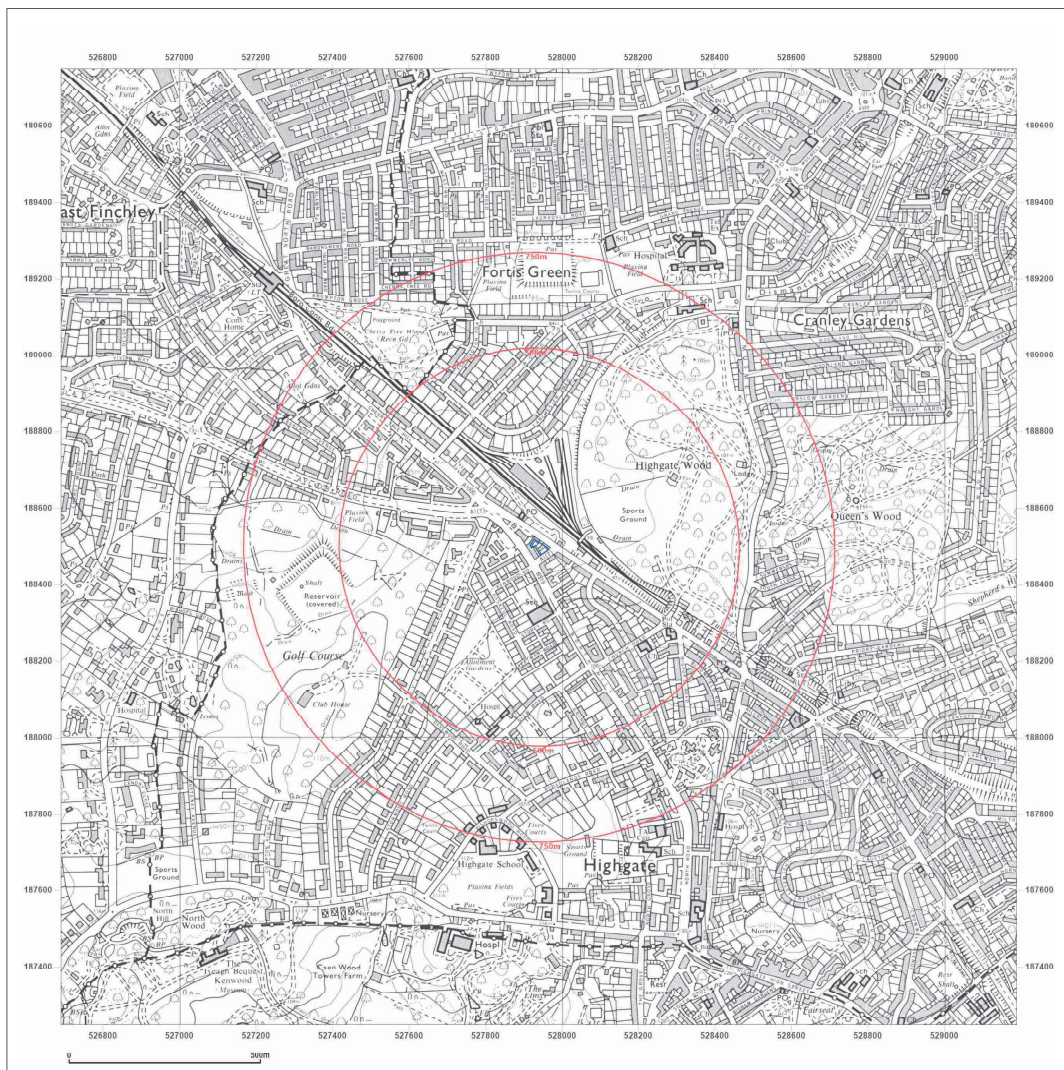




emapsite™

Site Details:

Client Ref: EMS_738056_960046
Report Ref: EMS-738056_960046
Grid Ref: 527939, 188498

Map Name: National Grid

Map date: 1974

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
 Revised 19/4
 Edition N/A
 Copyright N/A
 Levelled N/A



Produced by
 Groundsure Insights
www.groundsure.com

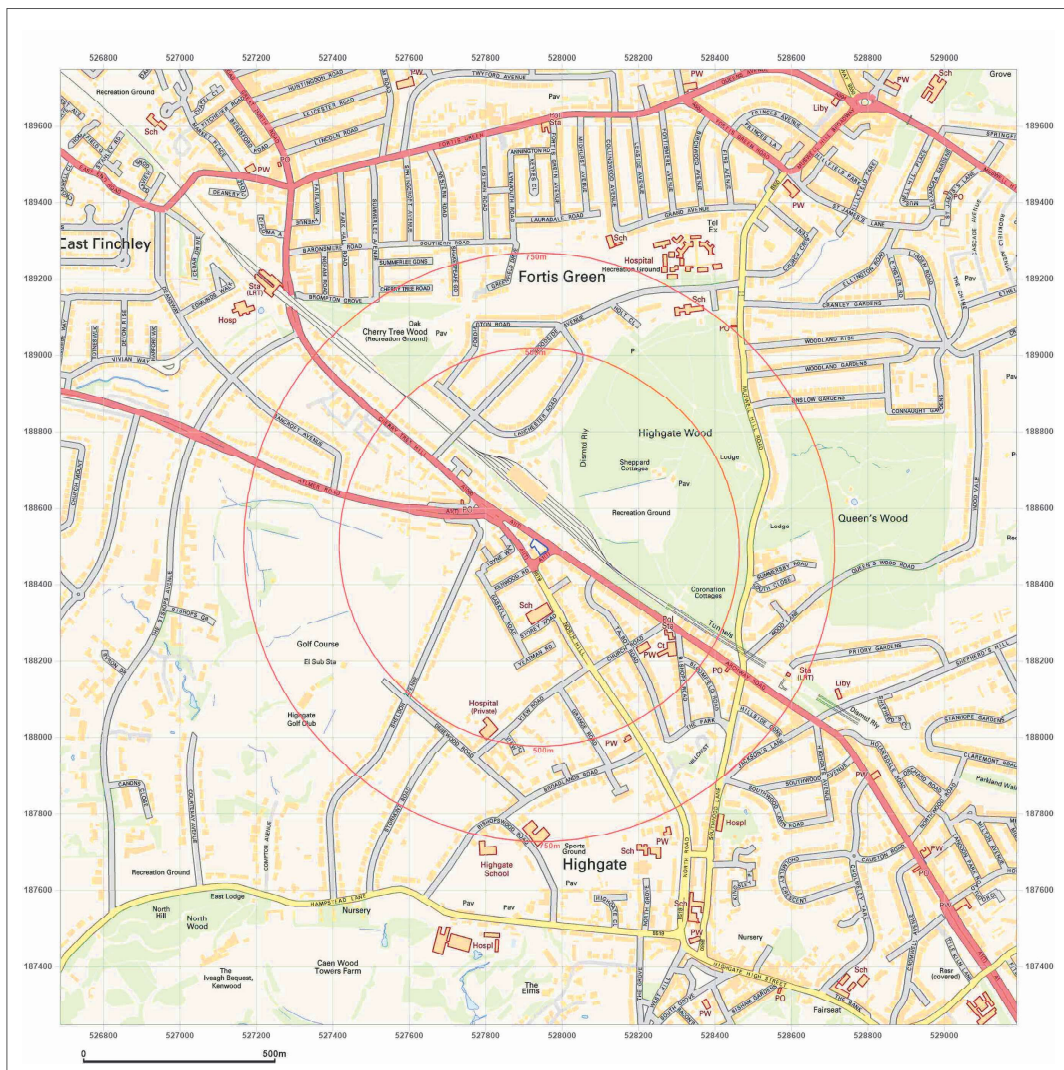


Supplied by:
www.emapsite.com
sales@emapsite.com

© Crown copyright and database rights 2019 Ordnance Survey 100035207

Production date: 15 November 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



emapsite™

Site Details:

Client Ref: EMS_738056_960046
Report Ref: EMS-738056_960046
Grid Ref: 527939, 188498

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



2001



Produced by
Groundsure Insights
www.groundsure.com

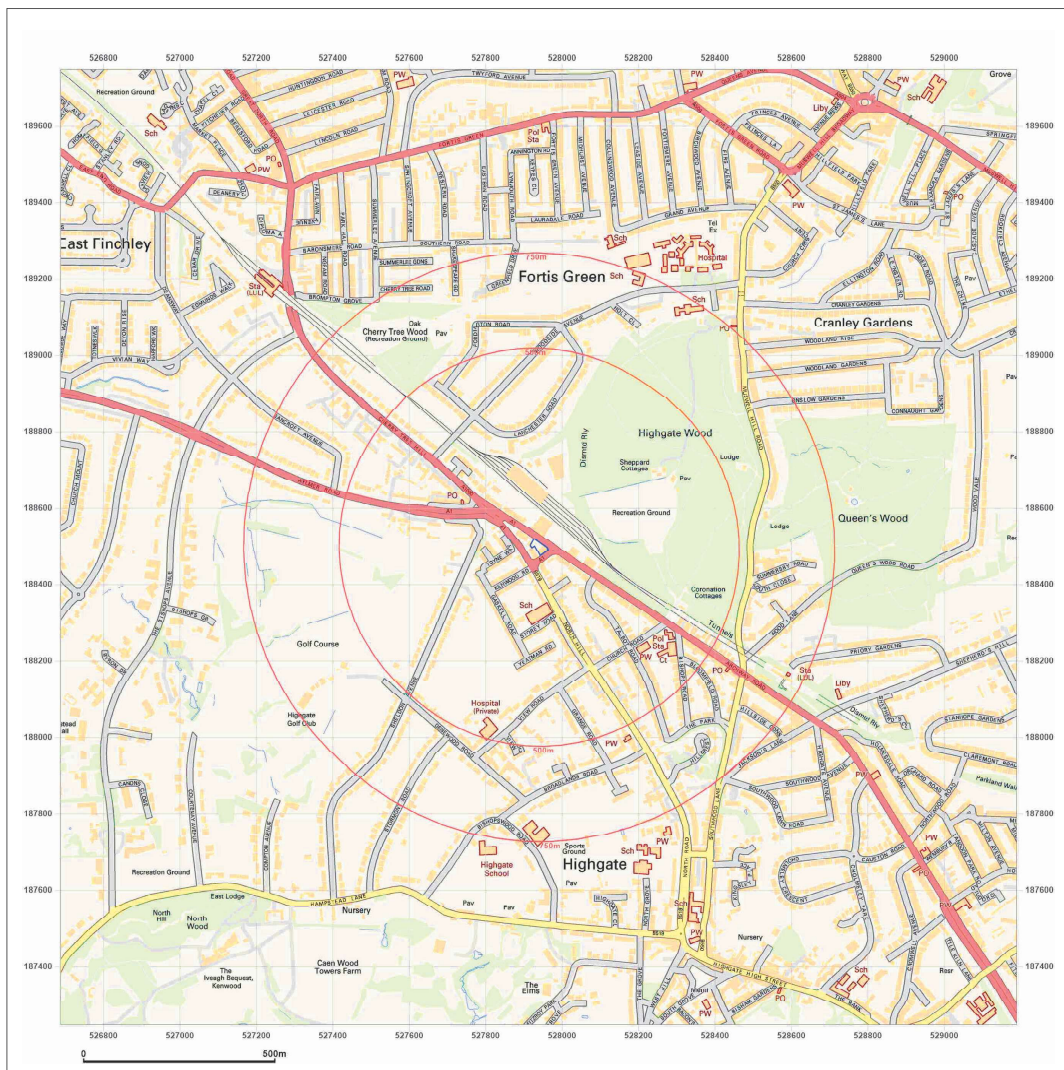


Supplied by:
www.emapsite.com
sales@emapsite.com

© Crown copyright and database rights 2019 Ordnance Survey 100035207

Production date: 15 November 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



emapsite™

Site Details:

Client Ref: EMS_738056_960046
Report Ref: EMS-738056_960046
Grid Ref: 527939, 188498

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010



Produced by
Groundsure Insights
www.groundsure.com

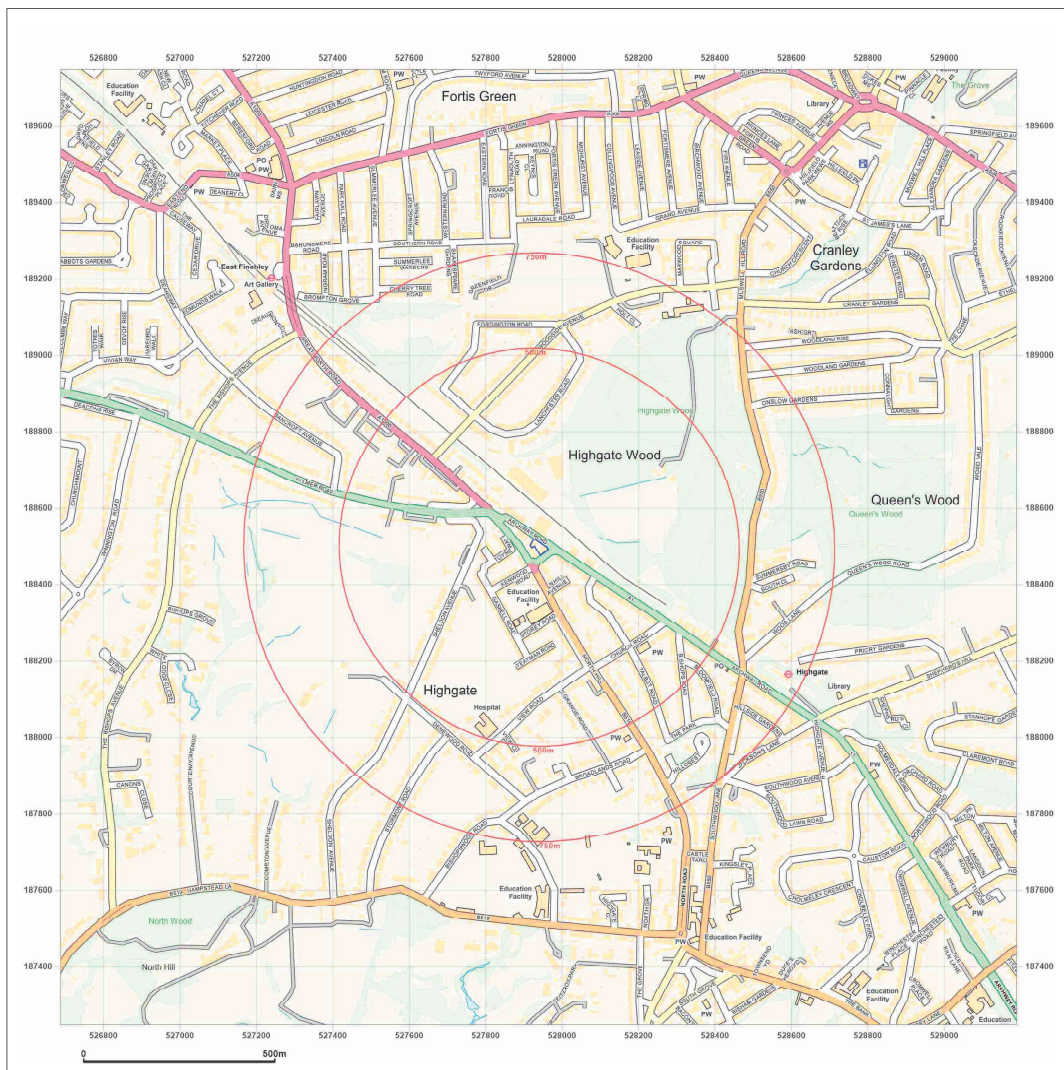


Supplied by:
www.emapsite.com
sales@emapsite.com

© Crown copyright and database rights 2019 Ordnance Survey 100035207

Production date: 15 November 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



emapsite™

Site Details:

Client Ref: EMS_738056_960046
Report Ref: EMS-738056_960046
Grid Ref: 527939, 188498

Map Name: National Grid

Map date: 2021

Scale: 1:10,000

Printed at: 1:10,000



2021



Produced by
Groundsure Insights
www.groundsure.com



Supplied by:
www.emapsite.com
sales@emapsite.com

© Crown copyright and database rights 2019 Ordnance Survey 100035207

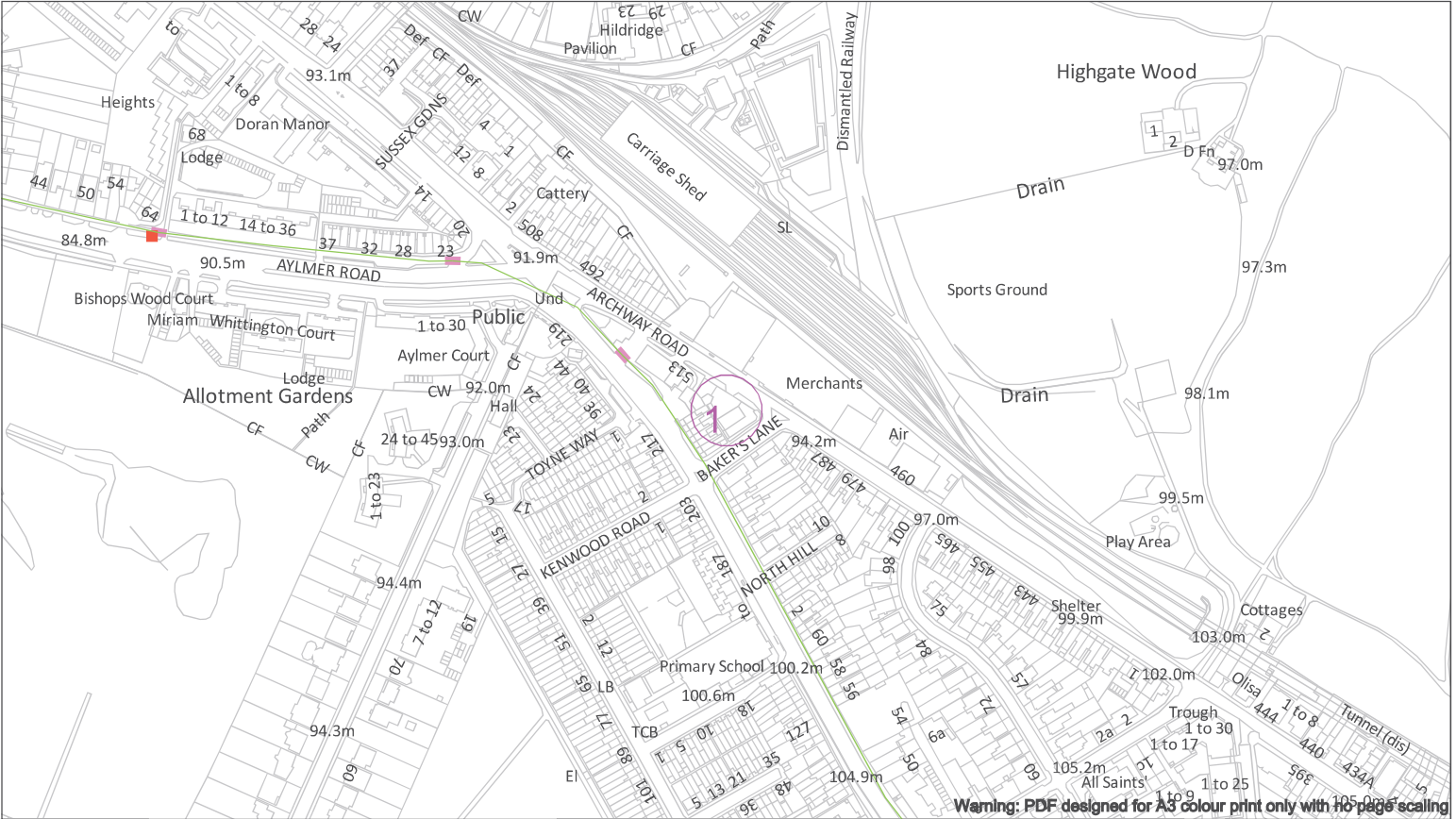
Production date: 15 November 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Appendix F Utilities



Crown Copyright © - This plan is reproduced from or based on the OS map by Cadent Gas Limited, with the sanction of the controller of HM Stationary Office. Crown Copyright Reserved. Ordnance Survey Licence number 100024886



Warning: PDF designed for A3 colour print only with no page scaling

Date Requested: 02/12/2021 Job Reference: 24058237 Site Location: 527942 188497 Requested by: Mr. Jamie Howarth Your Scheme/Reference: HCE0911 Scale: 1:2500 (When plotted at A3)	EXTREME CAUTION - HIGH VOLTAGE **RISK OF DEATH OR SERIOUS INJURY** IMPORTANT NOTICES This plan shows those pipes owned by National Grid Electricity Transmission plc in its role as a Licensed Electricity Transporter (ET). Electricity cables owned by other ETs, or otherwise privately owned, may be present in this area. Information with regards to such cables should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Ancillary equipment such as cooling systems and communication cables are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Electricity Transmission plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HSG147, must be used to verify and establish the actual position of cables and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near electricity apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.	National Grid Electricity Emergency Number: 0800 40 40 90 Available 24 hours, 7 days/week. Calls may be recorded and monitored Warning: PDF designed for colour print only with no page scaling 100m Dig Sites Area: Line: Underground Cables Overhead Lines Fibre Cables	nationalgrid NationalGrid House Warwick Technology Park Gallows Hill Warwick CV34 6DA AssetProtection@NationalGrid.com
---	---	--	--

Appendix G

Approach to Risk Evaluation

CSM Risk Evaluation Rationale

G.1 Introduction

G.1.1 The mechanism(s) through which a site is regulated will depend on its setting, context and the nature of any contamination present. Notwithstanding this, development and refinement of a CSM underpins the process through which risks associated with contaminated sites are evaluated in the UK irrespective of the context (e.g. whether the site is being developed under planning, assessed under Part 2A of the Environmental Protection Act 1990). The CSM identifies the possible relationships between contaminants, pathways and receptors and is used to identify relevant contaminant linkages that may warrant further assessment and/or remedial actions.

G.1.2 Consistent with DEFRA guidance⁵:

- “A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters;
- A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters; and
- A “pathway” is a route by which a receptor is or might be affected by a contaminant.”

G.1.3 Horizon’s approach to risk evaluation follows Environment Agency guidance⁶, with a tiered approach adopted to the assessment of risks associated with contaminated sites:

- Preliminary Risk Assessment – a qualitative assessment, typically forming part of a Phase 1 report, the output from which is the initial CSM;
- Generic Quantitative Risk Assessment – a quantitative assessment whereby the initial CSM is refined, typically on the basis of site specific data obtained as part of a Phase 2 site investigation. Generic assessment criteria (GAC) are utilised to screen measured concentrations of contaminants and identify contaminant linkages which might warrant further assessment (i.e. detailed quantitative risk assessment) and/or remedial actions; and
- Detailed Quantitative Risk Assessment – a site specific evaluation of individual contaminant linkages to further evaluate potential risks. The scope of a DQRA will be tailored to the requirements of a particular site and might include additional characterisation activities to reduce uncertainty in the CSM, more detailed modelling or development of site specific assessment criteria.

G.2 Preliminary Risk Assessment

G.2.1 The starting point in any contaminant linkage assessment is the identification of plausible sources of contamination (i.e. hazard identification). The review of desk based information supplemented with observations from the site walkover where conducted form the focus for information collection at this stage in the process.

G.2.2 A potential source area is described on the basis of the potential impact that the material within the source could have on either environmental (e.g. surface water) and/or human health receptors in its vicinity. Sources include a wide range of materials which could differ in their potential impacts depending on a number of factors which include:

- Chronic or acute affects;

⁵ DEFRA (2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance

⁶ Environment Agency (2004) Model Procedures for the Management of Land Contamination. CLR11.

- Long-term or short-term release;
- Phase of contamination (e.g. dissolved, free phase, vapour, etc);
- Point or diffuse discharge; and
- Toxicity, mobility and degradation potential of the contaminant.

G.2.3 Pathways represent the route via which contamination may eventually reach a sensitive receptor. Pathways may include direct and indirect exposure to contamination.

G.2.4 Horizon considers the potential for receptors identified in DEFRA guidance⁵ (e.g. humans, controlled waters, property, ecological systems) to be associated with a site, both in its current setting plus receptors that may be introduced if the site is being considered for redevelopment. A screening process is used to identify those receptors (both on-site and off-site) which may be at potential risk from contamination at the Site and therefore warrant inclusion in the CSM.

G.2.5 Where a potential contaminant linkage has been identified, the next step is assess the potential risks associated with each individual contaminant linkage (i.e. risk evaluation). The potential magnitude and/or severity of individual contaminant linkages being present at the site along with an assessment of probability are combined. The first stage, utilising the table below, estimates potential magnitude / severity of a contaminant linkage, taking into account the potential severity of the hazard and the sensitivity of the receptor. This table has been developed with reference to R&D66⁷.

Consequence	Example
Severe	Highly elevated concentrations of contaminants likely to represent "significant possibility of significant harm to human health" or greater if exposure occurs (i.e. Category 1 or 2 as defined by DEFRA ⁵). Equivalent to EA Category 1 pollution incident. Major damage to aquatic or other ecosystems. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations of contaminants, although unlikely to pass the legal test for "significant possibility of significant harm to human health" if exposure occurs (i.e. Category 3 as defined by DEFRA ⁵). Equivalent to EA Category 2 pollution incident. Significant damage to aquatic or other ecosystems (i.e. may result in substantial adverse change in functionality or harm to a species of interest). Significant damage to crops, buildings or property (e.g. ingress of contaminants through water supply pipes).
Mild	Slightly elevated concentrations of contaminants, potentially above a GAC, although unlikely to exceed the Category 3/4 boundary as defined by DEFRA ⁵). Exposure could lead to slight short-term effects such as mild skin rash. Equivalent to EA Category 3 pollution incident. Significant damage to aquatic or other ecosystems (i.e. may result in substantial adverse change in functionality or harm to a species of interest). Minor damage to crops, buildings or property (e.g. surface spalling of concrete).
Minor	Maximum contaminant concentrations unlikely to result in a measurable effect on humans. Equivalent to an insubstantial pollution incident with no observed effect on water / ecosystem quality. Repairable effects of damage to buildings, structures and services (e.g. discolouration of concrete).

Table K2-1: Approach to Magnitude / Severity Evaluation

⁷ NHBC (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D66.
Horizon Consulting Engineers Ltd.

G.2.6 Horizon utilises the following table, developed with reference to R&D66⁸, to assess the potential likelihood of an individual contaminant linkage being present at the site. Where a contaminant linkage has not been established, a risk is not considered to exist.

Likelihood	Example
High	A contaminant linkage exists and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	A contaminant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is a contaminant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table K2-2: Classification of Probability (In the Event a Contaminant Linkage Has Been Established)

G.2.7 The likelihood that an individual contaminant linkage will be present is then combined with the potential severity using the qualitative approach presented in the table below to assess the potential risk associated with each contaminant linkage.

Probability (Likelihood)	Consequence			
	Severe	Medium	Mild	Minor
Very High	High Risk	High Risk	Medium Risk	Medium Risk
High	High Risk	Medium Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk	Negligible
Low	Medium Risk	Low Risk	Negligible	Negligible

Table K2-3: Approach to Consequence Evaluation

G.2.8 A description of the risks as classified in the table above is presented in the table below. These risk definitions have been developed by Horizon with reference to R&D66⁹ and are utilised as part of the CSM in order to identify contaminant linkages warranting further assessment and/or remedial actions.

Magnitude of Potential Impact	Description
High	Harm is likely to arise or already is arising to a designated receptor from an identified hazard at the site. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works are likely required.
Medium	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Negligible	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

Table K2-4: Receptor Sensitivity Classification

⁸ NHBC (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D66.

⁹ NHBC (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D66.

G.3 Generic Quantitative Risk Assessment

G.3.1 If required, the second tier of assessment utilised to refine the CSM typically involves comparison of site specific information obtained as part of a ground investigation with GAC. Typically, GAC are conservative and based on largely generic assumptions regarding characteristics and behaviours of sources, pathways and receptors, within defined ranges of conditions.

G.3.2 A variety of different GAC are available to assess risks posed to individual receptors and it is noted the nature of the GAC can vary considerably. For example, some GAC (such as the SGV by the EA to support the evaluation of risks to human health from soil contamination) make an attempt to estimate the probability that harm will occur under the specific circumstances being considered. Other GAC (e.g. Environmental Quality Standards utilised to assess potential risks to controlled waters) do not take into account the probability that harm will actually occur. Horizon takes into account the form and level of conservatism inherent in an individual GAC as part of the risk evaluation process. The GAC typically utilised by Horizon are summarised in the table below:

Media	GAC Adopted
Chronic Risks to Human Health	
Soil Contaminants [Inorganic & Organic Chemicals]	LQM S4ULs ¹⁰ along with DEFRA C4SLs ¹¹ where applicable are directly compared with measured soil concentrations. Where a S4UL or C4SL has not been derived for a specific contaminant, reference is made to alternative publicly-available sources. If appropriate on the basis of dataset size and distribution, statistical analysis may be conducted, including assessing the 95 th percentile of the sample mean against the adopted GAC. If appropriate the assessment may make reference to published background levels for a number of contaminants given the risk may still be considered to be low and the site suitable for use if concentrations of contaminants, although elevated, are below local background levels.
Soil contaminants [Asbestos]	In the absence of a published GAC for asbestos in soil, the presence of asbestos fibres reported in a soil sample by a laboratory is the level upon which Horizon would undertake additional, more detailed site specific risk assessment.
Radon	Reference is made to BRE 211 ¹² to evaluate potential risks from soil-derived radon.
Ground Gas	Gas Screening Values (GSVs), calculated on the basis of gas concentrations and flow rates, are evaluated with reference to guidance published by CIRIA ¹³ , BSI ¹⁴ and NHBC ¹⁵ .
Dissolved Contaminants	Reference is made to Water Screening Values (WSVs) published by Atkins where organic contaminants are detected above the laboratory reporting limit in groundwater to assess chronic risks to human health via the indoor air inhalation pathway.
Risks to Controlled Waters	
Eluted Soil Contaminants / Dissolved Contaminants	Published Environmental Quality Standards (EQS) and Drinking Water Values (DWV) are used as an initial screen of eluted water quality and concentrations of dissolved phase contaminants in groundwater. These criteria make no reference to potential degradation, attenuation and dilution of contaminant concentrations between the source and the receptor.
Risks to Property	
Water supply pipes	Reference is made to the guidance published by the UK Water Industry ¹⁶ .
Sulphate & pH conditions	Reference is made to the guidance published by BRE ¹⁷ .
Risks to Vegetation & Plants	
Soil contaminants	Reference is made to guidance published by BSI ¹⁸ .

Table K3-1: GAC Typically Adopted by Horizon

¹⁰ LQM/CIEH (2015) The LQM / CIEH S4ULs for Human Health Risk Assessment

¹¹ DEFRA (2014) SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document

¹² BRE (2015) Radon Guidance on Protective Measures for New Buildings.

¹³ CIRIA (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings. C665.

¹⁴ BSI (2015) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings. BS8485.

¹⁵ NHBC (2007) Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present.

¹⁶ UKWIR (2010) Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites.

¹⁷ BRE (2005) Concrete in Aggressive Ground. SD1

¹⁸ BSI (2015) Specification for Topsoil. BS3882

Horizon Consulting Engineers Ltd.

Suite 2 The Dairy Barn,
Westpoint Court
Sidmouth Road
Exeter
EX5 1DJ

www.horizon-ce.co.uk

APPENDIX 2 – FIRST LINE DEFENCE’S PRELIMINARY UXO RISK REPORT



Preliminary UXO Risk Assessment

www.1stlinedefence.co.uk

Client	Geotechnical Consulting Group
Project	505-511 Archway Road, Highgate
Site Address	505-511 Archway Road, Highgate, London N6 4HX
Report Reference	PA14637-00
Date	22/11/21
Originator	ERG

Assessment Objective

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at the 505-511 Archway Road, Highgate site. The assessment involves the consideration of the basic factors that affect the potential for UXO to be present at a site as outlined in Stage One of the UXO risk management process.

Background

This assessment uses the sources of information available in-house to 1st Line Defence Ltd to enable the placement of a development site in context with events that may have led to the presence of German air-delivered or Allied military UXO. The report will identify any immediate necessity for risk mitigation or additional research in the form of a Detailed UXO Risk Assessment. It makes use of 1st Line Defence's extensive historical archives, library and unique geo-databases, as well as internet resources, and is researched and compiled by UXO specialists and graduate researchers.

The assessment directly follows CIRIA C681 guidelines "Unexploded Ordnance, a Guide for the Construction Industry". The document will therefore assess the following factors:

- Basic Site Data
- Previous Military Use
- Indicators of potential aerial delivered UXO threat
- Consideration of any Mitigating Factors
- Extent of Proposed Intrusive Works
- Any requirement for Further Work

It should be noted that the vast majority of construction sites in the UK will have a low or negligible risk of encountering UXO and should be able to be screened out at this preliminary stage. The report is meant as a common sense 'first step' in the UXO risk management process. The content of the report and conclusions drawn are based on basic, preliminary research using the information available to 1st Line Defence at the time this report was produced. It should be noted that the only way to entirely negate risk from UXO to a project would be to support the works proposed with appropriate UXO risk mitigation measures. It is rarely possible to state that there is absolutely 'no' risk from UXO to a project.





Risk Assessment Considerations	
Site location and description/current use	The proposed site is located in the local district of Highgate, within the London Borough of Haringey. Recent aerial imagery dated 2020 shows the site is currently occupied by an American Car wash, comprising several buildings and a hard-standing car park area. The site is bound by a petrol station to the north, Archway Road to the east, Bakers Lane to the south, and residential properties built along North Hill to the west. The site is approximately centred on the OS grid reference: TQ 27900 88500. 
Are there any indicators of current/historical military activity on/close to the site?	In house records suggests no indication of current or historical military use on site. No features such as WWII defensive positions, encampments or firing ranges are recorded to have been located at site of proposed works. In addition, no information of ordnance being stored, produced, or disposed of within the bounds of the site could be found. The closest Heavy Anti-Aircraft (HAA) Battery was located approximately 2.4km to the south-west of the site. The conditions in which unexploded anti-aircraft ordnance may have fallen unrecorded within the proposed site are analogous to that of aurally delivered Luftwaffe bombs.
What was the pre- and post-WWII history of the site?	Pre-WWII OS mapping dated 1935-1936 indicates that the site was semi-developed, comprising several small structures amongst sections of open land. The site was bound by a building to the north, Archway Road to the east, and Bakers Lane to the south and some terraced housing labelled <i>Mansfield Cottages</i> and associated gardens to the west. Post-war OS mapping dated 1950 indicates some structural change to the site and the surrounding area. A structure, situated within the southern sector of the site on Bakers Lane appears to have been demolished. A structure to the west on North Hill appears to have been removed, as have a large number of buildings within a <i>depot</i> in the wider western vicinity.
Was the area subject to bombing during WWII?	During WWII, the site was located within the Municipal Borough of Hornsey which sustained an overall high density of bombing according to official Home Office bombing statistics. The borough totalled 2,872 acres and was subject to 292 high explosive bombs, nine parachute mines, 28 oil bombs, five phosphorus bombs, 17 V-1 pilotless aircraft and four V-2 long range rocket strikes; culminating in a total of 355 items of ordnance and an average of 123.6 items of ordnance per 1,000 acres. A bomb strike was recorded approximately 25m to the east of the site on the opposite side of Archway Road. This appears to have been one of a large number of incidents that targeted the Highgate Tube Station. A land mine was also recorded approximately 95m to the west.
Is there any evidence of bomb damage on/close to the site?	Middlesex County Council (MCC) bomb damage mapping records the terraced buildings directly to the west of the site boundary as sustaining <i>Category 3 damage, uncertain if repairs possible</i>. The majority of structures throughout the western vicinity were also given this designation.





To what degree would the site have been subject to access?	Access to the site is considered to have been frequent at the onset of WWII, given the built-up urban nature of the site and the surrounding area. However, following the damage sustained to the surrounding buildings, it is possible that residents were evacuated, and therefore access may have significantly reduced for a time. Evidence of unexploded ordnance (UXO) is considered more likely to have gone unnoticed and unrecorded within infrequently accessed areas.
To what degree has the site been developed post-WWII?	Post-WWII, the pre-existing structures in the central sector of the site appear to have been demolished while a single building was constructed in the south.
What is the nature and extent of the intrusive works proposed?	Information provided by the client indicates that proposed works are to involve the redevelopment of the site for residential accommodation.

Summary and Conclusions

During WWII, the site was located within the Municipal Borough of Hornsey. According to official Home Office bombing statistics, this borough sustained an overall high density of bombing; culminating in a total of 355 items of ordnance and an average of 123.6 items of ordnance per 1,000 acres.

Local bomb plot mapping records multiple bombing incidents in the surrounding area notably a HE bombs approximately 25m to the east and a land mine approximately 95m to the west. The latter incident appears to have damaged many structures within the western vicinity, including a number adjacent to the site itself. Middlesex County Council (MCC) bomb damage mapping records the terraced buildings to the west of the site boundary to have sustained *Category 3 damage, uncertain if repairs possible*. Depending on the exact location and severity of this damage, the western sector of the site may be at a potential risk from the 'J-curve effect', whereby an item of UXO could have travelled underground from its point of entry and come to rest underneath an adjacent area.

As a result of structures adjacent to the site having sustained significant wartime damage thereby potentially placing the western sector being within 'J-curve' range, the possibility of UXO contamination cannot be confidently discounted at this preliminary stage.

Recommendations

Given the findings of this preliminary report, further research is recommended in the form of a **Detailed UXO Risk Assessment**. This is recommended in order to better assess the wartime conditions within the site area. Further research would involve the acquisition of any available local written records, aerial imagery and other archival material if acquirable. Depending on the quality and quantity of information available, it may be possible to 'zone' or mitigate the perceived risk from UXO across some sections of the site.

Prior to or in lieu of a Detailed Assessment, it is recommended that appropriate UXO Risk Mitigation Measures are provided for intrusive works proposed.

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1st Line Defence.

