



Lidl Great Britain Ltd

Geo-Environmental Desk Study Report

Lidl, Stoneham Lane, Eastleigh

16th August 2022

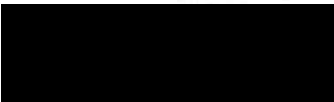


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-	May 2022	First Issue	WT	SD
A	28 th July 2022	Updated Proposed Site Layout, Boundary and Text	WT	SD
B	16 th August 2022	Updated Proposed Site Layout Drawing	WT	SD



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Drawings

21-1500-P/001/A	Site Location Plan
20321-AD-110	Proposed Site Plan

Appendices

Appendix A	Photographs
Appendix B	Historical Maps
Appendix C	Environmental Database Report



Summary

Development Proposals	The development proposals include the construction of a new Lidl store, access, car park and peripheral soft landscaping. The store will be located in the north of the site with the car park in the south, with access to the site situated at the western boundary.
Site Setting	The site is broadly square in dimension; however the south-east boundary of the site is arced. The site is north of Southampton and is shown on the appended Site Location Plan (21-1500-P/001/A), and centred on National Grid Reference 444170, 117580. The nearest postcode to site is: SO50 9SB.
Site History	A review of the available historical maps from 1868 indicate that the site has remained an open field throughout, aside from very recently, where the site has been used as a site compound for adjacent construction work to the north and west.
Geology & Hydrogeology	The superficial geology is mapped as undifferentiated river terrace deposits (sand and gravel), and the bedrock is mapped as clay, silt, sand and gravel (Thames Group). The site is within a Secondary A superficial aquifer designation, and the bedrock is designated as unproductive strata. The superficial aquifer is classified as having medium vulnerability. The site is located within an area described as having potential for groundwater flooding to occur at surface.
Hydrology	There are six sizeable pools within the surrounding area, five of which are within 500m of the site. Monks Brook runs to the east of site, trending north to south, as well as various associated drains/small tributaries. The site is not within an area which has a designated risk of flooding from surface water.
Radon	No Radon protective measures are required for the site.
Potential Contaminants	Potential, low to low-medium level risks have been identified from potential on-site and off-site sources relating to identified human health receptors. Potential risks are posed by the presence of metals, PAH, TPH, asbestos, pH, water-soluble sulphate, herbicides, pesticides and ground gases.
Environmental Assessment and Conclusions	Potential low to medium level risks have been identified at this site, relating to identified human health receptors posed by the presence of localised metals, PAH, TPH, asbestos, herbicides and/or pesticides. There is potential for elevated pH and water-soluble sulphate within near surface Made Ground, both on and off site, and low to medium level risk of Ground Gas from Made Ground, off-site pools, and off-site landfills. These risks cannot be removed through a desk-based risk assessment alone and hence it is recommended that these potential risks are assessed further through an appropriate intrusive investigation which should be sufficient in scope to assess the potential risks and enable development of a remedial strategy for the site if required.
Geotechnical Assessment and Conclusions	Given the site proposals, and in view of the published geology and the expected ground conditions, it is likely that conventional strip or trench fill foundations will be appropriate for the proposed buildings. The depth of Made Ground, topsoil and the strength of underlying natural soils should be assessed to determine this. If a significant thickness of Made Ground or strata with poor bearing capacities are present, a deeper foundation solution, such as piles may be a more suitable option. There is the potential for elevated water-soluble sulphate concentrations to be present in any Made Ground and strata underlying the site. The concrete classification required for any foundation solution should therefore be assessed accordingly.
Ground Investigation Recommendations	Given the development proposals and anticipated geology, it is considered that an appropriate investigation would comprise window sample boreholes with the installation of ground gas and groundwater monitoring wells. The investigation should include appropriate testing, interpretation and assessment to clarify the environmental and human health risks identified within the desk study, as well as geotechnical analysis to assist in foundation and floor slab design.



1 Introduction

Obsidian Geo-Consulting Ltd (Obsidian) was commissioned by Lidl Great Britain Ltd (the Client) to carry out a Geo-Environmental Desk Study for their proposed site at Stoneham Lane, Eastleigh.

The development proposals include the construction of a new Lidl store, access, car park and peripheral soft landscaping. The store will be located in the north of the site with the car park in the south, with access to the site situated at the western boundary.

For the preparation of this document, we have been provided with the following plans:

- One Design Architects Ltd Proposed Site Plan Ref. 20321-AD-110, dated May 2022.

It should be noted that the full review of the desk study information was undertaken by Obsidian prior to the commencement of the site works in April 2022.

The first issue of this Geo-Environmental Desk Study report was issued in May 2022. Obsidian was subsequently made aware by the planning consultant for the project that the proposed layout and planning boundary for the site had been changed. Our original report and searches were based on the boundary shown on the original proposed site plan dated September 2021. The report was therefore issued as Revision A, dated 28th July 2022.

Obsidian was subsequently made aware in August 2022 that the proposed layout drawing had been changed to the drawing referenced above, however there is no revision referenced on the drawing. This report has therefore issued as Revision B, dated 16th August 2022.

1.1 Objective

The objective of this assessment is to identify any potentially significant constraints to future proposed developments associated with the likely ground conditions prevalent beneath the site and the surrounding area and to identify any potential areas of environmental liability associated with the site and the surrounding area.

1.2 Scope

This assessment was carried out to an agreed brief as set out in Obsidian's proposal (Ref: BM/21-1500-Q/L001, dated 20th July 2021). The scope of works for the assessment include review and inclusion of the following:

- a desk-based review of available geological, hydrogeological and hydrological information, commercially available environmental database information and historical plans.
- the development of a preliminary conceptual site model to consider any potentially complete pollutant linkages.
- the preliminary identification of any potential ground conditions which may lead to geotechnical constraints for the proposed development.

1.3 Limitations

This report has been prepared by Obsidian with all reasonable skill, care and attention within the terms of the Contract with the Client and taking account of the information made available by the Client, as well as the manpower and resources devoted to it by agreement with the Client. Obsidian disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above Contract.



This report has been produced on behalf of the Client and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Obsidian. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

The desk study information has been obtained from a variety of sources, which Obsidian believes are reliable. Nevertheless, Obsidian cannot and does not guarantee the authenticity or reliability of the information it has relied upon from these sources.

Any plans appended to this report should not be used for scaling purposes.

2 The Site

2.1 Site Location

The site is broadly square in dimension; however the south-east boundary of the site is arced. The site is shown on the appended Site Location Plan (21-1500-P/001/A), and centred on National Grid Reference 444170, 117580. The nearest postcode to the site is: SO50 9SB.

2.2 Site Description

The site is surrounded to the west, north-west, and north by developments, some of which have not long been constructed, and as a result the site has recently been used as a construction compound.

The site is bounded by wooden hoarding with access via a lockable steel gate in the north-western corner.

A significant amount of surface debris is present with small stockpiles of waste construction materials and a stockpile of soil in the north of the site. It would appear that a significant volume of granular Made Ground has been imported and compacted across the site surface to create a compound and set-down areas. Some localised, surface ponding is present within the south of the site.

Some service inspection covers are visible as well as some peripheral excavations, assumed to be the termination points for new, buried services entering the site.

3 Desk Study

The following information sources have been consulted as part of the desk study:

- Envirocheck Database Report
- Historical Ordnance Survey plans
- British Geological Survey 1:50,000 Map and BGS online Lexicon
- MAGIC Website
- BR 211 Radon; Guidance on Protective Measures for New Dwellings, 2015 Edition
- Mining and Ground Stability Database Report

3.1 Site History

The site history has been reviewed using historical Ordnance Survey mapping to identify any previous potentially significant contaminative activities, located either on-site or off-site. The findings are summarised in Table 3.1.



Potential on-site contamination sources may present a risk to human health and controlled water receptors. Potential off-site contamination sources may also present a risk to soils and, if present, groundwater underlying the site through cross boundary migration.

Copies of the inspected historical maps are presented in Appendix B. The account presented in this report is restricted by specific time periods represented by these maps only.

Table 3.1: Site History

Map Edition	Key Features	
	On Site	Off Site
1886 (1:2,500), 1868-1886 (1:2,500)	The site is an empty field. There are no field boundaries on site, there is 1 tree present in the north-west corner of the site.	The site area is within a larger field, containing sparse trees. There is a lane to the east approximately 10m from site at its nearest point which trends north to south and is parallel to the nearest boundary of the site. There is more tree coverage approximately 60m to the south of the site, which is lining a further road approximately 70m from site, trending east to west. There are a series of tracks approximately 200m to the south-west, and a watercourse located to the east. "Nicholas's Church (Rectory)" with graveyard is located approximately 200m to the south-west of site. There is a separate Rectory approximately 100m to the south of the site.
1872 (1:10,560)	Site marked as being within "Avenue Park."	There is a pond labelled "Avenue Pond" approximately 350m to the north-west of the site, which is situated in "Avenue Park". "Avenue Park" is adjacent to the larger "Stoneham Park Deer Park," which is situated approximately 200m south-west of the site. This park contains 2 large ponds to the south-west (approximately 500m and 300m from site). There is a small settlement labelled "Middle" approximately 520m north of the site. There is a railway line and lane both trending north-east to south-west, approximately 800m from the site. The above-mentioned watercourse is labelled "Monks Brook."
1896 (1:2,500)	Area of site not covered by map.	A school appears to the east of the site, between the lane and watercourse, running approximately parallel to the eastern boundary of the site.
1897 (1:10,560)	No significant changes recorded.	The railway line is labelled "London & South Western Railway." Residential developments appear approximately 1400m to the north-east of the site adjacent to the railway line.
1909 (1:2,500)	No significant changes recorded.	No significant changes recorded.
1911 (1:10,560)	No significant changes recorded.	There are further residential developments alongside the railway line, approximately 1000m from site at nearest point.
1931 (1:10,560) 1931 (1:10,560)	No significant changes recorded.	There are further residential developments to the north-east of the site, adjacent to already existing residential developments which appeared in 1897.



Map Edition	Key Features	
	On Site	Off Site
		Buildings associated with "Atlantic Park Hostel" appear adjacent to the railway line, approximately 900m south-west of the site.
1938 (1:10,560)	No significant changes recorded.	Additional residential developments appear approximately 800m to the north-east of the site.
1946 (1:2,500)	No significant changes recorded.	No significant changes recorded.
1947-1979 (1:10,560) (aerial photography)	No significant changes recorded.	Residential buildings appear approximately 1,250m to the south-west of the site.
1951 (1:1,250)	No significant changes recorded.	Not all surrounding area available. No significant changes recorded.
1952-1963 (1:2,500)	No significant changes recorded.	No significant changes recorded.
1961-1974 (1:1,250)	No significant changes recorded.	Not all surrounding area available. No significant changes recorded.
1963 (1:10,560) 1963-1968 (1:10,560)	No significant changes recorded.	Further residential developments appear, to the north-east, north, and north-west. The closest area is approximately 350m north-east of the site.
1969 (1:10,560)	No significant changes recorded.	No significant changes recorded.
1970 (1:2,500)	Area of site not covered by map.	Not all surrounding area available. No significant changes recorded.
1974 (1:1,250)	No significant changes recorded.	Not all surrounding area available. No significant changes recorded.
1976 (1:2,500)	Area of site not covered by map.	Not all surrounding area available. No significant changes recorded.
1978 (1:10,000)	No significant changes recorded.	Not all surrounding area available. A nursery appears approximately 180m to the east of the site. A football ground appears approximately 250m to the south of the site.
1983-1989 (1:10,000)	No significant changes recorded.	Three large pools are approximately 200m to the east of the site, within the area previously marked as a nursery. Sloped ground is also present in this area which appears to be associated with the pools. A large unlabelled road and associated roundabout network and sloped ground appear approximately 550m to the south of the site.
1986-1989 (1:1,250) 1986 (1:10,000) (Russian)	No significant changes recorded.	Not all surrounding area available. An airport appears approximately 1100m to the south-east of site, situated beyond the buildings and railway line to the south-east.
1990 (1:10,000)	Area of site not available.	Limited area available, no significant changes recorded.
1992 (1:2,500)	No significant changes recorded.	Not all surrounding area available. No significant changes recorded.
1992 (1:1,250)	Area of site not available.	Not all surrounding area available. No significant changes recorded.



Map Edition	Key Features	
	On Site	Off Site
1993-1995 (1:1,250)	Area of site not available.	Area of site not available.
1996 (1:2,500)	Area of site not available.	Not all surrounding area available. No significant changes recorded.
1999 (aerial photography)	Site appears to be used as a football pitch with a small structure, possibly changing facilities in the north	A non-grassed area approximately 20m to the north of site could be Made Ground.
2000 (1:10,000)	No significant changes recorded.	An amphitheatre appears approximately 750m to the east of site.
2006 (1:10,000)	No significant changes recorded.	No significant changes recorded.
2021 (variable)	No significant changes recorded.	A building appears approximately 40m to the north of site. Above-mentioned large road to the south is labelled M27.

Recent aerial imagery alongside further external information and a site walkover indicates the site has recently been used as a site compound for construction of adjacent buildings.

3.2 Geology, Hydrogeology and Hydrology

3.2.1 Geology

The mapped superficial and bedrock geology is summarised in Table 3.2 below:

Table 3.2: Geology

Geology	Age	Stratigraphic Name	Description
Superficial Geology	Quaternary Period.	River Terrace Deposits (undifferentiated) - Sand and Gravel.	Superficial deposits formed in local environments dominated by rivers. Rivers were depositing mainly sand and gravel detrital material, to form floodplain alluvium.
Bedrock	Ypresian Age.	Thames Group - Clay, Silt, Sand and Gravel.	Sedimentary Bedrock formed approximately 34 to 56 million years ago in the Palaeogene Period. The local environment was previously dominated by shallow seas.

Made Ground deposits may be present in areas where ground improvement or drainage has been required as part of the sites use as a construction compound, or along the periphery of the site.

3.2.2 Hydrogeology

The site is within a Secondary A superficial aquifer designation, and the bedrock is designated as unproductive strata. The superficial aquifer is classified as having medium vulnerability.

Both the site and surrounding area do not contain any Source Protection Zones. The nearest water abstraction is >1600m from the site. The site is located within an area described as having potential for groundwater flooding to occur at surface.

3.2.3 Hydrology

There are 6 sizeable pools within the surrounding area of the site, five of which are within 500m of the site. Monks Brook runs to the east of the site, trending north to south, as well as various associated drains/small tributaries.

The site is not within an area which has a designated risk of flooding from surface water.



3.3 Environmental Considerations

The Envirocheck database report (referenced: 292774813_1) comprises a summary of statutory data held on public registers. The data can be used to identify potential sources of contamination on the site and within a search radius of 1km. In addition, the report data can be used to identify potential receptors of contamination on the site and within 1km of the site. The database report is presented as Appendix C and the salient issues relating to the site and surrounding area are summarised in the following sections.

3.3.1 Nitrate Vulnerable Zones.

The site is within a designated Nitrate Vulnerable Zone (eutrophic water within the Hamble Estuary).

3.3.2 Discharge Consents.

There are 8 discharge consents between 0-250m from the site, and 3 between 251-500m. The closest is an estimated 32m distance east of the site and is a non-water company (private) sewage discharge into a freshwater river, for a bakery.

3.3.3 Pollution incidents.

There is 1 recorded pollution incident to controlled waters within 250m of the site, dated 1st April 1996. This is described as septic tank effluent entering a brook and was given minor incident severity. There are 4 further recorded pollution incidents to controlled waters, which were between 251m-500m from the site, and occurred between 1993-1996. These range from miscellaneous pollutants, oils and chemicals, resulting in dead fish, oil on Monks Brook, thick grey film on top of water, Monks Brook being very frothy. These were listed as minor incidents.

3.3.4 Landfill.

There is 1 recorded historical landfill site located within 250m of the site – approximately 140m to the east. The first input date here was 19th January 1983, and the last input date is unknown. The deposited waste included inert and household waste. There are a further 3 historical landfill sites recorded within 500m of the site (approximately 279m south-west, 326m south-west, and 439m south-west), all of which have unknown first and last input dates. The deposited waste included inert waste and liquid sludge. There is 1 registered landfill site within 250m of the site – approximately 138m to the east, which had authority to dispose of excavated natural materials, and household waste.

3.3.5 Contemporary trade directory.

There are 2 contemporary trade directories within 500m of the site. These are for a catering equipment company (approximately 234m north-west), which is inactive, and an ironing & home laundry services company (approximately 422m north), which is active.

3.3.6 Points of interest (POI).

There is 1 commercial POI within 500m of the site (approximately 418m west), which is listed as vehicle repair, testing and servicing.

There is a manufacturing and production POI within 500m of the site (approximately 298m north), which is for tank production (generic).

There are 2 weirs noted at approximately 116m and 117m south-east of the site.

There is also a recreational and environmental POI noted approximately 362m north-east of the site, which is a playground.

3.3.7 Considerations from Site Walkover

The site walkover highlighted several environmental considerations. These included a significant degree of Made Ground on site. This Made Ground seems to have been placed in part for levelling



site compound units, and also a small Bund of Made Ground is located to the south-east of site to control some surface water on site.

There is some surface water pooled on site in a few locations on site, the largest by surface area is to the south-east of site.

There is vegetation overgrowth to the north-east corner of the site, however it is noted this is primarily bracken and there is no significant tree growth on site. There is also an electrical junction box in this corner of the site.

It was noted during the site walkover that there was a stockpile of off-site earth/compost to the north of the site, which was tended to at the time by a third party.

There are some small areas of concrete hardstanding and apparent evidence of burning of material on site.

There are also some containers, including a large skip, containing site waste. There are also some piles of site waste, which primarily includes rusted metalwork.

3.3.8 Other Activities and Records

There are other significant activities and records that the Envirocheck Report indicates as not being present within 500m of the site. These include:

- 32x further discharge consents between 500-1000m from the site
- 18x further pollution incidents to controlled waters between 500-1000m from the site.
- 2x water abstractions, both >1600m from the site.
- 4x further historic landfill sites and 3x further registered landfill sites all between 500-1000m from the site.
- 12x areas of potentially infilled land (water) between 500-1000m from the site.
- 1x registered waste treatment or disposal site between 500-1000m from the site.
- 17x further contemporary trade directory entries, all between 500-1000m from the site.
- 7x further commercial services POIs between 500-1000m from the site.
- 1x further manufacturing and production POI between 500-1000m from the site.
- 10x further public infrastructure POIs between 500-1000m from the site.

3.3.9 Radon.

The western part of the site is in a lower probability radon area (less than 1% of homes are estimated to be at or above the action level), however the south-eastern part of the site is in an intermediate probability radon area (1 to 3% of homes are estimated to be at or above the action level). No Radon protective measures are required for the site.

3.3.10 Ground stability hazards.

The site is considered very low risk of potential for collapsible ground on site, and low – no hazard elsewhere. The potential for compressible ground is deemed no hazard on site, however, is considered moderate potential at a location approximately 58m east of the site; it is deemed very low – no hazard elsewhere. It is regarded there is no hazard for the potential of ground dissolution on site. There is very low potential on site for landslides or running sands, and the potential for shrinking or swelling clays on site is considered low. The site is also not within the Brine Compensation Area, or Brine Subsidence Solution Area.

4 Preliminary Conceptual Site Model

The Contaminated Land (England) Regulations provide a risk-based approach to contaminated land in England. The government has adopted a 'suitable for use' criteria under the Regulations. This means that remediation is only required to the standard which is acceptable for the use of a site.



Land is only defined as 'contaminated' under the Regulations where it appears to the regulatory authority that:

- Significant environmental harm is being caused, or is likely to be caused; or
- Significant pollution of controlled waters is being caused or is likely to be caused.

Risk is defined as the combination of:

- The probability, or frequency of occurrence of a defined hazard; and
- The magnitude (including the seriousness) of the consequences.

For a risk of environmental harm or pollution to occur as a result of contaminated land, all the following elements must be present:

- A **Source**, i.e. a contaminant which could cause harm to health and/or the environment. Sources include current and historical uses, activities and events either on the site or in the surrounding area.
- A **Receptor**, i.e. a target which could be harmed by the contaminant. Receptors include both human and non-human organisms, 'controlled waters' (groundwater and surface water) and building materials (concrete and plastic); and
- A **Pathway**, i.e. a route by which contaminants could move from a source to a receptor.

A **Pollutant Linkage** occurs when a contaminant is able to move from a source, via a pathway to a receptor. Each element may exist in isolation and pose no environmental risk. It is only when all three elements are linked to each other that a pollution linkage exists and poses an environmental risk. If all three elements are present, then the magnitude of the risk is a function of the mobility of the source, the sensitivity of the receptor and the nature of the pathway.

Environmental risks associated with pollutant linkages at a site are assessed on the basis of information obtained from the desk study, site observations and laboratory testing results and are ranked into the following categories:

- **High:** A pollutant linkage is present, and this poses a significant risk to the identified receptor(s). Action must be taken to remove the pollutant linkage and/or reduce the risk.
- **Medium:** A pollutant linkage is present and there is sufficient evidence to suggest that this is likely to pose a significant risk to the identified receptor(s). Further investigation and assessment should be undertaken to confirm this.
- **Low:** A pollutant linkage is present and there is sufficient evidence to suggest that this is unlikely to pose a significant risk to the identified receptor(s). Further investigation and assessment may be undertaken to confirm this.
- **Negligible:** A pollutant linkage may be present, but this poses no significant risk to the identified receptor(s).

4.1 Potential Sources of Contamination

Between 1983-1989 3 large pools appear to the east of the site, within the grounds of Lakeside Country Park. The pools appear alongside associated sloped ground for the wider Lakeside Country Park area, and it is possible these groundworks could have consisted of movement of Made Ground. The pools themselves will have had circa 30-40 years of organic matter build-up, which could potentially contribute to possible Ground Gas in this area.



There is both Park Pond and Shrubbery Pond (to the south-west, both of which have existed as far back as 1872, as a minimum), and also Avenue Pond (to the north-west, appears in 1969), which will have had a minimum of 150 years and 50 years for organic matter to build-up, respectively, which likewise may contribute to possible Ground Gas presence in this area.

The site walkover highlighted Made Ground on site throughout, associated with its use as a site compound for adjacent construction work. There was noted to be a small bund of Made Ground to the south-east corner of the site, which appeared to be in place to mitigate surface water migration offsite, towards Stoneham Lane. There was some surface water still present above the bund, and the ground surface would suggest previous water levels have been higher.

The surrounding construction work, namely an Academy to the north of site, and a YMCA to the west of site will have also have likely involved the movement and placement of Made Ground in the immediately surrounding area. There are also residential developments to the north, north-west, and north-east, which are likely to be further sources of Made Ground.

Typically, Made Ground can contain concentrations of contaminants such as metals, PAH's, TPH and asbestos. Associated ground gases such as methane, carbon dioxide, hydrogen sulphide and carbon monoxide may also be present. Elevated pH and water-soluble sulphate concentrations may also be present within the Made Ground.

It was noted during the site walkover that there was a stockpile of imported soil in the north of the site. This is of unknown origin, and as such it is unknown what contaminants this may potentially contain.

The Envirocheck report indicates the nearby presence of up to 5 landfill areas which are reported to have involved disposal of inert and household waste, liquid sludge, and excavated natural materials. The nature of the liquid sludge is unknown, but these could all provide sources of contamination, including Ground Gas, metals, elevated pH and sulphates, TPH, and PAHs.

If any material has been burned on site, then the points at which this occurred could present potential sources of contamination, which may include metals.

As the site has historically been a field, it is possible that it may have been used agriculturally. If so, there may be historic use of herbicides and/or pesticides on site. If present these are likely to have remained in the topsoil.

Hence, the following potential **on-site** sources of contamination have been identified:

- Low to medium level Ground Gas associated with Made Ground.
- Low to medium level Metals, TPH and PAH associated with the soil stockpile, and Made Ground.
- Low to medium level asbestos containing materials associated with the Made Ground.
- Low to medium level water-soluble sulphate associated with the soils stockpile and Made Ground.
- Low level Metals associated with burnt material.
- Low level herbicides and pesticides within topsoil.

The following potential **off-site** sources of contamination have been identified:

- Low to medium level Ground Gas associated with pools, landfill, and Made Ground.
- Low to low-medium level Metals, TPH and PAH from landfill and Made Ground.

4.2 Potential Migration Pathways

The following potential migration pathways have been identified:



- **Inhalation:** Breathing dust and vapours from contaminated soil in outdoor air. Vapours can also migrate into buildings resulting in inhalation by the occupants.
- **Ingestion:** Eating and swallowing of contaminated soil either by deliberate consumption, indirectly by eating or smoking with dirty hands or by ingestion of fugitive dust.
- **Dermal Contact:** Direct contact with contaminated soil and groundwater, causing skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts or abrasions.
- **Migration of Ground Gas/Vapours:** Ground gases/vapours can migrate laterally or vertically through permeable or voided ground and accumulate within unprotected buildings.
- **Aggressive Attack/Direct Contact:** Building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete.

4.3 Potential Receptors of Contamination

The following potential human health and environmental receptors have been identified:

- Future Site Workers
- Customers
- Construction Workers
- Buried concrete and plastics (e.g., concrete foundations and water supply pipes)
- Groundwater beneath the site.

As the site is a designated Secondary A superficial aquifer, this could potentially provide support for local water supplies, as well as an important base-flow for rivers, however, the bedrock is unproductive strata, and there are only 2 recorded water abstractions within 2000m (>1500m) of the site. Therefore, the risk to groundwater is deemed low and will not be considered further within this assessment unless significant, potential sources of contamination are identified during the site works.

4.4 Preliminary Source-Pathway-Receptor Relationships

The preliminary Source-Pathway-Receptor relationships identified for the site bearing in mind the proposed redevelopment proposals are summarised as follows:

Table 4.1: Preliminary Source-Pathway-Receptor Relationships

Source Material/Activity	Potential Contaminant	Pathways	Receptor	Risk
Off-site pools.	Methane, Carbon Dioxide, Carbon Monoxide, Hydrogen Sulphide.	Migration of Ground Gas/vapours.	Future site workers, Customers, Construction workers.	Low-medium.
On-site Made Ground.	Methane, Carbon Dioxide, Carbon Monoxide, Hydrogen Sulphide.	Migration of Ground Gas/vapours.	Future site workers, Customers, Construction workers.	Low-medium.
	Asbestos containing materials.	Inhalation.	Future site workers, customers, construction workers.	Low-medium.
	Metals, TPH, PAH.	Inhalation, dermal contact, ingestion.	Future site workers, customers, construction workers.	Low-medium.
	PAH, TPH.	Direct contact.	Water supply pipes.	Low-medium.



Source Material/Activity	Potential Contaminant	Pathways	Receptor	Risk
	Water-soluble sulphate.	Aggressive attack.	Buried concrete.	Low-medium.
On-site topsoil.	Herbicides and pesticides	Inhalation, Ingestion, Dermal contact	Future site workers, Customers, Construction workers.	Low.
On-site soil stockpile.	Asbestos containing materials.	Inhalation.	Future site workers, Customers, Construction workers.	Low.
	Metals, TPH, PAH.	Inhalation, dermal contact, ingestion.	Future site workers, Customers, Construction workers.	Low.
	PAH, TPH.	Direct contact.	Water supply pipes.	Low.
	Water-soluble sulphate.	Aggressive attack.	Buried concrete.	Low.
	Herbicides and pesticides	Inhalation, Ingestion, Dermal contact	Future site workers, Customers, Construction workers.	Low.
Made Ground Off-site.	Metals, TPH, PAH.	Inhalation, dermal contact, ingestion.	Future site workers, customers, construction workers.	Low-medium.
On-site burnt material.	Metals	Dermal contact, ingestion, inhalation.	Construction workers.	Low
Off-site landfill.	Methane, Carbon Dioxide, Carbon Monoxide, Hydrogen Sulphide.	Migration of Ground Gas/vapours.	Future site workers, Customers, Construction workers.	Low-medium.
	Metals, PAH, TPH.	Migration of Mobile Contaminants	Future site workers, Customers, Construction workers	Low.

5 Conclusions and Recommendations

5.1 Development Proposals

The development proposals include the construction of a new Lidl store, access, car park and peripheral soft landscaping. The store will be located in the north of the site with the car park in the south, with access to the site situated at the western boundary.

5.2 Environmental Assessment

Potential, predominantly low to low-medium level risks have been identified at this site, relating to identified human health receptors posed by the presence of localised metals, PAH, TPH, asbestos, herbicides and/or pesticides.

There is potential for elevated pH and water-soluble sulphate within near surface Made Ground, both on and off site, and low – medium-level risk of Ground Gas from Made Ground, off-site pools, and off-site landfills.

These risks cannot be removed through a desk-based risk assessment alone and hence it is recommended that these potential risks are assessed further through an appropriate intrusive investigation which should be sufficient in scope to assess the potential risks and enable development of a remedial strategy for the site if required.

5.3 Geotechnical Assessment

Given the site proposals, and in view of the published geology and the expected ground conditions, it is likely that conventional strip or trench fill foundations will be appropriate for the proposed buildings. The depth of Made Ground, topsoil and the strength of underlying natural soils should be



assessed to determine this. If a significant thickness of Made Ground or strata with poor bearing capacities are present, a deeper foundation solution, such as piles may be a more suitable option.

There is the potential for elevated water-soluble sulphate concentrations to be present in any Made Ground and strata underlying the site. The concrete classification required for any foundation solution should therefore be assessed accordingly.

5.4 Proposed Investigation

Given the development proposals and anticipated geology, it is considered that an appropriate investigation would comprise several window sample boreholes with the installation of ground gas and groundwater monitoring wells.

The investigation should include appropriate testing, interpretation and assessment to clarify the environmental and human health risks identified within the desk study, as well as geotechnical analysis to assist in foundation and floor slab design.



Drawings





Key

 Site Location



Project:
Lidl, Stoneham Lane, Eastleigh

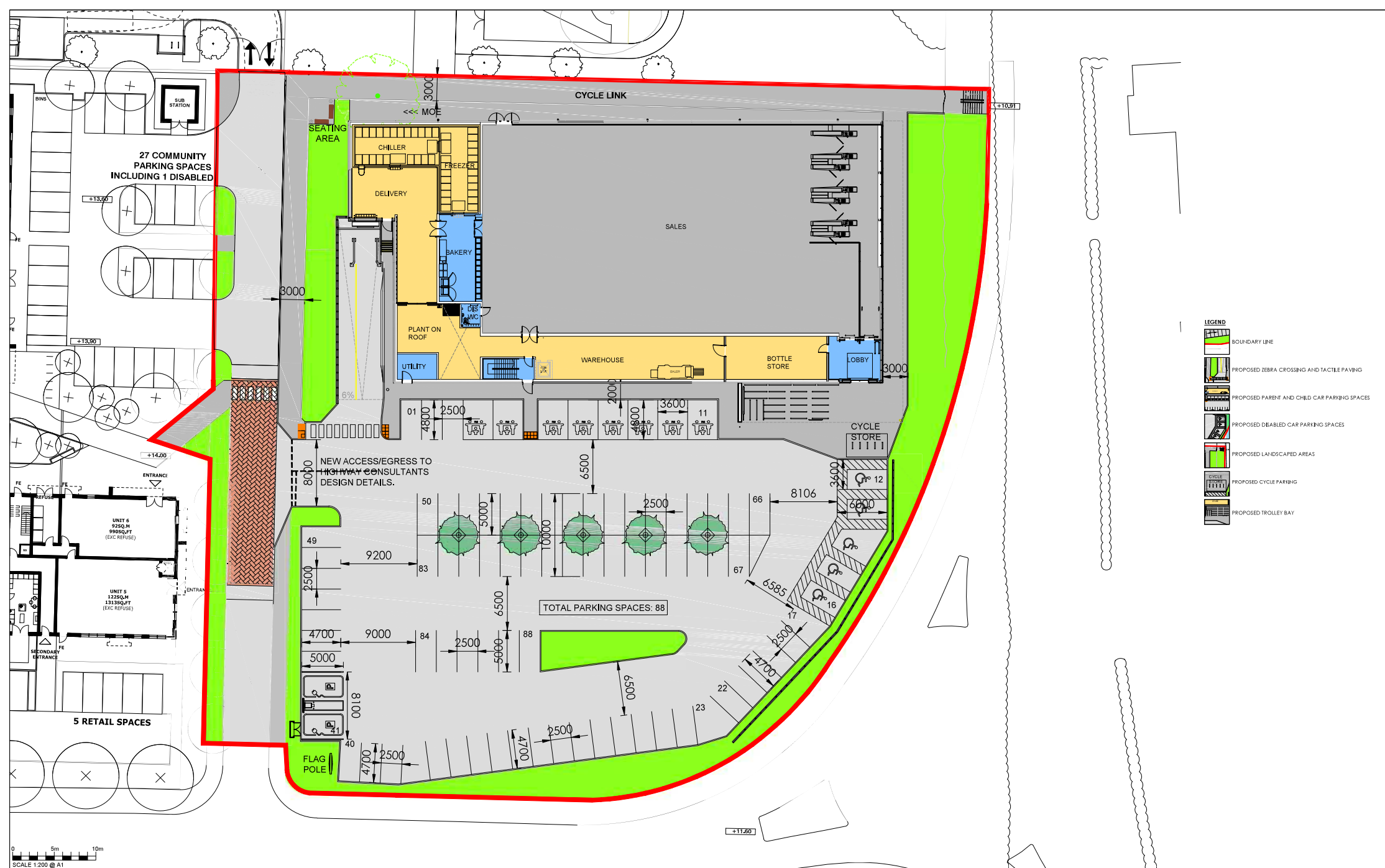
Title:
Site Location Plan

Project No: 21-1500-P

Drawing No: 001

Revision: A

Scale: NTS



Appendix A

Photographs





Photograph 1 – A view of the site entrance in the north-west corner.



Photograph 2 – A view south across the site.



Photograph 3 – A view across the site from the south.



Photograph 4 – A view of the ponding in the south of the site.





Photograph 5 – A view of the burnt waste materials on-site.



Photograph 6 – A view of the stockpile in the northern area of the site.



Photograph 7 – A view across the site from the north-east corner.



Photograph 8 – A view of the waste skip located centrally on site.



Appendix B

Historical Maps



Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

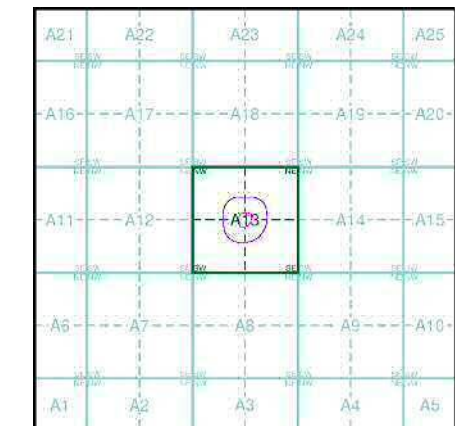
1:10,000 Raster Mapping

	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1872	3
Hampshire & Isle Of Wight	1:10,560	1897	4
Hampshire & Isle Of Wight	1:10,560	1911	5
Hampshire & Isle Of Wight	1:10,560	1931	6
Hampshire & Isle Of Wight	1:10,560	1931	7
Hampshire & Isle Of Wight	1:10,560	1938	8
Historical Aerial Photography	1:10,560	1947 - 1949	9
Ordnance Survey Plan	1:10,000	1963	10
Ordnance Survey Plan	1:10,000	1963 - 1968	11
Ordnance Survey Plan	1:10,000	1969	12
Ordnance Survey Plan	1:10,000	1978	13
Ordnance Survey Plan	1:10,000	1983 - 1989	14
Southampton	1:10,000	1986	15
Ordnance Survey Plan	1:10,000	1990	16
10K Raster Mapping	1:10,000	2000	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2021	19

Historical Map - Slice A



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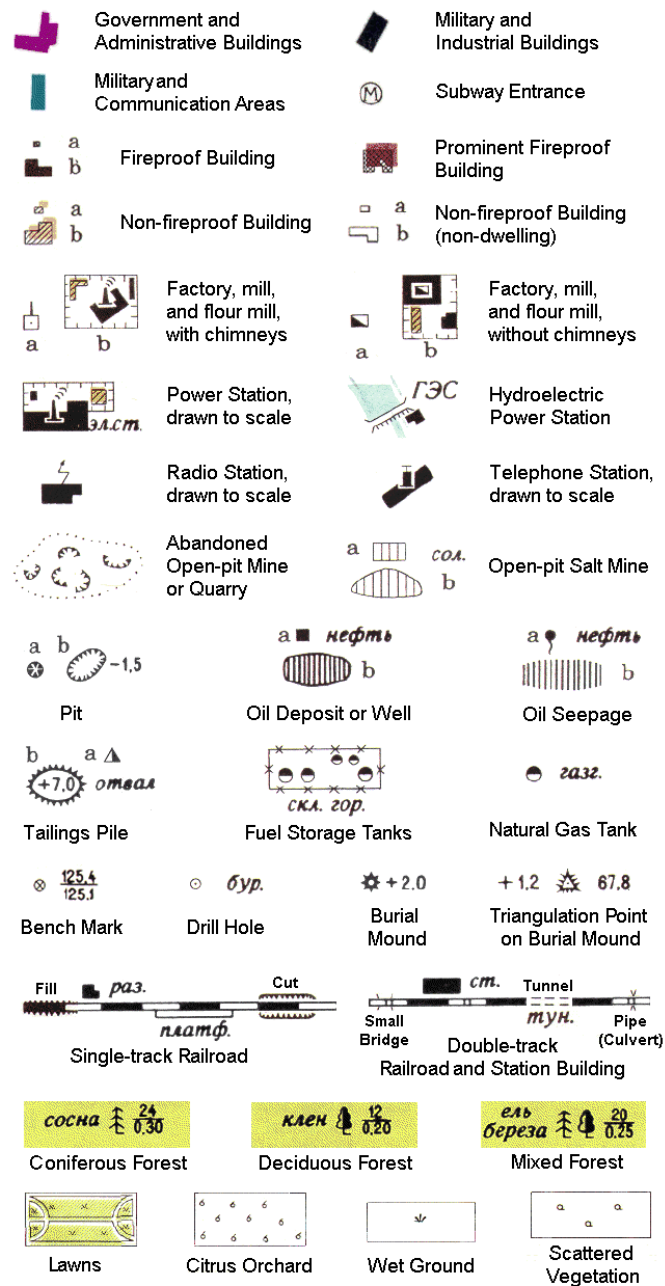
Site Details

Stoneham Lane, EASTLEIGH

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale



243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A) З з (Z) П п (P) Ч ч (CH)

Б б (B) И и (I) Р р (R) Ш ш (SH)

В в (V) Й й (Y) С с (S) Щ щ (SHCH)

Г г (G) К к (K) Т т (T) Ъ ъ (-)

Д д (D) Л л (L) У у (U) Ы ы (Y)

Е е (E) М м (M) Ф ф (F) Ь ь (')

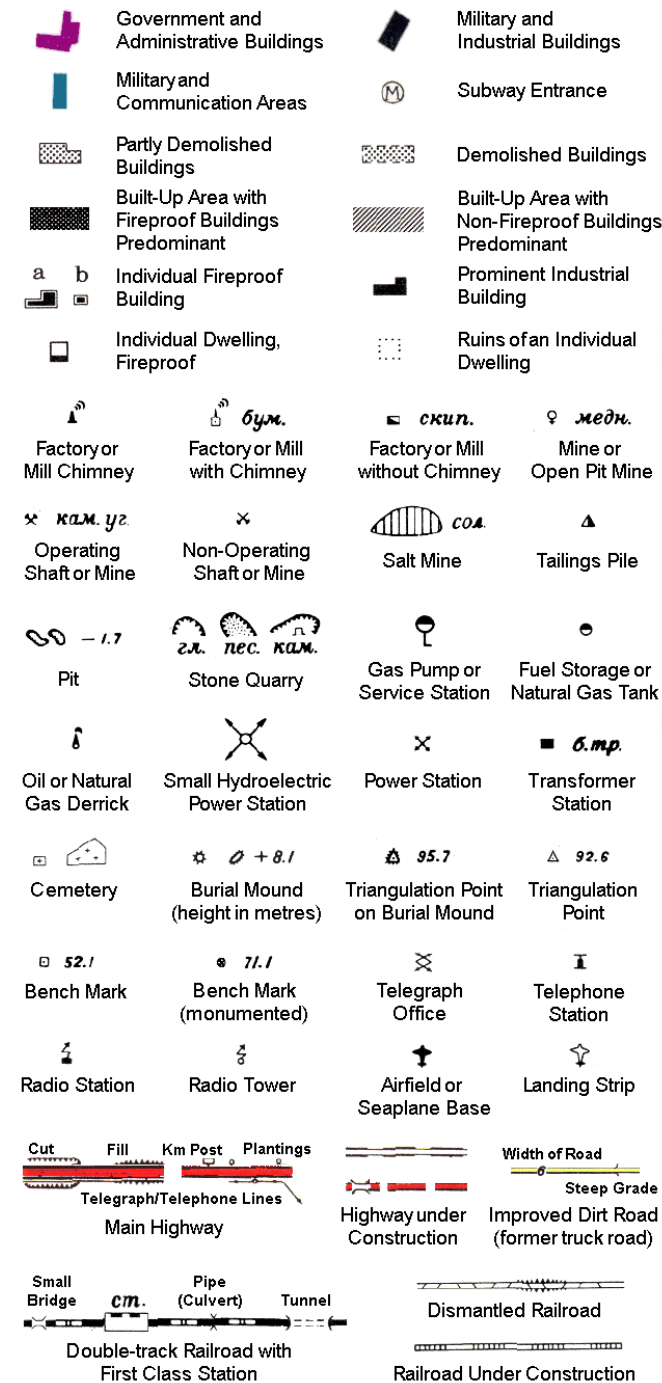
Ё ё (YO) Н н (N) Х х (KH) Э э (E)

Ж ж (ZH) О о (O) Ц ц (TS) Ю ю (YU or IU)

Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

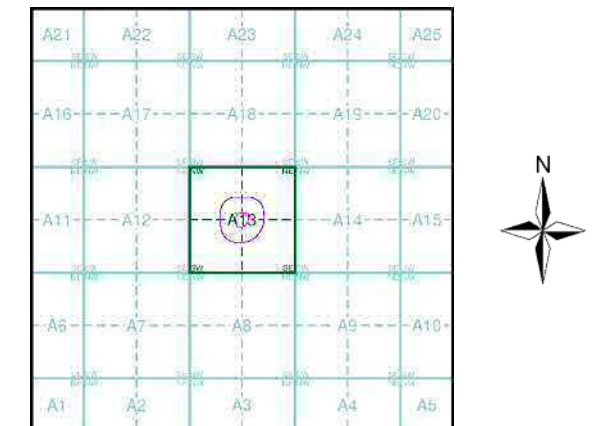


Key to Numbers on Mapping

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1872	3
Hampshire & Isle Of Wight	1:10,560	1897	4
Hampshire & Isle Of Wight	1:10,560	1911	5
Hampshire & Isle Of Wight	1:10,560	1931	6
Hampshire & Isle Of Wight	1:10,560	1931	7
Hampshire & Isle Of Wight	1:10,560	1938	8
Historical Aerial Photography	1:10,560	1947 - 1949	9
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Ordnance Survey Plan	1:10,000	1969	12
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Ordnance Survey Plan	1:10,000	1990	16
10K Raster Mapping	1:10,000	2000	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2021	19

Russian Map - Slice A

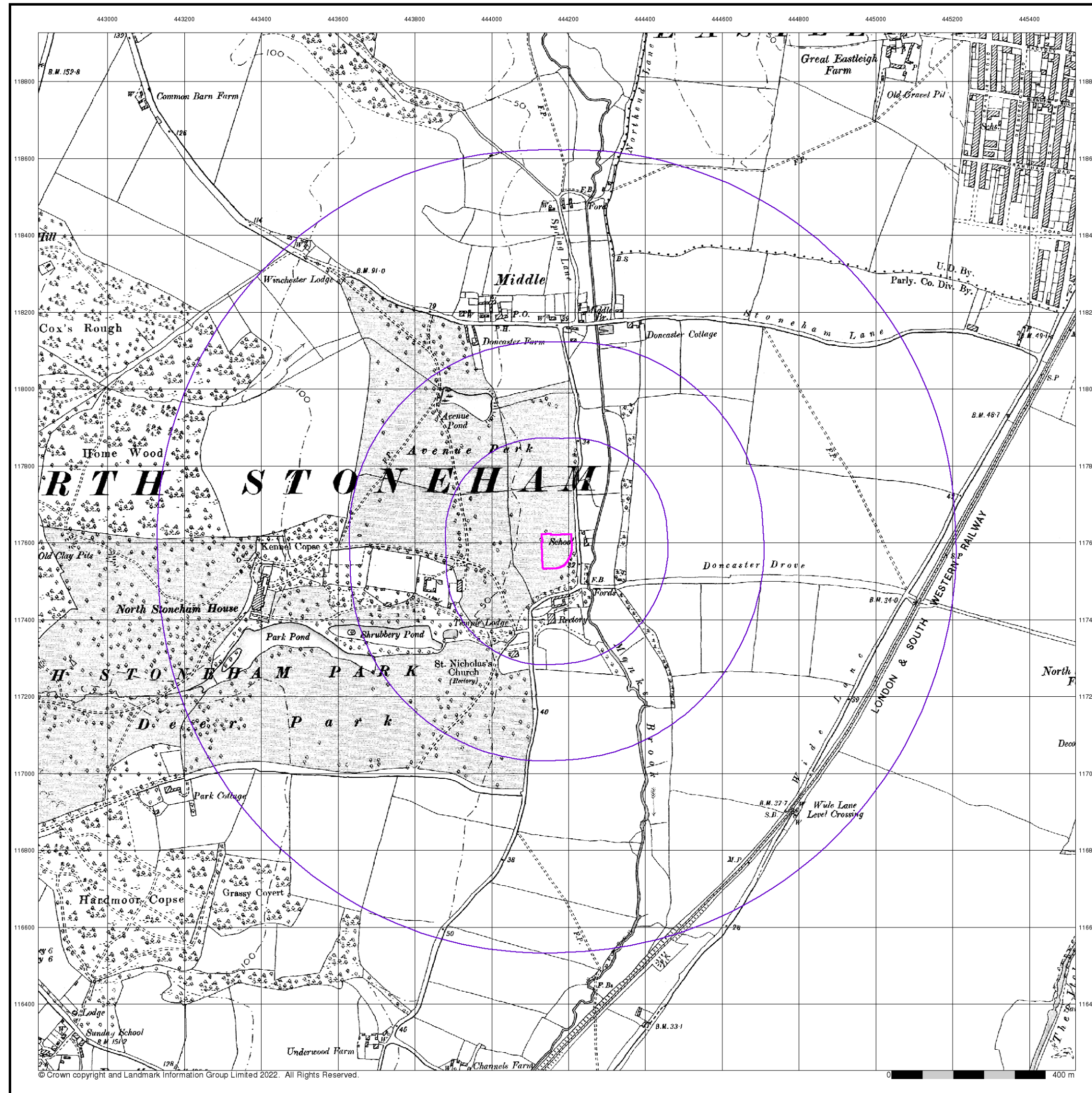


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Site Details

Stoneham Lane, EASTLEIGH



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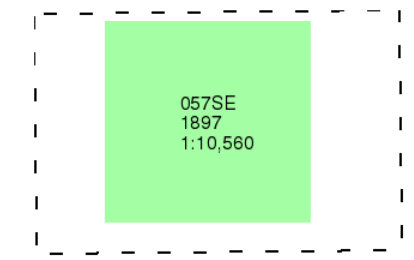
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Published 1897

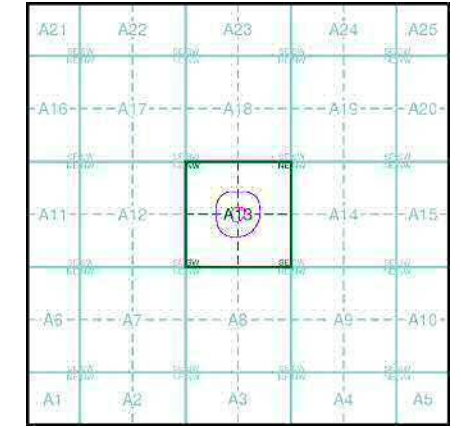
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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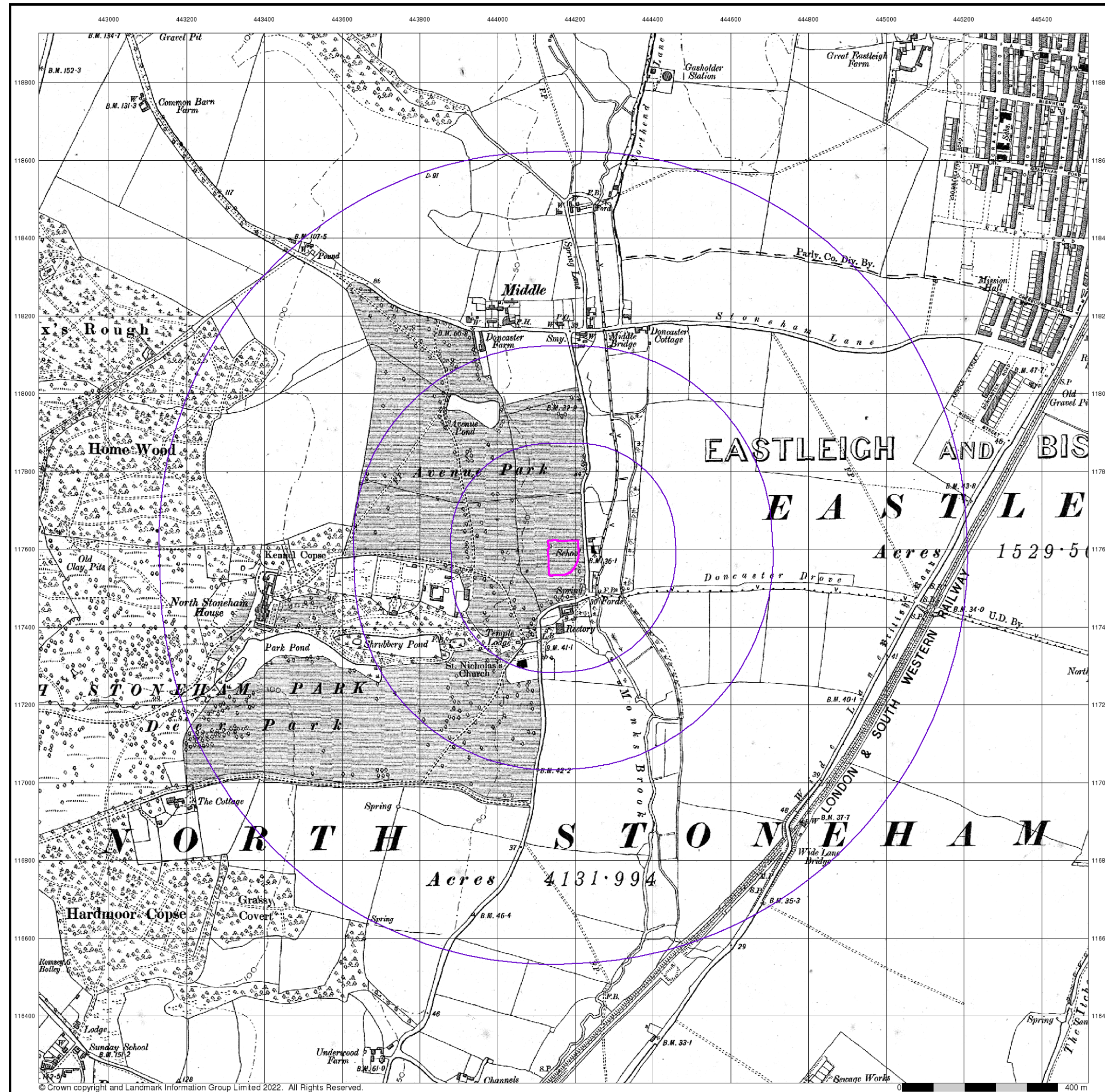
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Site Details

Stoneham Lane, EASTLEIGH



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



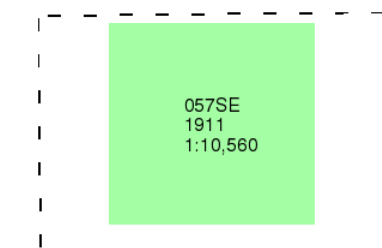
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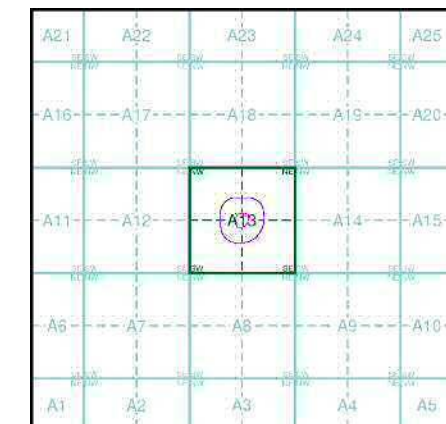
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Stoneham Lane, EASTLEIGH



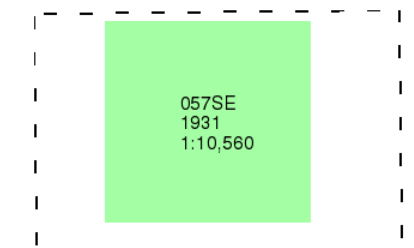
Hampshire & Isle Of Wight

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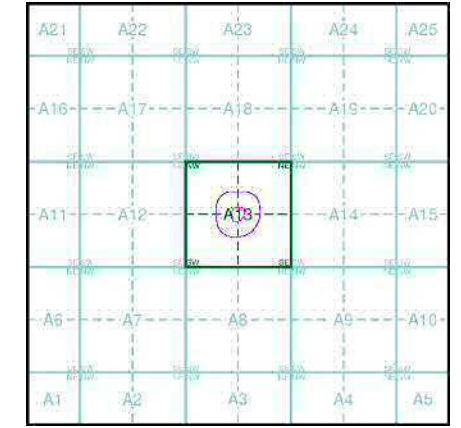
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Map Name(s) and Date(s)



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Site Details

Stoneham Lane, EASTLEIGH



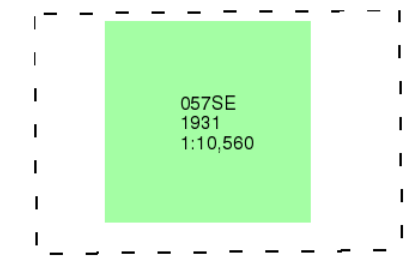
Tel: 0844 844 9952
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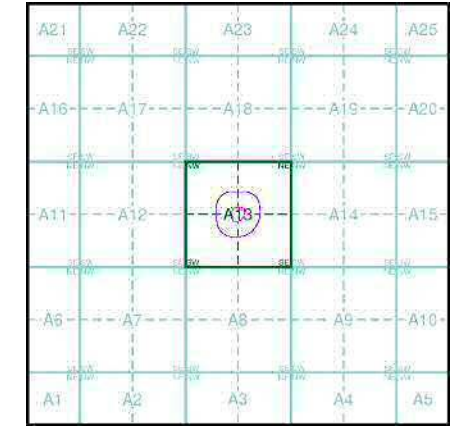
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