

CHURCHILL RETIREMENT LIVING

FORMER POLICE STATION, WINDMILL STREET, GRAVESEND, DA12 1DB

SITE INVESTIGATION REPORT

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1. INTRODUCTION

A residential development is proposed at Windmill Street, Gravesend, Kent. The site is currently occupied by a partially demolished police station and was historically occupied by residential properties. The proposed development comprises an apartment block, up to five storeys, together with soft landscaping and car parking. Residents of the development will be of retirement age.

Crossfield Consulting Limited has been commissioned to undertake an investigation of the site to identify potential constraints to redevelopment relating to the ground conditions and including a risk-based environmental assessment and recommendations for remediation works, recommendations regarding ground stability/support, and recommendations for foundations, road pavement design and general construction advice in the context of the above development proposals.

A Desktop Contamination Report undertaken in 2008 has been made available and relevant factual information reviewed in relation to the proposed redevelopment.

This report presents the information obtained from a desk study and ground investigation. Sections 2 to 5 of the report, together with the associated Figures and Appendices, provides a Ground Investigation Report (GIR), as defined in BS EN 1997-1:2004 and BS EN 1997-2:2007.

A risk-based assessment of potential contamination is included in Section 7 of the report. This assessment makes reference to the desk study, ground investigation information and a Conceptual Site Model. It is considered that the report complies with National Planning Policy Framework and is in general accordance with guidance published by the Environment Agency, Gravesham Council and NHBC. The ground investigation to inform the risk assessment of potential contamination is, due to current access constraints, an exploratory investigation, as defined in Environment Agency Land Contamination Risk Management (LCRM) (2020) and BS 10175:2011+A2:2017.

The report also includes a geotechnical assessment and the salient information, assessments and recommendations are presented in Sections 9 to 15 of the report, together with the associated Figures and Appendices.

The report has been prepared under the direction and supervision of a Chartered Geologist and Registered Specialist in Land Condition (SiLC). It is considered that the report is suitable for submission in support of a planning application and the report is appropriate to assist in an appraisal of development solutions and costs, together with the preparation of engineering designs for the development. The report also complies with the published guidance relating to the requirements of a Building Control authority.

2. THE SITE

2.1 Location

The site is located approximately 0.2 km to the south of Gravesend train station, as shown on Figure 1. The National Grid Reference for the site is TQ 6470 7380. The site is bounded to the north by Woodville Place with a gate allowing access to the site. Wrotham Road is present to the west, Windmill Street to the east and Zion Place to the south. Residential properties are located to the east, south and west of the site, with the Gravesham Council building to the north. The River Thames is located approximately 0.8 km to the north of the site.

2.2 Site Description

This site description is based on observations made during a ground investigation undertaken in November 2021. The site is roughly rectangular in shape, as shown on Figure 2, with an area of approximately 0.3 ha. A topographic survey plan is presented as Figure 3 and indicates that the site is generally flat, but the level is split into two, with a lower level/basement within the northern half of the site and a higher level/ground floor on the southern half of the site. The difference in ground level is approximately 2.5 m. The former police station sub-structure has been left in place and appears to act as a retaining wall to at least the northern half of the boundaries with Windmill Street to the east and the side road adjacent to Wrotham Road to the west.

The site comprises a demolished plot of land with a thick, heavily reinforced, concrete slab surface. Along the boundaries of the site, remain the outer walls of the former buildings, approximately two-storeys in height and of concrete construction, with brick surfacing on the exterior of the walls. It is believed that the site is currently being used as an impromptu builder's yard, as various building materials are being stored within the lower level area of the site. In addition, a number of abandoned vehicles are present in this area.

2.3 Site History

The site history has been researched with reference to old editions of the County Series and National Grid Ordnance Survey Plans obtained from Emapsite. Extracts from a selection of these plans are presented in Appendix I. Reference is also made to aerial photographs provided in the information in Appendix II. The plans and information indicate that the following development has taken place on and around the site.

The earliest available map edition from 1866 indicates that the site was located within a residential area and mostly comprised residential gardens, with semi-detached properties along the eastern and western boundaries. Additional residential properties were present to the north and south of the site. Two roads are indicated to the east and west of the site, identified as Windmill Street and Wrotham Road, respectively. A road is also present along the southern boundary of the site, identified as Woodville Street. A railway station is present approximately 200 m to the northwest of the site.

The 1897 map edition indicates that there were no significant changes to the site and records that the area surrounding the site comprised residential properties in all directions. By this time, the road to the south of the site, previously identified as Woodville Street was renamed to Zion Place. An infirmary is indicated to be present approximately 250 m to the southwest of the site.

By 1953, the site was redeveloped into a police and fire station, with the building covering the majority of the site apart from a central courtyard. The residential properties to the north of the site were also redeveloped into a series of municipal offices and a clinic, with a road separating the site from these buildings. A garage was present approximately 90 m to the northeast of the site.

The 1972 map edition does not record any significant changes to the site but the municipal offices to the north were redeveloped into a large building identified as the Civic Centre & Woodville Halls. A building was constructed to the south of the site, identified as Kent County Council Divisional Offices. Residential properties were demolished and redeveloped into three separate car parks, one of which comprises a multi-storey car park, approximately 100 m to the southeast, east and northeast of the site, respectively.

By 1978, the site was identified as just a police station and the buildings on site had been redeveloped into the present-day orientation. The road to the north of the site is identified as Woodville Place. There are no further significant changes to the site or surrounding area recorded up to the present day.

The 1999 aerial image indicates that a large multi-storey building was present within the southern area of the site, with a car parking area towards the middle of the northern half of the site. The multi-storey building is recorded to have been reduced to a single or two-storey building by the 2009 aerial image. By 2018, all of the above-ground structures on site are recorded to have been demolished.

3. PUBLISHED GEOLOGY

Geological map data, published by the British Geological Survey (BGS), online and in print, on the 1:50,000 scale Sheet No. 271 (Dartford), indicate that superficial deposits are absent from the site. The solid geology underlying the site is indicated to comprise Thanet Sand Formation strata, which consist of sands and clays. Beneath these deposits, and at the surface in the surrounding area, Lewes Nodular Chalk Formation strata are recorded.

4. DESK STUDY ENQUIRIES

Enquiries were made to the Groundsure Environmental and Geological Databases, British Geological Survey and Kent County Council regarding the site and surrounding area. Information obtained from these enquiries is presented in Appendix II and summarised below. In addition, relevant information from the 2008 Desktop Contamination Report is summarised below.

There are no active landfills recorded within 250 m of the site but a historical landfill is recorded approximately 124 m to the southwest of the site. Two facilities with waste exemptions are recorded within 250 m of the site, the closest located 161 m to the north, associated with the storage and sorting of waste. The other facility is located 167 m to the northeast of the site and is associated with the treatment and usage of waste plant matter.

Information on current or recent 'industrial' land uses within 100 m of the site indicates three landuses, comprising a cargo distribution and haulage depot located 83 m to the south of the site, an industrial estate 84 m to the northeast and a vehicle repair garage located 96 m to the southwest of the site. There are no active petrol filling stations within 250 m. A decontamination report, as referenced, indicates that a diesel spillage occurred on the site that was subsequently cleaned up such that there was no risk of contamination.

A topographical survey from 2010 records the presence of an existing fuel pump, suggesting the presence of a fuel tank. However, the local Petroleum Officer from Kent County Council indicates that there are no records relating to the current or historical presence of underground fuel tanks existing at the site, or in the immediate vicinity. With reference to the 2008 Desktop Contamination Report, it is reported that an 'oil spillage' occurred on site in 2006, such that it is presumed a fuel tank was present at that time. It is also stated that the spillage was 'adequately cleaned up' although no details are provided regarding these works and the standards achieved.

Two facilities with a licensed pollutant release content are recorded 166 m to the northeast and 209 m to the north of the site, both associated with dry cleaning. Another facility is located 335 m to the south of the site and is associated with the unloading of petrol into storage. A facility with a hazardous substance storage consent is recorded 282 m northeast of the site associated with the storage and distribution of natural gas. Neither the site nor land within 250 m of the site have been determined as contaminated land under Part 2A of the Environmental Protection Act (1990).

Hydrogeological information indicates that the solid strata underlying the site are classified as 'Secondary A' (Thanet Formation) and 'Principal' (Lewes Nodular Chalk Formation). The 'Secondary A' aquifer beneath the site is classified as having a high groundwater vulnerability. The site is considered likely to contain very

significant soluble rocks. The site does not lie within a groundwater Source Protection Zone. A groundwater abstraction licence is recorded 599 m to the southeast of the site.

Hydrological information indicates that the site does not lie within a designated Zone 2 or Zone 3 floodplain, as defined by the Environment Agency. There is a moderate risk of groundwater flooding at the site.

Natural ground subsidence geohazards, as classified by the BGS, indicates that there is a 'low' hazard beneath the site associated with dissolution of soluble rocks and running sands. Other geohazards are regarded as very low to negligible. A natural cavity, recorded as a solution pipe within chalk strata, is recorded 276 m to the east of the site. The BGS risk map of non-coal mining indicates that the site is within an area with a risk classification of 'A', which is classified as areas where sporadic underground mining may have occurred and the potential for difficult ground conditions is unlikely such that they do not need to be considered.

With reference to available BGS borehole records, as located approximately 40 m to the southeast of the site, the following strata are indicated below a thin cover of Made Ground:

- Silty fine sand to 6.9 m (Thanet Sand & Gravel Formation)
- Bullhead bed to 7.1 m
- Fissured chalk proven to 10 m (Lewes Nodular Chalk Formation)

Groundwater was not recorded to the maximum investigated depth.

BRE BR211 (2015) and the Groundsure report (based on BGS/Public Health England data) indicate that the site is not within an area where radon precautions are required in new buildings.

5. GROUND CONDITIONS AND GEOLOGICAL MODEL

5.1 Ground Investigation

Details of the rationale and scope of the ground investigation and laboratory testing, together with exploratory hole logs, monitoring, in situ and laboratory test results, are given in Appendix III. The investigation has identified the presence of the following, below the site.

5.2 Buried Foundations and Services

Buried foundations were identified during the ground investigation, including a reinforced concrete slab up to 400 mm thick across the site and piles within the southern area of the site. Voids were also identified beneath the concrete slab in the southwestern area of the site and along the northern and western sides, from basement level structures. No services were encountered during the ground investigation. It is not known if services are present across the site but buried obstructions should be anticipated below the site.

5.3 Strata Encountered

Made Ground

Made Ground has been identified in all locations, with concrete to depths of approximately 0.28 m and up to 0.35 m. The Made Ground underlying the concrete has been recorded to depths of 2.0 m in the basement area, and up to 3.9 m in the higher level. Locally, the materials have been reworked and include fragments of man-made inclusions, such as brick and concrete.

Possible Thanet Formation

Locally (in one location) below the Made Ground, possible Thanet Formation deposits are recorded to a depth of 2.5 m comprising orangish brown gravelly, sandy clay.

Standard Penetration Tests (SPTs) undertaken in the clay recorded 'N' values of 9 at 2.0 m depth.

Lewes Nodular Chalk Formation

Underlying the Made Ground, weathered Lewes Nodular Chalk Formation strata are recorded, comprising soft to very soft consistency (low strength) creamish white gravelly silt/clay with chalk and flint down to the maximum investigated depth. The chalk is classified as a structureless chalk, comprising gravelly clay (Grade Dm structureless chalk) with very weak, low to medium density chalk clasts and rare flint.

Standard Penetration Tests (SPTs) undertaken in the chalk recorded 'N' values of between 4 and 21 up to 9.0 m depth, increasing to values of between 27 and 42 at 17.0 m depth.

5.4 Groundwater

Groundwater has been recorded within the northern half of the site to depths of 17.9 m and 18.5 m depth.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

5.5 Ground Gases

Ground gas monitoring has been undertaken on one occasion following the installation of standpipes, as shown in Appendix III. Monitoring has identified no detectable methane, with carbon dioxide concentrations of up to 0.6%. Gas flow rates have locally been recorded at 0.1 l/hr but were typically recorded as less than 0.1 l/hr.

6. PROPOSED DEVELOPMENT

The proposed development includes the following buildings and other structures, as shown on Figure 4:

- A five-storey block of retirement flats
- Car parking
- Areas of managed soft landscaping

7. ASSESSMENT OF POTENTIAL CONTAMINATION AND GROUND GASES

7.1 Assessment Criteria

Assessment of potential contamination and ground gases has been undertaken using a risk assessment based approach, as recommended within the Environmental Protection Act (1990) (and subsequent amendments), Environment Agency LCRM (2020), CLEA Model (2004-2009), BS 10175:2011+A2:2017, CIRIA C552 (2001) and NHBC R&D Report 66 (2008). This approach considers the likely source of contamination, given the history and location of the site, and the possible migration pathways by which these potentially hazardous substances may reach likely receptors, such as end users of the site, controlled waters or the wider environment, in the context of the proposed development.

Part IIA of the Environmental Protection Act (1990) states that

‘Contaminated Land is any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) significant pollution of controlled waters is being caused or there is significant possibility of such pollution being caused;’

All risk assessments carried out as part of this investigation have been carried out with respect to the definition of ‘contaminated land’ within Part IIA of the Environmental Protection Act (1990) and have considered the site both before and on completion of the development. The basis of the risk assessment is the Conceptual Site Model, which is derived from the desk study and initial information and identifies potential contaminant linkages that could affect receptors relevant to the site and the wider environment. The Conceptual Site Model is presented in Table 1.

Based on the model, a ground investigation was designed to obtain relevant information to assess further the identified contaminant linkages. Where relevant, this included the recovery of representative samples and subsequent analytical laboratory testing. The rationale for the sampling and testing is set out in Appendix III. The results of the analytical testing are presented in Appendix III and summarised in Table 2. The results of ground gas monitoring are summarised in Table 4 and an assessment of gas data sufficiency is provided in Table 5. On the basis of the conceptual site model and the results of the analytical laboratory testing, an assessment of the identified contaminant linkages is presented in Table 6.

7.2 Potential Sources of Contamination

Based on the available information, the site was originally part of residential grounds, until 1953, when a police station fire station was constructed. This was then redeveloped into the current police station by 1978. Based on the age of the residential properties, it is possible that coal fires were used for heating and could have produced some ashy materials. Such ashy materials may have been scattered in small volumes within the garden areas of the properties such that there is the potential for limited ashy Made Ground at the site. Ashes, if present, could contain concentrations of polyaromatic hydrocarbons (PAHs) and toxic and phytotoxic metals.

The construction of the police and fire station during the 1950s may have involved the importation of coarse-grained materials (possibly including demolition rubble) to be used as fill beneath hardstanding areas. Demolition-derived materials may include asbestos containing materials (ACM) and also toxic and phytotoxic metals and polyaromatic hydrocarbons (PAHs) such that there is a potential for these contaminants to be present beneath the site. However, no significant concentrations of these substances are indicated.

It is indicated that the police station may have been associated with vehicle maintenance. It is considered, therefore, that there is potential for vehicle maintenance and washing to have occurred on site in the past. The Department of the Environment Industry Profile – *Road vehicle fuelling, servicing and repair: transport and haulage centres* considers that such activities may be associated with various potential contaminants such as metals, petroleum hydrocarbons, polyaromatic hydrocarbons and organic compounds such as those used in detergents and degreasants. Concrete floor slabs in the workshop and external areas would act as a barrier to minimise contaminants entering the soils, although there is a possibility that they could enter the ground from leaky drainage.

It is believed that the police station may have been associated with vehicle fuelling due to a fuel pump being located on a historical topographic survey. However, an enquiry to the local Petroleum Officer indicated that there are no historical or current records suggesting a fuel tank on site. The ground investigation also did not

suggest the existence of a fuel tank within the site. Whilst the presence of an existing underground fuel tank is unlikely it is considered that it cannot be entirely discounted at this stage.

With regards to potential sources of off-site contamination, there is no indication of premises associated with the bulk storage of liquid contaminants or processes that may give rise to mobile contaminants. Therefore, no realistic source of off-site contamination is identified in the available information.

Based on the available information, representative soil samples were recovered from the Made Ground materials encountered beneath the site and tested for the potential contaminants identified above. The test results are summarised in Table 2 and are presented against generic assessment criteria (GAC) and Category 4 Screening Levels (C4SL), relevant to the protection of human health residential development with managed landscaping. As can be seen from Table 2, the potential contaminant concentrations are recorded below the GAC (negligible risk to human health) and C4SL (low but acceptable risk to human health) and therefore, do not represent an unacceptable risk to end users.

Additional comments relevant to human health risk assessment are provided in Section 7.3.1.

Based on appropriate laboratory test data, risks to construction materials are assessed in Section 7.3.2.

No significant concentrations of potentially phytotoxic chemicals have been recorded. However, as the site is currently devoid of topsoil, a suitable thickness of topsoil is likely to be required to provide a growing medium in proposed soft landscaping areas. Further comment is provided in Section 7.3.3.

No significant concentrations of mobile potential contaminants have been identified. On this basis, it is considered unlikely that there is a valid contaminant source in relation to controlled waters. However, groundwater testing has been undertaken at the site and an assessment of the results and risks to end users is provided in Section 7.3.3.

No putrescible material has been identified at the site, although a significant thickness of Made Ground has been recorded in one location. There are no recorded landfills within influencing distance and the site is not within an area where precautions against the ingress of radon gas are required in new dwellings. However, gas monitoring has been undertaken at the site and an assessment of the gas monitoring results and risks to end users are provided in Section 7.4

7.3 Contaminant Linkages – Solids and Liquids

Based on the Conceptual Site Model, consideration is given below to identified contaminant linkages and a risk evaluation is undertaken of each possible source-pathway-receptor linkage that may occur at the site. The risk evaluation considers the potential consequences and probability of occurrence in accordance with CIRIA C552 (2001). Where risks are identified as 'negligible', then by implication such risks are within normally accepted levels for the proposed development, and the further reduction of such risks by remediation works is considered unnecessary. Where risks are identified that are 'low' as defined in CIRIA C552 (2001), or worse, then consideration is given to the management of the identified risks, with appropriate recommended actions that may include engineering solutions/remediation works as described in the following sections.

7.3.1 Human Health

Potential contaminants associated with the site history have been identified at concentrations below relevant GAC and C4SL values and asbestos fibres have not been detected. Following completion of the development, the majority of the site will be covered by buildings and areas of hardstanding that will ensure that there is an effective barrier between end users and the existing ground. It is understood that areas of managed soft

landscaping are proposed. Based on the available test data and the noted development proposals, no valid sources of potential contamination within the shallow soils have been identified, thus the potential contaminant pathways are limited and, hence, risks to end users are likely to be negligible. However, due to the current access constraints, it is recommended that additional investigation and testing be undertaken to confirm this assessment.

Landscaping contractors employed to manage the landscaping areas should only be involved in works to maintain the decorative landscaping and some replanting works involving digging into imported topsoil materials. Therefore, it is considered that there are no unacceptable risks to this site user group following completion of the development.

Groundworkers involved in the construction of the new development are unlikely to be exposed to short term (acute) risks. However, in line with good practice, it is recommended that appropriate personal protective equipment (PPE) be worn and high levels of personal hygiene be maintained by groundworkers. To minimise soils at the site becoming airborne and moving beyond the site boundaries during earth moving operations, it is recommended that appropriate soil dampening equipment be maintained on site during dry periods to minimise dust generation.

7.3.2 Durability of Buried Structures and Services

In view of the low soluble sulphate content and near-neutral soil conditions, there are no special precautions required for the protection of good quality buried foundation concrete. Based on guidance within *BRE Special Digest 1* (2005), the specified DC Class of concrete for buried structures and foundations should be suitable for an ACEC site classification of AC-1.

The site is understood to have been associated with past fuel and/or chemical storage (or land in close proximity has been associated with such storage) and, therefore, would be considered to be 'brownfield' under the definition provided by UKWIR (2010) with respect to the assessment of ground for water supply pipes. Based on the guidance provided by UKWIR, there would be a requirement to test appropriate soil samples from the line of proposed potable water supply pipes and to compare the test results with published criteria before consideration could be given to using conventional plastic materials for potable supply pipes. It would be prudent, therefore, to make allowance for the use of multi-layer barrier pipes. If the Client wishes to use conventional plastic materials, testing can be undertaken once the potable supply layout has been finalised. Alternatively, the decision can be made to provide the barrier pipe materials without undertaking additional testing.

It should be noted that individual water companies may have in-house requirements for the assessment of ground conditions for potable water supply pipes and these requirements may be in addition to, or may contradict, the guidance provided by UKWIR. Therefore, it is recommended that the relevant water supply company be consulted prior to finalising the potable water supply design.

7.3.3 Landscape Areas

No significant concentrations of phytotoxic compounds have been identified in shallow soils. However, it is noted that significant areas of the site are devoid of topsoil, such that there may be a requirement to import topsoil, so as to provide a suitable growing medium for the proposed landscaping scheme. Such soil import should be controlled in compliance with the landscaping requirements and published policies of NHBC (to demonstrate and document that imported materials are suitable for use in a residential development).

7.3.4 Controlled Waters

Hydrological information indicates that the solid geology beneath the site have been designated as Secondary and Primary Aquifers. The site does not lie within a groundwater Source Protection Zone. No surface water features are mapped within 250 m of the site. Groundwater monitoring at the site has indicated that groundwater is presented beneath the lower part of the site at depths of between 18.04 m and 18.14 m.

Groundwater analysis has generally recorded no elevated concentrations of potential contaminants, as indicated in Table 3. However, a very slight exceedance of nickel was recorded in one location, but there are no cost-effective remediation method to reduce the concentration of metals and it is considered that natural dissolution and dispersal will reduce the recorded concentrations. Therefore, it is considered that there are no unacceptable risks to controlled waters from ground conditions at the site and, as such, groundwater remediation is not required.

7.4 Contaminant Linkages – Gases

Based on the Conceptual Site Model, consideration is given below to identified contaminant linkages and a risk evaluation is undertaken of each possible source-pathway-receptor linkage that may occur at the site. Where risks are identified as 'negligible', then by implication such risks are within normally accepted levels for the proposed development, and the further reduction of such risks by remediation works is considered unnecessary. Where risks are identified that are 'low' as defined in CIRIA C552 (2001), or worse, then consideration is given to the management of the identified risks, with appropriate recommended actions that may include engineering solutions with remediation works or ground gas protection and control systems as described below. Reference is made to guidance published in BRE BR211 (2015), as referenced by the Building Regulations, to relevant assessment criteria published in BS 8485:2015+A1:2019 and to best-practice guidance as published in BS 8576:2013, CIRIA C665 (2007) and NHBC/RSK (2007), as listed in the References.

Ground gas monitoring has identified no detectible concentrations of methane, and concentrations of carbon up to 0.6% locally. Detectable gas flow rates of a maximum 0.1 l/hr have been identified, and standpipe pressures within boreholes have been recorded at very low values.

With reference to the summary data in Table 4, it is noted that the maximum gas concentrations and gas flow rates are compatible with Gas Characteristic Situation 1, as defined in BS 8485:2015+A1:2019. As outlined in Table 5, and based on the guidance in BS 8576:2013, there is effectively no likelihood of a significant change in the ground gas regime.

On the basis of all the available information, it is considered that no special ground gas protection is required to be installed in the proposed development.

7.5 Recommended Remedial Works

On the basis of the foregoing available information and risk assessment, there is no evidence of any valid contaminant linkages such that remediation works should not be necessary for the proposed development. However, due to the current access constraints, it is recommended that additional investigation and testing be undertaken to confirm this assessment.

As usual for brownfield land, it is recommended that a Discovery Strategy be implemented during the period of groundworks at the site. This provides a straightforward procedure for the site team to report unexpected materials that might be associated with a potential source of contamination, such that those materials are then inspected/investigated and any necessary risk assessment or further works undertaken, with all necessary

documentation issued to the local planning authority and, if applicable NHBC, in compliance with published requirements.

7.6 Construction Management/Best Practice

- In view of the ground conditions recorded at the site, it is recommended that soils should be kept damp during groundworks undertaken in dry weather to minimise the potential of aerial migration of dust to neighbouring properties and public.
- As the site is currently devoid of topsoil, a suitable thickness of topsoil is likely to be required to provide a growing medium in proposed soft landscaping areas.

7.7 Potential Liabilities

Based on the available data and risk assessment, it is considered that there should be no significant environmental liabilities associated with the ground conditions and site ownership. Provided the work outlined in Sections 7.5 and 7.6 is undertaken, there should be no such liabilities following completion of the development.

8. ASSESSMENT OF MINING, QUARRYING AND OVERALL GROUND STABILITY

The site is not within an area of coal mining but the BGS hazard rating for non-coal mining in the area indicates the site is Class A, a hazard relating to small scale mining in chalk, but it is unlikely to encounter difficult ground conditions.

Based on the available information and recent ground investigation observations, the ground conditions beneath the site comprise chalk strata. Chalk strata can be dissolved by water to form solution features, which can fill with loose superficial deposits. Such deposits can be susceptible to collapse settlement (if loads are applied) or to inundation settlement (if large volumes of water are introduced to the superficial materials). No solution features are recorded at the site and the closest recorded such feature is recorded 276 m to the northeast of the site. The site has been classified as being at low risk of solution features.

The current ground investigation did not find anomalous ground indicative of solution features. Notwithstanding this, it is recommended that vigilance be maintained during groundworks and, if anomalous ground conditions are encountered that could be indicative of solution features or other features that may be a risk of poor ground support, specialist geotechnical inspection should be undertaken so that, if appropriate, recommendations can be provided in respect of foundation precautions.

9. GEOTECHNICAL ASSESSMENT

9.1 Assessment of Foundation Solutions

It is understood that the proposed development will comprise a five-storey block of apartments together with car parking.

The former police station sub-structure has been left in place and appears to act as a retaining wall to at least the northern half of the boundaries with Windmill Street to the east and the side road adjacent to Wrotham Road to the west.

The relationship between the proposed structure and the existing retaining walls is not known. It is recommended that a specialist be employed to advise on appropriate demolition, temporary works and permanent wall solutions to ensure continuous support to the adjacent pavements/highways, during the construction of the proposed scheme.

With reference to the recorded ground conditions and corresponding Geological Model presented in Section 5, salient elements of the geotechnical model are outlined below.

Ground conditions beneath the site include reinforced concrete up to 0.4 m below ground level, underlain by Made Ground, as recorded to depths of up to approximately 2.5 m across the lower level of the site, and up to 3.9 m in the upper level of the site. This was underlain by Possible Thanet Formation deposits, comprising firm (medium strength) gravelly, sandy clays to a depth of between 2.5 m and 4.9 m. Beneath these deposits were strata of the Lewes Nodular Chalk Formation, comprising gravelly silt/clay with chalk and flint, recorded to the maximum investigated depth of 23 m. The chalk is classified as a structureless (Grade Dm) chalk of the Lewes Nodular Chalk Formation, recorded to be of high to very high strength from approximately 9 m depth.

Based on the available information, it is considered that the Made Ground is not suitable as founding strata for the proposed development due to the potential for significant and unpredictable differential settlements in such materials.

It is considered that the variable possible Thanet Formation deposits, including low strength strata encountered up to depths of 4 m, preclude the use of conventional strip or trench-fill footings within superficial deposits and/or chalk strata. Vibro-replacement ground treatment techniques and the use of reinforced strip footings in treated ground are also constrained due to the presence of chalk beneath the site, as vibro-techniques are typically not compatible with chalk strata (and particularly not with low density chalk strata).

Based on the available information and likely high loads associated with the proposed five-storey block, it is considered that the proposed structure will require to be supported on a piled foundation extending into the stronger chalk strata at depth. Continuous flight auger (CFA) piles are likely to be most appropriate for the ground conditions and site setting.

Existing subsurface structures will be required to be broken out to enable foundation construction. Given the thickness and reinforced nature of the upper slab encountered it is considered that this work may require to be undertaken by a specialist demolition contractor.

It will be necessary to undertake additional investigation, including boreholes within the southern area of the site to obtain relevant data for pile design purposes.

9.3 Floor Slab Recommendations

Due to the thickness of Made Ground at the site and the potential for ground disturbance during demolition, it is recommended that an allowance be made for suspended ground floor slabs.

9.4 General Construction Advice

All formations should be cleaned, and subsequently inspected by a suitably qualified engineer prior to placing concrete. Should any soft, compressible or otherwise unsuitable materials be encountered they should be removed and replaced by blinding concrete.

Foundation concrete, or alternatively, a blinding layer of concrete, should be placed immediately after excavation and inspection in order to protect the formation against softening and disturbance.

Generally, all formations should be placed wholly within the same material type, unless specific geotechnical inspection and assessment have been undertaken.

Care should be taken to ensure that any existing services encountered are carefully and satisfactorily blocked to prevent water seeping through the drains and into any excavations.

10. TEMPORARY WORKS

Conventional plant is considered to be suitable for excavation works at the site. However, hydraulic breakers will be required to break up existing reinforced hardstanding and any buried obstructions associated with the existing development.

Shallow excavations may remain stable in the short term but should not be left open for extended periods of time, particularly during inclement weather. Support should be provided, or the sides battered back, in any excavations requiring man entry, in compliance with a suitable risk assessment. Likewise, support is likely to be necessary in deeper excavations.

With regards to a piled foundation solution, it will be necessary to construct a working platform for tracked plant involved in the works. The platform should be designed by a suitably qualified geotechnical specialist in accordance with the guidance given in BRE Document BR470 (2004). The platform can be either designed to be placed on existing ground and then removed following completion of the works, or ground levels can be reduced, and the working platform can be incorporated into the final development.

11. ASSESSMENT OF SOAKAWAY DRAINAGE

The ground conditions comprise clays and silts (including matrix supported Grade Dm structureless chalk strata), which may preclude the use of shallow soakaway drainage. Due to the presence of potential soluble strata beneath the site, ground support conditions relating to the underlying chalk will need to be considered if an infiltration drainage solution is to be proposed and further investigation is recommended to provide additional data in this regard. Based on the available information, it would be prudent to identify an alternative drainage solution at this stage.

12. ROAD PAVEMENTS

Based on the nature of the shallow soils beneath the site a preliminary design equilibrium CBR of 3% may be considered for the design of road pavements. The materials at shallow depth may be regarded as frost susceptible.

13. ASSESSMENT OF MATERIALS FOR WASTE DISPOSAL

It is not known if there is a requirement to remove soils from site and, therefore, development levels should be set such that soils can be retained and reused on site where possible. Providing development levels are set to accommodate soil arisings (for example, from foundation excavations), such materials would not be classified as waste if retained and re-used on site. However, if materials are excess to requirements, they should be taken to an appropriately permitted waste facility.

If material is identified for removal to a waste facility, it will be necessary to provide a description of the material and laboratory test data to the receiving facility. This information is included in Appendix III. It should be noted that additional testing, either for classification purposes or for waste acceptance criteria (WAC) testing to confirm acceptability of the waste may be required (as noted below).

The available analytical laboratory test data has been used to provide preliminary waste disposal advice. It should be noted that these test results may not specifically relate to materials that are, or will be, scheduled for removal from site. However, the results are appropriate for preliminary guidance and costing purposes.

A preliminary assessment of potential waste classification for materials on site has been undertaken in accordance with the Environment Agency's document Guidance on the Classification and Assessment of Waste WM3 (2015). The assessment indicates that the following preliminary waste classification advice would be appropriate.

- Concrete surfacing should be taken to a recycling facility. Such materials are unlikely to meet WAC for disposal at landfill.
- Based on the testing undertaken to date, Made Ground samples are indicated to be classified as 'non-hazardous' waste. However, this is subject to change following additional investigation.
- Natural strata, providing they have not been impacted by potential contaminants associated with the site usages, would be classified as 'inert' waste without any requirement for laboratory testing.

Waste requires pre-treatment prior to disposal at landfill and this may take the form of physical or chemical treatment to reduce hazards and/or waste volumes. The segregation and screening of waste soils into separate, and appropriately classified, waste streams would satisfy the pre-treatment criteria by ensuring that volumes of each waste category are minimised. Segregation of waste streams is also important to prevent materials being classified within a worse-case category and, therefore, incurring higher disposal costs. Mixing of different waste streams to dilute hazardous properties is not permitted.

It should be noted that the above assessment is provided in accordance with current waste disposal and environmental permitting legislation and guidance documents. However, individual landfills and other waste disposal facilities may have variances in their permit that differs from standard guidance. Waste facilities may also make decisions with respect to accepting waste on a commercial basis. Therefore, landfills or other waste facilities should be approached to confirm that they will accept waste materials prior to finalising waste disposal proposals.

14. RECOMMENDATIONS FOR FURTHER GROUND INVESTIGATIONS

It is recommended that a supplementary phase of investigation be undertaken. To achieve this it will be necessary to form a ramp from the lower level to the higher level. The ramp should be sufficiently shallow to enable a rig to be pulled up or tracked to the higher level. This will require a section of the upper concrete slab to be broken out and possibly the importation of coarse-grained fill to form the upper part of the ramp. It will also be necessary for the upper concrete slab to be broken out or drilled/cored through at several locations to enable exploratory holes to be formed at the higher level. This enabling work, required prior to undertaking additional investigation, is likely to necessitate the use of a large, tracked excavator with an appropriately sized hydraulic concrete breaker and buckets to break out the concrete and form the ramp. Such work may take a week or more to complete and would require the permission of the current site owners.

Once the enabling work is undertaken it is recommended that 2 No. additional deep boreholes (25 m deep) be constructed at the higher level. Trial pits, to allow additional samples to be undertaken for analytical laboratory testing, should also be undertaken across the site.

15. RECOMMENDED SUPERVISION AND MONITORING

In compliance with the requirements in BS EN 1997-1:2004 and BE EN 1997-2:2007, construction and workmanship of the engineering solutions recommended in this report shall be supervised. In particular, issues listed in Section 9.4 General Construction Advice shall be considered in the implementation of the works and design of any necessary temporary works set out in Section 10.

In relation to the foundation solution(s) and ground floor slab recommendations in Section 9, the following supervision and monitoring is recommended.

- Verification testing required for piled foundations (in compliance with the Specification for the piling works), if applicable.

16. SUMMARY

A residential development is proposed at Windmill Street, Gravesend, Kent. The site is currently occupied by a partially demolished police station and was historically occupied by residential properties. The proposed development comprises an apartment block, up to five storeys, together with soft landscaping and car parking. Residents of the development will be of retirement age.

It is understood that the police station was associated with vehicle maintenance and the former police station buildings, including offices, basement structures and workshop.

The ground conditions at the site generally comprise a layer of hardstanding (reinforced concrete slab) up to 400 mm thick, underlain by Made Ground down to depths of between 2 m and 3.9 m, which consists of gravelly, sandy clay with man-made inclusions. Possible Thanet Formation deposits underlie are present to a depth of 2.5 m within the northern area of the site and generally comprise gravelly, sandy clays. Lewes Nodular Chalk Formation deposits are present beneath the Thanet Formation and Made Ground to the maximum investigated depth of 23 m, comprising medium to high strength silt/clay with chalk gravel.

Based on the available information, a conceptual site model has been developed for the site that has identified a number of potential pollutant linkages. A ground investigation was then designed to provide assessment of these pollutant linkages. All contaminants were identified at negligible concentrations such that it is considered that there are no unacceptable risks to human health at the site. However, due to the current access constraints, it is recommended that additional investigation and testing be undertaken to confirm this assessment.

In view of the possible low strength near-surface natural strata, the use of conventional strip or pad footings and vibro-replacement ground treatment are considered not to be appropriate for the proposed development. It is considered that the proposed development will require the use of piled foundations. A suspended ground floor slab is recommended. The relationship between the proposed structure and the existing retaining walls is not known. It is recommended that a specialist be employed to advise on appropriate demolition, temporary works and permanent wall solutions to ensure continuous support to the adjacent pavements/highways, during the construction of the proposed scheme.

Due to the nature of the impermeable strata within the shallow ground, it is considered that the use of soakaway drainage is effectively precluded from the site. It is recommended that an alternative drainage solution be identified for the development.

When suitable access is available, a supplementary phase of ground investigation will be necessary. The supplementary ground investigation works are likely to include additional boreholes and the use of trial pits. The supplementary ground investigation will be designed to provide additional data for a more detailed environmental assessment to be undertaken to confirm the current risk assessments and to obtain additional data for foundation design.

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Gravesham Borough Council

GENERAL NOTES

1. The report is limited to the site boundaries and is specific to the development proposals as identified by the Client (or Client's advisor) and confirmed within this report. The report should not be used in a different context. Where the report is identified as a site appraisal, further geoenvironmental assessment, and detailed investigations, will be required prior to finalisation of ground related assessment and designs. Other reports may recommend additional investigation or other works that would be considered essential prior to the preparation of final assessments and associated designs.
2. This report has been prepared by Crossfield Consulting Limited with all reasonable skill, care and diligence within the terms of the Appointment/Proposal Terms and Conditions (as applicable) and with the resources agreed with the Client. Responsibility for any matters outside the agreed scope is not accepted.
3. Where any data supplied by the Client or by other external sources, including previous site investigation data, have been used it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Crossfield Consulting Limited for inaccuracies within the data supplied by others.
4. Any borehole data from the British Geological Survey sources are included on the following basis: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.
5. Any assessments made in this report are based on the ground conditions indicated by the factual records included and/or referenced in the report, namely, trial pits and/or boreholes, together with the results of any field or laboratory testing undertaken and, where appropriate, other relevant site data/desk study information which may have been obtained for the site. Variations in ground conditions may occur between exploratory hole locations and there may be special conditions appertaining to the site that have not been revealed by the investigation and that have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.
6. Exploratory hole locations provided in the report are generally established by tape measurement (or similar measurement) from existing features or boundaries. Ground levels stated in the report are based on site survey plans as provided. Hole locations are not accurately surveyed and ground levels at these locations are not obtained unless specifically included in the agreed scope of services.
7. Unless stated otherwise, no consultations with regulatory authorities, funders or other third parties have been carried out; hence, definitive assurance that such third parties will accept the findings of this report cannot be provided.
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11. New information, improved methods, changes in published guidance, codes of practice, policies and legislation can occur at any time and may necessitate an alteration to the report in whole, or in part, after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to Crossfield Consulting Limited for re-assessment and, if necessary, re-appraisal.

Gravesham Borough Council

TABLES

TABLE 1

CONCEPTUAL SITE MODEL				
	Potential Contaminant Source	Potential Contaminants	Potential Pathway	Receptors and Assessed Contaminant Linkage
On-Site Solid	Ashy Made Ground from historical domestic fires/bonfires historical to current police station	Toxic metals and phytotoxic metals Petroleum hydrocarbons (likely to be degraded) Polyaromatic hydrocarbons	Dermal and oral exposure pathways (including air-borne migration) are present during construction phase but will not be present following development due to building and hardstanding effective barriers. Limited landscaping areas after development represent possible dust exposure pathways.	Human Health <i>End Users:</i> Possible contaminant linkage <i>Groundworkers:</i> Possible contaminant linkage <i>Neighbouring Properties/General Public:</i> Possible contaminant linkage Buried Structures & Services <i>Buried concrete:</i> No contaminant linkage <i>Potable water pipes:</i> Possible contaminant linkage <i>Other buried structures:</i> No contaminant linkage Landscape Areas No contaminant linkage
	Vehicle servicing activities	Toxic metals and phytotoxic metals Petroleum hydrocarbons (likely to be degraded) Polyaromatic hydrocarbons Volatile organic compounds	Although likely to be degraded, organic compound penetration of plastic construction materials should be considered.	
	Imported materials for construction of current police station	Asbestos fibres/ACM	Release into Liquid Phase Metals and PAHs have generally low solubility. Potential for plant uptake of metals. Degraded organic compounds/petroleum hydrocarbons likely to be of limited solubility. If present, short-chain petroleum hydrocarbons and VOCs can be readily mobilised.	
Off-Site Solid	No evidence of potential source	N/A	Release into Vapour Phase Degraded organic compounds unlikely to be associated with significant volatilisation potential. Certain petroleum hydrocarbon fractions and VOCs can readily volatilise, and inhalation exposure pathways may exist if vapours migrate into the proposed building.	
On-Site Liquid	No evidence of potential source	N/A	As contaminant sources are likely to be fully adsorbed, potential pathways and exposure routes are as above.	
Off-Site Liquid	No evidence of potential source	N/A	Release into Vapour Phase Degraded organic compounds unlikely to be associated with significant volatilisation potential.	
On Site Liquid	No evidence of potential source	N/A	N/A	Controlled Waters <i>Groundwater:</i> Secondary aquifer (Thanet Formation) and Principal aquifer (Lewes Nodular Chalk) but no Source Protection Zone – No contaminant linkage <i>Surface Water:</i> No nearby watercourses – No contaminant linkage
Ground Gases	No evidence of nearby landfills	N/A	N/A	Human Health <i>End Users:</i> No contaminant linkage
	Not a radon affected area	N/A		
	Significant thickness of Made Ground within southern section of site, but no evidence of putrescible materials	N/A		

NOTES

1. The above conceptual model is based on CIRIA C552 (2001) and BS 10175:2011+A2:2017, BS EN ISO 21365:2020 and Environment Agency Land Contamination Risk Management (LCRM) (2020).
2. The Conceptual Site Model is prepared from available desk study information. Where a site walkover or ground investigation identifies information that was not known at the desk study stage, such information is used to modify the Model.
3. Where a contaminant linkage is identified, any subsequent ground investigation is designed to obtain relevant information to assess the pollutant linkage. See Table 6 for a summary of contaminant linkage assessments.

TABLE 2
(Page 1 of 2)

SUMMARY OF ANALYTICAL TEST DATA: SOILS
RISKS TO HUMAN HEALTH

Determinand	Units	No of Tests	Concentration (mg/kg)		Generic Assessment Criteria (mg/kg) Residential With Plant Uptake		Category 4 Screening Level (mg/kg) Residential With Plant Uptake	
			Min	Max	Value	No>GAC	Value	No>C4SL
Arsenic	mg/kg	4	8.4	11	37 ¹	0	37 ³	0
Cadmium	mg/kg	4	<0.2	4.0	11 ¹	0	26 ³	0
Chromium (Total) ⁴	mg/kg	4	25	96	910 ¹	0	-	-
Chromium (VI)	mg/kg	4	<4.0	<4.0	6 ¹	0	21 ³	0
Lead	mg/kg	4	11	240	-	-	200 ³	0
Inorganic Mercury	mg/kg	4	<0.3	<0.3	40 ¹	0	-	-
Nickel	mg/kg	4	15	22	130 ¹	0	-	-
Selenium	mg/kg	4	<1.0	<1.0	250 ¹	0	-	-
Copper	mg/kg	4	18	23	2400 ¹	0	-	-
Zinc	mg/kg	4	51	98	3700 ¹	0	-	-
Boron	mg/kg	4	0.4	1.8	290 ¹	0	-	-
Phenols	mg/kg	4	<1.0	<1.0	120 ¹	0	-	-
pH	-	9	8.6	11.7	-	-	-	-
Total Organic Carbon	%	4	0.1	0.7	-	-	-	-
Petroleum Hydrocarbons								
Aliphatics C ₅ – C ₆	mg/kg	4	<0.001	<0.001	42 ¹	0	-	-
Aliphatics C ₆ – C ₈	mg/kg	4	<0.001	<0.001	100 ¹	0	-	-
Aliphatics C ₈ – C ₁₀	mg/kg	4	<0.001	<0.001	27 ¹	0	-	-
Aliphatics C ₁₀ – C ₁₂	mg/kg	4	<1.0	<1.0	130 ¹	0	-	-
Aliphatics C ₁₂ – C ₁₆	mg/kg	4	<2.0	3.8	1100 ¹	0	-	-
Aliphatics C ₁₆ – C ₃₅	mg/kg	4	<8.0	328	65,000 ¹	0	-	-
Aromatics C ₆ – C ₇	mg/kg	4	<0.001	<0.001	70 ¹	0	-	-
Aromatics C ₇ – C ₈	mg/kg	4	<0.001	<0.001	130 ¹	0	-	-
Aromatics C ₈ – C ₁₀	mg/kg	4	<0.001	<0.001	34 ¹	0	-	-
Aromatics C ₁₀ – C ₁₂	mg/kg	4	<1.0	<1.0	74 ¹	0	-	-
Aromatics C ₁₂ – C ₁₆	mg/kg	4	<2.0	<2.0	140 ¹	0	-	-
Aromatics C ₁₆ – C ₂₁	mg/kg	4	<10	<10	260 ¹	0	-	-
Aromatics C ₂₁ – C ₃₅	mg/kg	4	<10	<10	1100 ¹	0	-	-
VOCs								
Benzene	mg/kg	4	<1.0	<1.0	0.087 ¹	0	0.2 ³	0
Toluene	mg/kg	4	<1.0	<1.0	130 ¹	0	-	-
Ethylbenzene	mg/kg	4	<1.0	<1.0	47 ¹	0	-	-
Xylene	mg/kg	4	<1.0	<1.0	56 ¹	0	-	-
MTBE	mg/kg	4	<1.0	<1.0	49 ²	0	-	-

TABLE 2
(Page 2 of 2)

Determinand	Units	No of Tests	Concentration (mg/kg)		Generic Assessment Criteria (mg/kg) Residential With Plant Uptake		Category 4 Screening Level (mg/kg) Residential With Plant Uptake	
			Min	Max	Value	No>GAC	Value	No>C4SL
PAHs								
Naphthalene	mg/kg	4	<0.05	<0.05	2.3 ¹	0	-	-
Acenaphthylene	mg/kg	4	<0.05	<0.05	170 ¹	0	-	-
Acenaphthene	mg/kg	4	<0.05	<0.05	210 ¹	0	-	-
Fluorene	mg/kg	4	<0.05	<0.05	170 ¹	0	-	-
Phenanthrene	mg/kg	4	<0.05	<0.05	95 ¹	0	-	-
Anthracene	mg/kg	4	<0.05	<0.05	2400 ¹	0	-	-
Fluoranthene	mg/kg	4	<0.05	0.45	280 ¹	0	-	-
Pyrene	mg/kg	4	<0.05	0.35	620 ¹	0	-	-
Benz(a)anthracene	mg/kg	4	<0.05	0.24	7.2 ¹	0	-	-
Chrysene	mg/kg	4	<0.05	0.21	15 ¹	0	-	-
Benzo(b)fluoranthene	mg/kg	4	<0.05	0.31	2.6 ¹	0	-	-
Benzo(k)fluoranthene	mg/kg	4	<0.05	0.21	99 ¹	0	-	-
Benzo(a)pyrene	mg/kg	4	<0.05	0.20	2.2 ¹	0	5 ³	0
Indeno(123cd)pyrene	mg/kg	4	<0.05	<0.05	27 ¹	0	-	-
Dibenzo(ah)anthracene	mg/kg	4	<0.05	<0.05	0.24 ¹	0	-	-
Benzo(ghi)perylene	mg/kg	4	<0.05	<0.05	320 ¹	0	-	-

NOTES

1. Suitable for Use Level (S4UL) published by LQM/CIEH, 2015 – Residential With Plant Uptake landuse. S4UL assumptions comprise 1% soil organic matter, soil pH of 7 and sandy loam soil type. S4ULs are copyright © Land Quality Management Limited reproduced with permission; Publication Number S4UL3133.
2. Soil GAC for Human Health Risk Assessment produced by CL:AIRE (2010) – Residential With Plant Uptake. Assumption of 1% soil organic matter.
3. Category 4 Screening Level (C4SL), Department for Environment Food and Rural Affairs (March 2014) – calculated for 1% SOM using the CLEA Model v1.071
4. In the absence of desk study or historical map evidence indicating a potential source of chromium (VI) usage at or in the near vicinity of the site (and confirmed by laboratory testing), total chromium concentrations have been compared to the GAC for chromium (III).

TABLE 3
(Page 1 of 2)

SUMMARY OF ANALYTICAL TEST DATA: GROUNDWATER

Determinand	No of Tests	Units	Concentration		Published Environmental Standard (as listed in the Notes)	
			Min	Max	Value	No > Value ⁷
BOD	2	mg/l	<1.0	3.3	-	-
COD	2	mg/l	15	1200	-	-
Hardness	2	mg/l	384	541	-	-
Ammonia	2	mg/l	<0.015	0.037	-	-
Sulphate	2	mg/l	117	141	-	-
Nitrates	2	mg/l	11.5	15	-	-
Arsenic	2	µg/l	0.3	0.6	50 ^{1,5}	0
Cadmium	2	µg/l	<0.02	<0.02	1.5 ¹	0
Chromium	2	µg/l	1.9	2.9	4.7 ¹	0
Lead	2	µg/l	<0.2	<0.2	7.2 ^{1,5}	0
Mercury	2	µg/l	<0.05	<0.05	0.07 ¹	0
Copper	2	µg/l	2.5	2.8	28 ^{1,5}	0
Nickel	2	µg/l	4.4	21	20 ^{1,5}	1
Zinc	2	µg/l	8.9	25	125 ^{1,5}	0
Selenium	2	µg/l	3.6	3.6	10 ²	0
Total Petroleum Hydrocarbons C ₅ – C ₃₅						
Aliphatics C ₅ – C ₆	2	µg/l	<1.0	<1.0	15,000 ⁴	0
Aliphatics C ₆ – C ₈	2	µg/l	<1.0	<1.0	15,000 ⁴	0
Aliphatics C ₈ – C ₁₀	2	µg/l	<1.0	<1.0	300 ⁴	0
Aliphatics C ₁₀ – C ₁₂	2	µg/l	<10	<10	300 ⁴	0
Aliphatics C ₁₂ – C ₁₆	2	µg/l	<10	<10	300 ⁴	0
Aliphatics C ₁₆ – C ₂₁	2	µg/l	<10	<10	n/a ⁴	0
Aliphatics C ₂₁ – C ₃₅	2	µg/l	<10	<10	n/a ⁴	0
Aromatics C ₆ – C ₇	2	µg/l	<1.0	<1.0	10 ⁴	0
Aromatics C ₇ – C ₈	2	µg/l	<1.0	<1.0	700 ⁴	0
Aromatics C ₈ – C ₁₀	2	µg/l	<1.0	<1.0	300 ⁴	0
Aromatics C ₁₀ – C ₁₂	2	µg/l	<10	<10	90 ⁴	0
Aromatics C ₁₂ – C ₁₆	2	µg/l	<10	<10	90 ⁴	0
Aromatics C ₁₆ – C ₂₁	2	µg/l	<10	<10	90 ⁴	0
Aromatics C ₂₁ – C ₃₅	2	µg/l	<10	<10	90 ⁴	0

TABLE 3
(Page 2 of 2)

Determinand	No of Tests	Units	Concentration (µg/l)		Published Environmental Standard (as listed in the Notes)	
			Min	Max	Value (µg/l)	No > Value ⁷
VOCs ⁶						
Benzene	2	µg/l	<1.0	<1.0	50 ¹	0
Toluene	2	µg/l	<1.0	<1.0	380 ¹	0
Ethylbenzene	2	µg/l	<1.0	<1.0	300 ³	0
Xylene	2	µg/l	<1.0	<1.0	30 ^{1,5}	0
Polyaromatic Hydrocarbons						
Naphthalene	2	µg/l	<0.01	<0.01	2.4 ^{1,5}	0
Fluoranthene	2	µg/l	<0.01	<0.01	1 ¹	0
Benzo(b)fluoranthene } Benzo(k)fluoranthene }	2	µg/l	<0.02	<0.02	0.03 ^{1,5}	0
Benzo(a)pyrene	2	µg/l	<0.01	<0.01	0.1 ¹	0
Indeno(123cd)pyrene } Benzo(ghi)perylene }	2	µg/l	<0.02	<0.02	0.002 ^{1,5}	0

NOTES

1. The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015. Type 7 River with moderate overall physico-chemical quality. Thresholds selected for "Good Standard for Rivers and Freshwater Lakes". Where applicable, water hardness >250 mg/l assumed, based on site data.
2. The Water Supply (Water Quality) Regulations 2010 and/or World Health Organisation drinking water values.
3. Value based on the Dangerous Substance Directive (List II). The Environmental quality standard has not been updated for this chemical under the Water Framework Directive
4. Value set out in CL:AIRE *Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies* (2017)
5. Value is an annual average and not a maximum acceptable concentration
6. All other VOCs below laboratory detection limits or there are no published environmental standards indicating concern to controlled waters associated with the VOC.
7. Value given is number of detectable concentrations greater than the environmental quality standard.

TABLE 4

SUMMARY OF GROUND GAS CONDITIONS

17/11/2021

Standpipe Ref	Methane $C_{hg} CH_4$ (%)	Carbon Dioxide $C_{hg} CO_2$ (%)	Oxygen (%)	Trace Gases H ₂ S CO (ppm) (ppm)		Atm ¹ (mb)	Standpipe Pressure ² (mb)	Ground Gas ^{2,3} Flow Rate (litre/hr)	Characteristic Hazardous gas Flow Rate Methane $Q_{hgs} CH_4$ ⁴ (litre/hr)	Characteristic Hazardous gas Flow Rate Carbon Dioxide $Q_{hgs} CO_2$ ⁴ (litre/hr)
BH1	< 0.1	0.2	20.1	<1	<1	1026 R	0.04	<0.1	0.0001	0.0002
BH2	< 0.1	0.1	20.4	<1	<1	1026 R	0.09	<0.1	0.0001	0.0001
BH101	< 0.1	0.6	20.0	<1	<1	1026 R	0.17	0.1	0.0001	0.0006
BH102	< 0.1	0.3	20.2	<1	<1	1026 R	0.05	<0.1	0.0001	0.0003

NOTES:

1. Atm denotes atmospheric pressure. R: rising F: falling S: static (pressure trend is over day of measurement, as indicated on the record sheets).
2. Negative recorded flow/pressure values are indicative of flow from the atmosphere into the standpipe and are associated with negligible ground gas emissions to atmosphere.
3. Ground Gas Flow Rate (q) measured at the gas tap on monitoring standpipe.
4. Characteristic Hazardous Gas Flow Rate (Q_{hgs}) = ($C_{hg} / 100$) x q (from BS 8485:2015+A1:2019). This value has been calculated for each gas under highest recorded flow conditions. This parameter is similar to the "Gas Screening Value" (GSV) in NHBC/RSK Report 10627-R01.04 (2007) and in CIRIA C665 (2007).
5. Groundwater level data is also presented in Appendix III together with the ground gas measurements.
6. Ground Gas monitoring equipment: Geotech GA2000+ S/N 11567.

TABLE 5

GROUND GAS DATA SUFFICIENCY ASSESSMENT

The following assessment is based on Table F1: BS8576 (2013).

Action	Result
Recorded Ground Gas Regime	Characteristic Hazardous Gas Flow Rate ¹ : Methane 0.0001 litre/hr Characteristic Methane Concentration: < 0.1% Characteristic Hazardous Gas Flow Rate ¹ : Carbon dioxide 0.0006 litre/hr Characteristic Carbon dioxide Concentration: 0.6 % Other gases of concern: None Characteristic Situation (CS) ² CS 1
Increase in Ground Gas Concentration required increase level of risk/gas protection requirements.	Ground gas concentration (methane or carbon dioxide) would need to increase to 70%
Increase in Ground Gas Flow rate required increase level of risk/gas protection requirements.	Ground gas flow rate would require to increase to greater than 70 litre/hr for methane and 1.75 litre/hour for carbon dioxide
Likelihood of increase in Ground Gas Concentration required increase level of risk/gas protection requirements.	Effectively no likelihood of the above increase in ground gas values. There is no valid mechanism for a future increase in gas generation and associated flow rates.
Likelihood of increase in Ground Gas Flow Rate required increase level of risk/gas protection requirements.	
Conclusion: Requirement for Additional Ground Gas Monitoring	No – Based on the above assessment, additional ground gas monitoring is not required to support an assessment compliant with BS8485:2015+A1:2019 and BS8576:2013.

NOTES:

1. Characteristic Hazardous Gas Flow Rate as defined in BS8485:2015+A1:2019. This parameter is synonymous with the “Gas Screening Value” (GSV) in NHBC/RSK Report 10627-R01.04 (2007) and in CIRIA C665 (2015).
2. Reference should also be made to the accompanying detailed assessment presented in Section 7 of the report.

TABLE 6

ASSESSMENT OF CONTAMINANT LINKAGES

NOTES:

- 1. Contaminant linkage validity assessed following qualitative or semi-quantitative risk assessment.
- 2. Contaminant linkage assessed following detailed quantitative risk assessment or assuming the recommended remediation or mitigation measures are in place.

		Consequence (C)			
		Severe	Medium	Mild	Minor
Probability (P)	High likelihood (HL)	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely (L)	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low likelihood (LL)	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely (UL)	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

All terminology in accordance with the definitions provided in CIRIA C552 (2001)

Contaminant Linkage			Assessment of Contaminant Linkage following Ground Investigation	Contaminant Linkage Valid? ¹	Risk Rating			Quantitative Risk Assessment	Recommended Remediation/Mitigation (See Section 7 for further details)	Recommended Work Verified?	Contaminant Linkage Valid? ²
Source	Pathway	Receptor			C	P	Risk				
Toxic heavy metals PAHs Petroleum hydrocarbons VOCs Asbestos	Ingestion (dust), Dermal (dust), Inhalation (dust)	End Users	All tests below concentrations considered to be a short-term (acute) risk. No further assessment required. None detected	No No	N/A N/A	N/A N/A	N/A N/A	Not applicable	Not required	Not applicable	No
Toxic heavy metals PAHs Petroleum hydrocarbons VOCs Asbestos	Ingestion (dust), Dermal (dust), Inhalation (dust)	Construction Workers	All tests below concentrations considered to be a short-term (acute) risk. No further assessment required. None detected	No No	N/A N/A	N/A N/A	N/A N/A	Not applicable	Not applicable but standard personal protective equipment is recommended as good practice. Conventional dust control and soil dampening to be used during construction.	Not applicable	No
Toxic heavy metals PAHs Petroleum hydrocarbons VOCs Asbestos	Ingestion (dust), Dermal (dust), Inhalation (dust)	Neighbours/general public	All tests below concentrations considered to be a short-term (acute) risk. No further assessment required. None detected	No No	N/A N/A	N/A N/A	N/A N/A	Not applicable	Not required but dust suppression techniques to be used during construction in line with good practice.	Not applicable	No
Phytotoxic Metals	Plant uptake		Phytotoxic metals not identified at concentrations considered to be unacceptable to healthy plant growth based on BS 3882:2015.	No	N/A	N/A	N/A	Not applicable	Not required	Not applicable	No

Gravesham Borough Council

FIGURES

FIGURE 1

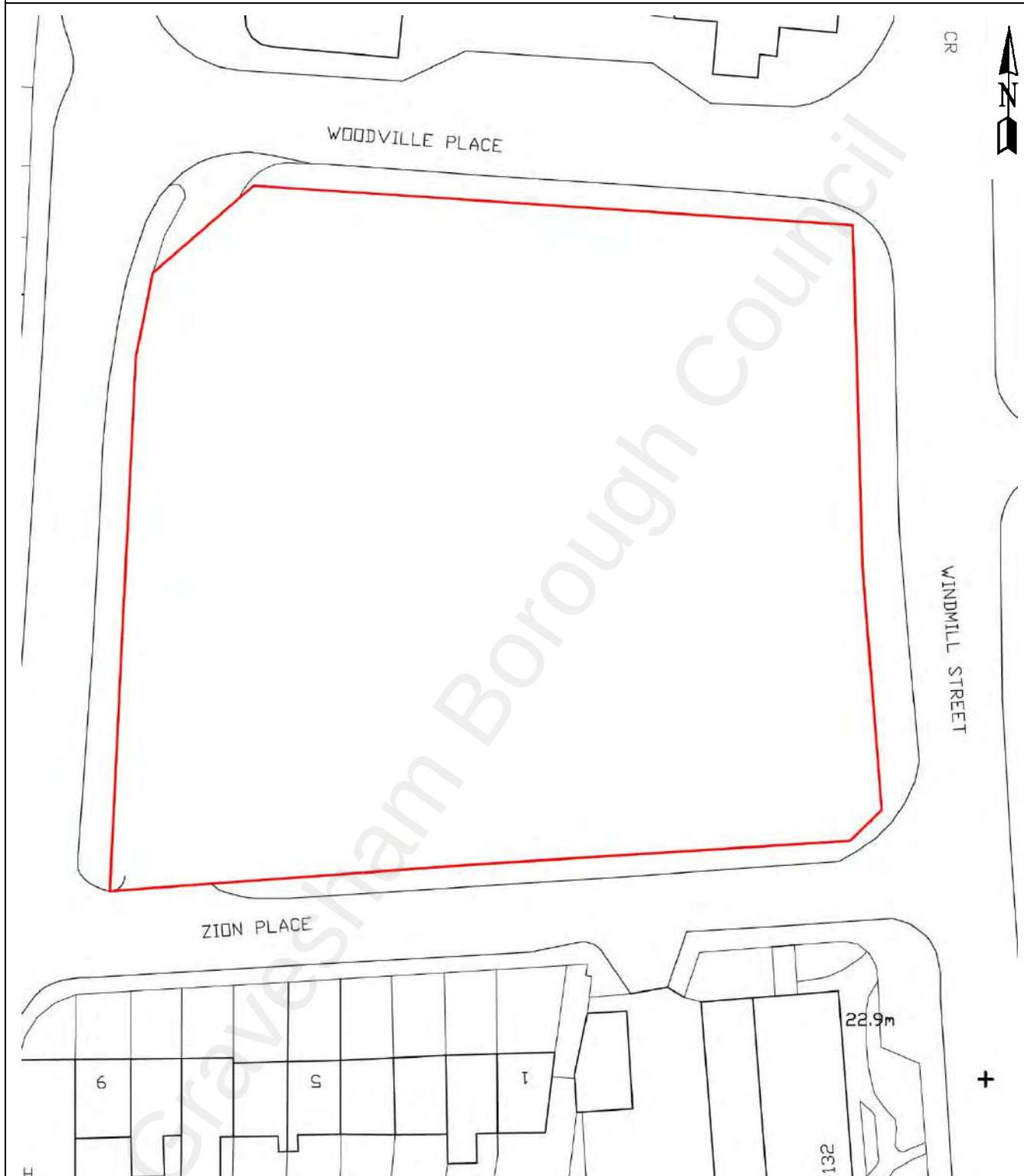


SITE LOCATION PLAN

Scale 1: 50,000

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FIGURE 2



SITE PLAN

Scale 1:500

Reproduced from drawing No. 21 SE018_LP_001, by Planning Issues dated August 2021



Scale: 1:250

Crossfield
CONSULTING
GEOTECHNICAL ENVIRONMENTAL

FIGURE 4



PROPOSEDD DEVELOPMENT PLAN
Scale: 1:250

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APPENDIX I

APPENDIX I – HISTORICAL INFORMATION

GroundSure MapInsight

Historical Ordnance Survey County Series and National Grid maps, as part of Groundsure's MapInsight package, have been obtained from Emapsite. Only map extracts that indicate relevant changes to the site and surrounding area are presented in this Appendix and discussed further in Section 2.3 of the report. A complete list of the maps received in the MapInsight package is given below in Table I-1. A full copy of the MapInsight package can be provided on request.

TABLE I-1

Large Scale Maps 25" County Series/1:2500 National Grid Series/1:1250 LandLine	Small Scale Maps 6" County Series/1:10,000 National Grid Series
1864-1865	1863
1866	1865
1864-1866	1888
1866	1895
1897	1895-1898
1909	1895-1899
1932-1933	1907
1939	1916
1953	1923
1953	1931-1932
1954	1938
1972-1975	1946
1978	1948
1983-1988	1955
1991-1994	1966-1967
2003	1971-1973
	1977-1982
	1990-1992
	2001
	2010
	2021



emapsite™

Site Details:

Land at Former Police Station,
Windmill Street,
Gravesend, Former Police
Station, Windmill
Street, Gravesend, DA12 1DD

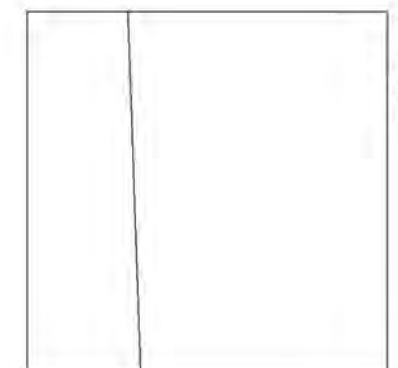
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Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: County Series

Map date: 1866

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1866
Revised 1866
Edition N/A
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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



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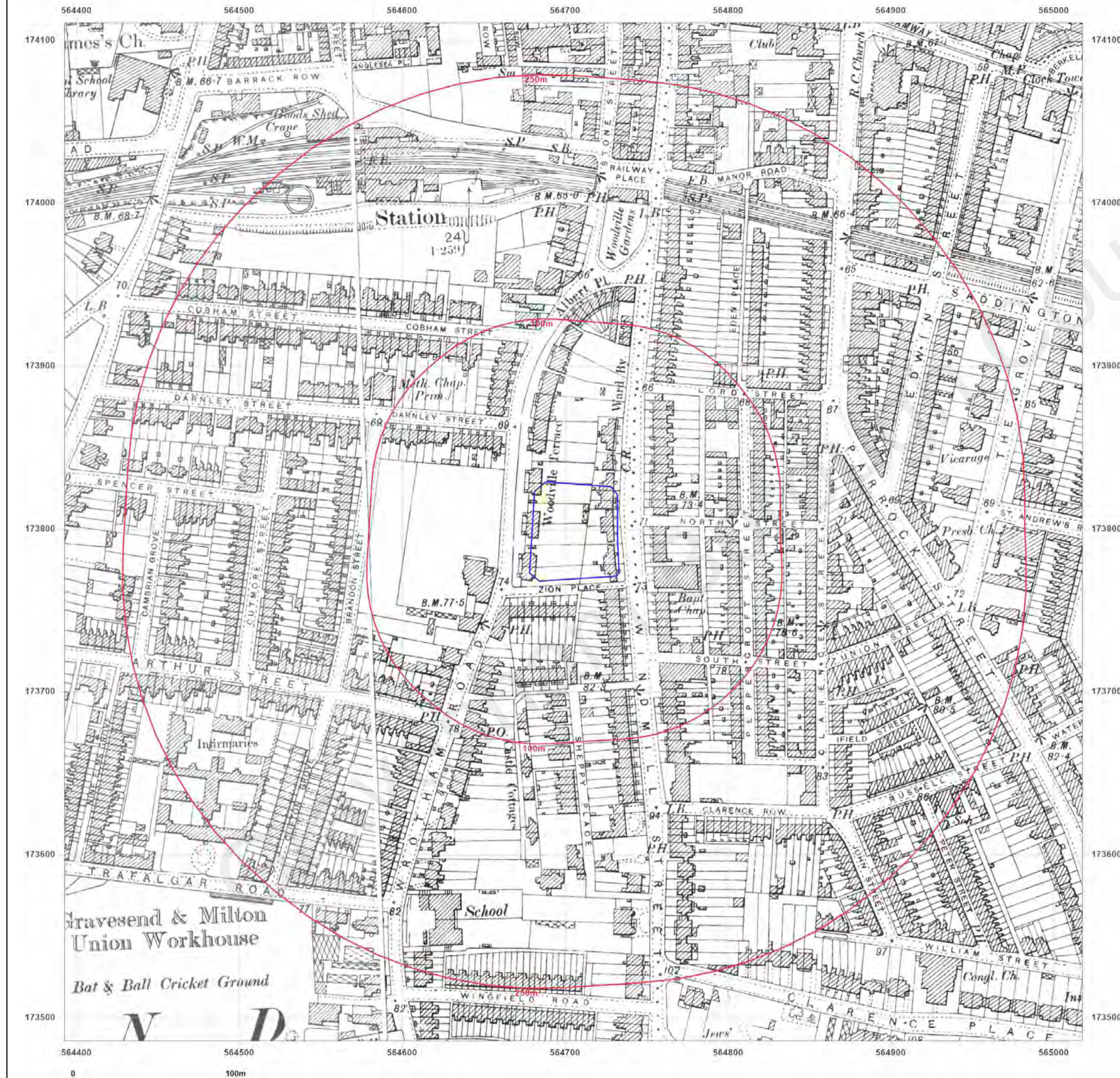


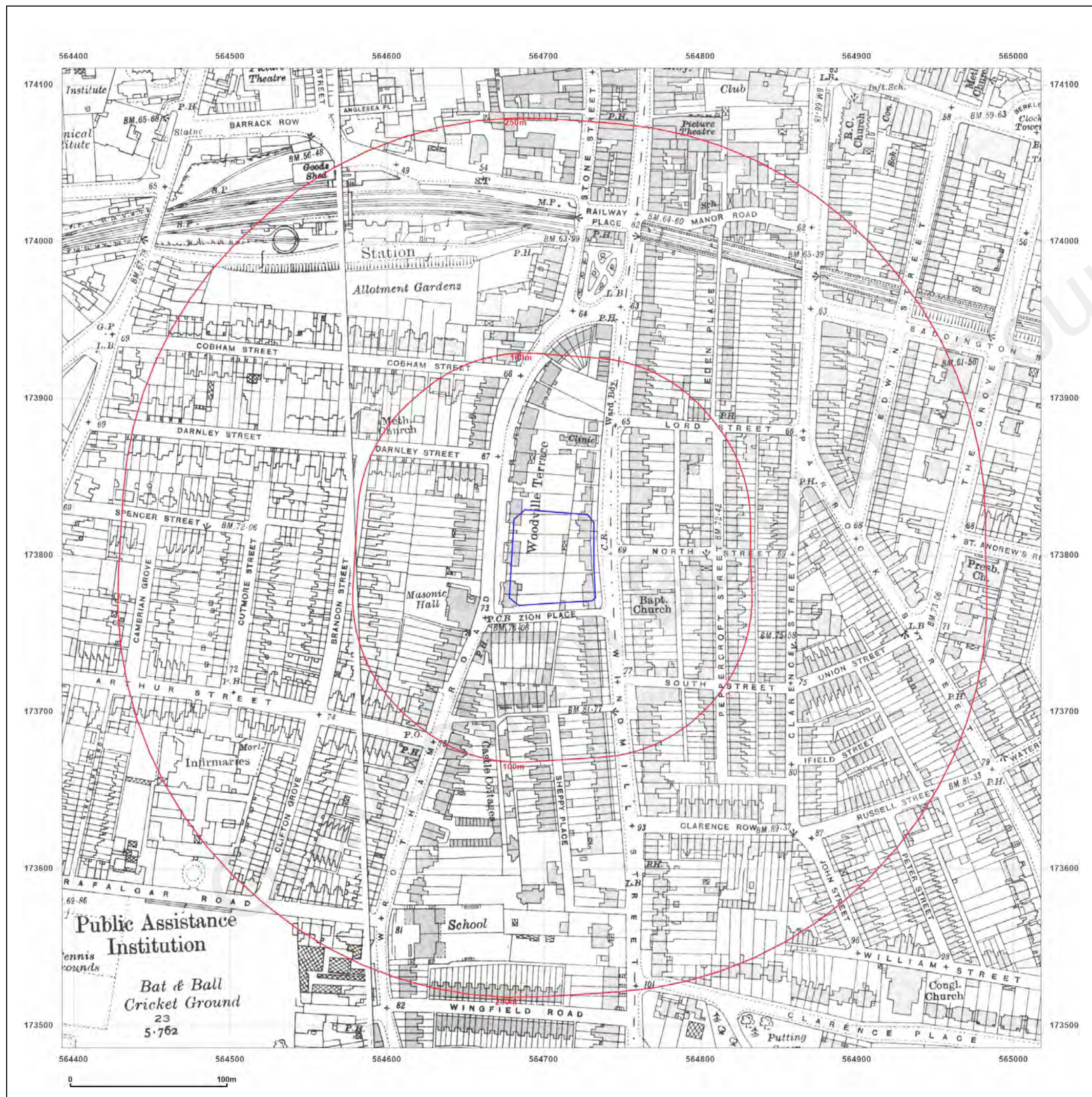
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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: County Series

Map date: 1932-1933

Scale: 1:2,500

Printed at: 1:2,500



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Edition N/A
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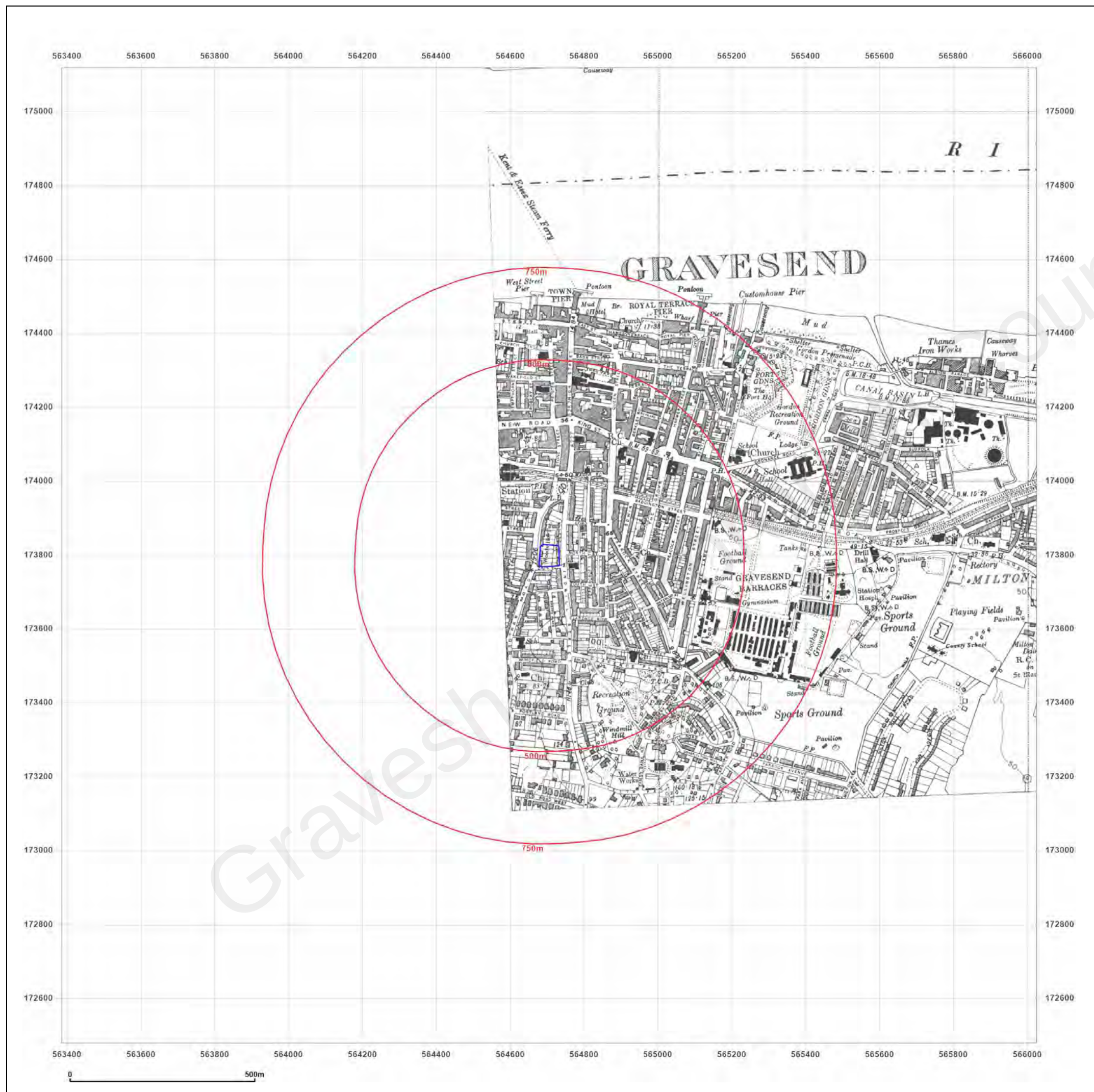


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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: County Series

Map date: 1948

Scale: 1:10,560

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Street, Gravesend, DA12 1DD

Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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Revised 1953
Edition N/A
Copyright N/A
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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 1972-1975

Scale: 1:1,250

Printed at: 1:2,000



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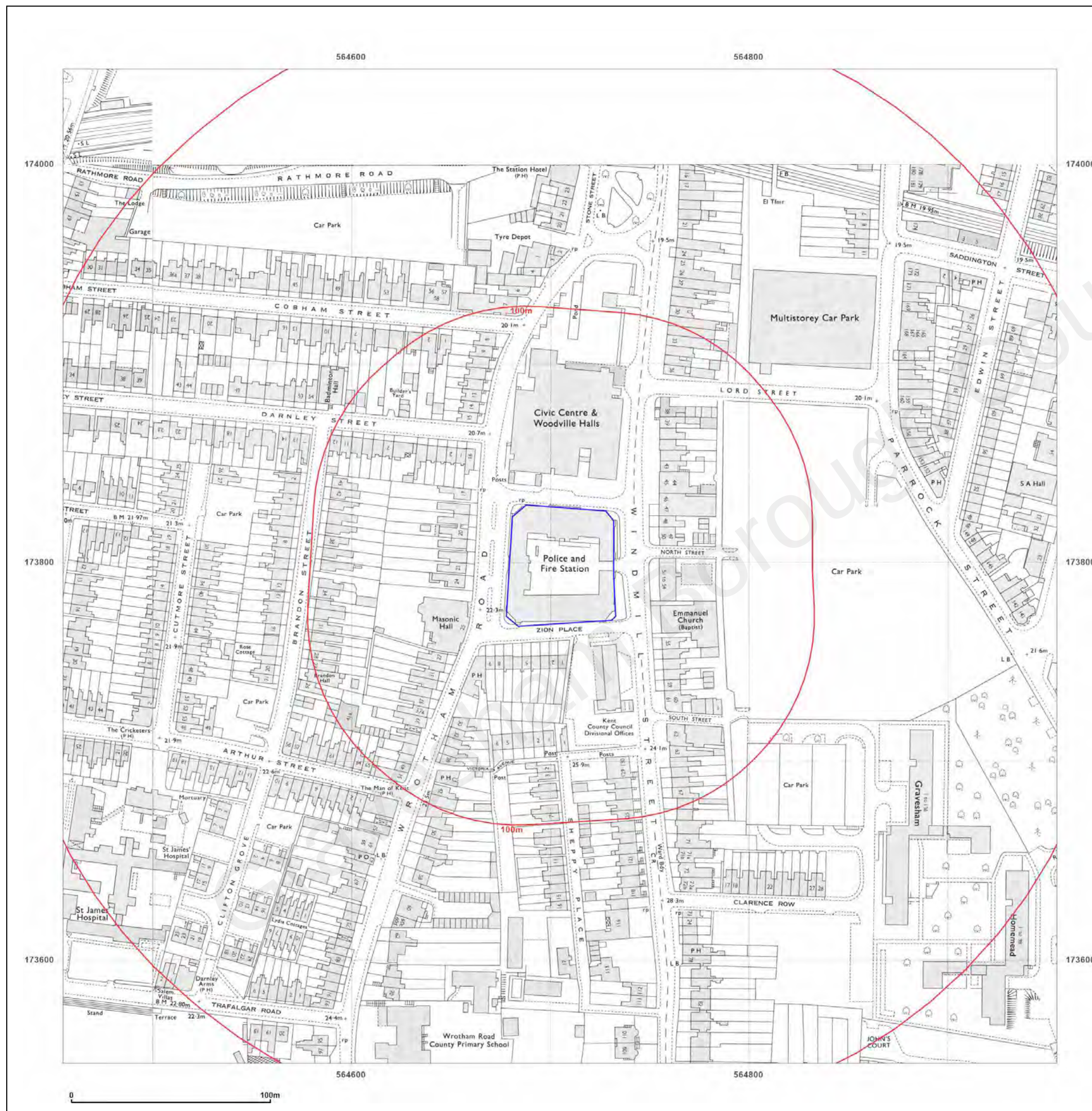


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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 1978

Scale: 1:1,250

Printed at: 1:2,000



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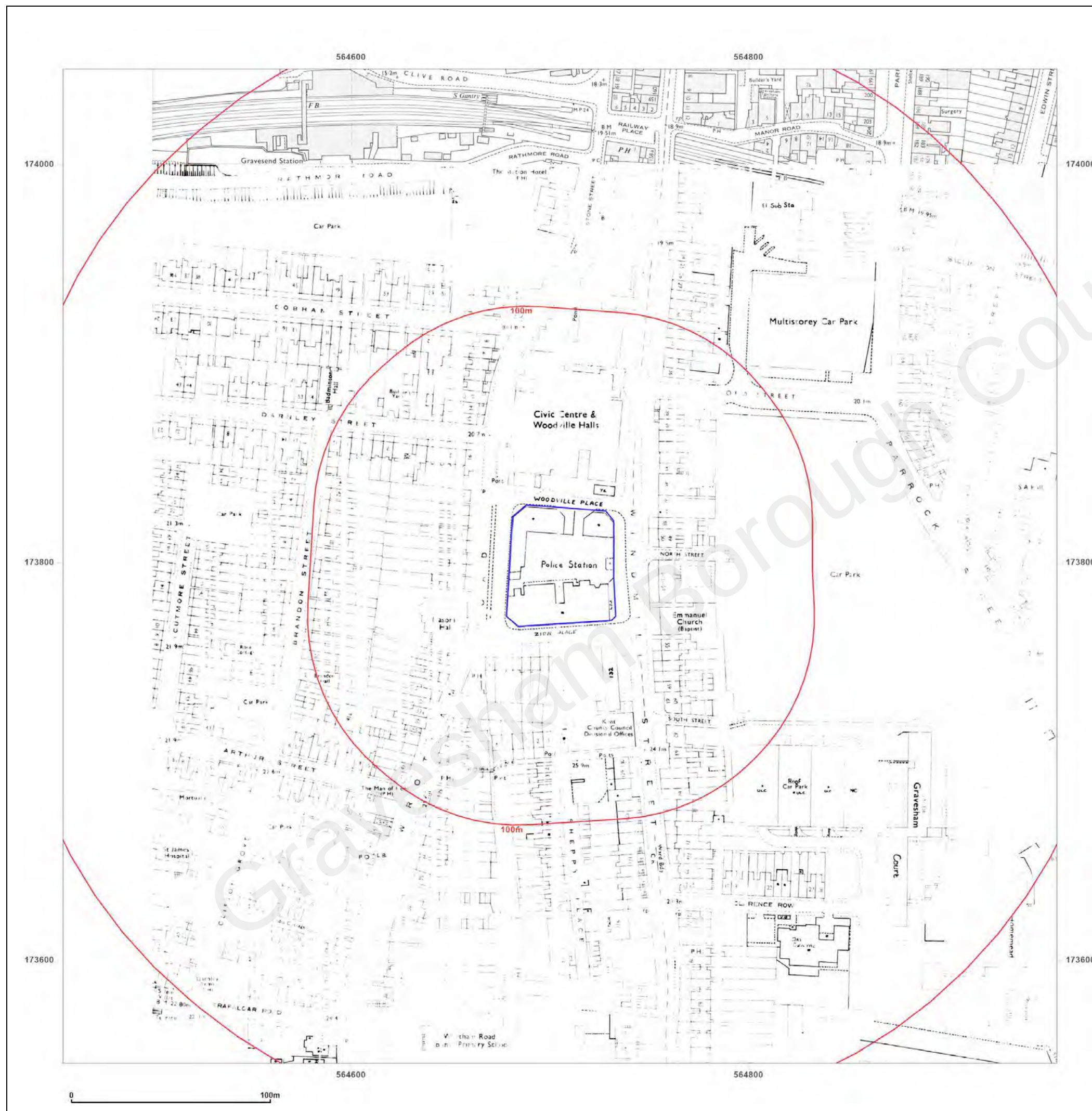


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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 1983-1988

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A
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Revised 1983
Edition N/A
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Edition N/A
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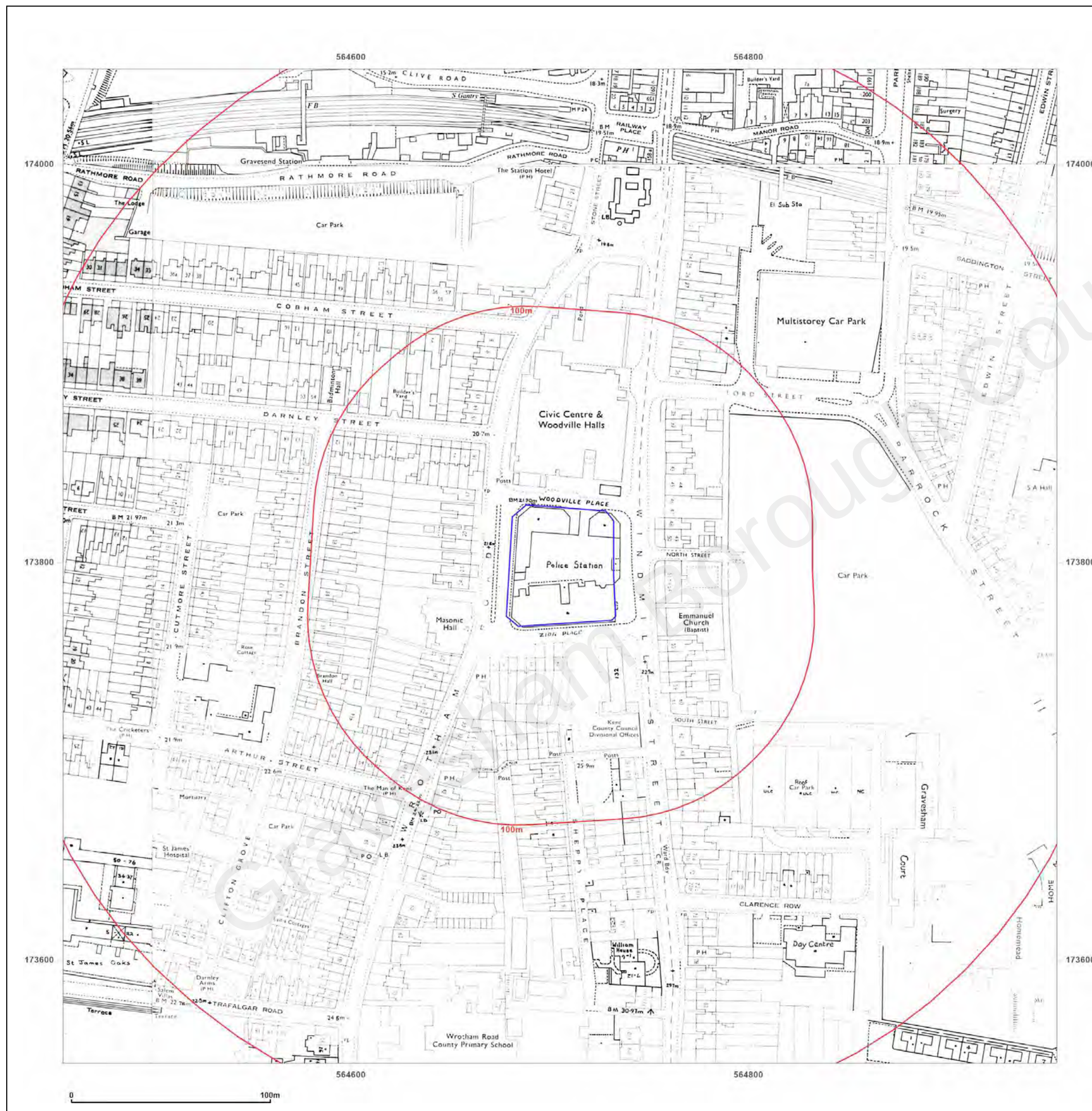


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Client Ref: EMS_734613_955887
Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 1991-1994

Scale: 1:1,250

Printed at: 1:2,000



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Revised N/A
Edition N/A
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Levelled 1983

Surveyed N/A
Revised N/A
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Report Ref: EMS-734613_955887
Grid Ref: 564705, 173798

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Client Ref: EMS_734613_955887
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Grid Ref: 564705, 173798

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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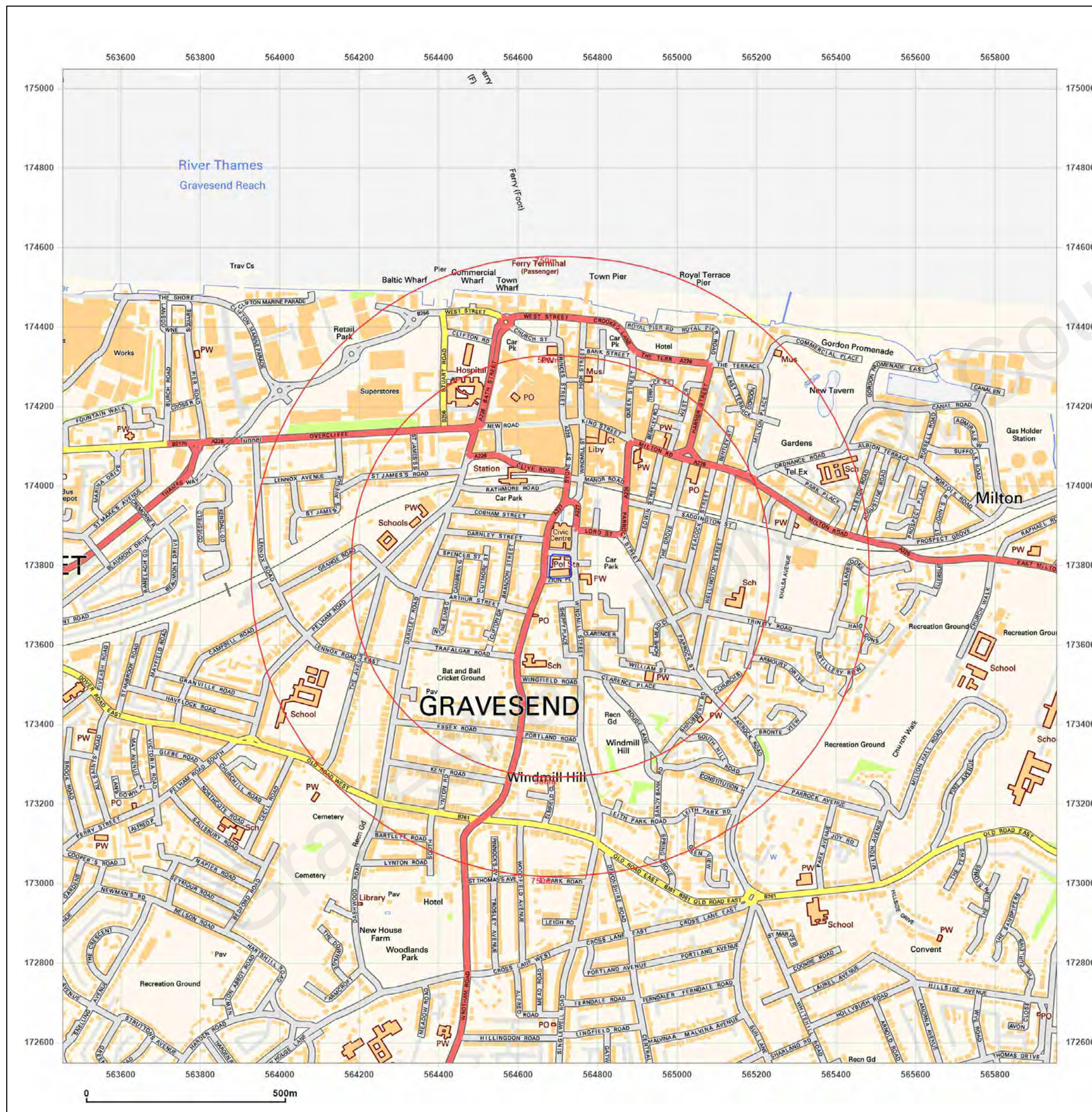


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Map Name: National Grid

Map date: 2021

Scale: 1:10,000

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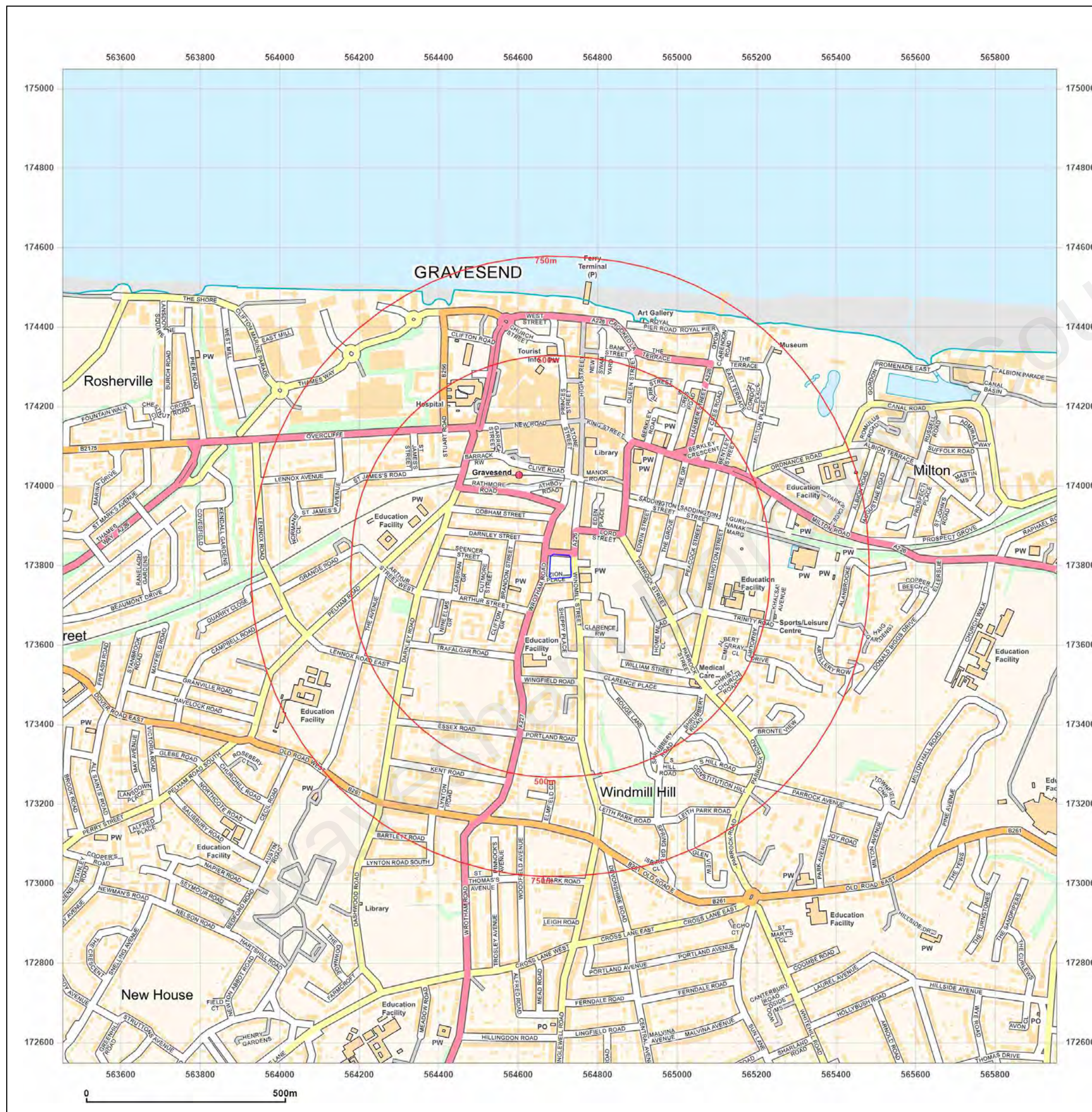


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APPENDIX II

APPENDIX II – DESK STUDY INFORMATION

Groundsure Enviro+Geo Insight Databases

An Enviro+Geo Insight Report has been obtained from Groundsure for the site and surrounding area. The databases compile information from a variety of sources and includes entries that cover Environment Agency permits, waste sites, hazardous substances, geological data, industrial landuse, groundwater vulnerability, source protection zones and floodplains.

Also included is reference to databases that cover geological data, including information regarding mining/mineral extraction, natural cavities, landslips and other geohazards.

A report is included in this Appendix for a search radius of up to 1 km around the site and that report includes a summary table of the search results. Detailed information contained in the report has been included only if it is relevant to the geotechnical and environmental assessment. All other pages have been omitted. A full copy of the GroundSure Report can be provided on request.

Kent County Council

A petroleum tank enquiry has been obtained from Kent County Council relating to the site. The enquiry carries out a check of all information, current and archived paper records, relating to the presence of current or historical fuel tanks within the site or within the immediate vicinity.

British Geological Survey

Records of Wells and Exploratory Holes close to the site, held by the British Geological Survey National Geological Records Centre, are presented in this Appendix. The locations of these holes are identified within a plan provided in this Appendix. The records are reproduced under the Open Government Licence, available for viewing at <http://www.nationalarchives.gov.uk/doc/open-government-licence>.

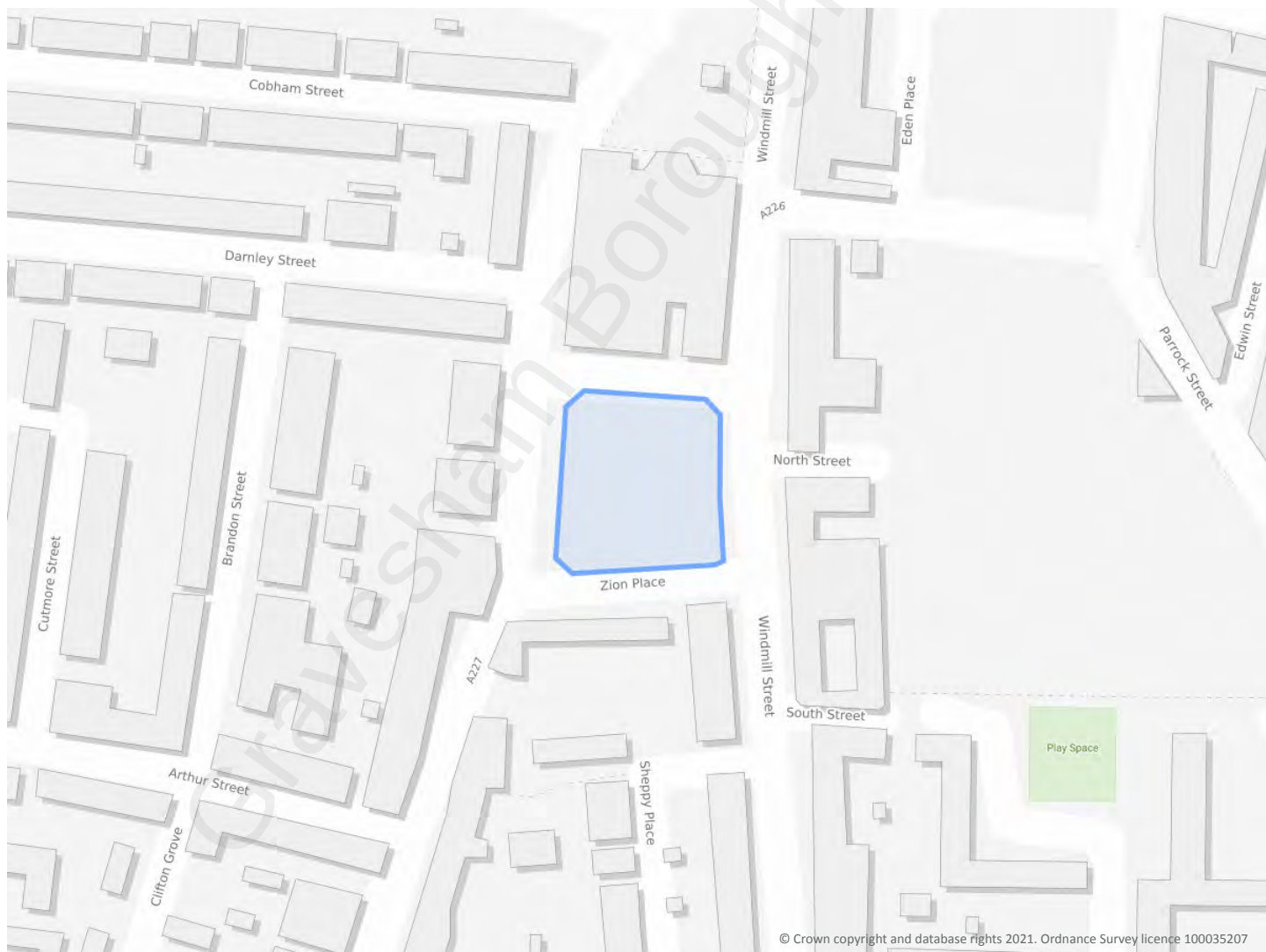
Land at Former Police Station, Windmill Street, Gravesend, Former Police Station, Windmill Street, Gravesend, DA12 1DD

Order Details

Date: 01/11/2021
Your ref: EMS_734613_955888
Our Ref: EMS-734613_955888
Client: emapsite

Site Details

Location: 564705 173797
Area: 0.3 ha
Authority: [Gravesham Borough Council](#)



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Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

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Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	2	0	76	125	-
22	1.2	<u>Historical tanks</u>	0	0	1	18	-
23	1.3	<u>Historical energy features</u>	0	0	2	22	-
24	1.4	Historical petrol stations	0	0	0	0	-
24	1.5	<u>Historical garages</u>	0	0	8	25	-
26	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
27	2.1	<u>Historical industrial land uses</u>	3	0	101	166	-
37	2.2	<u>Historical tanks</u>	0	0	1	36	-
39	2.3	<u>Historical energy features</u>	0	0	3	50	-
41	2.4	Historical petrol stations	0	0	0	0	-
41	2.5	<u>Historical garages</u>	0	0	16	41	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
44	3.1	Active or recent landfill	0	0	0	0	-
44	3.2	Historical landfill (BGS records)	0	0	0	0	-
45	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
45	3.4	<u>Historical landfill (EA/NRW records)</u>	0	0	1	0	-
45	3.5	Historical waste sites	0	0	0	0	-
45	3.6	Licensed waste sites	0	0	0	0	-
46	3.7	<u>Waste exemptions</u>	0	0	10	6	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
48	4.1	<u>Recent industrial land uses</u>	0	0	19	-	-
50	4.2	<u>Current or recent petrol stations</u>	0	0	0	2	-
50	4.3	Electricity cables	0	0	0	0	-
50	4.4	Gas pipelines	0	0	0	0	-
50	4.5	Sites determined as Contaminated Land	0	0	0	0	-

50	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
51	4.7	Regulated explosive sites	0	0	0	0	-
51	4.8	<u>Hazardous substance storage/usage</u>	0	0	0	1	-
51	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
51	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
52	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	2	2	-
52	4.12	Radioactive Substance Authorisations	0	0	0	0	-
53	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
53	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
53	4.15	Pollutant release to public sewer	0	0	0	0	-
53	4.16	List 1 Dangerous Substances	0	0	0	0	-
53	4.17	List 2 Dangerous Substances	0	0	0	0	-
54	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	2	0	-
54	4.19	Pollution inventory substances	0	0	0	0	-
54	4.20	Pollution inventory waste transfers	0	0	0	0	-
55	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
56	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
57	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
59	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
60	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
60	5.5	Groundwater vulnerability- local information	None (within 0m)				
61	5.6	<u>Groundwater abstractions</u>	0	0	0	0	8
63	5.7	Surface water abstractions	0	0	0	0	0
64	5.8	<u>Potable abstractions</u>	0	0	0	0	1
64	5.9	<u>Source Protection Zones</u>	0	0	1	2	-
64	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
66	6.1	Water Network (OS MasterMap)	0	0	0	-	-

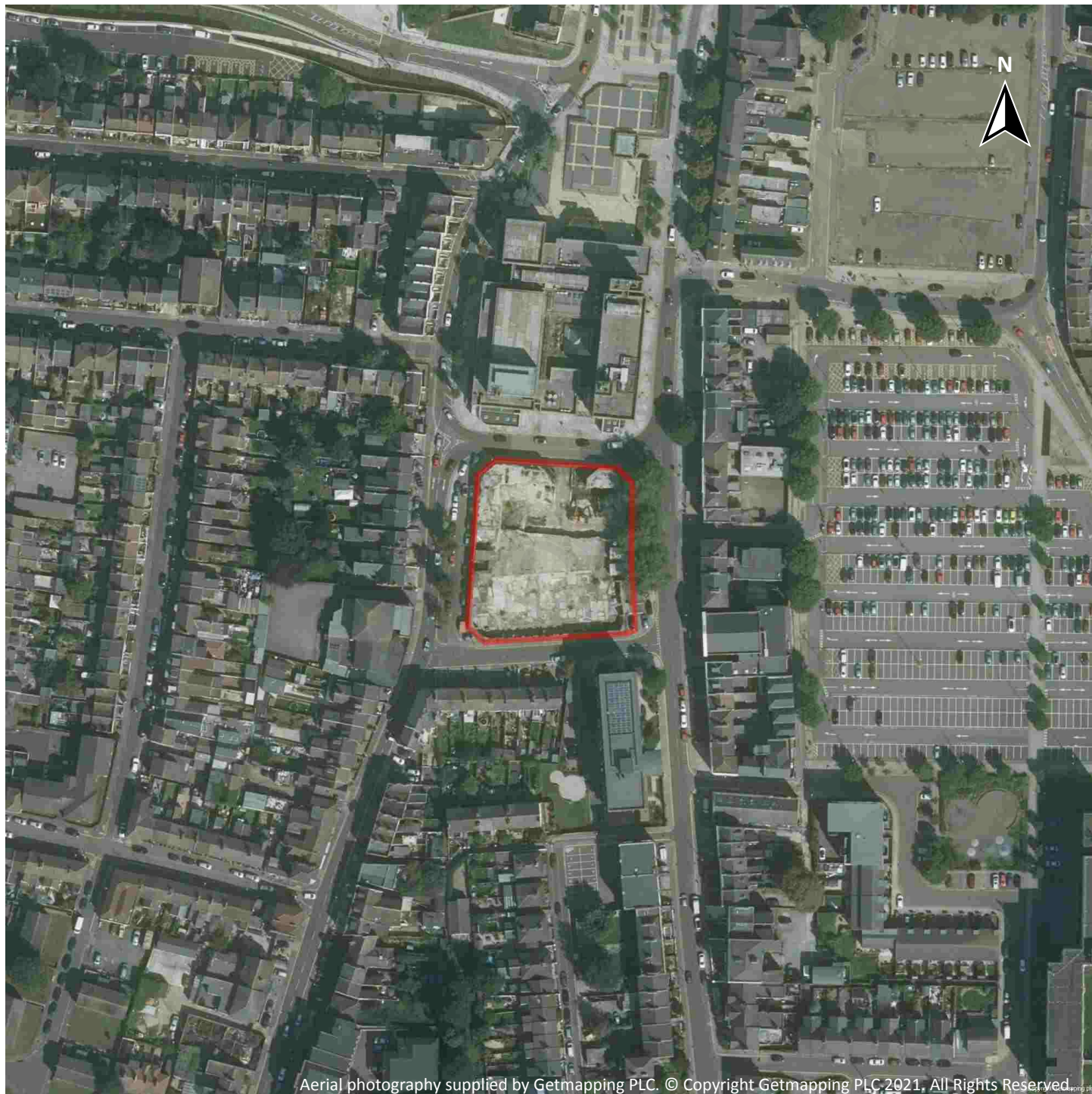
66	6.2	Surface water features	0	0	0	-	-
67	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
67	6.4	WFD Surface water bodies	0	0	0	-	-
67	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
69	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
69	7.2	Historical Flood Events	0	0	0	-	-
69	7.3	Flood Defences	0	0	0	-	-
70	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
70	7.5	Flood Storage Areas	0	0	0	-	-
71	7.6	Flood Zone 2	None (within 50m)				
71	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
72	8.1	Surface water flooding	Negligible (within 50m)				
Page	Section	Groundwater flooding					
73	9.1	<u>Groundwater flooding</u>	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
74	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
74	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
74	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
74	10.4	Special Protection Areas (SPA)	0	0	0	0	0
75	10.5	National Nature Reserves (NNR)	0	0	0	0	0
75	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
75	10.7	Designated Ancient Woodland	0	0	0	0	0
75	10.8	Biosphere Reserves	0	0	0	0	0
76	10.9	Forest Parks	0	0	0	0	0
76	10.10	Marine Conservation Zones	0	0	0	0	0
76	10.11	Green Belt	0	0	0	0	0
76	10.12	Proposed Ramsar sites	0	0	0	0	0

76	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
77	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
77	10.15	Nitrate Sensitive Areas	0	0	0	0	0
77	10.16	<u>Nitrate Vulnerable Zones</u>	0	0	0	0	3
78	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
79	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
80	11.1	World Heritage Sites	0	0	0	-	-
81	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
81	11.3	National Parks	0	0	0	-	-
81	11.4	<u>Listed Buildings</u>	0	3	8	-	-
82	11.5	<u>Conservation Areas</u>	1	1	2	-	-
82	11.6	Scheduled Ancient Monuments	0	0	0	-	-
83	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
84	12.1	<u>Agricultural Land Classification</u>	Urban (within 250m)				
85	12.2	Open Access Land	0	0	0	-	-
85	12.3	Tree Felling Licences	0	0	0	-	-
85	12.4	Environmental Stewardship Schemes	0	0	0	-	-
85	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
86	13.1	Priority Habitat Inventory	0	0	0	-	-
86	13.2	Habitat Networks	0	0	0	-	-
86	13.3	Open Mosaic Habitat	0	0	0	-	-
86	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
87	14.1	<u>10k Availability</u>	Identified (within 500m)				
88	14.2	<u>Artificial and made ground (10k)</u>	0	0	1	2	-
89	14.3	<u>Superficial geology (10k)</u>	0	0	0	1	-

90	14.4	Landslip (10k)	0	0	0	0	-
91	14.5	<u>Bedrock geology (10k)</u>	1	0	1	4	-
92	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
93	15.1	<u>50k Availability</u>	Identified (within 500m)				
94	15.2	<u>Artificial and made ground (50k)</u>	0	0	1	0	-
95	15.3	Artificial ground permeability (50k)	0	0	-	-	-
96	15.4	<u>Superficial geology (50k)</u>	0	0	0	1	-
97	15.5	Superficial permeability (50k)	None (within 50m)				
97	15.6	Landslip (50k)	0	0	0	0	-
97	15.7	Landslip permeability (50k)	None (within 50m)				
98	15.8	<u>Bedrock geology (50k)</u>	1	0	1	2	-
99	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
99	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
100	16.1	<u>BGS Boreholes</u>	0	0	24	-	-
Page	Section	Natural ground subsidence					
103	17.1	<u>Shrink swell clays</u>	Negligible (within 50m)				
104	17.2	<u>Running sands</u>	Low (within 50m)				
105	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
106	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
107	17.5	<u>Landslides</u>	Very low (within 50m)				
108	17.6	<u>Ground dissolution of soluble rocks</u>	Low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
110	18.1	<u>Natural cavities</u>	0	0	0	1	-
111	18.2	BritPits	0	0	0	0	-
111	18.3	Surface ground workings	0	0	0	-	-
111	18.4	<u>Underground workings</u>	0	0	0	0	6
112	18.5	Historical Mineral Planning Areas	0	0	0	0	-

<u>112</u>	<u>18.6</u>	<u>Non-coal mining</u>	1	0	0	5	9
<u>114</u>	<u>18.7</u>	<u>Mining cavities</u>	0	0	0	0	6
114	18.8	JPB mining areas	None (within 0m)				
115	18.9	Coal mining	None (within 0m)				
115	18.10	Brine areas	None (within 0m)				
115	18.11	Gypsum areas	None (within 0m)				
115	18.12	Tin mining	None (within 0m)				
115	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<u>116</u>	<u>19.1</u>	<u>Radon</u>	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<u>117</u>	<u>20.1</u>	<u>BGS Estimated Background Soil Chemistry</u>	1	0	-	-	-
117	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
117	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
118	21.1	Underground railways (London)	0	0	0	-	-
118	21.2	Underground railways (Non-London)	0	0	0	-	-
<u>119</u>	<u>21.3</u>	<u>Railway tunnels</u>	0	0	1	-	-
<u>119</u>	<u>21.4</u>	<u>Historical railway and tunnel features</u>	0	0	62	-	-
121	21.5	Royal Mail tunnels	0	0	0	-	-
122	21.6	Historical railways	0	0	0	-	-
<u>122</u>	<u>21.7</u>	<u>Railways</u>	0	0	13	-	-
123	21.8	Crossrail 1	0	0	0	0	-
123	21.9	Crossrail 2	0	0	0	0	-
123	21.10	HS2	0	0	0	0	-

Recent aerial photograph



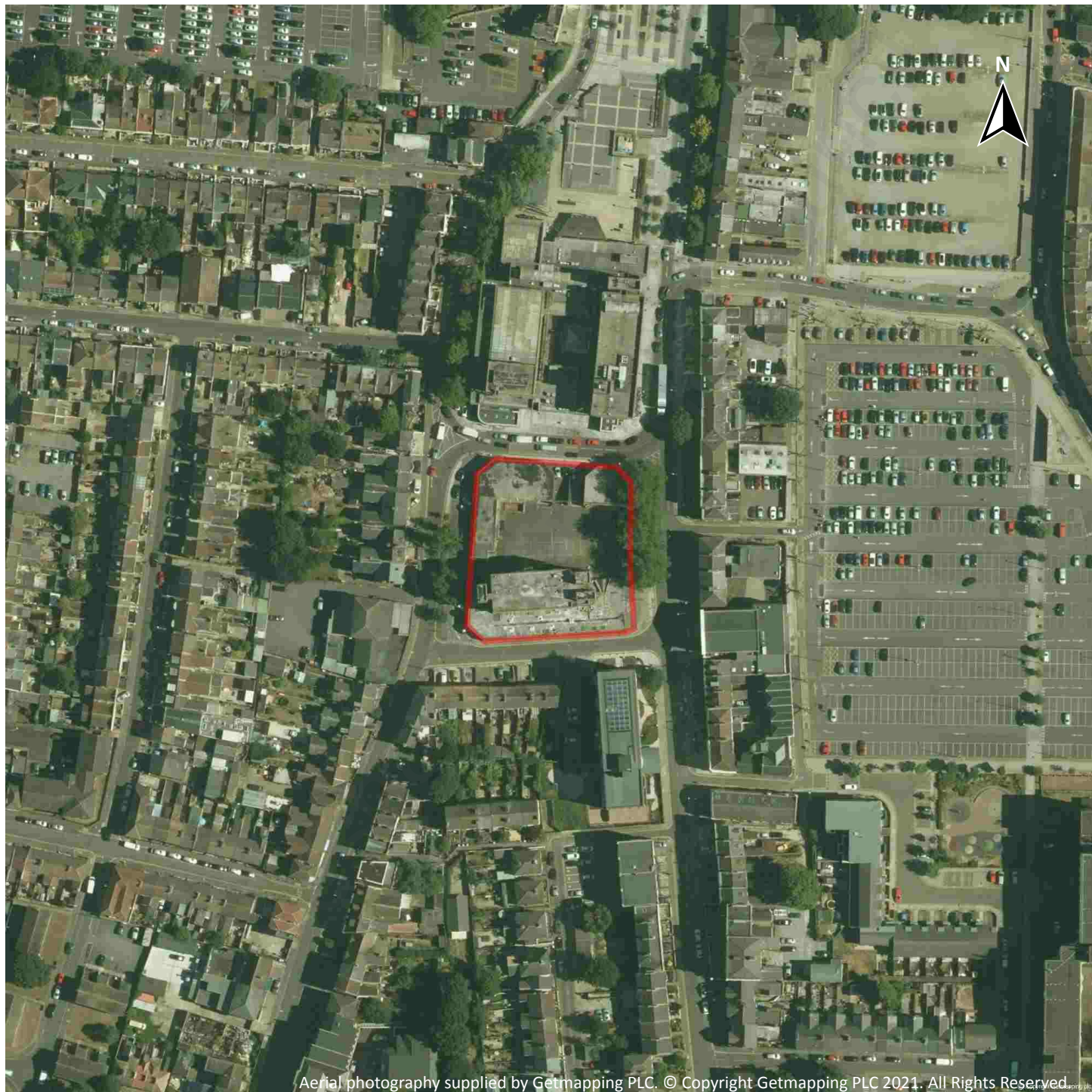
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2021. All Rights Reserved

Capture Date: 01/09/2018

Site Area: 0.3ha



Recent site history - 2015 aerial photograph



Capture Date: 30/06/2015

Site Area: 0.3ha



Recent site history - 2012 aerial photograph

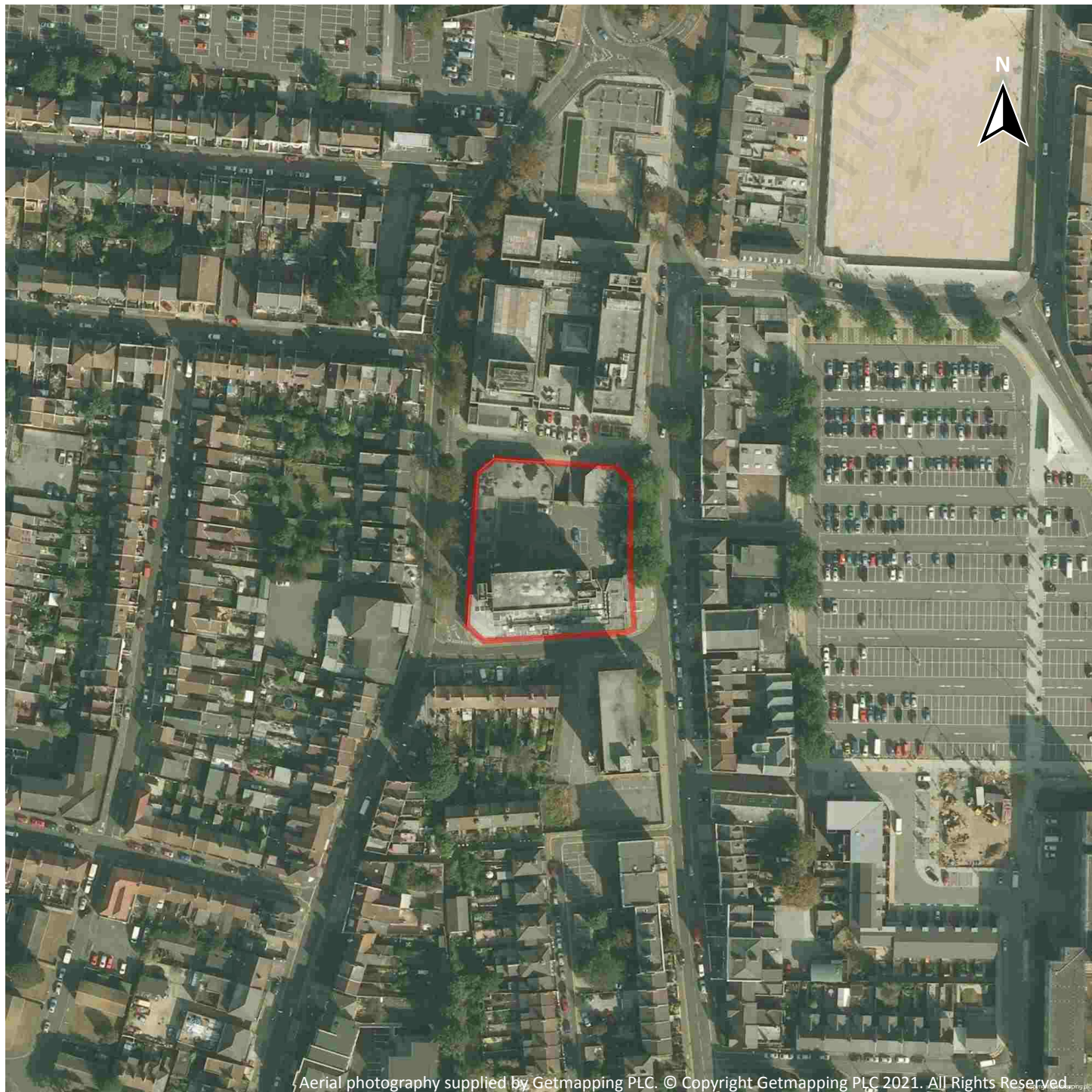


Capture Date: 25/05/2012

Site Area: 0.3ha



Recent site history - 2009 aerial photograph



Capture Date: 27/09/2009

Site Area: 0.3ha



Recent site history - 1999 aerial photograph

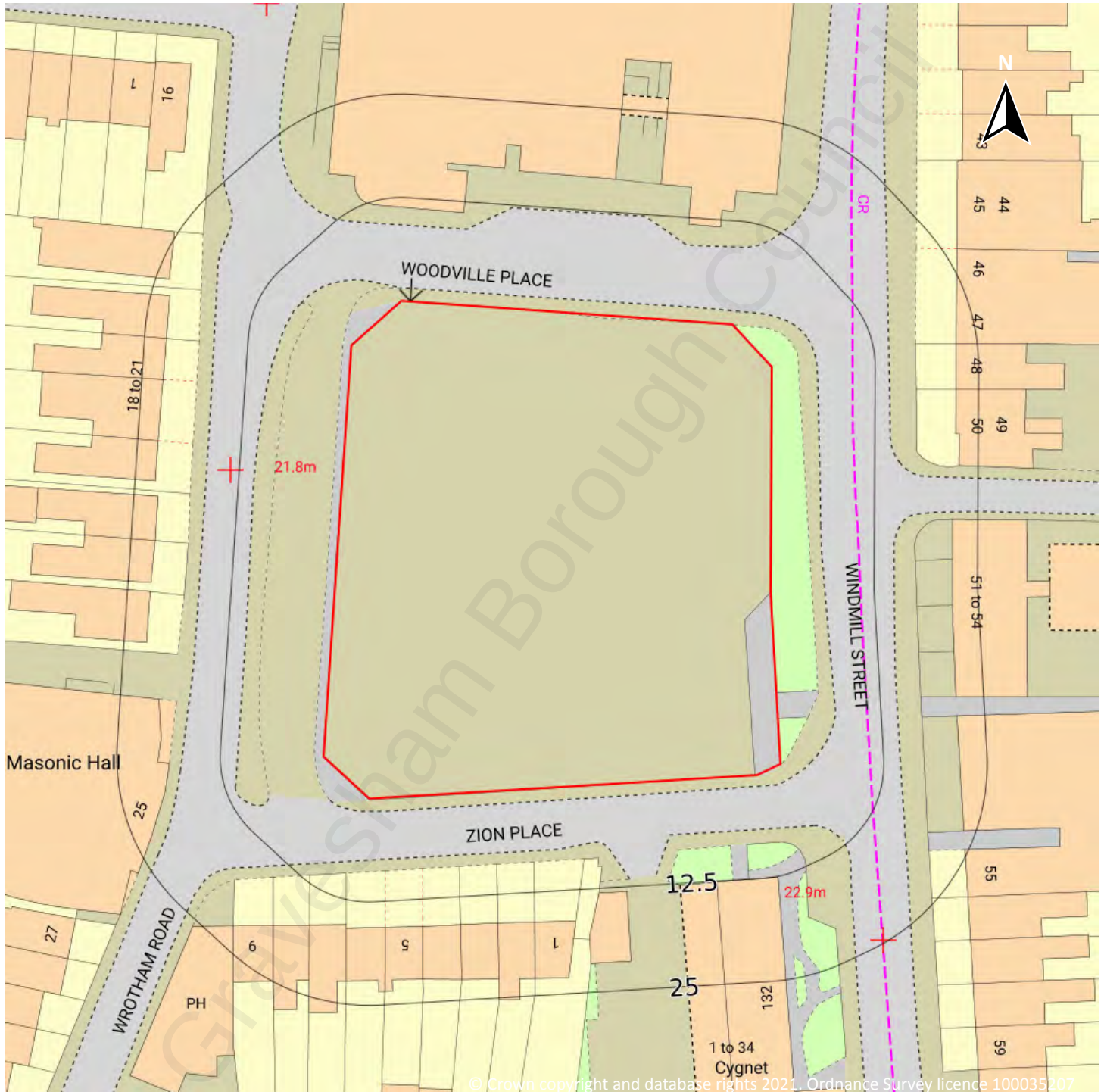


Capture Date: 03/09/1999

Site Area: 0.3ha



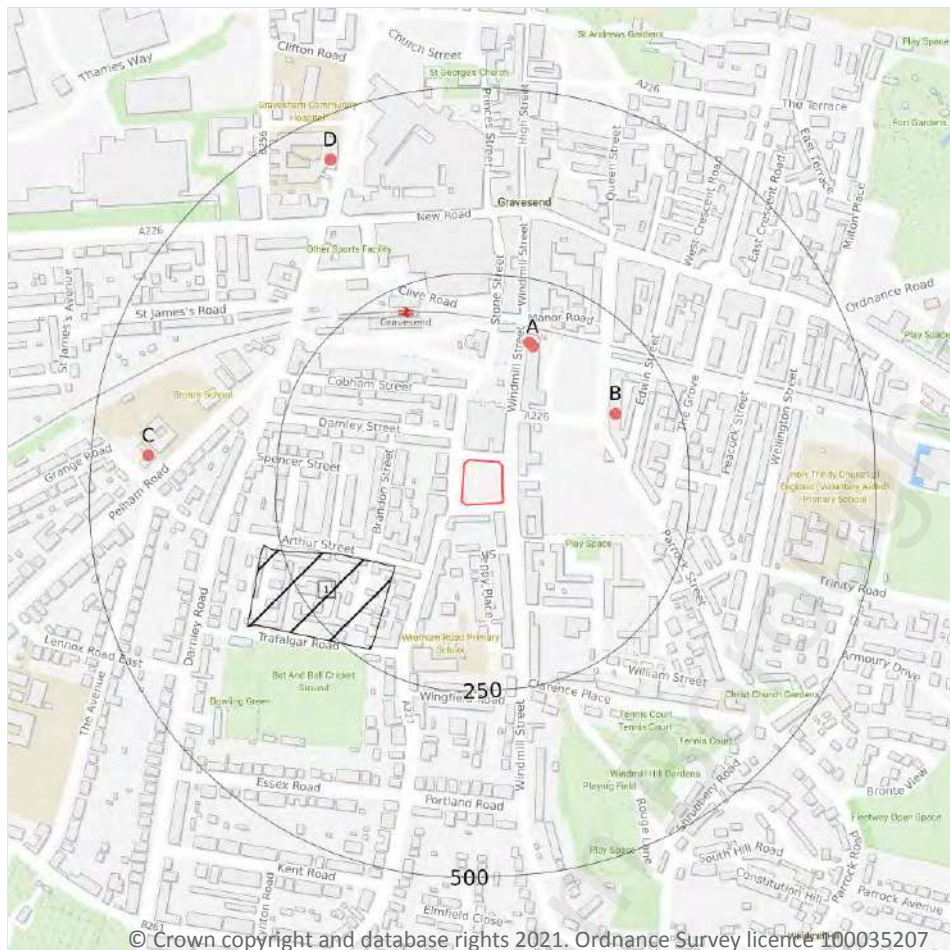
OS MasterMap site plan



Site Area: 0.3ha



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Historical landfill (EA/NRW)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.



3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m

1

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 44**

ID	Location	Details		
1	124m SW	Site Address: Nine Elms, Gravesend, Kent Licence Holder Address: -	Waste Licence: - Site Reference: GR7 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded: - Last Recorded: -

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m

0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m

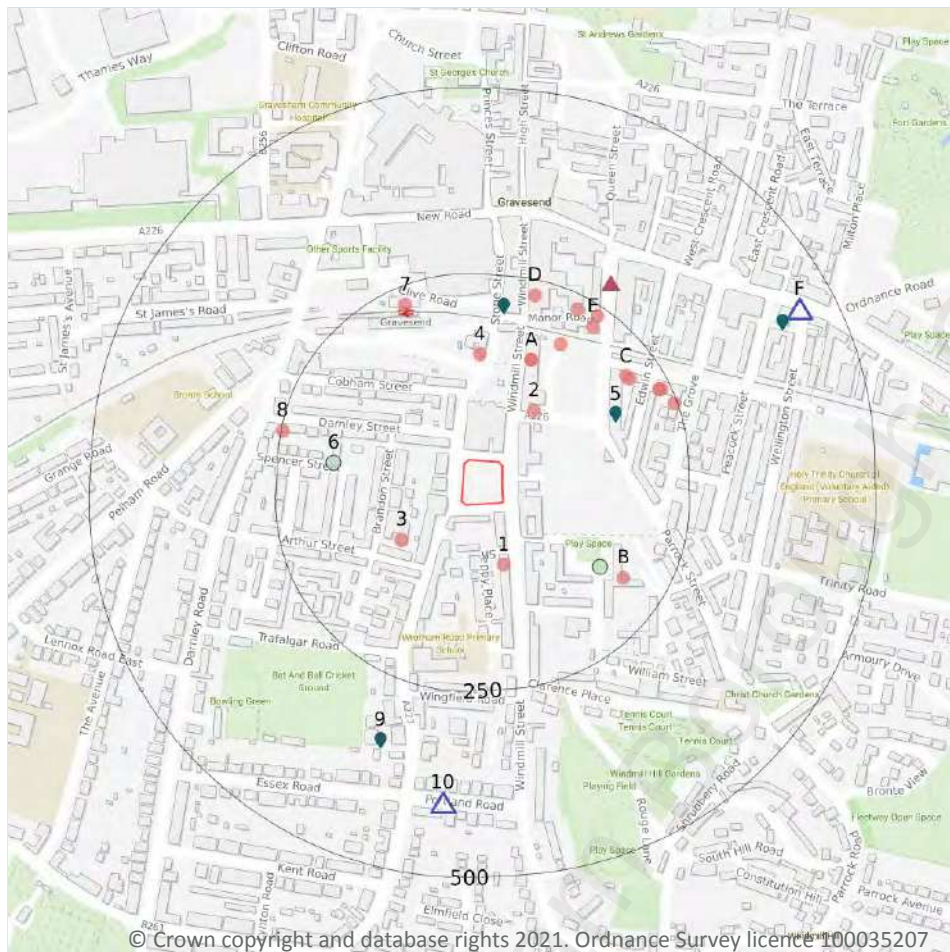
16

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 44**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	161m N	19, WINDMILL STREET, GRAVESEND, DA12 1AS	WEX144855	Treating waste exemption	Not on a farm	Sorting mixed waste
A	161m N	19, WINDMILL STREET, GRAVESEND, DA12 1AS	WEX144855	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	161m N	19, WINDMILL STREET, GRAVESEND, DA12 1AS	WEX144855	Storing waste exemption	Not on a farm	Storage of waste in secure containers
A	164m N	19 Windmill Street GRAVESEND Kent DA12 1AS	EPR/EF0307CK /A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Treating waste exemption	Not on a farm	Treatment of waste aerosol cans
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Using waste exemption	Not on a farm	Use of waste in construction
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Using waste exemption	Not on a farm	Use of mulch
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Using waste exemption	Not on a farm	Spreading of plant matter to confer benefit
B	167m NE	Existing Car Park, PARROCK STREET, GRAVESEND, DA12 1ER	WEX001127	Using waste exemption	Not on a farm	Use of waste for a specified purpose
C	424m W	THE GRANGE, 17, PELHAM ROAD, GRAVESEND, DA11 0HN	WEX155443	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal

4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- ▲ Current or recent petrol stations
- ▲ Hazardous substance storage/usage
- Licensed pollutant release (Part A(2)/B)
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

19

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 48**

ID	Location	Company	Address	Activity	Category
1	83m S	U Cargo	Third Floor Windmill House, Windmill Street, Gravesend, Kent, DA12 1BL	Distribution and Haulage	Transport, Storage and Delivery
2	84m NE	Waterman House	1, Lord Street, Gravesend, Kent, DA12 1AW	Business Parks and Industrial Estates	Industrial Features
3	96m SW	Clutch Clinic	41a, Wrotham Road, Gravesend, Kent, DA11 0PN	Vehicle Repair, Testing and Servicing	Repair and Servicing



ID	Location	Company	Address	Activity	Category
4	143m N	S L C Alarms & CCTV	20, Stone Street, Gravesend, Kent, DA11 ONP	Electronic Equipment	Industrial Products
A	144m N	Bennett & Brown	21-24, Windmill Street, Gravesend, Kent, DA12 1AS	Furniture	Consumer Products
A	144m N	Bennett & Brown	21-24, Windmill Street, Gravesend, Kent, DA12 1AS	Beds and Bedding	Consumer Products
A	178m NE	Electricity Sub Station	Kent, DA12	Electrical Features	Infrastructure and Facilities
B	191m SE	Electricity Sub Station	Kent, DA12	Electrical Features	Infrastructure and Facilities
C	205m NE	Darren Cruse Car Sales	2, Saddington Street, Gravesend, Kent, DA12 1ED	New Vehicles	Motoring
C	208m NE	W-i-security Ltd	4, Saddington Street, Gravesend, Kent, DA12 1ED	Electronic Equipment	Industrial Products
E	222m NE	Apex One Business Services Ltd	20, Manor Road, Gravesend, Kent, DA12 1AA	Distribution and Haulage	Transport, Storage and Delivery
7	225m N	Gravesend Rail Station	Kent, DA11	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure
D	230m N	Abaca Auto Electrics	Unit 7 Windmill Street, Gravesend, Kent, DA12 1AD	Vehicle Repair, Testing and Servicing	Repair and Servicing
E	230m NE	Teleios Signature	11, Manor Road, Town Centre, Gravesend, Kent, DA12 1AA	Clothing, Components and Accessories	Consumer Products
C	235m NE	Autocruse Service Centre	6A, Saddington Street, Gravesend, Kent, DA12 1ED	Vehicle Components	Industrial Products
C	236m NE	Auto Cruse	73, Edwin Street, Gravesend, Kent, DA12 1EL	Vehicle Repair, Testing and Servicing	Repair and Servicing
E	237m NE	Enter Computers	203, Parrock Street, Gravesend, Kent, DA12 1EW	Electrical Equipment Repair and Servicing	Repair and Servicing
C	245m E	Arch Autos	39-41, The Grove, Gravesend, Kent, DA12 1DX	Vehicle Repair, Testing and Servicing	Repair and Servicing
8	248m W	A.B.C Self Drive	31a, Darnley Road, Gravesend, Kent, DA11 OSD	Vehicle Hire and Rental	Hire Services

This data is sourced from Ordnance Survey.



4.2 Current or recent petrol stations

Records within 500m

2

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 48**

ID	Location	Company	Address	LPG	Status
10	401m S	OBSOLETE	Wrotham Road, Gravesend, Kent, DA13 0HP	Not Applicable	Obsolete
F	451m NE	ESSO	139, Milton Road, Wellington Street, Gravesend, Kent, DA12 2RG	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m

0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m

0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m

0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

1

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 48**

ID	Location	Details	
E	282m NE	Application reference number: 20020581 Application status: Approved Application date: 08/07/2002 Address: Transco PLC, Gravesend Holder Station, Suffolk Road, Gravesend, Kent, England, DA12 2SW	Details: Storage and distribution of natural gas. Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

4

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 48**

ID	Location	Address	Details	
5	166m NE	Dappers Dry Cleaners, 161 Parrock Street, Gravesend, Kent, DA12 1ER	Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
D	209m N	Railway Dry Cleaners, 6 Railway Place, Gravesend, Kent, DA12 1AP	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
9	335m S	Wrotham Road Motoring Centre, 119-131 Wrotham Road, Gravesend, Kent, DA11 0PA	Process: Unloading of Petrol into Storage at Terminals Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
F	422m NE	Clocktower Service Station, 139 Milton Road, Gravesend, Kent, DA12 2RQ	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

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m**0**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m**0**

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m**0**

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m**0**

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

2

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 48**

ID	Location	Details	
B	156m SE	Incident Date: 26/02/2003 Incident Identification: 139622 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
6	175m W	Incident Date: 28/10/2002 Incident Identification: 117250 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m

0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

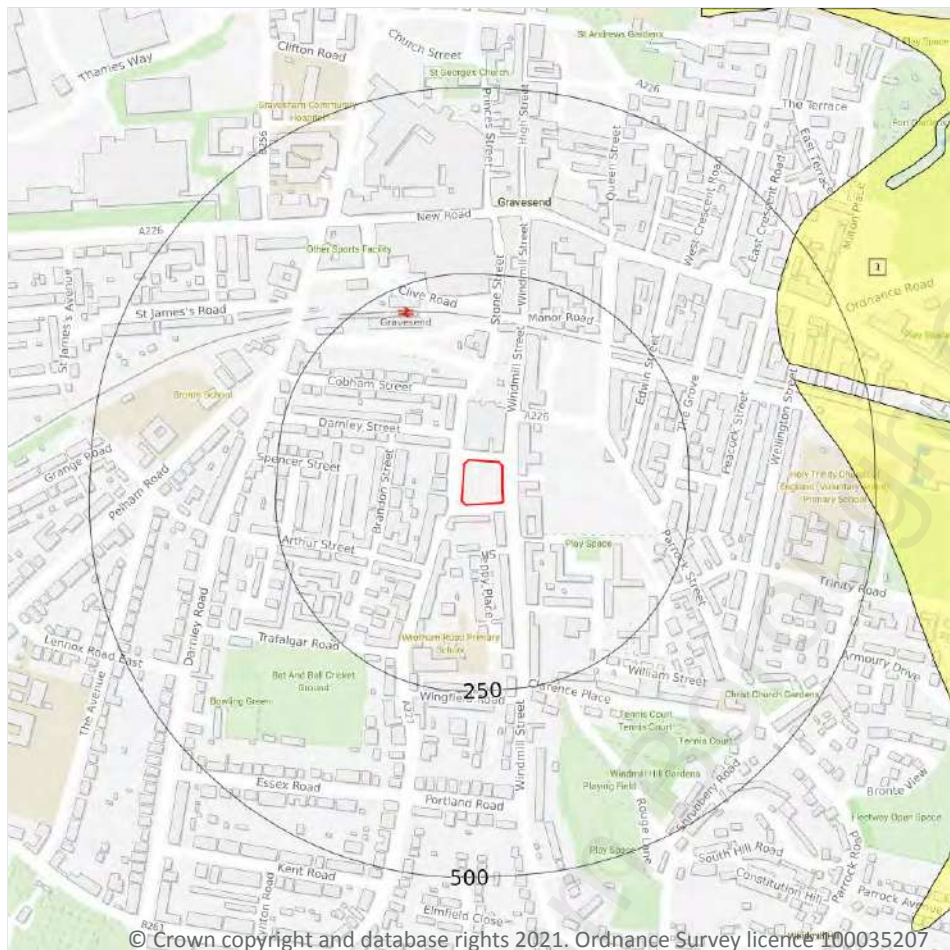
Records within 500m

0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

1

Aquifer status of groundwater held within superficial geology.

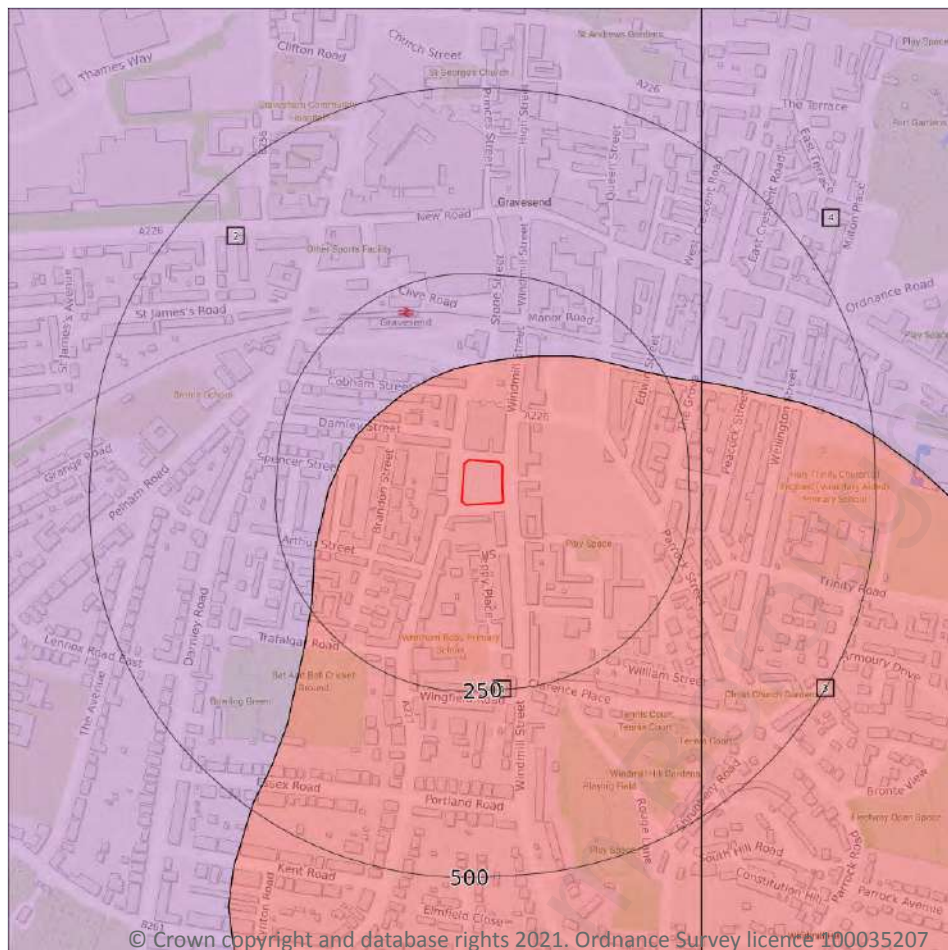
Features are displayed on the Hydrogeology map on **page 56**

ID	Location	Designation	Description
1	406m E	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

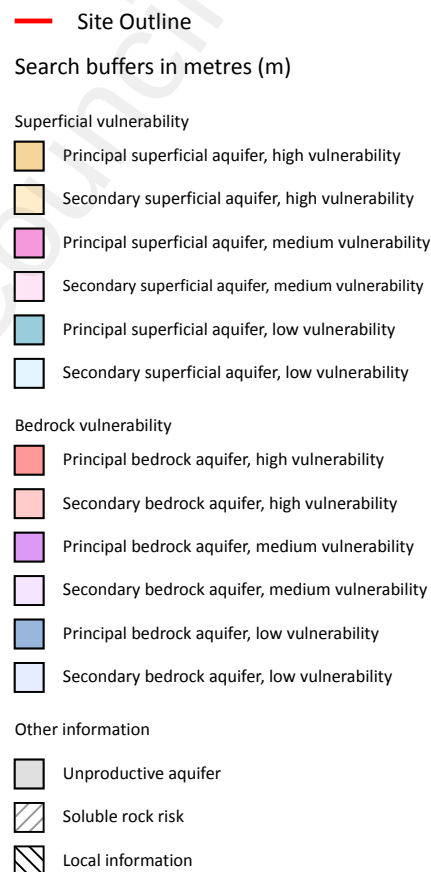
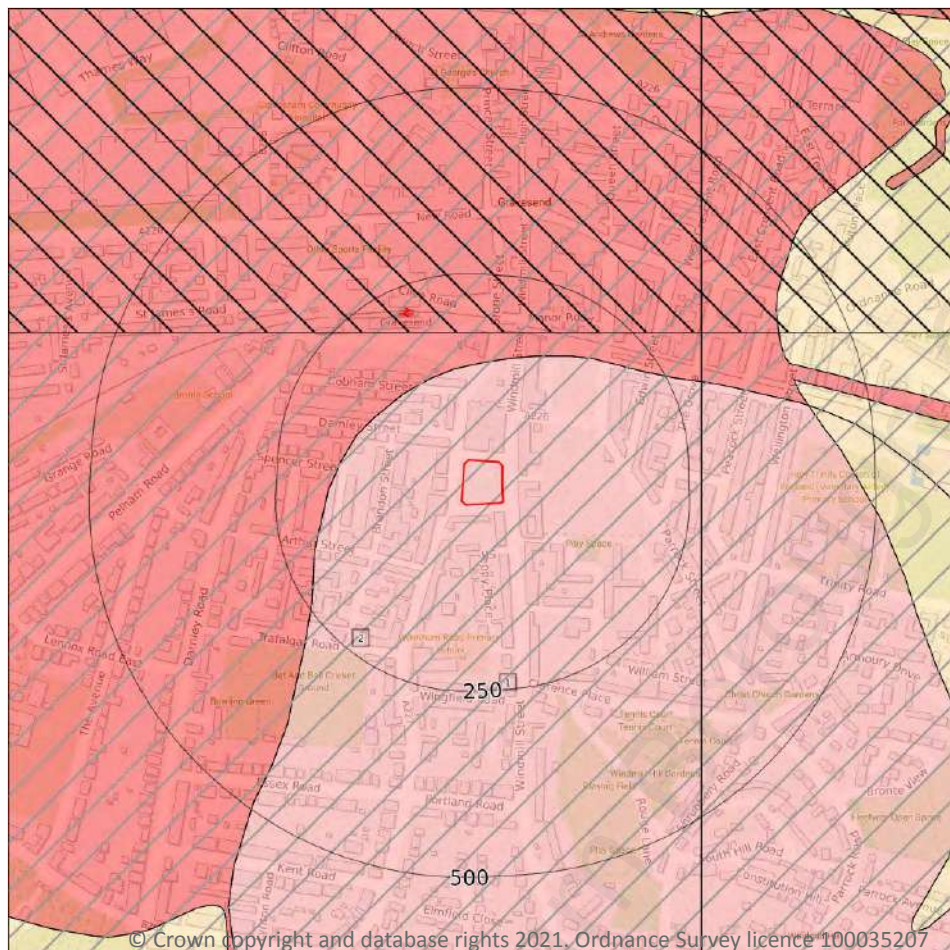
4

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 57**

ID	Location	Designation	Description
1	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
2	121m NW	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

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 59**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: Medium	Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	1
------------------------	----------

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
2	Very significant soluble rocks are likely to be present with a high possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, especially in adverse conditions such as concentrated surface or subsurface water flow.	4.0%

This data is sourced from the British Geological Survey and the Environment Agency.

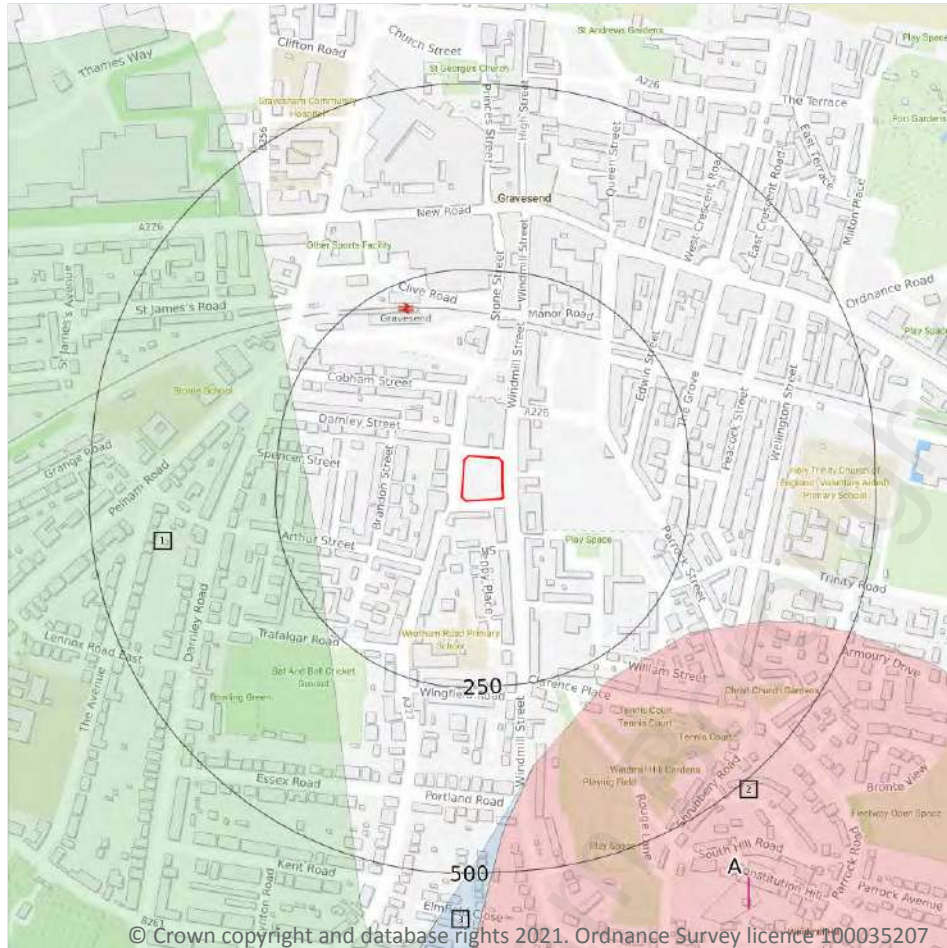
5.5 Groundwater vulnerability- local information

Records on site	0
------------------------	----------

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

8

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 61**

ID	Location	Details	
A	599m SE	Status: Active Licence No: 9/40/01/0511/G Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLES, ADITS AND CATCHPITS AT WINDMILL HILL PS Data Type: Poly4 Name: Southern Water Services Ltd Easting: 565060 Northing: 173270	Annual Volume (m ³): 17,700,000 Max Daily Volume (m ³): 92,000 Original Application No: - Original Start Date: 24/03/1986 Expiry Date: - Issue No: 100 Version Start Date: 27/11/2006 Version End Date: -
-	1756m W	Status: Active Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: BOREHOLE 4, CRETE HALL ROAD, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562980 Northing: 174260	Annual Volume (m ³): 4,710,000 Max Daily Volume (m ³): 19,656 Original Application No: - Original Start Date: 27/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1996 Version End Date: -
-	1875m W	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT 2, GREENSAND BOREHOLE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562830 Northing: 174120	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/05/1966 Version End Date: -
-	1931m W	Status: Active Licence No: 9/40/01/0092/A/GR/R1 Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562772 Northing: 174114	Annual Volume (m ³): 320,000 Max Daily Volume (m ³): 1,309 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2030 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
-	1932m S	Status: Active Licence No: SO/040/0001/019 Details: Spray Irrigation - Storage Direct Source: Southern Region Groundwater Point: MID KENT GOLF CLUB BOREHOLE Data Type: Point Name: Mid Kent Golf Club Limited Easting: 564325 Northing: 171869	Annual Volume (m ³): 10,000 Max Daily Volume (m ³): 50 Original Application No: - Original Start Date: 29/10/2014 Expiry Date: 31/03/2024 Issue No: 1 Version Start Date: 29/10/2014 Version End Date: -

ID	Location	Details	
-	1934m W	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562770 Northing: 174120	Annual Volume (m ³): 400000 Max Daily Volume (m ³): 1309 Original Application No: - Original Start Date: 27/05/1966 Expiry Date: 31/03/2018 Issue No: 101 Version Start Date: 24/04/2002 Version End Date: -
-	1946m E	Status: Active Licence No: 9/40/01/0508/G Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT 1, BOREHOLE AT GRAVESEND SEWAGE WORKS IN KENT. Data Type: Point Name: Southern Water Services Ltd Easting: 566670 Northing: 174000	Annual Volume (m ³): 55,000 Max Daily Volume (m ³): 340 Original Application No: - Original Start Date: 23/03/1989 Expiry Date: - Issue No: 100 Version Start Date: 27/11/2006 Version End Date: -
-	1964m W	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT 1, GREENSAND BOREHOLE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562860 Northing: 174560	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/05/1966 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	0
-----------------------------	----------

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m

1

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 61**

ID	Location	Details	
A	599m SE	Status: Active Licence No: 9/40/01/0511/G Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLES, ADITS AND CATCHPITS AT WINDMILL HILL PS Data Type: Poly4 Name: Southern Water Services Ltd Easting: 565060 Northing: 173270	Annual Volume (m ³): 17,700,000 Max Daily Volume (m ³): 92,000 Original Application No: - Original Start Date: 24/03/1986 Expiry Date: - Issue No: 100 Version Start Date: 27/11/2006 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m

3

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 61**

ID	Location	Type	Description
1	202m W	3	Total catchment
2	282m SE	1	Inner catchment
3	360m S	2	Outer catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

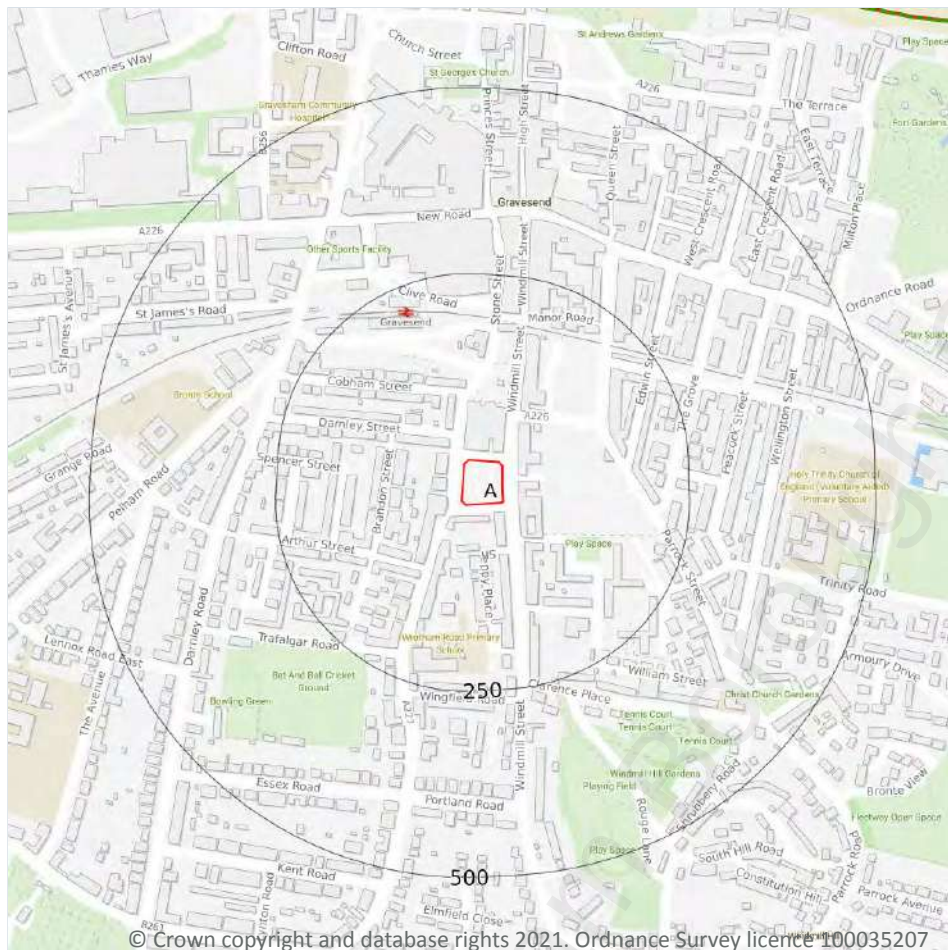
5.10 Source Protection Zones (confined aquifer)

Records within 500m

0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

0

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.



This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1
------------------------	----------

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 66**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	Coastal Catchment	Not part of a river WB catchment	130	Lower Medway	Medway

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	0
---------------------------	----------

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1
------------------------	----------

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 66**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	On site	North Kent Medway Chalk	<u>GB40601G500300</u>	Poor	Poor	Poor	2015



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0
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Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

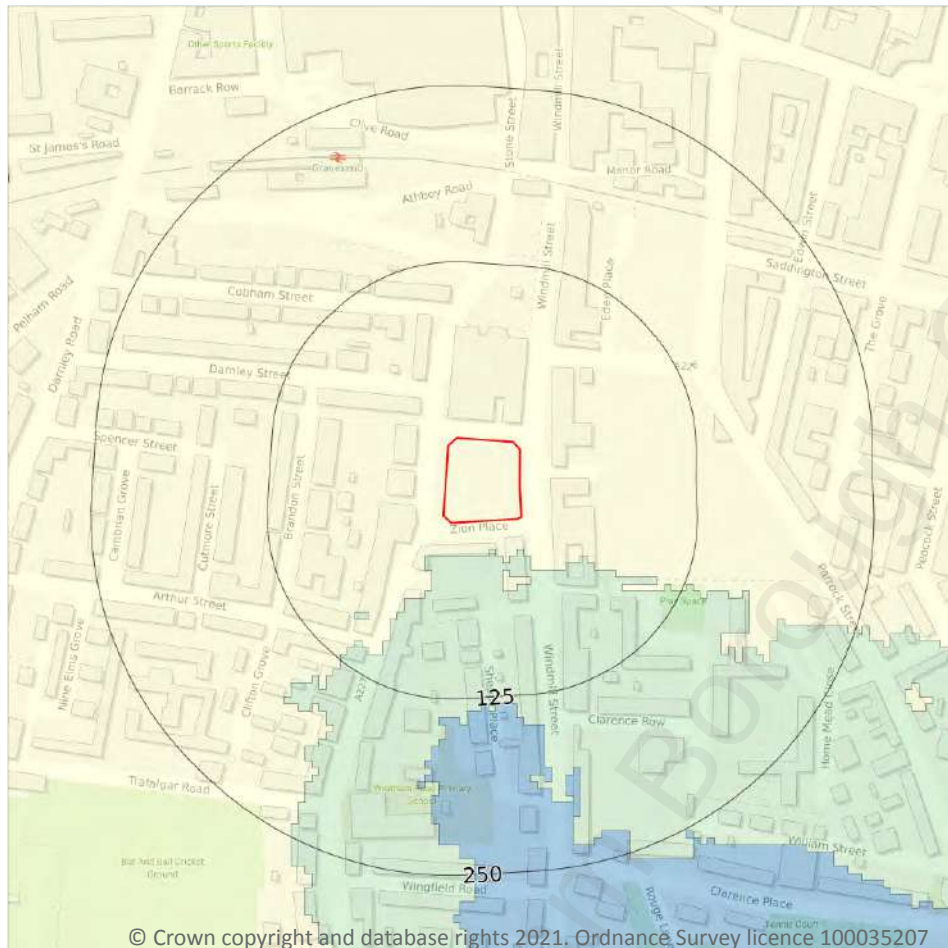
7.7 Flood Zone 3

Records within 50m	0
--------------------	---

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

9 Groundwater flooding



— Site Outline
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site

Moderate

Highest risk within 50m

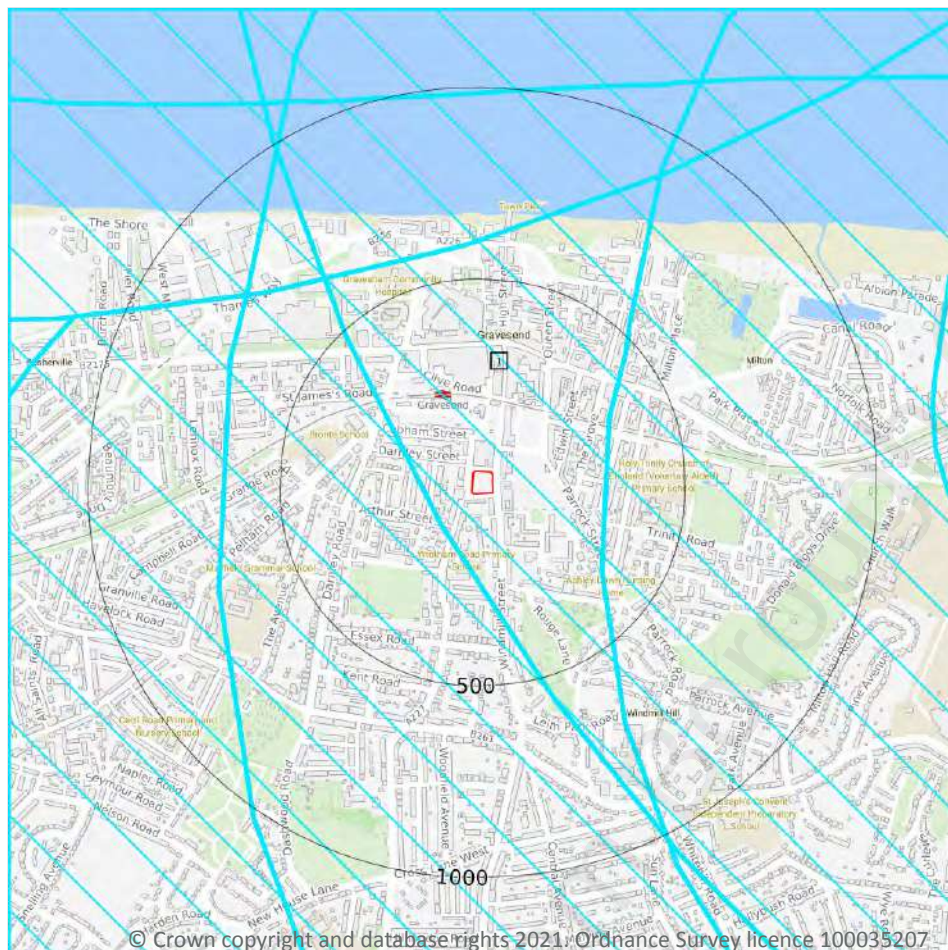
Moderate

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 73**

This data is sourced from Ambiantal Risk Analytics.

SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 78**

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Airports, helipads and other aviation proposals. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. Residential - Residential development of 500 units or more. Rural residential - Any residential development of 500 or more houses outside existing settlements/urban areas. Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t) Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion Discharges - Any discharge of water or liquid waste of more than 5m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location). Notes: For new residential development in this area financial contributions are required to mitigate increased recreational disturbance on coastal SPAs and Ramsar Sites. Check with Local Planning Authority.

This data is sourced from Natural England.

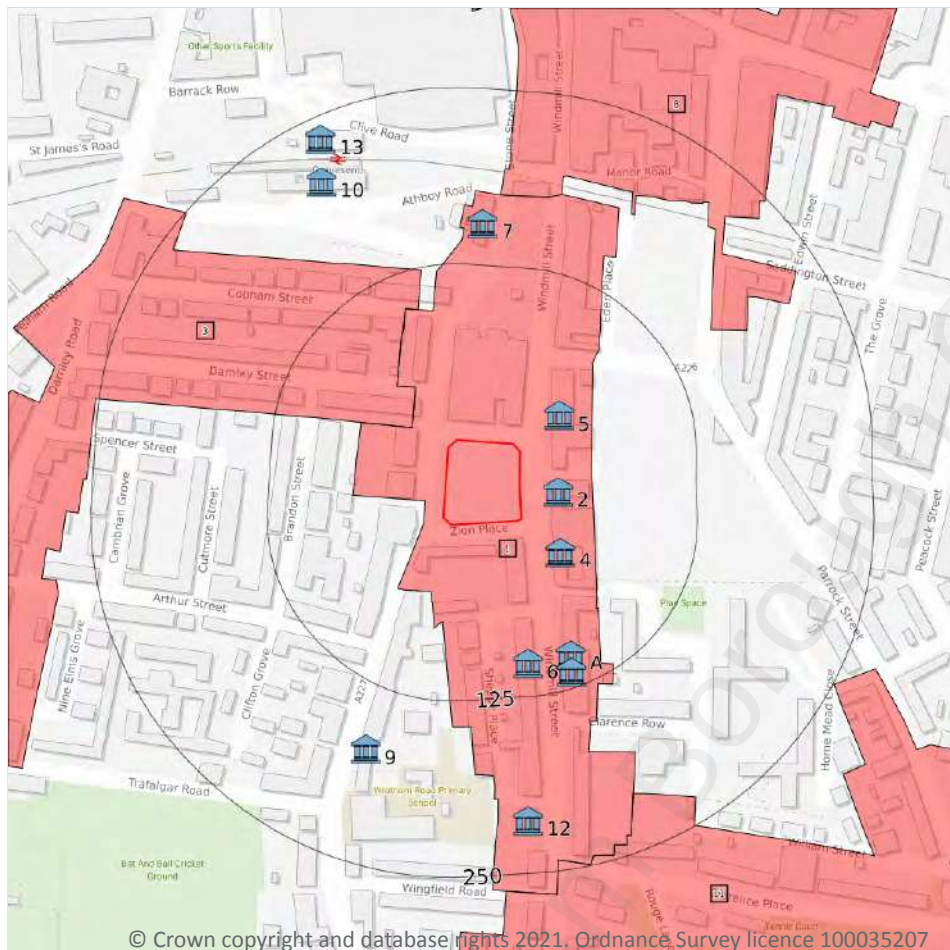
10.18 SSSI Units

Records within 2000m	0
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Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

11

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 80**

ID	Location	Name	Grade	Reference Number	Listed date
2	27m E	51-54, Windmill Street, Central, Gravesham, Kent, DA12	II	1089007	03/07/1975
4	36m SE	55-59, Windmill Street, Central, Gravesham, Kent, DA12	II	1089008	03/07/1975
5	38m NE	St George's Terrace, Central, Gravesham, Kent, DA12	II	1025880	03/07/1975
6	101m S	123-126, Windmill Street, Pelham, Gravesham, Kent, DA12	II	1089009	03/07/1975
A	102m S	68 And 69, Windmill Street, Central, Gravesham, Kent, DA12	II	1025845	03/07/1975
A	114m S	70 And 71, Windmill Street, Central, Gravesham, Kent, DA12	II	1341517	03/07/1975

ID	Location	Name	Grade	Reference Number	Listed date
7	155m N	20-24, Stone Street, Pelham, Gravesham, Kent, DA11	II	1341510	03/07/1975
9	170m S	62 And 64, Wrotham Road, Pelham, Gravesham, Kent, DA11	II	1089010	03/07/1975
10	207m NW	Gravesend Railway Station (Up Side), Pelham, Gravesham, Kent, DA11	II	1057649	03/07/1975
12	213m S	109 And 110, Windmill Street, Pelham, Gravesham, Kent, DA12	II	1025847	03/07/1975
13	234m NW	Gravesend Railway Station (Downside), Pelham, Gravesham, Kent, DA11	II	1341495	03/07/1975

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	4
----------------------------	----------

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 80**

ID	Location	Name	District	Date of designation
1	On site	Upper Windmill Street, Gravesend	Gravesham	18/12/1980
3	29m NW	Darnley Road, Gravesend	Gravesham	01/02/1990
8	160m NE	King Street, Gravesend	Gravesham	18/12/1980
11	210m SE	Windmill Hill, Gravesend	Gravesham	29/07/1975

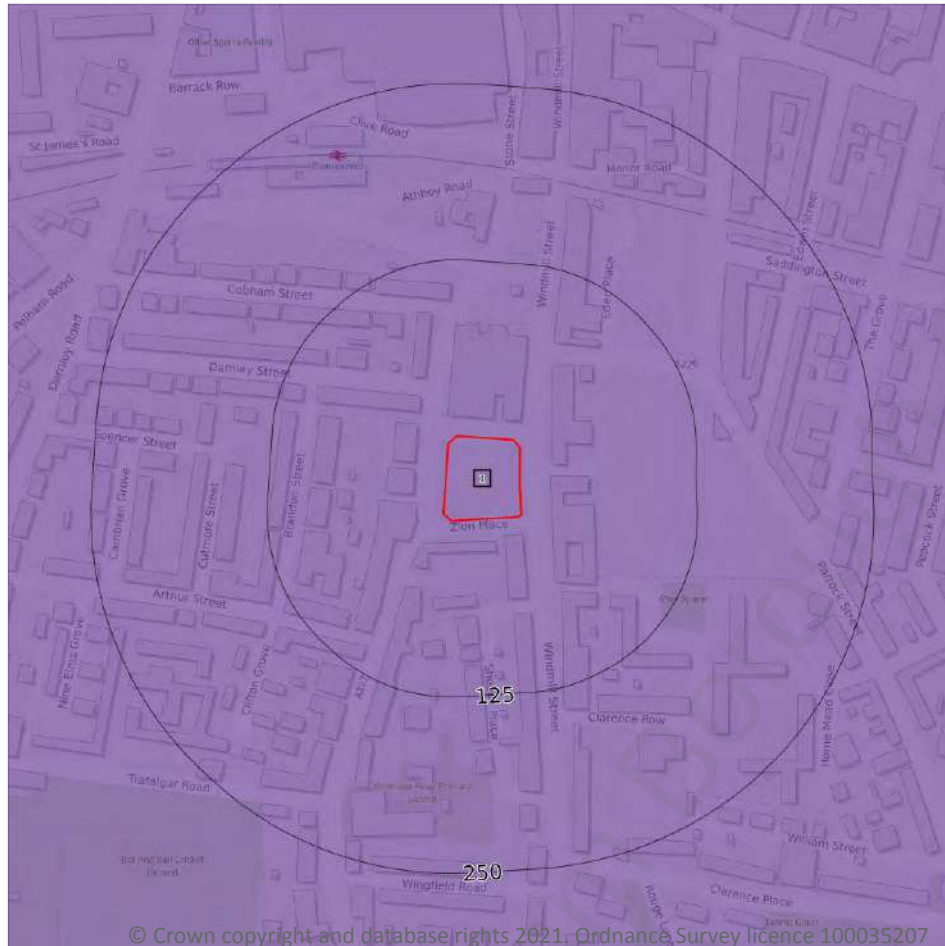
This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0
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A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial

12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

1

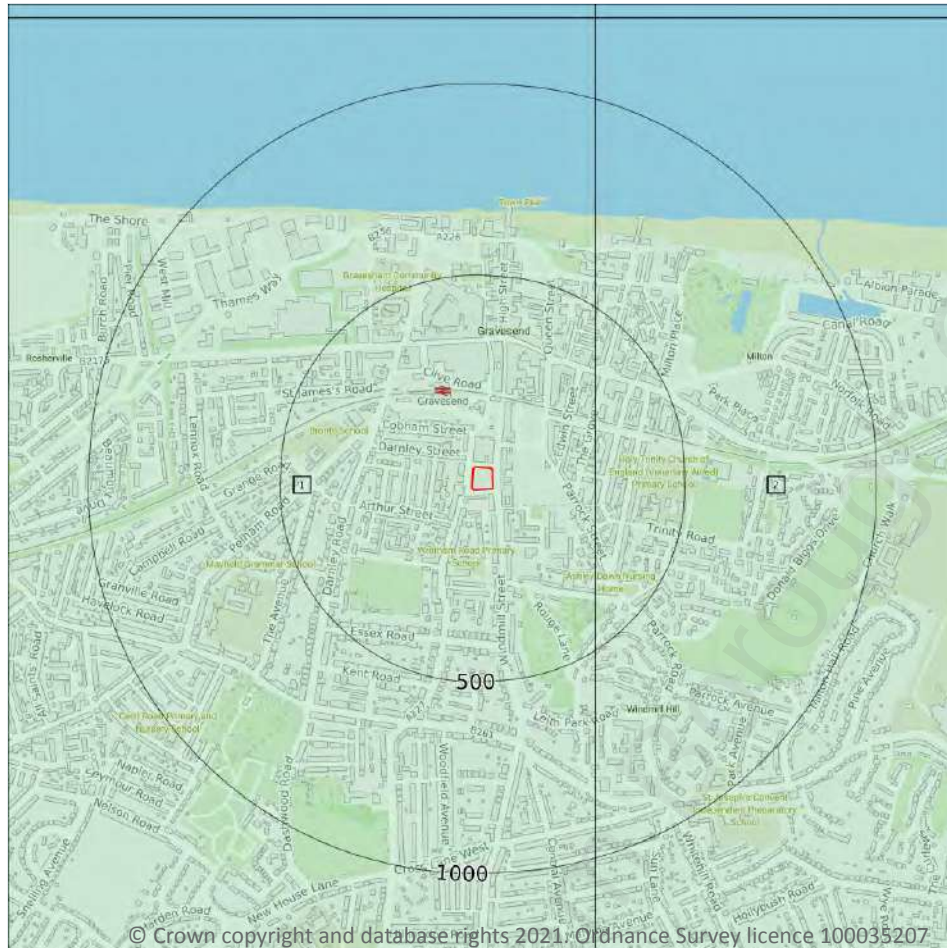
Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 84**

ID	Location	Classification	Description
1	On site	Urban	-

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Full coverage
 - Partial coverage
 - No coverage

14.1 10k Availability

Records within 500m

2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

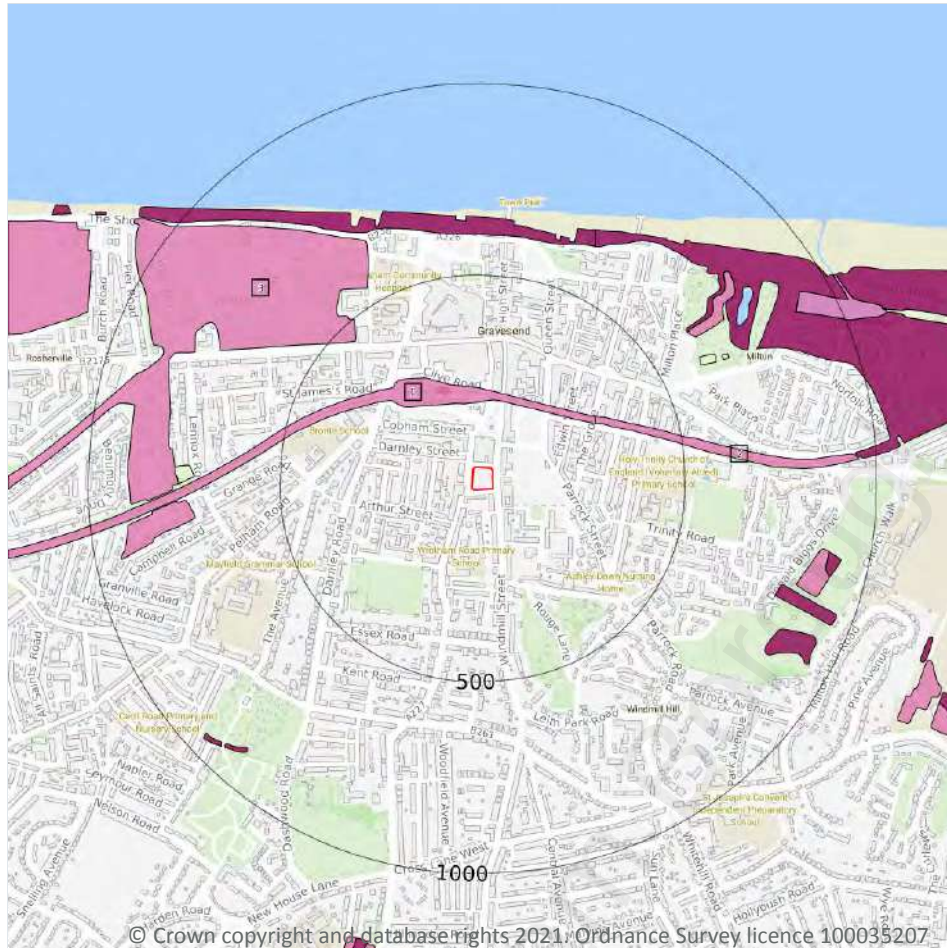
Features are displayed on the Geology 1:10,000 scale - Availability map on **page 87**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	TQ67SW
2	267m E	Full	Full	Full	No coverage	TQ67SE

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Artificial and made ground



- Site Outline
- Search buffers in metres (m)
- Reclaimed ground
 - Made ground
 - Worked ground
 - Infilled ground
 - Disturbed ground
 - Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m

3

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

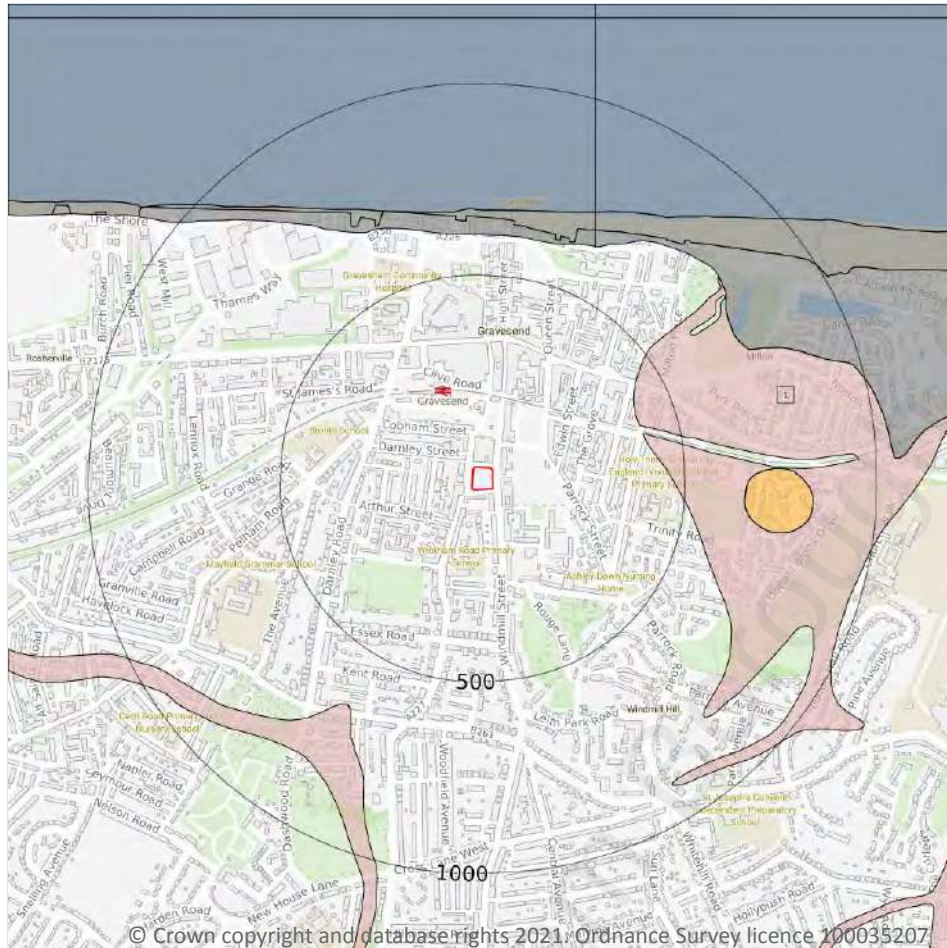
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 88**

ID	Location	LEX Code	Description	Rock description
1	167m N	WGR-VOID	Worked Ground (Undivided)	Void
2	294m NE	WGR-VOID	Worked Ground (Undivided)	Void
3	454m NW	WGR-VOID	Worked Ground (Undivided)	Void

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (10k)
- Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m

1

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

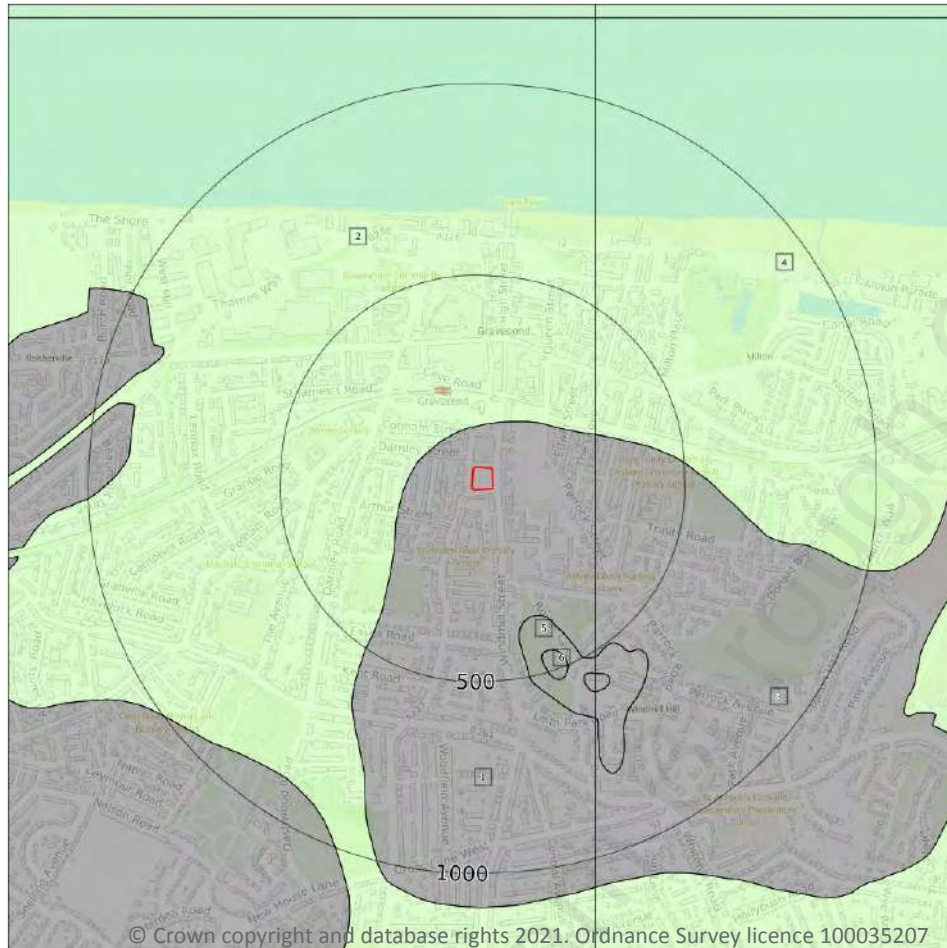
Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 89**

ID	Location	LEX Code	Description	Rock description
1	399m E	HEAD-DMTN	Head - Diamicton	Diamicton

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



— Site Outline
Search buffers in metres (m)
.... Bedrock faults and other linear features (10k)
Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

6

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 91**

ID	Location	LEX Code	Description	Rock age
1	On site	TAB-SANDU	Thanet Sand Formation - Sand	Thanetian Age
2	101m N	SECK-CHLK	Seaford Chalk Formation - Chalk	Santonian Age - Coniacian Age
3	267m E	TAB-SANDU	Thanet Sand Formation - Sand	Thanetian Age
4	283m E	SECK-CHLK	Seaford Chalk Formation - Chalk	Santonian Age - Coniacian Age

ID	Location	LEX Code	Description	Rock age
5	348m S	LMBE-SANCL	Lambeth Group - Sand And Clay	Paleocene Epoch
6	446m S	HWH-GRAV	Harwich Formation - Gravel	Eocene Epoch - Paleocene Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

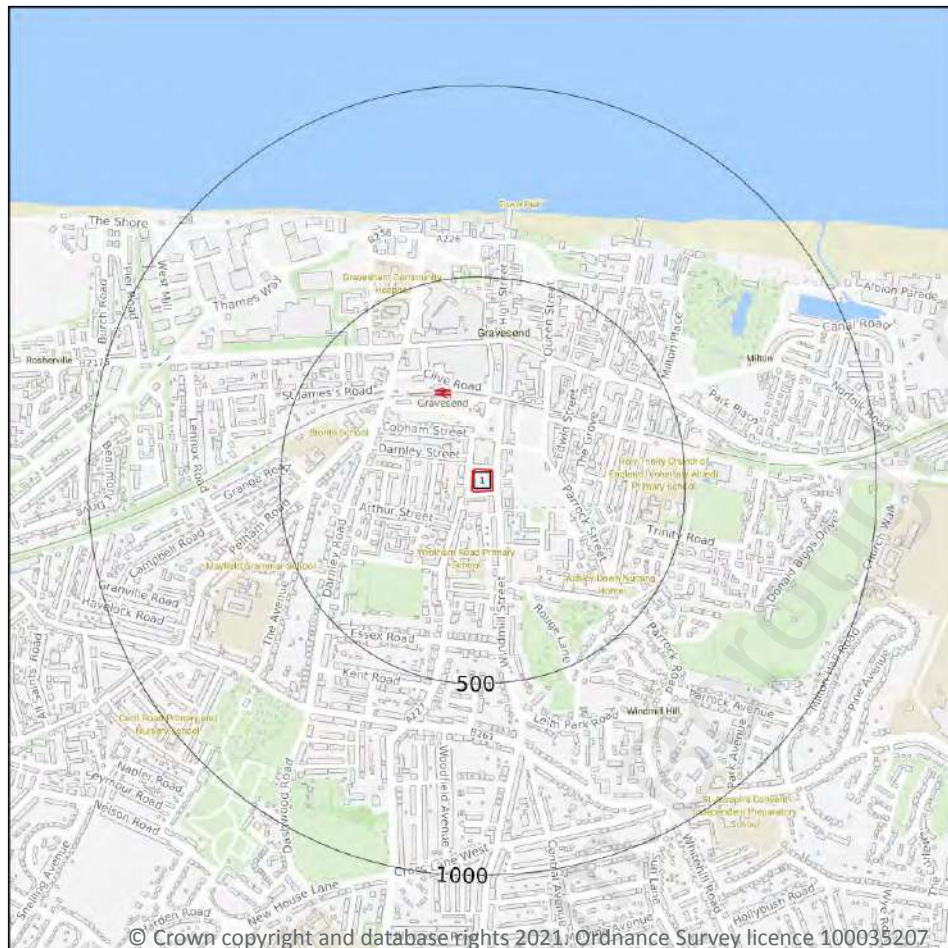
Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- ☐ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

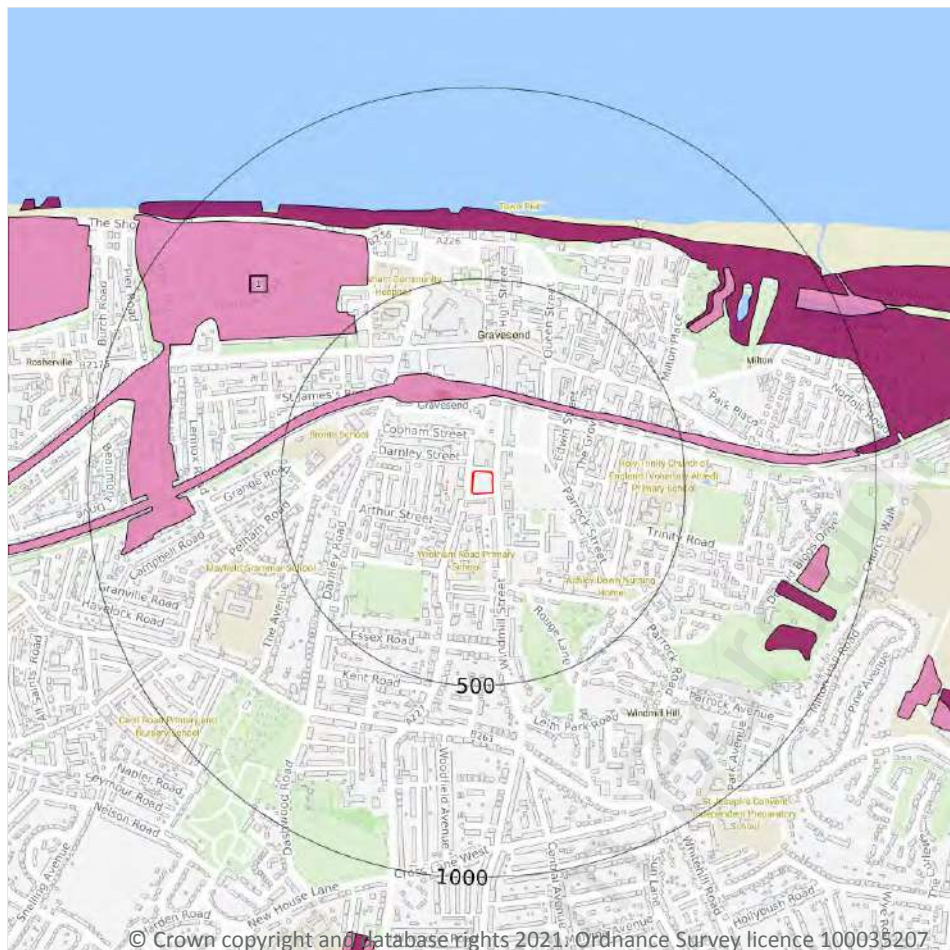
Features are displayed on the Geology 1:50,000 scale - Availability map on **page 93**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW271_dartford_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground



- Site Outline
- Search buffers in metres (m)
- Made ground
 - Worked ground
 - Infilled ground
 - Disturbed ground
 - Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m

1

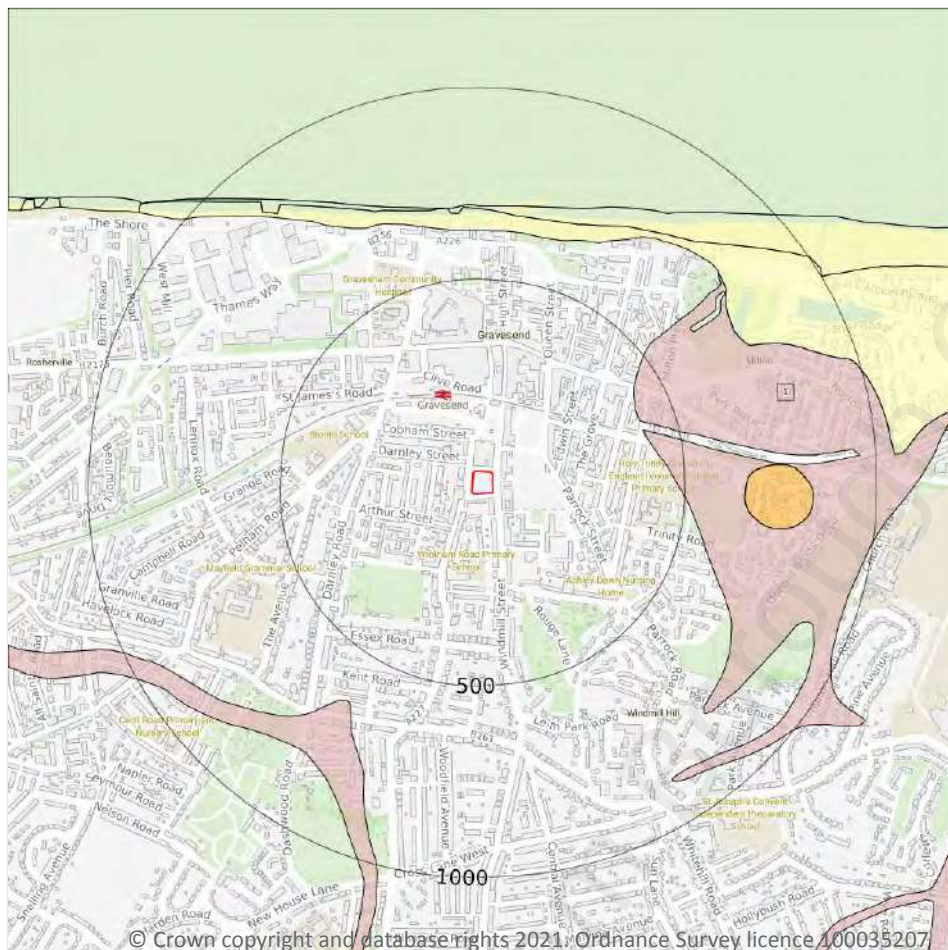
Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 94**

ID	Location	LEX Code	Description	Rock description
1	188m N	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



— Site Outline
Search buffers in metres (m)
 Landslip (50k)
Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

1

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 96**

ID	Location	LEX Code	Description	Rock description
1	406m E	HEAD- XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

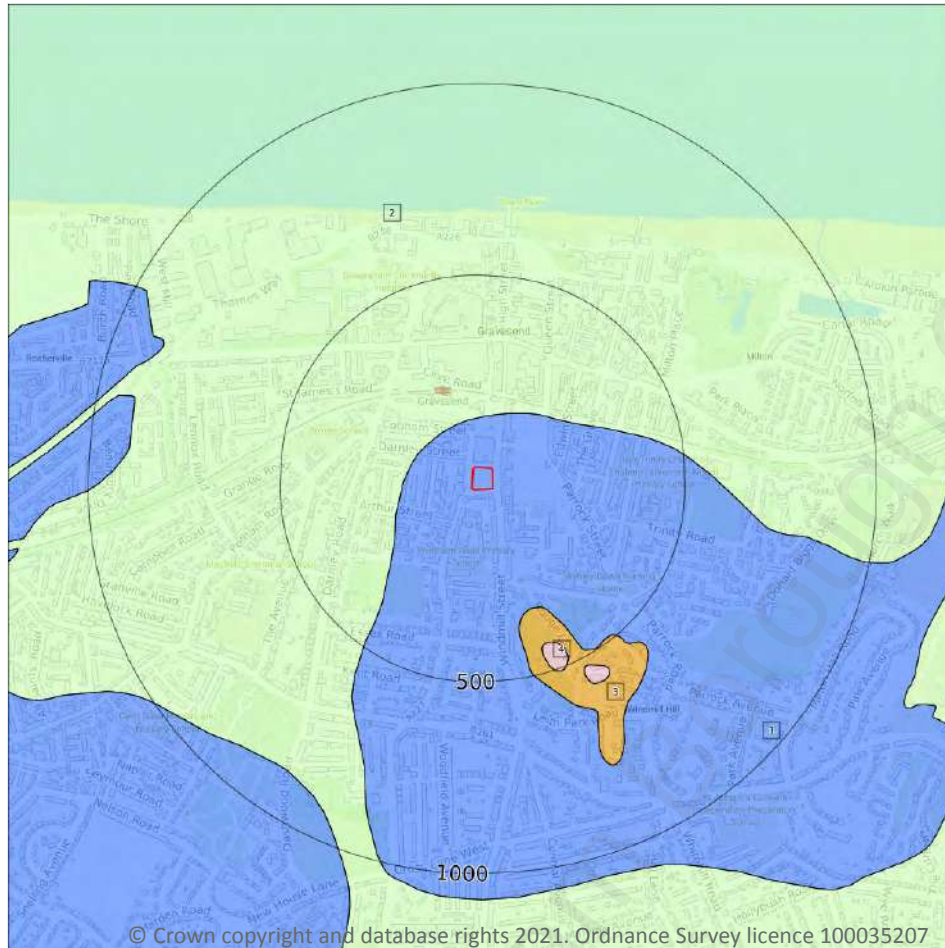
Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

4

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 98**

ID	Location	LEX Code	Description	Rock age
1	On site	TAB-S	THANET FORMATION - SAND	THANETIAN
2	121m NW	LSNCK-CHLK	LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN
3	328m S	LMBE-XSZC	LAMBETH GROUP - SAND, SILT AND CLAY	THANETIAN



ID	Location	LEX Code	Description	Rock age
4	427m S	HWH-XSV	HARWICH FORMATION - SAND AND GRAVEL	YPRESIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	High	High

This data is sourced from the British Geological Survey.

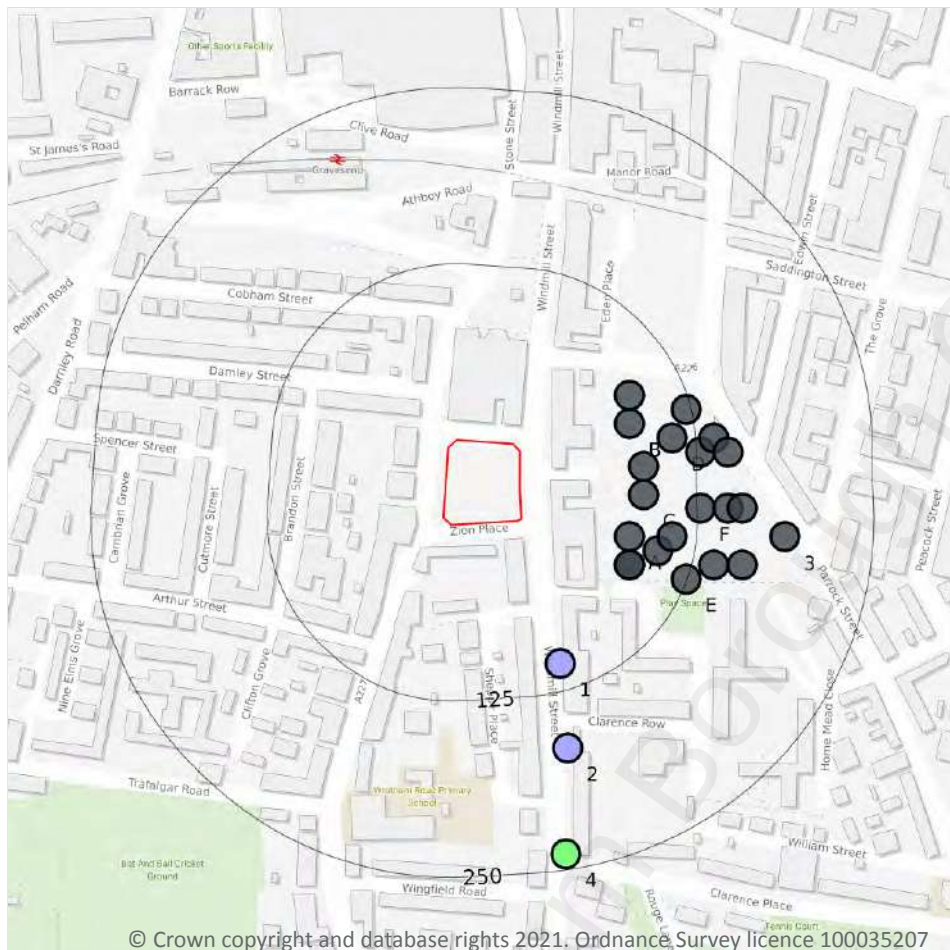
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0
----------------------------	----------

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



- Site Outline**
- Search buffers in metres (m)**
- Confidential
 - 0 - 10m
 - 10 - 30m
 - 30m+
 - Unknown

16.1 BGS Boreholes

Records within 250m

24

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

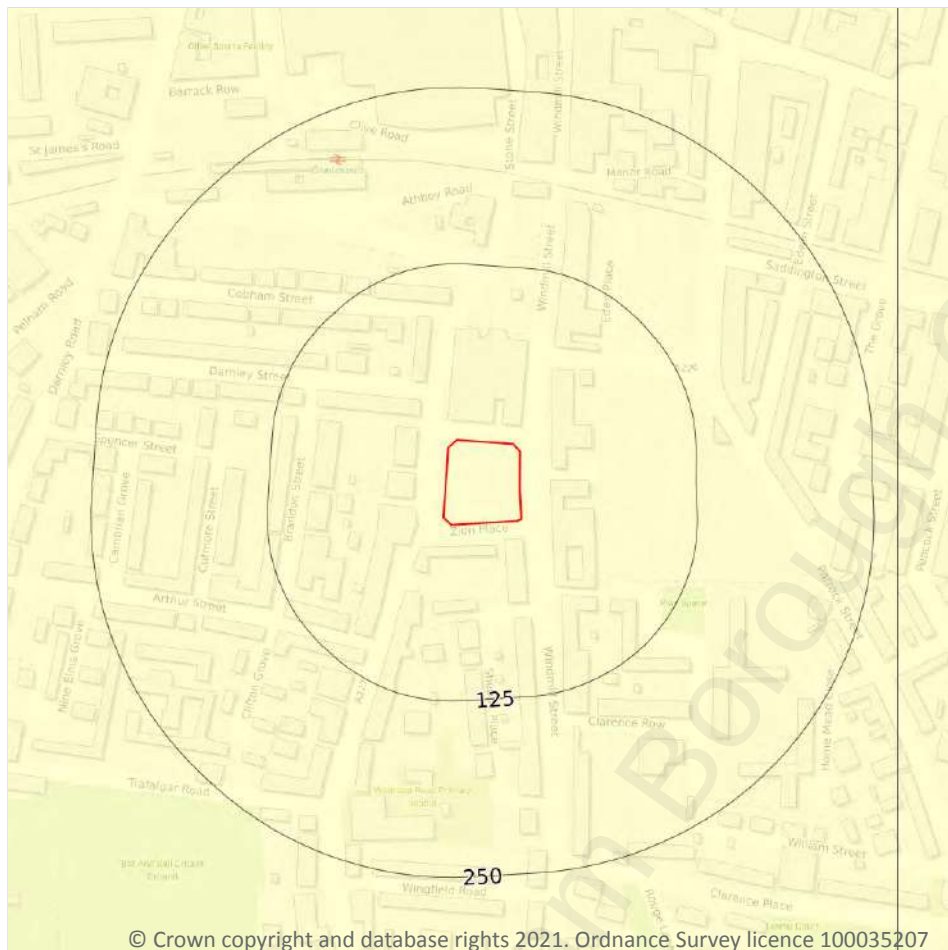
Features are displayed on the Boreholes map on **page 100**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	78m E	564810 173760	PARROCK STREET CAR PARK GRAVESEND KENT TP 2	-	Y	N/A
B	80m E	564810 173840	PARROCK STREET CAR PARK GRAVESEND KENT TP 10	-	Y	N/A



ID	Location	Grid reference	Name	Length	Confidential	Web link
A	83m SE	564810 173740	PARROCK STREET CAR PARK GRAVESEND KENT TP 1	-	Y	N/A
A	83m SE	564810 173740	PARROCK STREET CAR PARK GRAVESEND KENT 1	-	Y	N/A
B	87m NE	564810 173860	PARROCK STREET CAR PARK GRAVESEND KENT 6	-	Y	N/A
C	88m E	564820 173790	PARROCK STREET CAR PARK GRAVESEND KENT 5	-	Y	N/A
C	88m E	564820 173810	PARROCK STREET CAR PARK GRAVESEND KENT TP 11	-	Y	N/A
A	99m E	564830 173750	PARROCK STREET CAR PARK GRAVESEND KENT TP 3	-	Y	N/A
1	106m S	564761 173670	WINDMILL ST GRAVESEND 1	10.0	N	838627
A	107m E	564840 173760	PARROCK STREET CAR PARK GRAVESEND KENT TP 4	-	Y	N/A
D	108m E	564840 173830	PARROCK STREET CAR PARK GRAVESEND KENT TP 12	-	Y	N/A
D	121m E	564850 173850	PARROCK STREET CAR PARK GRAVESEND KENT 2	-	Y	N/A
E	124m E	564850 173730	PARROCK STREET CAR PARK GRAVESEND KENT 3	-	Y	N/A
F	127m E	564860 173780	PARROCK STREET CAR PARK GRAVESEND KENT TP 5	-	Y	N/A
D	128m E	564860 173820	PARROCK STREET CAR PARK GRAVESEND KENT TP 13	-	Y	N/A
D	138m E	564870 173830	PARROCK STREET CAR PARK GRAVESEND KENT TP 14	-	Y	N/A
E	141m E	564870 173740	PARROCK STREET CAR PARK GRAVESEND KENT TP 6	-	Y	N/A
F	147m E	564880 173780	PARROCK STREET CAR PARK GRAVESEND KENT TP 7	-	Y	N/A
D	148m E	564880 173820	PARROCK STREET CAR PARK GRAVESEND KENT TP 15	-	Y	N/A
F	157m E	564890 173780	PARROCK STREET CAR PARK GRAVESEND KENT 4	-	Y	N/A
E	160m E	564890 173740	PARROCK STREET CAR PARK GRAVESEND KENT TP 8	-	Y	N/A
2	165m S	564766 173610	WINDMILL ST GRAVESEND 2	10.0	N	838628
3	187m E	564920 173760	PARROCK STREET CAR PARK GRAVESEND KENT TP 9	-	Y	N/A

17 Natural ground subsidence - Shrink swell clays



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.1 Shrink swell clays

Records within 50m

1

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

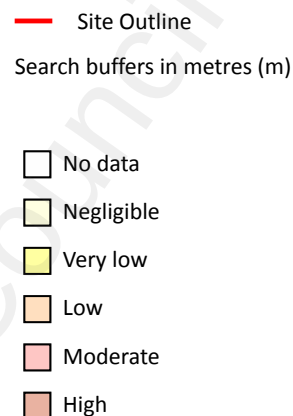
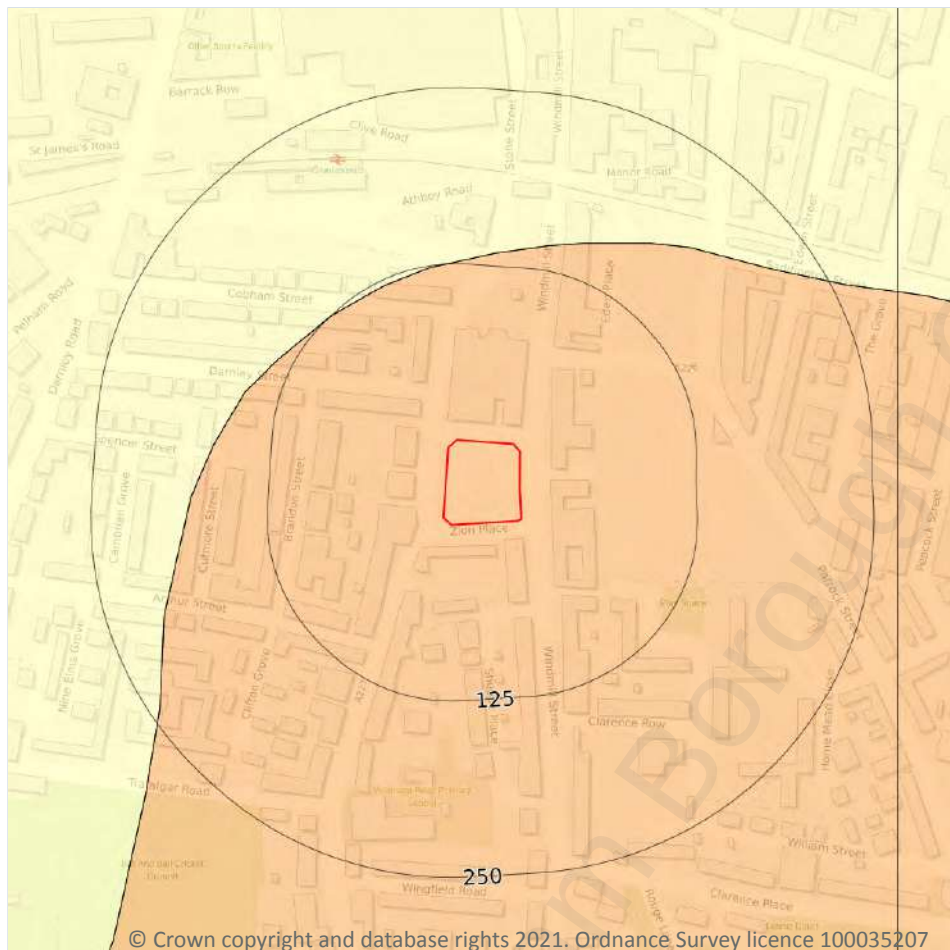
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 103**

Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m

1

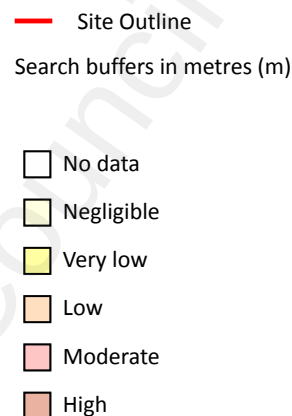
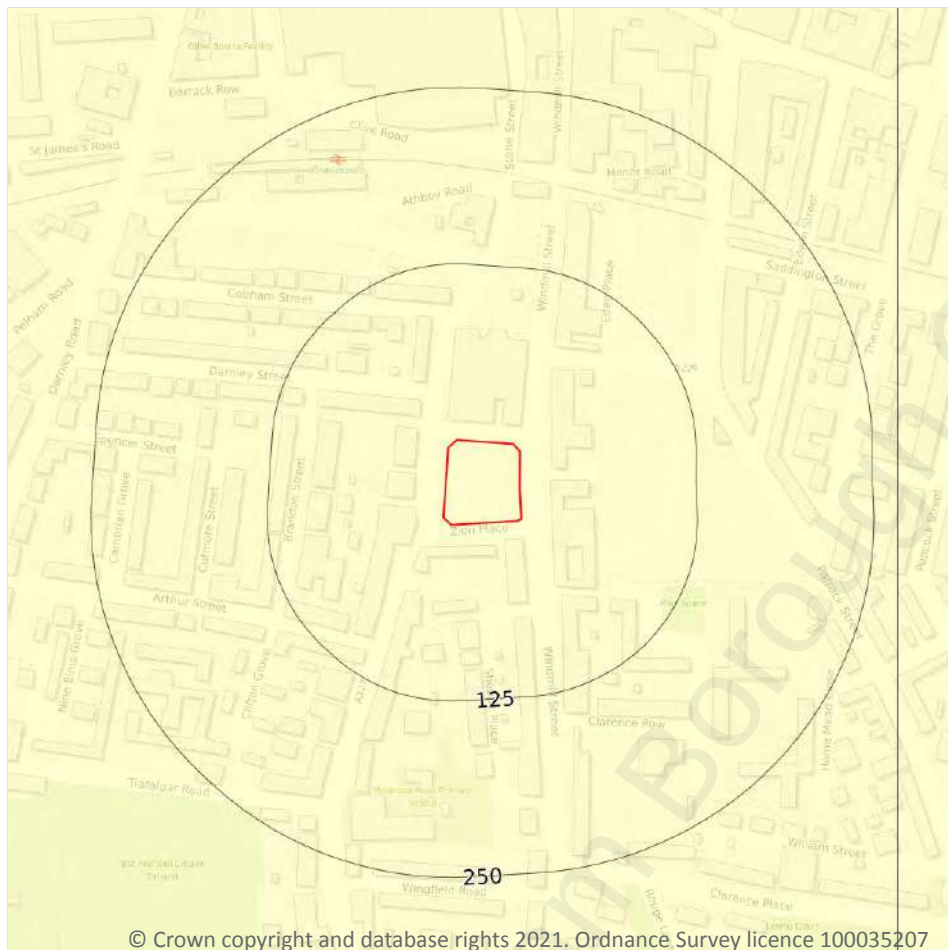
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 104**

Location	Hazard rating	Details
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

1

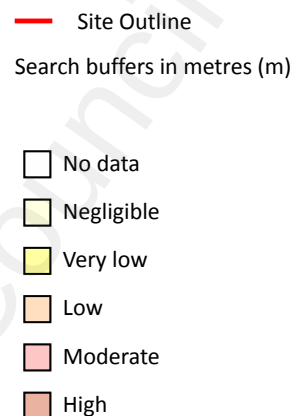
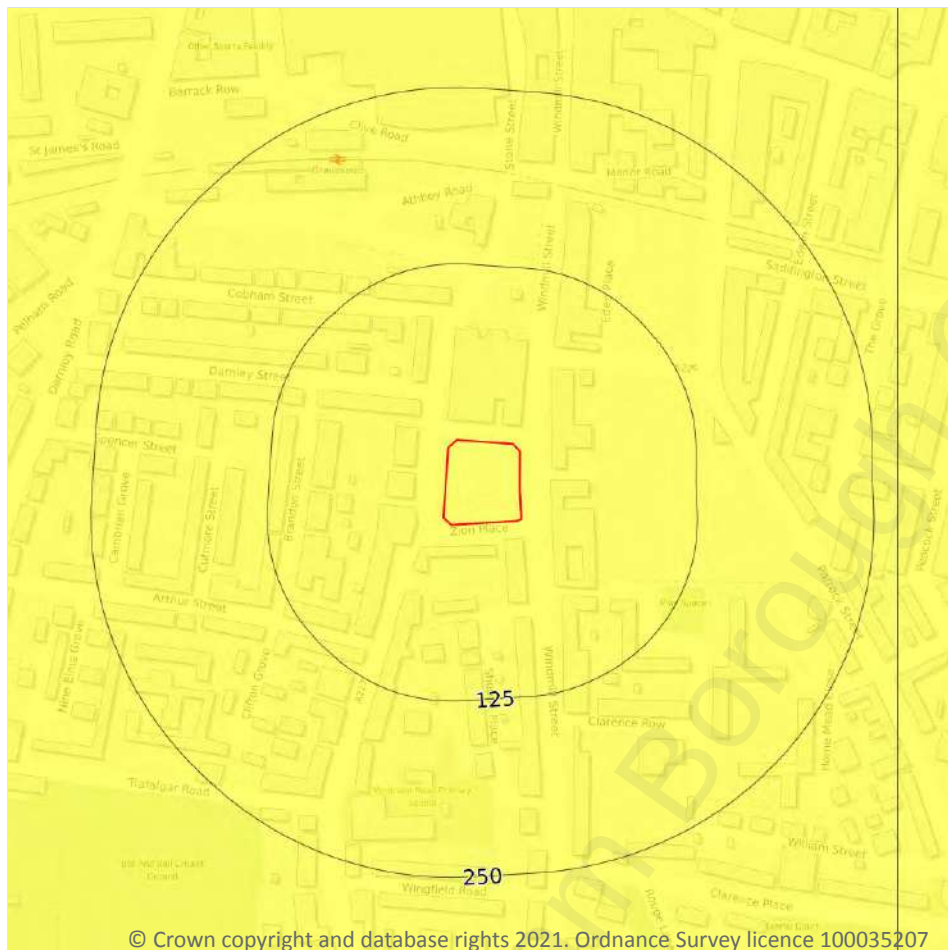
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 105**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m

1

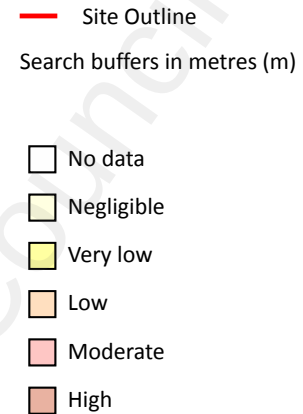
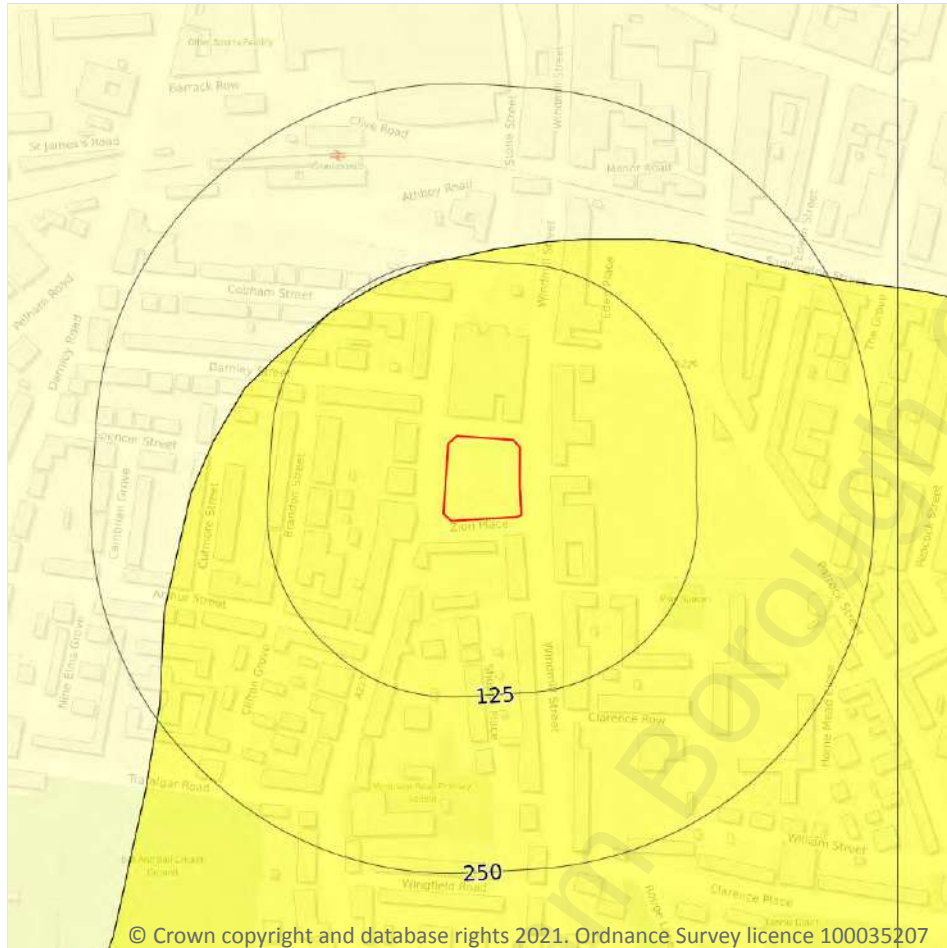
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 106**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m

1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

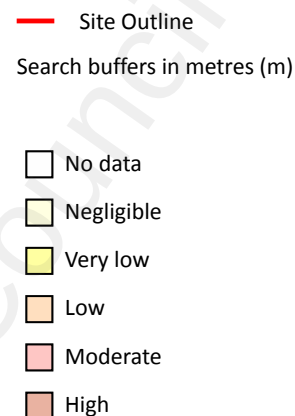
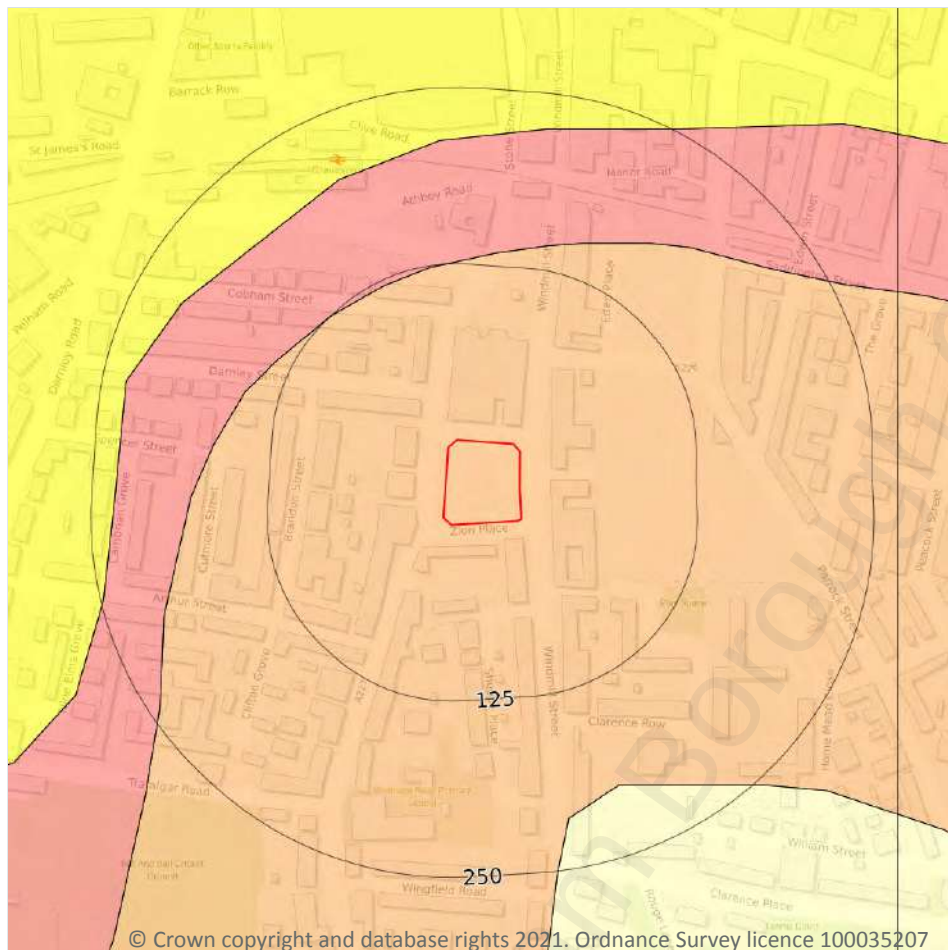
Features are displayed on the Natural ground subsidence - Landslides map on **page 107**

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

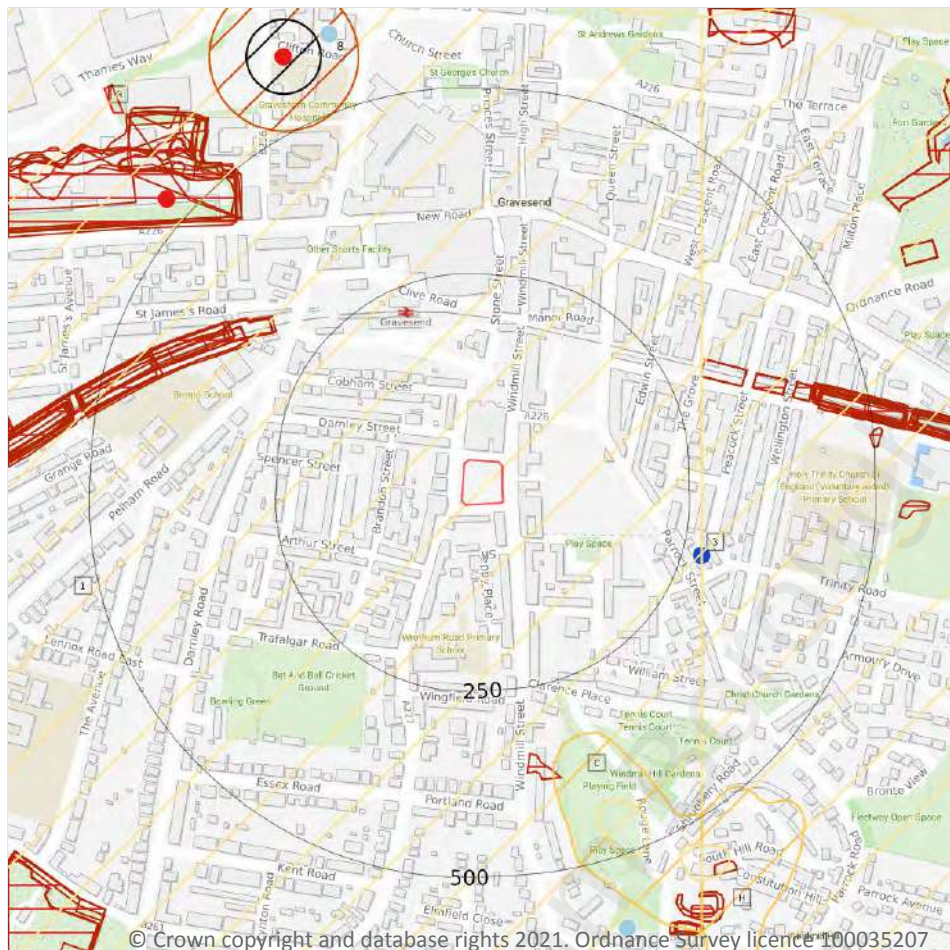
1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 108**

Location	Hazard rating	Details
On site	Low	Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances.

18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

1

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Details	Source
3	276m E	Type: Solution Pipe x 20 Superficial Geology: - Bedrock Geology: Chalk Group, Thanet Sand Formation	Simple Bibliography: - Full Bibliography: BUCKLAND, W., On the action of acidulated waters on the surface of the Chalk near Gravesend., 1839; British Association for the Advancement of Science Confidentiality: Data source can be revealed, data can be used freely

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0
----------------------------	----------

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	0
----------------------------	----------

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

This data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	6
-----------------------------	----------

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Land Use	Year of mapping	Mapping scale
R	657m NW	Tunnel	1977	1:10000
-	711m W	Tunnel	1923	1:10560
-	712m W	Tunnel	1907	1:10560
-	720m W	Tunnel	1938	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
-	795m W	Tunnel	1923	1:10560
-	807m W	Tunnel	1932	1:10560

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

15

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Chalk	A	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
2	267m E	Not available	Chalk	A	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
C	328m S	Not available	Chalk	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
C	427m S	Not available	Chalk	A	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

ID	Location	Name	Commodity	Class	Likelihood
-	988m SE	Not available	Chalk	D	Underground mining is known or considered likely to have occurred within or close to the area. Potential for difficult ground conditions are at a level where they should be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	6
-----------------------------	----------

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Mine Address	Mineral	Data source	Publisher
7	596m S	Gravesend, Kent	Chalk	-	Chelsea Speleological Society
8	601m N	Clifton Road Tunnel, Gravesend, Kent	Chalk	-	Chelsea Speleological Society
R	678m NW	Gravesend, Kent	Chalk	-	-
-	832m NW	Gravesend, Kent	Chalk	-	-
-	888m S	Gravesend, Kent	Chalk	-	-
-	969m SE	Gravesend, Kent	Chalk	-	-

This data is sourced from Stantec UK Ltd.

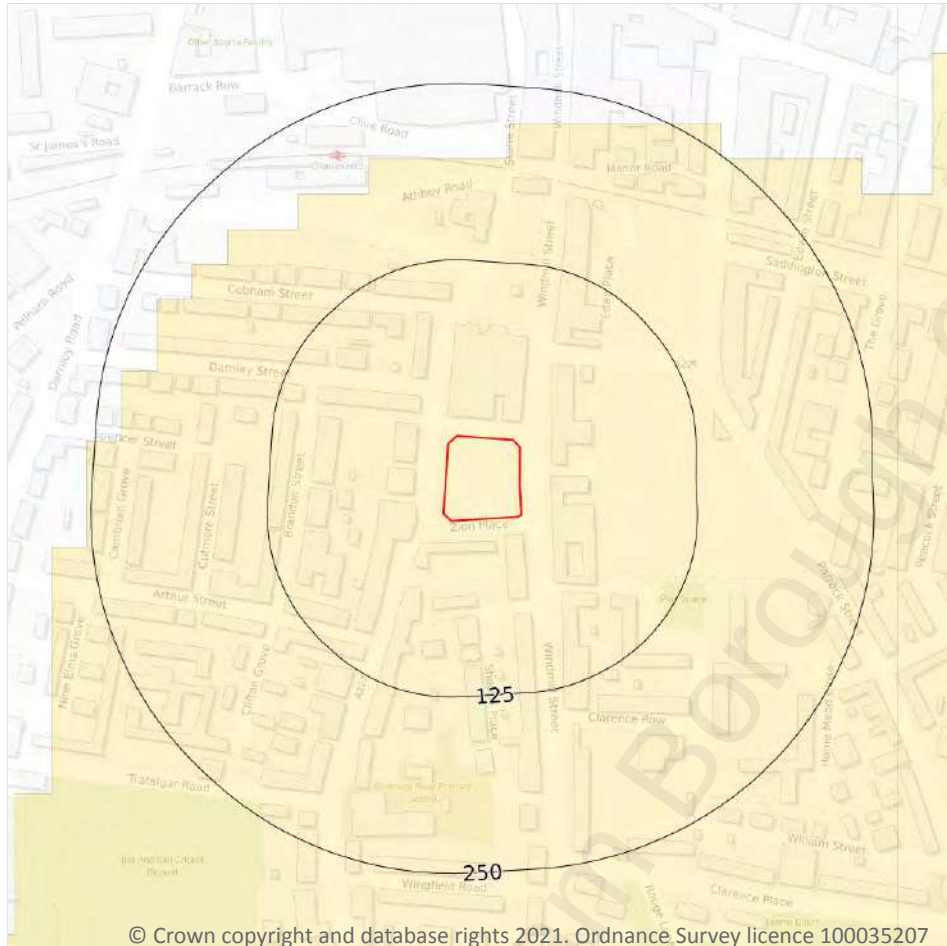
18.8 JPB mining areas

Records on site	0
------------------------	----------

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

19 Radon



— Site Outline
Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 116**

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None

This data is sourced from the British Geological Survey and Public Health England.



20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

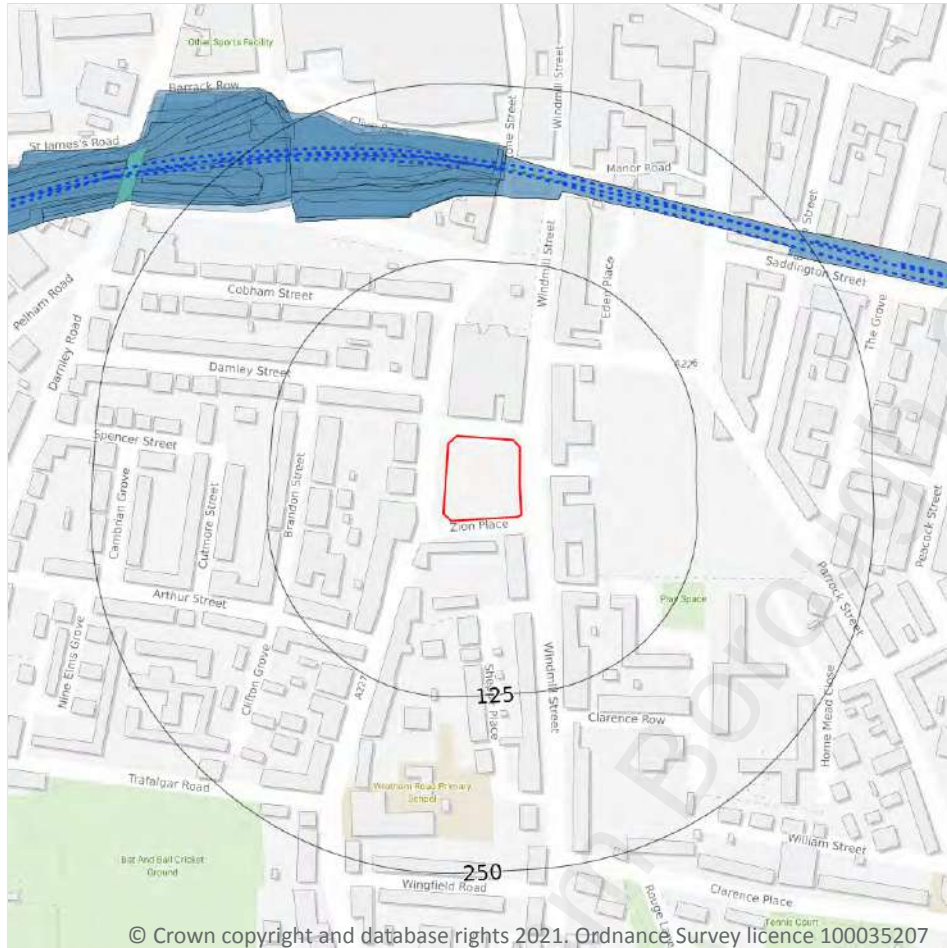
Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- C1** Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- C2** Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- 🚂 Railway stations
- ⋯ Active railways
- ⋯ Active tunnels
- ⋯ Abandoned railways
- Historic railways
- Historic tunnels
- 🚂 Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.





FAO Daniel Joel
Crossfield Consulting
The Granary
White Hall Farm
Long Itchington
Warwickshire
CV47 9PU

TRADING STANDARDS

P O Box 320
Ashford
Kent TN24 8AS
Tel: 03000 412020
Fax: 03000 422845

Website: www.kent.gov.uk/tradingstandards
Email: Karen.hopkins@kent.gov.uk
Ask for: Karen Hopkins
Ref: 176552
Date: 24 November 2021

Dear Mr Joel

Environmental Information Regulations 2004

Thank you for your enquiry regarding the history of the site at Former Police Station, 133 Windmill Street, Gravesend, DA12 1DB.

Having carried out extensive checks of our database, and both our current and archived paper records for this address, I have been unable to locate any information relating to the current or historical presence of underground fuel tanks on the site or within the immediate vicinity, nor any storage of licensable products.

Please note that all information provided is taken from the current and archived site records held by KCC Trading Standards, and is not in the direct knowledge or recollection of the undersigned officer, and as such no responsibility can be taken for any inaccuracies discovered from the information provided.

Yours faithfully

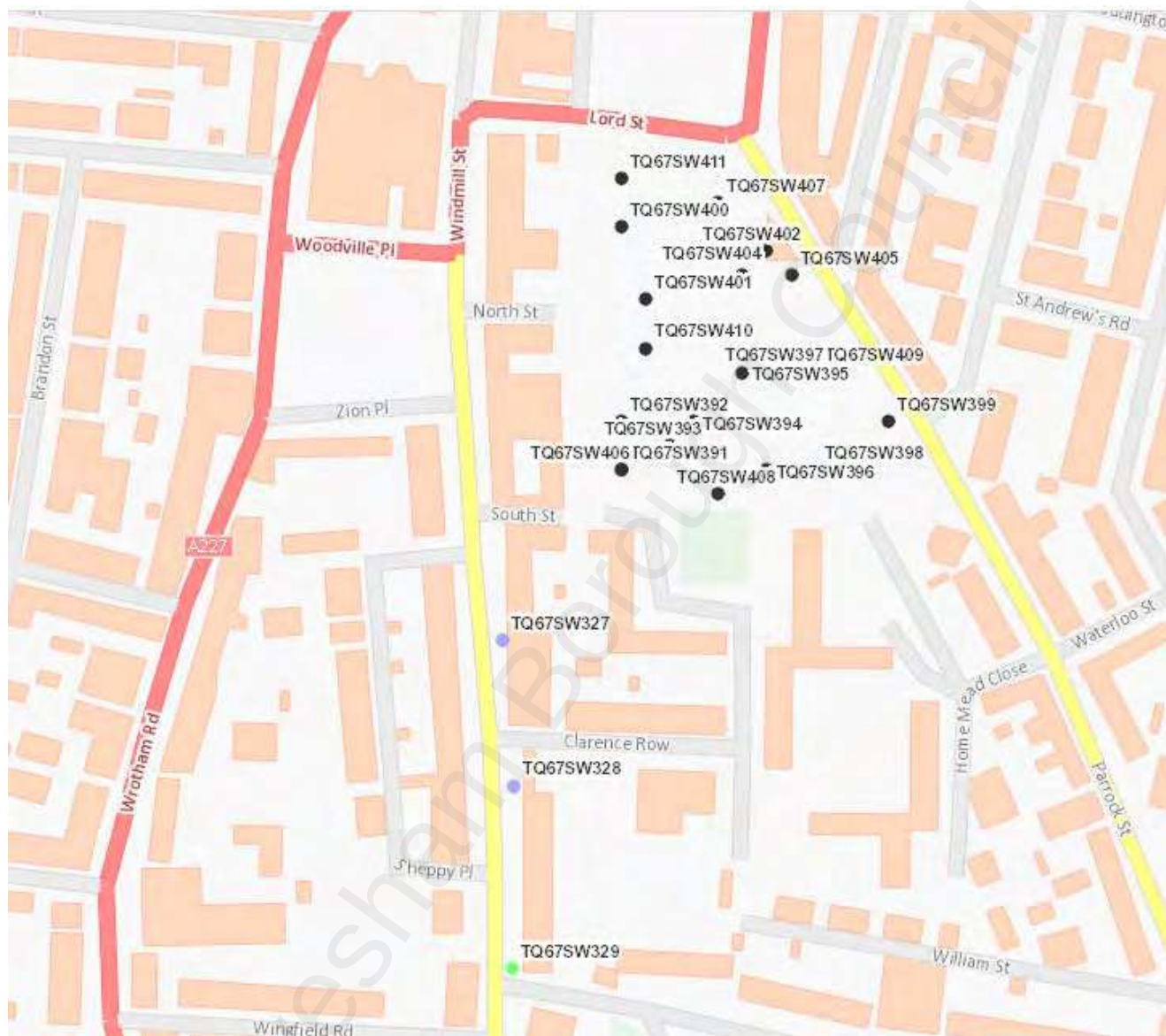
Karen Hopkins
Trading Standards Officer

Gravesham Borough Council



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



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Former Police Station, Gravesend

CCL03479.CO72

November 2021

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British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 838627 BGS Reference: TQ67SW327

British National Grid (27700): 564761, 173670

Form No. 493

KENT COUNTY COUNCIL
HIGHWAYS LABORATORY

Sheet 1 of 1

BOREHOLE LOG TQ67SW 327

Date started 11th April, 1979 Date completed 12th April, 1979

Scheme Soakaways, Windmill Street, Gravesend

Location _____

Borehole No. 1 Ground Level 26.09 m A.O.D.

KEY

- Disturbed Sample
- ▲ Bulk Disturbed Sample
- 105 mm Undisturbed Sample
- Standard Penetration Test
- △ Water Sample

Sample			Section	Depth about O.D. or below Ground Level	Thickness of Stratum m.	Description of Soil	Penetration Test	
No.	Type	Depth m.					Pen't'n mm.	No. of Blows
				0.8	0.8	MADE GROUND		
				2.95	2.95	Grey silty fine SAND		
				3.75	3.75	WEATHERED THANET BEDS		
				3.15	3.15	Grey and orange brown silty fine SAND		
				6.9	6.9	WEATHERED THANET BEDS		
				7.1	0.2	Bullhead bed		
				2.9	2.9	Fissured chalk		
				10.0	10.0	WEATHERED UPPER CHALK		
						Borehole Terminated at 10.0 m		
						Borehole Dry		

K.C.C. Highways Laboratory, Forstal, Aylesford, Kent.

Scale 1:50

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Former Police Station, Gravesend

CCL03479.CO72

November 2021

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APPENDIX III

APPENDIX III – GROUND INVESTIGATION

Introduction

This Appendix, together with Sections 2 to 5 of the report, forms the Ground Investigation Report for the development described in the report, in compliance with the requirements of BS 5930:2015+A1:2020, BS EN1997-1:2004(2007) and BS EN1997-2:2007(2007).

The site operations were carried out between 8th November and 11th November 2021 under the supervision of a geotechnical engineer from Crossfield Consulting Limited. The scope and rationale for the design of the investigation is presented in Table III-1.

The ground investigation was designed and supervised by qualified and experienced geotechnical specialists from Crossfield Consulting Limited. Where appropriate, and as outlined below, specialist drilling/sampling equipment was procured together with trained and experienced operators. Unless otherwise indicated, sampling and logging remained the responsibility of trained staff from Crossfield Consulting Limited and field records were prepared on site, during or immediately following drilling/sampling or in situ measurements/tests. The results of in situ tests are presented on the relevant record sheets in this Appendix and the data are summarised on Figure III-1.

An exploratory hole location plan is presented as Figure III-2.

Trial Pits

One trial pit, denoted as TP1, was excavated by a JCB 3CX excavator on 8th November 2021. The trial pit records from the investigation are presented in this Appendix and these records include the descriptions and depths of the strata encountered, together with sample depths, groundwater observations and other pertinent comments.

Boreholes

Two boreholes, denoted as BH1 to BH2, were sunk by RD Drilling, between 8th November and 10th November 2021, to depths of between 22 m and 23 m. All exploratory holes were vertical, unless otherwise indicated on the record sheets. The drilling equipment and methods comprised light cable percussion boring, using a Dando/Pilcon rig with clay-cutter and chisel drop-tools and in conjunction with 150 mm diameter temporary steel casing. Disturbed soil samples were recovered from arisings recovered from boring operations immediately following strata changes and at intervals not exceeding 1.5 m. These samples have been used for descriptive and geotechnical testing purposes. 100 mm diameter “undisturbed” samples (denoted PS-T/W in BS EN 22475-1:2006) of fine-grained strata were taken for geotechnical testing purposes. The borehole record is based on the inspection of both drilling arisings and the recovered samples. Standard Penetration Tests (SPT) were carried out at regular intervals to provide data on the in situ density of coarse-grained strata and an indication of strength within fine-grained and chalk strata. A summary of SPT/depth data is presented in this Appendix. The SPTs were carried out in accordance with BS EN ISO 22476-3:2005(2007).

To minimise risks of introducing polluting substances, bio-degradable vegetable-based oils/greases were used on drilling/boring tools and casing.

On completion, combined groundwater/gas monitoring standpipes were installed in boreholes BH1 and BH2 to the full depths. The remainder of the exploratory holes were backfilled with arisings recovered from drilling/boring operations, with soil materials returned to the relevant location from where they were extracted.

The borehole records from this investigation are presented in this Appendix. These records include the descriptions and depths of the strata encountered, together with sample depths, in situ test results

(uncorrected values), groundwater observations, details of installations/backfill within exploratory holes and other pertinent comments.

Dynamic Sampling

Seven dynamic sampling boreholes, denoted as DS1 to DS7, were sunk by RD Drilling, on 11th November 2021 to between 0.3 m and 5.0 m depth. Dynamic/driven open-tube soil sampling/boring was undertaken using a Dart rig. Using a 1.0 m long thick-walled open-tube sampler (with plastic liner), Category A and B samples were recovered (sample disturbance being influenced by the specific soils encountered). Where appropriate, small disturbed sub-samples were recovered from the materials recovered in the open-tube sampler.

Standard Penetration Tests (SPT) were carried out at regular intervals to provide data on the in situ density of coarse-grained strata and an indication of strength within fine-grained strata. A summary of SPT/depth data is presented in this Appendix.

The records from the investigation are presented in this Appendix. These records include the descriptions and depths of the strata encountered, together with sample depths, in situ test results (uncorrected values), groundwater observations, details of installations/backfill within exploratory holes and other pertinent comments.

Soil Samples

All samples for analytical testing were collected in appropriate containers, stored in cool boxes (where appropriate) and sent to the testing laboratory overnight. The sample containers, storage and handling procedures were all compatible with the relevant recommendations of the UKAS accredited testing laboratory for the specific testing proposed.

Samples designated for geotechnical testing were collected, stored and transported in accordance with the published requirements for the specific tests scheduled, such that moisture content and soil structure integrity was maintained, as necessary for the test requirements.

Groundwater Monitoring

Groundwater levels within the two borehole standpipes/piezometers were measured on one occasion on 17th November 2021 by experienced staff from Environmental Site Sampling Limited. Results of groundwater monitoring are presented in this Appendix.

Groundwater Sampling

Water samples were taken, in accordance with BS 6068/BS EN ISO 5667-18(2001), on 17th November 2021 from the borehole standpipes. The sampling was undertaken by experienced geoenvironmental specialists from Environmental Site Sampling Limited.

Details of the groundwater sampling and associated water levels measured are presented in this Appendix, together with permeability calculations.

On site water quality testing was undertaken to determine the following parameters:

- pH
- Redox Potential
- Dissolved Oxygen
- Conductivity
- Temperature

The results of the water quality testing are presented in this Appendix, together with details of the instruments used.

Water Samples

All samples for analytical testing were collected in appropriate containers, stored in cool boxes, and sent to the testing laboratory overnight.

Ground Gas Monitoring

Standpipes installed in Borehole Nos BH1 and BH2 were monitored for ground gases on one occasion on 17th November 2021 using a GA2000+ S/N 11567 and the following parameters recorded:

- Ground gas pressure and flow (from standpipe and relative to atmospheric conditions)
- Atmospheric pressure and temperature on site during monitoring site visit
- Atmospheric pressure trend (From MET Office data for the site area over the 24 hours that included site measurements)
- Concentration (%v/v) of methane, carbon dioxide and oxygen
- Concentration (ppm v/v) of hydrogen sulphide and carbon monoxide
- Groundwater level in monitoring standpipe

The sampling was undertaken by experienced geoenvironmental specialists from Environmental Site Sampling.

Standpipe gas taps remained closed between each monitoring visit. The results of gas monitoring are presented in this Appendix together with a calibration certificate for the monitoring instrument.

Analytical Laboratory Testing

The rationale for the analytical testing is set out in Table III-2.

Selected samples of the soils encountered were submitted for screening analysis of the following determinands:

- | | |
|---------------------------------|------------------------------|
| • Arsenic (Total) | • Cadmium (Total) |
| • Chromium (Total) | • Copper (Total) |
| • Lead (Total) | • Mercury (Total) |
| • Nickel (Total) | • Zinc (Total) |
| • Selenium (Total) | • Boron (Water soluble) |
| • Cyanide (Total) | • Sulphide (Total) |
| • Sulphate (Water soluble) | • Phenols (Total-monohydric) |
| • pH | • Total Organic Carbon |
| • Asbestos (Fibre & ACM Screen) | • Asbestos (Quantification) |

Note: Total determinands are based on an aqua-regia extract.

Selected samples of the soils encountered were submitted for analysis of the following determinands:

- Total Petroleum Hydrocarbons – aromatic/aliphatic split and carbon number banding, using GC-FID techniques
- BTEX and MTBE – using GC-MS techniques
- Volatile Organic Compounds – using GC-MS techniques
- Polyaromatic Hydrocarbons – using GC-MS techniques

Selected samples were submitted for Waste Acceptance Criteria Tests (WAC) to BS EN 12457-3:

Solid Tests

Total Organic Carbon (TOC)	PCB # - Total (7 Congeners)
Loss on Ignition @ 450°C	PAH ^Δ - (WAC 17)
TPH (C ₁₀ -C ₄₀)	Acid Neutralisation Capacity
BTEX *	pH

* BTEX: Benzene, Toluene, Ethylbenzene, Xylenes

PCB: Polychlorinated biphenyl (congener Nos. 28, 52, 101, 118, 138, 153, 180)

^Δ PAH: Polyaromatic Hydrocarbons (17No. compounds from WAC criteria)

Eluate Tests

Arsenic (dissolved)	Molybdenum (dissolved)	Chloride
Barium (dissolved)	Nickel (dissolved)	Fluoride
Cadmium (dissolved)	Lead (dissolved)	Sulphate as SO ₄
Chromium (dissolved)	Antimony (dissolved)	Dissolved Solids
Copper (dissolved)	Selenium (dissolved)	Phenols - Total (monohydric)
Mercury (dissolved)	Zinc (dissolved)	Total Organic Carbon (TOC)

The analyses were carried out by i2 Analytical Limited, a UKAS accredited laboratory, and the results are presented in this Appendix. Soil testing was undertaken in accordance with the Environment Agency's Monitoring Certification Scheme (MCERTS).

Water samples were submitted for analysis for the following determinands:

- Hardness
- BOD
- Sulphates
- Arsenic
- Chromium
- Lead
- Nickel
- Selenium
- Ammoniacal Nitrogen
- COD
- Nitrates
- Cadmium
- Copper
- Mercury
- Zinc
- Total Petroleum Hydrocarbons – aromatic/aliphatic split and carbon number banding, using GC-FID techniques
- BTEX and MTBE – using GC-MS techniques
- Volatile Organic Compounds – using GC-MS techniques
- Polyaromatic Hydrocarbons – using GC-MS techniques

The analyses were carried out by i2 Analytical Limited, a UKAS accredited laboratory, and the results are presented in this Appendix.

Geotechnical Laboratory Testing

The rationale for the geotechnical laboratory testing is set out in the Table III-3.

Selected samples of the soils encountered were submitted for analysis for the following tests:

- pH value
- Water soluble sulphate
- Total Sulphate
- Total sulphur

The analyses were carried out by i2 Analytical Limited, a UKAS accredited laboratory, and the results are presented in this Appendix.

TABLE I-1

RATIONALE FOR THE DESIGN OF THE GROUND INVESTIGATION

The scope of the ground investigation was designed with reference to the published geology and ground conditions indicated in the desk study information. It is noted that the investigation works were constrained by access restrictions, in particular a reinforced concrete slab present across the whole site, observed to be of up to 400 mm thickness. Furthermore, the site has a split level, with one half of the site 2.5 m lower than the other, preventing the light cable percussion rig and JCB 3CX to access it due to the lack of a ramp.

In compliance with the guidance published in BS EN 1997-2:2007, the ground investigation was designed to verify the preliminary ground model, established from the desk study information and to characterise the ground conditions within influencing distance of the proposed structures. In this regard, the exploratory holes were targeted within relevant areas of the site to provide information on the strata profile down to competent materials. With reference to the desk study information and the support requirements of the proposed development, it is evident that adequate support is provided by the strata that continue below the depths of the exploratory holes.

In compliance with the guidance published in BS 10175:2011+A2:2017, BS 5930:2015+A1:2020 and Environment Agency LCRM (2020), the layout of the exploratory holes and sampling regime also considers the Conceptual Site Model and potential contaminant linkages, such that the spatial arrangement of the investigation provides the necessary information to support a risk assessment of the identified potential contaminant linkages.

Exploratory Hole and Technique	Rationale for Hole Location	Depth (m)	Sampling/In Situ Testing and Monitoring
BH1 – BH2	Exploratory holes were located to investigate deeper natural strata and provide geotechnical data.	Up to 23 m	Representative samples of shallow soils collected for analytical laboratory testing. Standard Penetration Tests (SPTs) were carried out at regular intervals to provide data on the strength within fine grained strata.
DS1 – DS7	Exploratory holes were located to provide coverage of the site to provide shallow analytical testing and geotechnical data.	Up to 5 m	Representative samples of shallow soils collected for analytical laboratory testing. Standard Penetration Tests (SPTs) were carried out at regular intervals to provide data on the strength within fine grained strata.
TP1	Exploratory hole located to provide coverage of the site.	Up to 0.3 m	N/A

Key

TP X	Machine dug trial pit	BH X(LCP)	Light Cable Percussion Borehole
DS X	Dynamic Sample Borehole		

TABLE III-2

RATIONALE FOR THE ANALYTICAL TESTING SUITE

Exploratory Hole and Samples	Selection Criteria	Analytical Tests
DS1 0.5 m DS1 1.5 m BH1 1 m BH2 1.5 m	Representative samples of shallow soils recovered to assess the presence of potential contaminants	Metals and metalloids, pH, phenol, sulphate (water soluble and total), sulphide Petroleum Hydrocarbons VOCs PAHs Asbestos (fibre and ACM screen)
DS1 0.5 m BH1 1 m BH2 1.5 m	Representative samples of shallow soils recovered to provide data for waste classification.	Waste classification/WAC testing in accordance with BS EN 12456-3
BH1 BH2	Representative samples of groundwater recovered to assess the presence of potential contaminants.	BOC, COD, Ammonia, Sulphates, Nitrates, Hardness, pH <i>Metals Suite</i> As, Cd, Pb, Hg, Ni, Se, Zn <i>Organic Compounds</i> TPH VOCs PAHs

TABLE III-3

RATIONALE FOR THE GEOTECHNICAL TESTING SUITE

Exploratory Hole and Sample	Selection Criteria	Geotechnical Tests
BH1 2 m BH1 8 m BH1 20 m BH2 13 m BH2 18 m	Representative samples recovered to undertake testing to aid concrete design classification.	pH Water soluble sulphate Acid soluble sulphate Total sulphur

TRIAL PIT RECORDS

KEY

	J	Disturbed Jar Sample	} Category B Samples
	G	Soil Sample in Glass Container	
	g	Soil Sample in Glass Vial	
	B	Disturbed Bulk Sample	
	C	"Undisturbed" CBR Mould Sample (denoted Category A: OS-TK/W in BS EN 22475-1:2006)	
	W	Water Sample	
FVT	{	c_{fv}	Undrained Shear Strength (from hand vane shear vane test)
		c_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)
		c_{fv}^*	Undrained Shear Strength from Hand Vane Shear Strength Test on block sample dug from pit by excavator

Notes:

1. All measurement values on record sheets are uncorrected, unless otherwise indicated.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004, BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc.) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14)
5. Undrained shear strength (low, medium, high etc.) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc.) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

Trial Pit Record Sheet

Hole Ref. TP1

Project Former Police Station, Gravesend

Sheet 1 of 1

Date 11/08/2021

Job No. CCL03479

Bearing: South

Shoring None used

Ground Level 19.90 m OD

Plant JCB 3CX

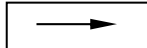
Stability Stable

Co-ordinates

Trial Pit

A

Plan



B

C

Water Dry

Logged by DJ

Logged on
site during
excavation

Checked by *AMM*

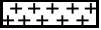
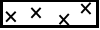
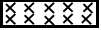
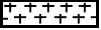
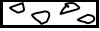
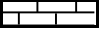
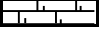
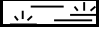
Depth	Face A	Face B	Face C	Depth
0.30		(1)		0.30
		Base of hole		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description
			1	0.00 - 0.30	Reinforced concrete, with steel rebar up to 15 mm thick

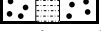
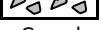
Remarks	Notes
Ground level from topographic survey shown as Figure 3 Hole abandoned due to equipment limitations	1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. Symbols and abbreviations are explained on the accompanying key 3. All linear dimensions are in metres unless otherwise stated

BOREHOLE & DRILLHOLE RECORDS - LEGENDS KEY SHEET

Legend - Strata Encountered in Exploratory Hole

Soil	Rock		
	Sedimentary	Igneous	Metamorphic
 Made Ground	 Mudstone	 Fine-grained	 Fine-grained
 Clay	 Shale	 Medium-grained	 Medium-grained
 Silt	 Siltstone	 Coarse-grained	 Coarse-grained
 Sand	 Sandstone		
 Gravel	 Limestone		
 Peat/Topsoil	 Chalk		
 Organic Sand	 Coal		
 Organic Clay	 Conglomerate		

Legend - Backfill to Borehole and Standpipe Installations

Backfill	Installations
 Soil arisings	 Concrete Cover Over Standpipe
 Bentonite	 Plain Standpipe - Bentonite Surround
 Cement-based Grout	 Perforated Standpipe - Geotextile and Granular Filter Surround
 Gravel	 Perforated Standpipe End Geotextile and Granular Filter Surround

Notes:

1. A combination of the strata symbols are indicative of mixed soil types.
2. The response zone of a standpipe refers to the section of perforated pipe within a granular surround, where substances may freely enter the standpipe from the surrounding strata.

BOREHOLE & PROBING RECORDS

KEY

Sampling

J	Soil Sample: Plastic Jar	} Category B Samples
G	Soil Sample: Glass Jar	
g	Soil Sample: Glass Vial	
D	Soil Sample: Small Bag Sample	
B	Disturbed Bulk Soil Sample	
W	Water Sample – recovered during boring operations	
U	"Undisturbed" 100 mm Diameter Soil Sample (denoted Category A OS-TK/W in BS EN 22475-1:2006)	
P	"Undisturbed" Piston Soil Sample (denoted PS-T/W in BS EN 22475-1:2006)	
NR	Sample not recovered	
S	Standard Penetration Test (SPT: split spoon sampler)	
SPT(C)	SPT carried out with a 60° cone	
IC	Nett sample recovery ratio (ratio of length of recovered sample to length of sample run)	

In Situ Measurements

FVT	C_{fv}	Undrained Shear Strength (from hand vane shear vane test)
	C_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)
	C_{fv}^*	Hand Vane Shear Strength Test (on Category A: OS-TK/W soil sample "U" type, as outlined above)
SPT N	100	'N' Value from SPT test
	(10)	Number of blows to drive U100
	N_{10}	Dynamic Probe Test: Number of blows to drive 100 mm
DPH	N_{H10}	Dynamic Probe Test: Heavy (30 kg mass & 500 mm fall)
DPSH-A	N_{SHA10}	Dynamic Probe Test: Super-Heavy A (63.5 kg mass & 500 mm fall)
DPSH-B	N_{SHB10}	Dynamic Probe Test: Super-Heavy B (63.5 kg mass & 750 mm fall)
	$\frac{x}{y}$	x Blows per y Driving Distance (for non-standard driving distance)
	mm	
T		Torque (max) required to turn rods (unit: Nm, unless otherwise shown)

Notes:

1. All measurement values on record sheets are uncorrected.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004, BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14)
5. Undrained shear strength (low, medium, high etc) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

						Light Cable Percussion Borehole Record Sheet				Hole Ref. BH1	
Project: Former Police Station, Gravesend						Sheet 1 of 3				Job No. CCL03479	
Contractor RD Drilling Equipment Dando 4000						Ground Level 19.9 m OD				Co-ordinates	
Method 0 m - 23.0 m Light Cable Percussion Boring						Logged by: DJ Logged on site during drilling operations				Checked by: <i>AM</i>	
Boring Diameter 150 mm; 0 m - 23.0 m											
Casing Diameter 150 mm; 0 m - 13.5 m											
Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.		
1.00	JGg				Reinforced concrete (MADE GROUND)	0.25			19.60		
1.20-1.65	S	1.20	Dry	N=13	Greyish brown gravelly, clayey sand. Gravel is fine to medium and subrounded of chert (REWORKED MATERIAL/MADE GROUND)						
2.00-2.45	S, J	1.50	Dry	N=9		2.00			17.85		
3.00-3.45	S, J	3.00	Dry	N=6	Firm consistency greyish brown mottled orange gravelly, sandy CLAY. Gravel is fine to medium and rounded of flint (POSSIBLE THANET FORMATION)	2.50			17.35		
4.00-4.45	S	3.00	Dry	N=4	Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk. Gravel also of fine, subrounded flint (LEWES NODULAR CHALK FORMATION)						
5.00-5.45	S	4.00	Dry	N=11							
6.50-6.95	S	6.00	Dry	N=13							
8.00-8.45	S, J	7.00	Dry	N=10							
9.50-9.95	S	9.00	Dry	N=12							
10.00	J										
Progress/Groundwater							Chiselling		Additional Tests		
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
9.11.2021	18.80	13.50		18.80	17.00						
Remarks Ground level based on topographic survey shown as Figure 3	Notes 1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m ²										

Light Cable Percussion Borehole Record Sheet

Hole Ref. **BH1**

Project: Former Police Station, Gravesend
Start Date 11/08/2021 **End Date** 11/09/2021

Sheet 2 of 3
Job No. CCL03479

Contractor RD Drilling **Equipment** Dando 4000
Method 0 m - 23.0 m Light Cable Percussion Boring
Boring Diameter 150 mm; 0 m - 23.0 m
Casing Diameter 150 mm; 0 m - 13.5 m

Ground Level 19.9 m OD
Co-ordinates
Logged by: DJ Logged on site during drilling operations
Checked by: *APM*

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
11.00-11.45	S	10.50	Dry	N=21	Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk with occasional medium density chalk. Gravel also of fine, (LEWES NODULAR CHALK FORMATION)				
12.00	J								
12.50-12.95	S	12.00	Dry	N=13					
14.00-14.45	S	13.50	Dry	N=16					
15.00	J								
15.50-15.95	S	13.50	Dry	N=15					
17.00-17.45	S	13.50	Dry	N=27					
18.50-18.95	S	13.50	18.50	N=36					
20.00-20.45	S, J	13.50	18.50	N=39					

Progress/Groundwater							Chiselling		Additional Tests		
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
9.11.2021	18.80	13.50		18.80	17.00						

Remarks
Ground level based on topographic survey shown as Figure 3

Notes
1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m²

Light Cable Percussion Borehole Record Sheet

Hole Ref. **BH1**

Project: Former Police Station, Gravesend
Start Date 11/08/2021 **End Date** 11/09/2021

Sheet 3 of 3
Job No. CCL03479

Contractor RD Drilling **Equipment** Dando 4000
Method 0 m - 23.0 m Light Cable Percussion Boring
Boring Diameter 150 mm; 0 m - 23.0 m
Casing Diameter 150 mm; 0 m - 13.5 m

Ground Level 19.9 m OD
Co-ordinates
Logged by: DJ Logged on site during drilling operations
Checked by: *AAH*

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk with occasional medium density chalk. Gravel also of fine, (LEWES NODULAR CHALK FORMATION)				
					Base of hole	23.00			-3.15

Progress/Groundwater							Chiselling		Additional Tests		
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
9.11.2021	18.80	13.50		18.80	17.00						

Remarks	Notes
Ground level based on topographic survey shown as Figure 3	1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m ²

Crossfield CONSULTING GEOTECHNICAL ENVIRONMENTAL					Light Cable Percussion Borehole Record Sheet					Hole Ref. BH2	
Project: Former Police Station, Gravesend					Sheet 1 of 3					Job No. CCL03479	
Start Date 11/09/2021 End Date 11/10/2021					Ground Level 19.9 m OD					Co-ordinates	
Contractor RD Drilling Equipment Dando 4000					Logged by: DJ Logged on site during drilling operations					Checked by: <i>APM</i>	
Method 0 m - 21.0 m Light Cable Percussion Boring					Boring Diameter 150 mm; 0 m - 21.0 m					Casing Diameter 150 mm; 0 m - 7.5 m	
Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.		
1.50	JGg				Reinforced concrete (MADE GROUND)	0.25			19.65		
					Greyish brown gravelly sand. Gravel is fine to medium and angular of concrete and flint fragments (MADE GROUND)						
3.00-3.45	S	3.00	Dry	N=7	Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk with rare medium density chalk. Gravel also of fine, subrounded flint (LEWES NODULAR CHALK FORMATION)	2.10			17.80		
4.00-4.45	S, J	3.00	Dry	N=9							
5.00-5.45	S	4.50	Dry	N=11							
6.00-6.45	S, J	6.00	Dry	N=21							
7.50-7.95	S	6.00	Dry	N=19							
9.00-9.45	S	6.00	Dry	N=19							
					...Frequent gravel of medium density chalk from 10.0 m						
Progress/Groundwater					Chiselling					Additional Tests	
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
10.11.2021	18.60	7.50		18.60	17.96						
Remarks					Notes						
Ground level based on topographic survey shown as Figure 3					1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m ²						

Light Cable Percussion Borehole Record Sheet

Hole Ref. **BH2**

Project: Former Police Station, Gravesend
Start Date 11/09/2021 **End Date** 11/10/2021

Sheet 2 of 3
Job No. CCL03479

Contractor RD Drilling **Equipment** Dando 4000
Method 0 m - 21.0 m Light Cable Percussion Boring
Boring Diameter 150 mm; 0 m - 21.0 m
Casing Diameter 150 mm; 0 m - 7.5 m

Ground Level 19.9 m OD
Co-ordinates
Logged by: DJ Logged on site during drilling operations
Checked by: *APM*

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
10.50-10.95	S	7.50	Dry	N=24	Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk with frequent medium density chalk. Gravel also of fine, subrounded flint (LEWES NODULAR CHALK FORMATION)				
12.00-12.45	S	7.50	Dry	N=27					
13.00	J								
13.50-13.95	S	7.50	Dry	N=36					
15.00-15.45	S	7.50	Dry	N=32					
16.50-16.95	S	7.50	Dry	N=42					
18.00-18.45	S, J	7.50	Dry	N=44					
19.50-19.95	S	7.50	17.90	N=50					

Progress/Groundwater							Chiselling		Additional Tests		
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
10.11.2021	18.60	7.50		18.60	17.96						

Remarks	Notes
Ground level based on topographic survey shown as Figure 3	1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m ²

Light Cable Percussion Borehole Record Sheet				Hole Ref.	BH2	
Project:		Former Police Station, Gravesend		Sheet	3 of 3	
Start Date		11/09/2021	End Date	11/10/2021	Job No.	CCL03479
Equipment		Dando 4000		Ground Level	19.9 m OD	
Percussion Boring				Co-ordinates		
				Logged by: DJ Checked by: <i>[Signature]</i>		
				Logged on site during drilling operations		

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth		Legend	Backfill	Level O.D.
					Structureless CHALK of white gravelly CLAY. Gravel is very weak, low density and white of chalk with frequent medium density chalk. Gravel also of fine, subrounded flint (LEWES NODULAR CHALK FORMATION)					-2.10
					Base of hole	22.00				

Progress/Groundwater							Chiselling		Additional Tests		
Date/Time	Hole Depth	Case Depth	Water Depth	Depth Struck	Depth after 20 min	Depth Sealed	Depth Range	Time (hours)	Test Type	Test Depth	Test Value
10.11.2021	18.60	7.50		18.60	17.96						

Remarks	Notes
Ground level based on topographic survey shown as Figure 3	1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m^2

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Unit 8
Orton Enterprise Centre
Orton Southgate
Peterborough
PE2 6XU

SPT Hammer Ref: RD4
 Test Date: 03/01/2021
 Report Date: 03/01/2021
 File Name: RD4.spt
 Test Operator: PR

Instrumented Rod Data

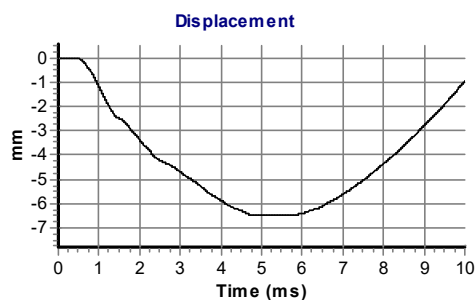
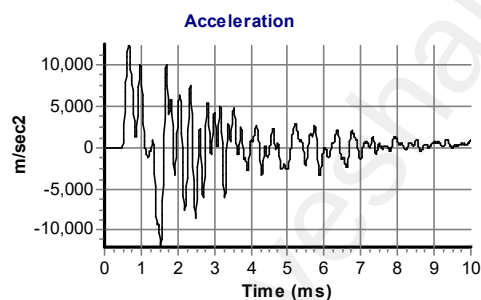
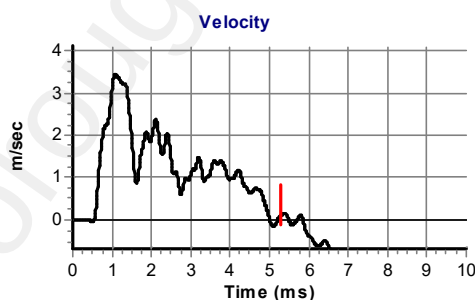
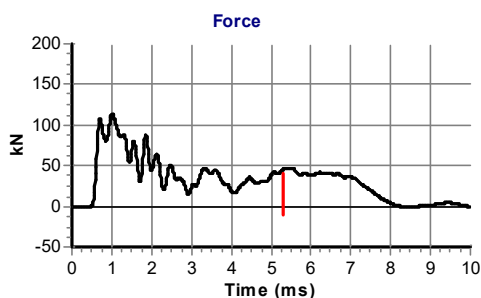
Diameter d_r (mm): 54
 Wall Thickness t_r (mm): 6.3
 Assumed Modulus E_a (GPa): 208
 Accelerometer No.1: 11853
 Accelerometer No.2: 10332

SPT Hammer Information

Hammer Mass m (kg): 63.0
 Falling Height h (mm): 760
 SPT String Length L (m): 15.0

Comments / Location

Recommended calibration interval is 6 months,
 maximum 12



Calculations

Area of Rod A (mm^2): 944
 Theoretical Energy E_{theor} (J): 473
 Measured Energy E_{meas} (J): 366

Energy Ratio E_r (%): **77**

Signed: PR
 Title: Operator

P. Rodgman

WINDOWLESS SAMPLE RECORDS

KEY

Sampling

J	Disturbed Jar Sample
G	Jar Sample in Glass Container
g	Soil Sample in Glass Vial
W	Water Sample
IC	Nett sample recovery ratio (ratio of length of recovered sample to length of sample run)

In Situ Measurements

FVT	C_{fv}	Undrained Shear Strength (from hand vane shear vane test)
	C_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)
	C_{fv}^*	Hand Vane Shear Strength Test (on Category A: OS-TK/W soil sample recovered in window sampler)
	S	Standard Penetration Test (SPT: split spoon sampler)
	SPT(C)	SPT carried out with a 60° cone
	'N'	'N' Value from SPT test
	N_{10}	Dynamic Probe Test: Number of blows to drive 100 mm
DPH	N_{H10}	Dynamic Probe Test: Heavy (30 kg mass & 500 mm fall)
DPSH-A	N_{SHA10}	Dynamic Probe Test: Super-Heavy A (63.5 kg mass & 500 mm fall)
DPSH-B	N_{SHB10}	Dynamic Probe Test: Super-Heavy B (63.5 kg mass & 750 mm fall)
	$\frac{x}{y}$	x Blows per y Driving Distance (for non-standard SPT or DP driving distance)
	y mm	
	T	Torque (max) required to turn rods (unit: Nm, unless otherwise shown)

Notes:

1. All measurement values on record sheets are uncorrected, unless otherwise indicated.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14).
5. Undrained shear strength (low, medium, high etc) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

						Dynamic Sample Record Sheet		Hole Ref. DS1	
Contractor RD Drilling Equipment Dart Method 0.0 m to 5.0 m dynamic sampling Boring Diameter 100 mm						Project: Former Police Station, Gravesend		Sheet 1 of 1	
						Date: 11/11/2021		Job No. CCL03479	
						Ground Level. 22.90 m OD		Co-ordinates	
						Logged by: DJ		Logged on site during drilling operations	
						Checked by: <i>AAH</i>			
Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
0.50	JGg				Reddish brown gravelly sand. Gravel is fine to medium and angular of brick and concrete fragments and chert (MADE GROUND)				
1.00-1.45	S	None	Dry	N=12	...Thin concrete layer at 1.2 m				
1.50	JGg				Firm consistency brown gravelly clay. Gravel is fine to medium and subangular to subrounded of chalk and chert fragments, brick fragments and black carbonaceous fragments (MADE GROUND)				
2.00-2.45	S	None	Dry	N=11					
2.70	JGg								
3.00-3.45	S	None	Dry	N=12	...Brick and concrete fragments at 3.0 m				
					...Coarse gravel of medium to high density chalk fragments from 3.4 m				
4.00-4.45	S	None	Dry	N=15	Medium dense bluish grey mottled orange SILT (POSSIBLE THANET FORMATION)				
5.00-5.45	S	None	Dry	N=16	Structureless CHALK of clayey angular GRAVEL. Gravel is very weak low density to medium density and white (LEWES NODULAR CHALK FORMATION, Grade Dm)				
						4.90			18.00
						5.00			17.90
Core Recovery				Groundwater			Additional Tests		
Depth	Recovery	Hole Depth	Strike Depth	Water Depth	Observations	Test type	Test Depth	Test Value	
0.00-1.00	100%	5.00	Not		Dry				
1.00-2.00	100%								
2.00-3.00	100%								
3.00-4.00	100%								
4.00-5.00	0%								
Remarks					Notes				
Ground level based on topographic survey shown as Figure 3					1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. The depths to strata change are approximate only 3. Symbols and abbreviations are explained on the accompanying key 4. All linear dimensions are in metres unless otherwise stated 5. Undrained shear strength test value given in kN/m ²				

Dynamic Sample Record Sheet		Hole Ref.	DS3
Project:	Former Police Station, Gravesend	Sheet	1 of 1
Date:	11/11/2021	Job No.	CCL03479
Equipment	Dart	Ground Level.	22.60 m OD
sampling		Co-ordinates	
		Logged by:	DJ Logged on site during drilling operations
		Checked by:	<i>[Signature]</i>

[illegible]

Core Recovery		Groundwater				Additional Tests		
Depth	Recovery	Hole Depth	Strike Depth	Water Depth	Observations	Test type	Test Depth	Test Value
0.00-0.38	90%							

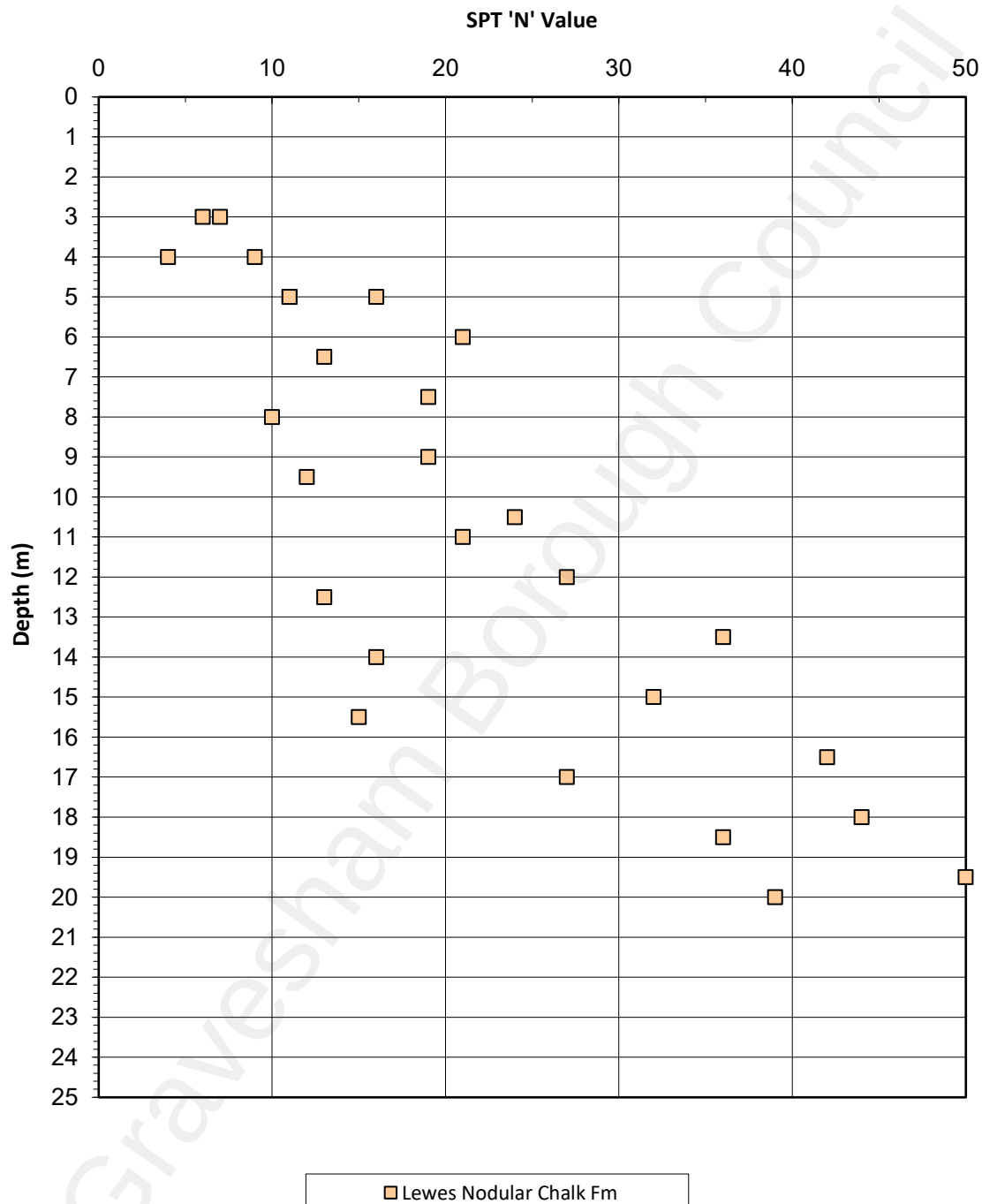
Remarks

Hole terminated in concrete due to equipment limitations
Ground level based on topographic survey shown as Figure 3

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

FIGURE III-1



'N' values are uncorrected.

SPT 'N' VALUE PROFILE

TABLE III-4

GROUNDWATER MONITORING DATA

Borehole	Ground Level (mOD)	Date: Depth to Groundwater (m)	17.11.2021 Groundwater Level (mOD)
BH1	19.85	18.14	1.71
BH2	19.90	18.04	1.86
BH101	19.85	4.99	14.86
BH102	19.85	N/A	N/A

Notes:

1. Ground levels from topographical survey provided by the client, presented as Figure 3.

ESS

Environmental Site Sampling Ltd

17th November 2021

Mr D Joel
Crossfield Consulting Ltd
The Granary
White Hall Farm
Long Itchington
Warwickshire
CV47 9PU

Environmental Site Sampling Ltd
94 Dillotford Avenue
Styvechale
Coventry
CV3 5DU

Tel/Fax: (024) 7669 0514

Mobile : 07971 664 118

e.mail: cosgrove_patrick@hotmail.com

Page 1 of 2

In-situ Analysis Report: CCL/6087

Dear Mr Joel,

Please find enclosed a copy of the in-situ ground gas analysis undertaken at Former Police Station, Windmill Street, Gravesend, DA12 1DD, on 17th November 2021.

I trust you find these satisfactory. Should you have any queries please contact us.

Yours Sincerely,

Patrick Cosgrove

P V Cosgrove BSc MSc
Environmental Site Sampling Ltd



Environmental Site Sampling Ltd Registered in England & Wales No. 4431348
Registered Office: 94 Dillotford Avenue Coventry CV3 5DU

In-situ Analysis: CCL/6087

Client: Crossfield Consulting Ltd

Project: CCL03479, Former Police Station, Windmill Street, Gravesend, DA12 1DD

17/11/21

Sample Location	Gas Flow (l/hr)	Borehole Pressure (mb)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)		Water Level (Meters)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H ₂ S	CO	
BH 1	<0.1	0.04	<0.1	<0.1	<2	<2	0.2	0.2	20.1	20.1	<1	<1	18.14m
BH 2	<0.1	0.09	<0.1	<0.1	<2	<2	0.1	0.1	20.4	20.4	<1	<1	18.04m
BH 101	0.1	0.17	<0.1	<0.1	<2	<2	0.6	0.6	20.0	20.0	<1	<1	4.99m
BH 102	<0.1	0.05	<0.1	<0.1	<2	<2	0.3	0.3	20.2	20.2	<1	<1	Dry 4.01m
Notes: Monitoring order is from left to right. Steady concentrations are measured up to 3 minutes.													

Additional Information	
Date Monitoring Undertaken:	17 th November 2021
Monitoring Undertaken By:	P Cosgrove
Equipment Used:	GA2000+ S/N 11567
Atmospheric Pressure Gravesend a.m. (mb) :	1023mb
Atmospheric Pressure On-site (mb) :	1026mb
Atmospheric Pressure Gravesend p.m. (mb) :	1028mb
Weather During Visit:	Sunny, Dry, Wind W, 2m/s, 9°C
Comments:	

**Daniel Joel**

Crossfield Consulting Ltd
The Granary
White Hall Farm
Leamington Road
Long Itchington
Warwickshire
CV47 9PU

e: dj@crossfield-consulting.co.uk

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

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 21-22746

Project / Site name:	Former Police Station, Gravesend	Samples received on:	12/11/2021
Your job number:	CCL03479	Samples instructed on/ Analysis started on:	12/11/2021
Your order number:	PO12189	Analysis completed by:	24/11/2021
Report Issue Number:	1	Report issued on:	24/11/2021
Samples Analysed:	4 soil samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 21-22746

Project / Site name: Former Police Station, Gravesend

Your Order No: PO12189

Lab Sample Number				2082015	2082016	2082017	2082018
Sample Reference				DS1	DS1	BH1	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.00	1.50
Date Sampled				11/11/2021	11/11/2021	08/11/2021	09/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	41	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	16	16	13
Total mass of sample received	kg	0.001	NONE	1.5	1.2	1.5	1.5

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	10.9	8.8	10.2	11.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	3700	850	2800	3600
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	0.11	0.11	0.017
Sulphide	mg/kg	1	MCERTS	3.1	< 1.0	< 1.0	2.3
Total Sulphur	mg/kg	50	MCERTS	1700	290	1100	1300
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.3	0.6	0.1	0.7

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.45
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.35
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.24
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.21
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.31
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.21
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.20
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	1.97
-----------------------------	-------	-----	--------	--------	--------	--------	------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	8.6	8.4	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	1.8	0.4	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	4.0	0.3	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31	25	96	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	19	18	23
Lead (aqua regia extractable)	mg/kg	1	MCERTS	240	110	11	69
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	15	22	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	98	51	85	71

Analytical Report Number: 21-22746

Project / Site name: Former Police Station, Gravesend

Your Order No: PO12189

Lab Sample Number				2082015	2082016	2082017	2082018
Sample Reference				DS1	DS1	BH1	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.00	1.50
Date Sampled				11/11/2021	11/11/2021	08/11/2021	09/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	3.8
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	28
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	300
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	330

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10

Analytical Report Number: 21-22746

Project / Site name: Former Police Station, Gravesend

Your Order No: PO12189

Lab Sample Number				2082015	2082016	2082017	2082018
Sample Reference				DS1	DS1	BH1	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.00	1.50
Date Sampled				11/11/2021	11/11/2021	08/11/2021	09/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0

Analytical Report Number: 21-22746

Project / Site name: Former Police Station, Gravesend

Your Order No: PO12189

Lab Sample Number				2082015	2082016	2082017	2082018
Sample Reference				DS1	DS1	BH1	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	1.00	1.50
Date Sampled				11/11/2021	11/11/2021	08/11/2021	09/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0

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

Analytical Report Number : 21-22746

Project / Site name: Former Police Station, Gravesend

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2082015	DS1	None Supplied	0.5	Brown clay and sand with rubble and stones.
2082016	DS1	None Supplied	1.5	Brown clay and sand with chalk.
2082017	BH1	None Supplied	1	Brown sandy clay with gravel.
2082018	BH2	None Supplied	1.5	Brown clay and sand with gravel.

Analytical Report Number : 21-22746

Project / Site name: Former Police Station, Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

Analytical Report Number : 21-22746

Project / Site name: Former Police Station, Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report



Analytical Report Number : 21-22746

Project / Site name: Former Police Station, Gravesend

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	None Supplied	S	2082017	c	Sulphide in soil	L010-PL	c
BH1	None Supplied	S	2082017	c	Total cyanide in soil	L080-PL	c

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Analytical Report Number : 21-22747

Project / Site name:	Former Police Station, Gravesend	Samples received on:	12/11/2021
Your job number:	CCL03479	Samples instructed on/ Analysis started on:	12/11/2021
Your order number:	PO12189	Analysis completed by:	23/11/2021
Report Issue Number:	1	Report issued on:	23/11/2021
Samples Analysed:	3 wac multi samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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

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Waste Acceptance Criteria Analytical Results							
Report No:	21-22747						
				Client: CROSSFCLTD			
Location	Former Police Station, Gravesend						
Lab Reference (Sample Number)	2082019			Landfill Waste Acceptance Criteria			
Sampling Date	11/11/2021			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID	DS1						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	0.3			3%	5%	6%	
Loss on Ignition (%) **	-			--	--	10%	
BTEX (µg/kg) **	< 10			6000	--	--	
Sum of PCBs (mg/kg) **	< 0.30			1	--	--	
Mineral Oil (mg/kg) #	< 10			500	--	--	
Total PAH (WAC-17) (mg/kg)	< 0.85			100	--	--	
pH (units)**	-			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	-			--	To be evaluated	To be evaluated	
Eluate Analysis							
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.017	< 0.010		0.099	0.5	2	25
Barium *	0.015	0.022		0.21	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.037	0.013		0.16	0.5	10	70
Copper *	0.016	0.0081		0.088	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0048	< 0.0030		0.030	0.5	10	30
Nickel *	0.0063	0.0050		0.051	0.4	10	40
Lead *	0.0063	0.012		0.11	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	0.017	< 0.010		0.091	0.1	0.5	7
Zinc *	0.0081	0.0061		0.063	4	50	200
Chloride *	15	8.9		95	800	15000	25000
Fluoride	0.46	0.26		2.8	10	150	500
Sulphate *	68	21		250	1000	20000	50000
TDS*	220	110		1200	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	15	14		140	500	800	1000
Leach Test Information							
Stone Content (%)	41						
Sample Mass (kg)	1.5						
Dry Matter (%)	88						
Moisture (%)	12						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.16						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results							
Report No:	21-22747						
				Client: CROSSFCLTD			
Location	Former Police Station, Gravesend						
Lab Reference (Sample Number)	2082020			Landfill Waste Acceptance Criteria			
Sampling Date	08/11/2021			Limits			
Sample ID	BH1			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	< 0.1			3%	5%	6%	
Loss on Ignition (%) **	-			--	--	10%	
BTEX (µg/kg) **	< 10			6000	--	--	
Sum of PCBs (mg/kg) **	< 0.30			1	--	--	
Mineral Oil (mg/kg) #	< 10			500	--	--	
Total PAH (WAC-17) (mg/kg)	< 0.85			100	--	--	
pH (units)**	-			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	-			--	To be evaluated	To be evaluated	
Eluate Analysis							
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	2:1	8:1	Cumulative 10:1	Limit values for compliance leaching test			
	mg/l	mg/l	mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
Arsenic *	< 0.010	< 0.010	< 0.050	0.5	2	25	
Barium *	< 0.0050	0.0070	0.068	20	100	300	
Cadmium *	< 0.0005	< 0.0005	< 0.0020	0.04	1	5	
Chromium *	0.086	0.021	0.28	0.5	10	70	
Copper *	0.014	0.0046	0.056	2	50	100	
Mercury *	< 0.0015	< 0.0015	< 0.010	0.01	0.2	2	
Molybdenum *	0.0043	< 0.0030	0.023	0.5	10	30	
Nickel *	0.0033	0.0040	0.039	0.4	10	40	
Lead *	< 0.0050	< 0.0050	0.046	0.5	10	50	
Antimony *	< 0.0050	< 0.0050	0.025	0.06	0.7	5	
Selenium *	< 0.010	< 0.010	< 0.040	0.1	0.5	7	
Zinc *	0.0033	0.0015	< 0.020	4	50	200	
Chloride *	17	< 4.0	44	800	15000	25000	
Fluoride	0.32	0.23	2.4	10	150	500	
Sulphate *	26	13	140	1000	20000	50000	
TDS*	200	190	1900	4000	60000	100000	
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13	< 0.50	1	-	-	
DOC	13	3.6	47	500	800	1000	
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	84						
Moisture (%)	16						
Stage 1							
Volume Eluate L2 (litres)	0.30						
Filtered Eluate VE1 (litres)	0.20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.							
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.							

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Waste Acceptance Criteria Analytical Results

Report No:	21-22747						
				Client: CROSSFCLTD			
Location	Former Police Station, Gravesend						
Lab Reference (Sample Number)	2082021			Landfill Waste Acceptance Criteria			
Sampling Date	09/11/2021			Limits			
Sample ID	BH2			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Depth (m)	1.50						
Solid Waste Analysis							
TOC (%)**	0.6			3%	5%	6%	
Loss on Ignition (%) **	-			--	--	10%	
BTEX (µg/kg) **	< 10			6000	--	--	
Sum of PCBs (mg/kg) **	< 0.30			1	--	--	
Mineral Oil (mg/kg) #	410			500	--	--	
Total PAH (WAC-17) (mg/kg)	1.20			100	--	--	
pH (units)**	-			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	-			--	To be evaluated	To be evaluated	
Eluate Analysis							
	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.088	0.050		0.54	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.030	0.032		0.32	0.5	10	70
Copper *	0.14	0.046		0.56	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0060	0.0042		0.044	0.5	10	30
Nickel *	0.020	0.0061		0.077	0.4	10	40
Lead *	< 0.0050	< 0.0050		0.026	0.5	10	50
Antimony *	< 0.0050	< 0.0050		0.032	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.057	0.1	0.5	7
Zinc *	0.0020	0.0025		0.024	4	50	200
Chloride *	30	9.6		120	800	15000	25000
Fluoride	0.089	0.089		0.89	10	150	500
Sulphate *	5.8	10		96	1000	20000	50000
TDS*	1600	830		9100	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	24	8.0		98	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	87						
Moisture (%)	13						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 21-22747

Project / Site name: Former Police Station, Gravesend

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2082019	DS1	None Supplied	0.5	Brown clay and sand with rubble and stones.
2082020	BH1	None Supplied	1	Brown sandy clay with gravel.
2082021	BH2	None Supplied	1.5	Brown clay and sand with gravel.

Analytical Report Number : 21-22747

Project / Site name: Former Police Station, Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Preparation WAC leachate		In-house method	L043-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	ISO 17025
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L031-PL	W	NONE
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Mineral Oil in Soil C10 - C40	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L076-PL	D	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Analytical Report Number : 21-22747

Project / Site name: Former Police Station, Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-23133

Project / Site name:	Former Police Station, Gravesend	Samples received on:	12/11/2021
Your job number:	CCL03479	Samples instructed on/ Analysis started on:	12/11/2021
Your order number:	PO12189	Analysis completed by:	24/11/2021
Report Issue Number:	1	Report issued on:	24/11/2021
Samples Analysed:	5 soil samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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

Analytical Report Number: 21-23133

Project / Site name: Former Police Station, Gravesend

Your Order No: PO12189

Lab Sample Number				2083890	2083891	2083892	2083893	2083894
Sample Reference				BH1	BH1	BH1	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.00	8.00	20.00	13.00	18.00
Date Sampled				08/11/2021	08/11/2021	09/11/2021	10/11/2021	10/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	23	20	23	21
Total mass of sample received	kg	0.001	NONE	0.50	0.60	1.0	1.0	1.0

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.3	9.2	9.0	8.8	8.6
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1100	610	560	590	540
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.091	0.027	0.036	0.015	0.023
Total Sulphur	mg/kg	50	MCERTS	400	200	180	170	150

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

Analytical Report Number : 21-23133

Project / Site name: Former Police Station, Gravesend

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Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2083890	BH1	None Supplied	2	Grey clay with gravel.
2083891	BH1	None Supplied	8	Light brown clay with chalk.
2083892	BH1	None Supplied	20	Light brown clay with chalk.
2083893	BH2	None Supplied	13	Light brown clay with chalk.
2083894	BH2	None Supplied	18	Light brown clay with chalk.

Analytical Report Number : 21-23133

Project / Site name: Former Police Station, Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

**Daniel Joel**

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Analytical Report Number : 21-23511

Project / Site name:	Former Police Station Gravesend	Samples received on:	17/11/2021
Your job number:	CCL03479	Samples instructed on/ Analysis started on:	17/11/2021
Your order number:	PO12197	Analysis completed by:	24/11/2021
Report Issue Number:	1	Report issued on:	24/11/2021
Samples Analysed:	2 water samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



Analytical Report Number: 21-23511

Project / Site name: Former Police Station Gravesend

Your Order No: PO12197

Lab Sample Number				2085716	2085717
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				17/11/2021	17/11/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

Sulphate as SO ₄	µg/l	45	ISO 17025	117000	141000
Ammoniacal Nitrogen as NH ₃	µg/l	15	ISO 17025	< 15	37
Nitrate as N	mg/l	0.01	ISO 17025	20.7	11.5
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	15	1200
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	< 1.0	3.3

Hardness - Total	mg/l 3/l	1	ISO 17025	541	384
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16
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Heavy Metals / Metalloids

Calcium (dissolved)	mg/l	0.012	ISO 17025	200	140
Magnesium (dissolved)	mg/l	0.005	ISO 17025	9.2	10

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.30	0.60
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	2.9	1.9
Copper (dissolved)	µg/l	0.5	ISO 17025	2.8	2.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.4	21
Selenium (dissolved)	µg/l	0.6	ISO 17025	3.6	3.6
Zinc (dissolved)	µg/l	0.5	ISO 17025	8.9	25



Analytical Report Number: 21-23511

Project / Site name: Former Police Station Gravesend

Your Order No: PO12197

Lab Sample Number				2085716	2085717
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				17/11/2021	17/11/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10



Analytical Report Number: 21-23511

Project / Site name: Former Police Station Gravesend

Your Order No: PO12197

Lab Sample Number				2085716	2085717
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				17/11/2021	17/11/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0



Analytical Report Number: 21-23511

Project / Site name: Former Police Station Gravesend

Your Order No: PO12197

Lab Sample Number				2085716	2085717
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				17/11/2021	17/11/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0

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



Analytical Report Number : 21-23511

Project / Site name: Former Police Station Gravesend

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammonia as NH3 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025

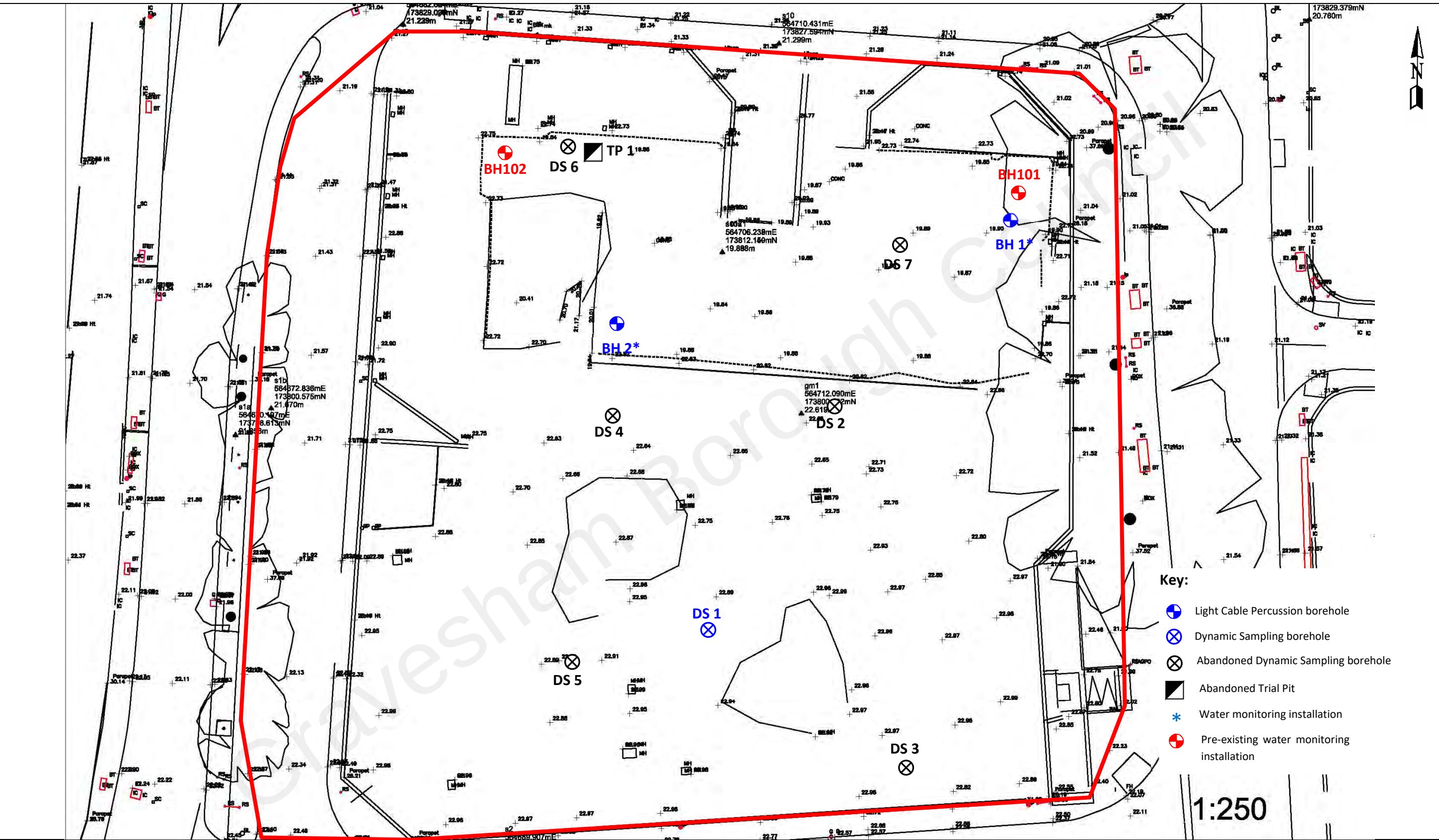
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

FIGURE III-2



EXPLORATORY HOLE LOCATION PLAN
Scale: 1:250

Reproduced from the topographic survey provided by the Client