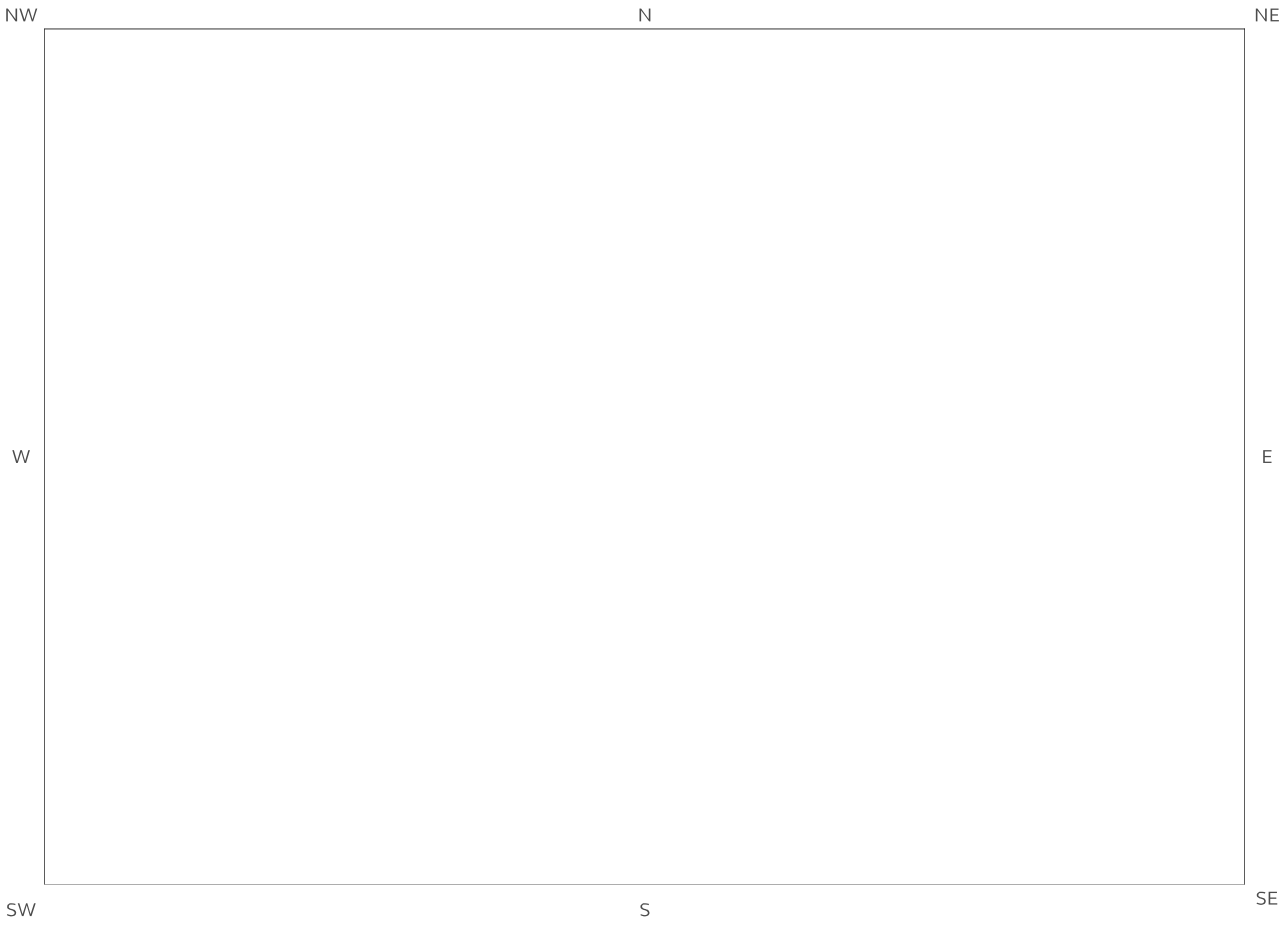
6.11 Surface Water Features

Surface water features within 250m of the study site — Identified

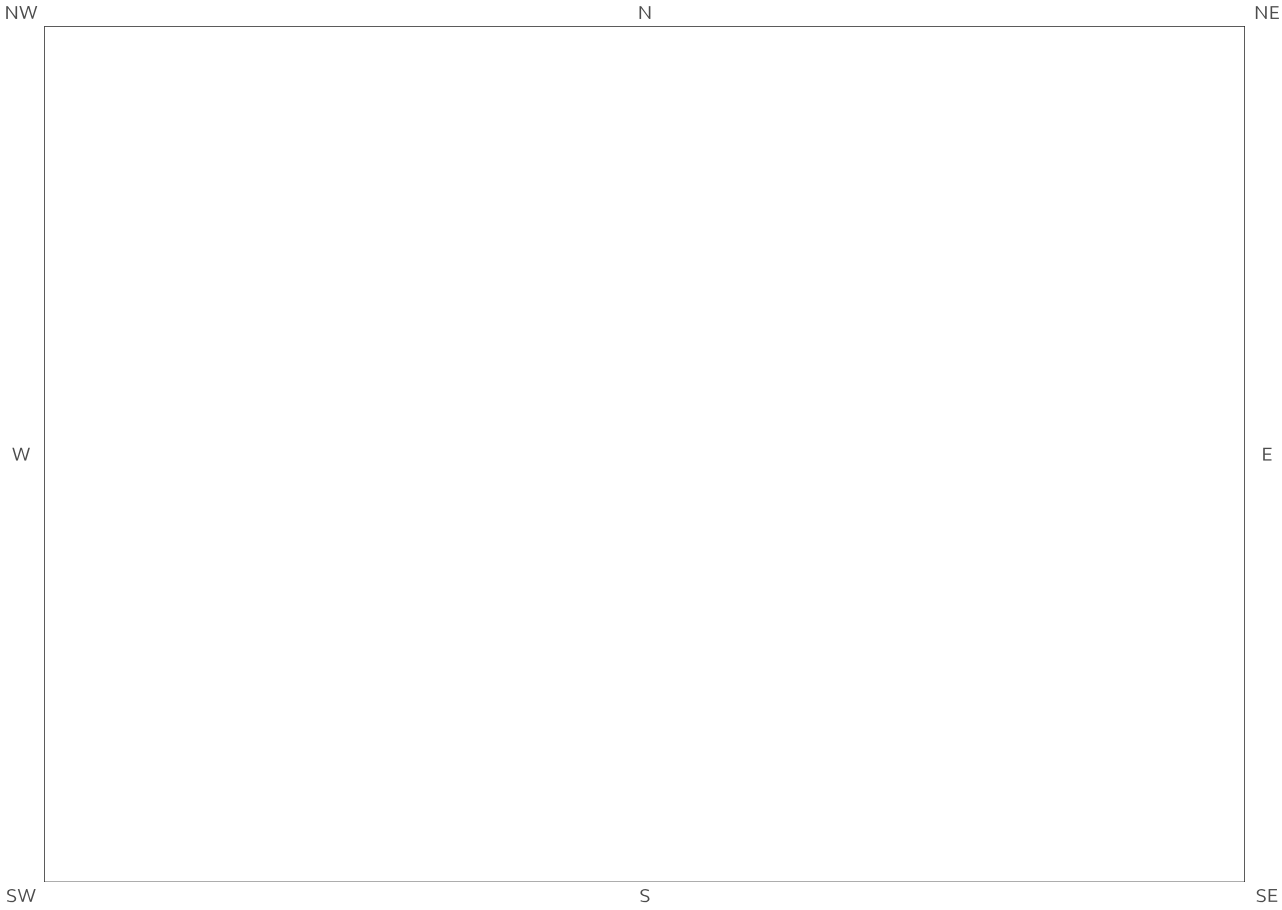
The following surface water records are not represented on mapping:

Distance (m)	Direction
131	SW
153	W

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite — Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site	None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site	Identified
Clearwater Flooding or Superficial Deposits Flooding	Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

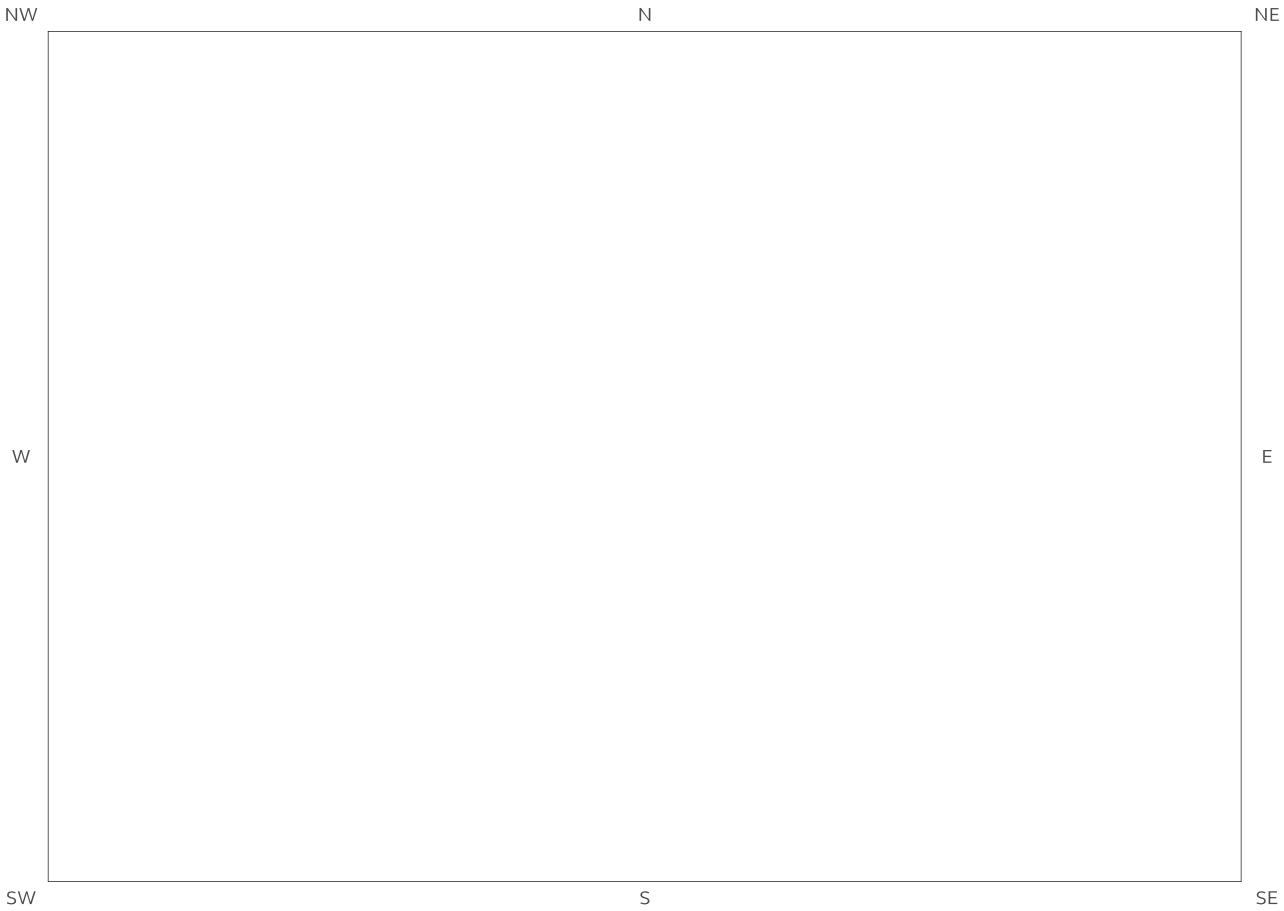
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result	High

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site | Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

3

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	1193	NW	Sherrardspark Wood	Natural England
Not shown	1408	NW	Sherrardspark Wood	Natural England
Not shown	1626	NW	Sherrardspark Wood	Natural England

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

4

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
9	1210	NW	UNKNOWN	Ancient and Semi-Natural Woodland
10	1288	NW	UNKNOWN	Ancient Replanted Woodland
Not shown	1763	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1971	E	UNKNOWN	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

3

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
4	1193	NW	Sherrardspark Wood	Natural England
Not shown	1682	NW	Sherrardspark Wood	Natural England
Not shown	1830	SE	The Commons	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

2

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
7	0	On Site	Existing	DEFRA
Not shown	1929	SW	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

1

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name

13	1205	NW	London Area Greenbelt	Welwyn Hatfield District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — Identified

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Not available	Chalk	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

Past underground mine workings are uncommon, localised and of limited area. The rock types present in this area are such that minor mineral veins may be present within them on which it is possible that there have been attempts to work these by underground methods and/or it is possible that small scale underground extraction of other materials may have occurred. All such occurrences are likely to be restricted in size and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

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Tel: 08456 050505

Local Authority
Authority: Welwyn Hatfield Council
Phone: 01707 357 000
Web: http://www.welhat.gov.uk/
Address: Council Offices, The Campus, Welwyn Garden City,

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Tel: 01252 845444

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-may25-2018