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**LAND REAR OF 113-127 MOORFIELD ROAD,
COWLEY, UXBRIDGE, UB8 3SH**

REPORT ON PRELIMINARY INVESTIGATION

Contract: 52693

Date: February 2018

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PRELIMINARY INVESTIGATION REPORT

carried out at

**LAND REAR OF 113-127 MOORFIELD ROAD,
COWLEY, UXBRIDGE UB8 3SH**

Prepared for

**LONDON BOROUGH OF HILLINGDON
Civic Centre
High Street
Uxbridge
Middlesex
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Contract: 52693

Date: February 2018

Report Issue Log

Draft Issue	Issued By	Checked By
Issue Method E/P/D	Date	Date

Final Issue	Issued By	Checked By
Issue Method E	VT Date 09/02/2018	LH Date 09/02/2018

Revision	Issued By	Checked By
Issue Method E/P/D	Date	Date

Issue Method: E = Electronic
P = Paper
D = Disc

EXECUTIVE SUMMARY

On the instructions of Philip Pank Partnership, consulting engineers to London Borough of Hillingdon, a Preliminary Investigation in the form of a desk study and site reconnaissance has been carried out in order to assess the potential hazards on and adjacent to the site and prepare a risk assessment for further consideration.

The site, which is proposed for the development of 5 No. three bedroom houses with private gardens and parking, is situated on land to the rear of 113-127 Moorfield Road, approximately 1km to the southeast of the town centre of Cowley, and may be located by Grid Reference TQ 058 814.

A walkover survey was carried out on the 25 January 2018, at which time the site was disused and secure yet had evidence of fly tipping. The structures present on the site were observed to be disused, with evidence of industrial grade cooling units.

A review of available historical maps has revealed that the site was situated within an undeveloped field until c.1914, by which time the south eastern section comprised filter beds extending off-site and forming part of a sewage works, which also comprised sludge beds, tanks and rail tracks associated with a railway embankment present some 15m to west from the earliest available map, dated 1865-1892, which trended roughly northeast/southwest. The sewage works was labelled as disused by c.1960, and by c.1963-1965, the site had been redeveloped for two unlabelled structures, resembling its current form, together with significant development of the immediately surrounding area for predominantly residential use. The railway to the west of the site was removed by c.1966-1972 and by c.1977 had been completely redeveloped for further residential use.

A number of pits and evidence of earthworks, including redevelopment of the railway embankment, were recorded in the surrounding area, together with industrial land uses to the south and southwest of the site.

A preliminary UXO risk assessment carried out for the site found there to be a low risk of UXO encounter.

Published geological and hydrogeological records indicate that the site is underlain by superficial deposits of the Langley Silt Member, underlain by further superficial deposits of the Lynch Hill Gravel Member. The superficial deposits are underlain by the London Clay Formation. Areas of worked ground are recorded in the vicinity of the site, the closest being approximately 60m to the northwest. In these areas, the Langley Silt is no longer present and the surface geology comprises the Lynch Hill Gravel. The Langley Silt and London Clay are designated unproductive strata due to their negligible permeability, whilst the highly permeable Lynch Hill Gravel is designated a Principal aquifer.

Geological hazards associated with the site are thought to include the potential for old buried foundations and services associated with the previous development of the site, the potential for Made Ground underlying the site, and the potential for volume changes and aggressive conditions for construction materials associated with the London Clay Formation.

The research has identified the following potential sources of contamination which may form part of a pollutant linkage:

- Made Ground and nearby worked ground.
- Previous commercial use of the site.
- Former sewage works and filter beds on the site and adjacent land.
- Former railway approximately 15m to the west of the site.
- Ground gas.

Evidence of potential sources of contamination on or which may impact on the site has been identified by the research, with plausible pathways to the likely receptors, and therefore potential pollutant linkages have been suggested. Furthermore, the research identified evidence of potential hazards associated with underlying ground conditions, either natural or man-made, and therefore it is recommended that further work be carried out to confirm the presence, nature or extent of those hazards anticipated to impact on the site.

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1.0 INTRODUCTION

1.1 General

- 1.1.1 On the instructions of Philip Pank Partnership, consulting engineers to London Borough of Hillingdon, a Preliminary Investigation in the form of a desk study and site reconnaissance has been carried out in order to assess the potential hazards on and adjacent to the site and prepare a risk assessment for further consideration.
- 1.1.2 It is understood that it is proposed to develop the site for 5 No. three bedroom houses with private gardens and parking. A plan of the proposed development is provided in Appendix 1, Figure A1.3.
- 1.1.3 This report has been prepared for the sole use of the Client for the purpose described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.
- 1.1.4 It is recommended that a copy of this report be submitted to the relevant authorities to enable them to carry out their own site assessment and provide any comments.
- 1.1.5 The comments given in this report and the opinions expressed herein are based on the information obtained from the desk study and site reconnaissance. No intrusive investigation has been carried out to confirm the actual ground or environmental conditions.
- 1.1.6 Any risks identified in this report are perceived risks based on information reviewed. Actual risks can only be assessed following a physical investigation of the site.
- 1.1.7 This report has been based, in part, on information supplied by others. The report has been prepared on the basis of that information being accurate.
- 1.1.8 The conclusions presented in this report are based on the guidance available at the time of preparation of the report. No liability can be accepted for the retrospective effects of any changes or amendments to legislation or guidance.
- 1.1.9 This Preliminary Investigation has been conducted in general accordance with CLR 3, ref. 8.1, CLR 11, ref 8.2, BS 10175, ref 8.3, and GPLC 1, ref 8.4.

2.0 SITE

2.1 Site Location

2.1.1 The site is situated on land to the rear of 113-127 Moorfield Road, approximately 1km to the southeast of the town centre of Cowley, and may be located by Grid Reference TQ 058 814. Site location plans and an aerial photograph are included in Appendix 1, Figures A1.1 and A1.2.

2.1.2 The site is situated at an approximate altitude of 32mAOD.

2.2 Site Walkover and Description

2.2.1 A walkover survey of the site was conducted on the 25 January 2018. The walkover was carried out in general accordance with CLR 2, ref. 8.5.

2.2.2 The site is rectangular in shape and occupies an approximate area of 0.11Ha.

2.2.3 At the time of the walkover survey, the site was disused and secure yet had evidence of fly tipping, not indicated in the recent aerial photograph.

2.2.4 The site was relatively level with the immediately surrounding area. The structures on and adjacent to the site were in relatively good condition. However, two phases of repairs on cracked masonry were observed on the northern and southern elevations of the building on the eastern boundary of the site, which could be indicative of ground movements.

2.2.5 There were no springs, ponds or watercourses observed on or near the site at the time of the walkover survey. Trees and shrubs were observed in the south western corner of the site. Further trees were visible in the north western corner of the site on aerial photographs. However, at the time of the walkover, there was no access to the north western corner of the site. Several mature trees were also observed in the residential gardens to the south of the site.

2.2.6 The ground surface of the site comprised roughly 55% concrete hard standing, 20% grass and with the remainder occupied by structures. The structures present on the site were disused, with evidence of industrial grade cooling units, that could represent a possible source of contamination in the western area of the site.

2.2.7 Fly tipping and the former use of the site are the only sources of possible contamination observed on or adjacent to the site at the time of the walkover survey.

2.2.8 Evidence of services was observed within the site boundary, inferred from the presence of an electricity junction box located by the north eastern entrance of the site, together with scarring of concrete and multiple manhole covers concentrated adjacent to the eastern boundary of the site.

- 2.2.9 Photographs from the walkover survey are included within Appendix 2, Figure A2.1.

2.3 Historical Maps

2.3.1 A review of the history of the site has been conducted based on readily available historical maps. Details of the findings are provided in the table below. All maps are provided in Appendix 4.

Map, Date and Scale	Site Description	Regional Setting
Middlesex 1865-1892 1:2500	Site is situated within an undeveloped field.	The surrounding area is predominantly undeveloped. The Great Western Railway (Uxbridge Branch), indicated to be raised up on an embankment, trends roughly northeast/southwest approximately 15m to the west of the site, parallel with the site boundary. A track trends east/west approximately 30m to the north of the site. Cowley Manor Farm is approximately 150m to the east of the site and the village of Cowley Peachey is approximately 260m to the west. A river (later identified as the River Pinn) trends roughly northeast/southwest approximately 220m to the southeast at its closest point to the site.
Middlesex 1868 1:10560	No significant changes.	Brick fields are recorded approximately 425m to the southeast and 800m to the east of the site, together with gravel pits some 500m and 800m to the southeast. The path of the Grand Union Canal can be seen some 425m to the southwest of the site and Yiewsley is indicated some 900m to the south. The River Colne trends north/south some 1000m to the west of the site, beyond which there is no data mapped.
Buckinghamshire 1880 1:2500	No data available.	No data available.
Buckinghamshire 1881 1:10560	No data available.	Data is only available for the western section of the map, beyond the River Colne. Open fields and parkland are shown.
Middlesex 1895-1896 1:2500	No significant changes.	Cowley Peachey has expanded to immediately beyond the railway to the west of the site.
Middlesex 1897 1:10560	No significant changes.	The brickfields and gravel pits are no longer present to the southeast of the site. Several wooded/orchard areas are recorded in the wider surrounding area. Further development has taken place in and around Yiewsley to the south of the site.
Buckinghamshire 1899 1:2500	No significant changes.	No significant changes.

Map, Date and Scale	Site Description	Regional Setting
Buckinghamshire 1900 1:10560	No significant changes.	No significant changes.
Middlesex 1914 1:2500	The south eastern half of the site comprises filter beds with extend off-site and form part of a sewage works to the southeast. The north western half of the site remains vacant.	Other than the sewage works, which includes tanks approximately 50m to the west of the site, residential development has taken place approximately 125m to the south/southwest of the site and a chair factory is recorded some 400m to the southwest.
Middlesex 1920 1:10560	No significant changes.	Further development has taken place in and around Further development has taken place in and around Yiewsley to the south of the site.
Buckinghamshire 1932 1:10560	No significant changes.	No significant changes.
Buckinghamshire 1932 1:2500	No data available.	No data available.
Middlesex 1934-1935 1:2500	No significant changes.	Further development of the sewage works has taken place, including sludge beds where tanks were previously recorded approximately 50m to the west of the site, and further filter beds with cylindrical features, possible tanks, and rail tracks approximately 30m to the southwest. A further sewage works, including filter beds, sludge beds and tanks, is recorded approximately 175m to the northeast of the site. Further residential development has taken place immediately beyond the railway to the west of the site and approximately 350m to the northwest. The chair factory to the southwest is no longer labelled.
Middlesex 1935 1:10560	No significant changes.	Significant residential development has taken place in the surrounding area, from approximately 500m to the north, 600m to the southeast and 750m to the east. Large agricultural nurseries are recorded around 800m and 1000m to the northeast of the site.
Middlesex 1938 1:10560	No significant changes.	No significant changes, although development of the surrounding areas has continued.
Historical Aerial Photography 1948 1:10560	No significant changes.	Development of the surrounding areas has continued. Structures, later identified as Hillingdon Hospital, are recorded around 100m to the northeast of the site.

Map, Date and Scale	Site Description	Regional Setting
Ordnance Survey 1960 1:10000	The filter beds are still present on the site, though the sewage works is identified as disused.	Both the sewage works to the southeast of the site and to the northeast of the site are indicated as disused and some of the features have been removed.
Ordnance Survey 1963-1965 1:1250	The site has been developed with two small unlabelled structures, resembling its current form.	Development has taken place immediately surrounding the site in all directions, predominantly for residential use with associated playgrounds and community hall. The site identified as a chair factory previously has expanded and is identified as a factory once again (unspecified).
Additional SIMs 1963-1987 1:1250	No significant changes.	No data available for northern section of the map. No significant changes.
Ordnance Survey 1966-1972 1:2500	No significant changes.	The railway to the west of the site has been removed, though its path is still visible. The factory to the southwest of the site is now identified as an engineering works.
Ordnance Survey 1970-1974 1:10000	No significant changes.	The furthest nurseries to the northeast of the site are indicated as disused. Further works and factories are recorded to the south of the site, the closest being approximately from the site boundary. Evidence of earthworks is indicated adjacent to the Grand Union Canal some 400m to the southwest of the site and an area of landfill or refuse heap is indicated approximately 700m to the southwest.
Ordnance Survey 1971-1975 1:1250	No significant changes.	No data available for the northern section of the map. Development of the former railway to the west of the site has started to take place for additional residential use. An electricity substation is recorded approximately 85m to the southwest of the site. Further commercial development has taken place some 300 to the southwest of the site for warehousing.
Unpublished Survey Information 1975 1:1250	No data available.	No data available for southern part of the site. No significant changes.
Ordnance Survey 1977 1:10000	No significant changes.	No data available for western part of the site. The former railway to the west of the site is now fully developed. Further development has taken place in the surrounding area, including the former disused nurseries to the northeast and within Hillingdon Hospital to the northeast.
Additional SIMs 1983-1989 1:1250	No data available.	Data available for eastern and western edges of the map only. No significant changes.

Map, Date and Scale	Site Description	Regional Setting
London 1985 1:25000	No observable changes.	No observable changes.
Ordnance Survey 1988 1:10000	No data available.	Data available for western section of the map only. No significant changes.
Ordnance Survey 1990 1:10000	No significant changes.	No data available for western section of the map. Hillingdon Hospital to the northeast of the site has expanded.
Additional SIMs 1990 1:1250	No data available.	Data available for eastern and western edges of the map only. No significant changes.
Ordnance Survey 1991 1:1250	No data available.	Data available for south eastern corner of the map only. No significant changes.
Large-Scale National Grid 1992 1:1250	No significant changes.	No significant changes.
Large-Scale National Grid 1993 1:1250	No data available.	Data available for south eastern corner of the map only. No significant changes.
Large-Scale National Grid 1996 1:1250	No data available.	Data available for south eastern corner of the map only. No significant changes.
Historical Aerial Photography 1999 1:2500	No significant changes.	No significant changes.
10K Raster Mapping 1999 1:10000	No significant changes.	Further expansion of Hillingdon Hospital has taken place to the northeast of the site, together with other small scale development in the surrounding area.
10K Raster Mapping 2006 1:10000	No significant changes.	The remaining nursery to the northeast of the site has been replaced by a garden centre. Further small scale development has taken place in the surrounding area and some commercial/industrial buildings to the south of the site have been removed.

Map, Date and Scale	Site Description	Regional Setting
VectorMap Local 2017 1:1,000	No significant changes.	No significant changes other than small scale development in the surrounding area.

2.4 Summary

2.4.1 The site was situated within an undeveloped field until c.1914, by which time the south eastern section comprised filter beds extending off-site and forming part of a sewage works, which also comprised sludge beds, tanks and rail tracks associated with a railway embankment present some 15m to west from the earliest available map, dated 1865-1892, which trended roughly northeast/southwest. The sewage works was labelled as disused by c.1960, and by c.1963-1965, the site had been redeveloped for two unlabelled structures, resembling its current form, together with significant development of the immediately surrounding area for predominantly residential use. The railway to the west of the site was removed by c.1966-1972 and by c.1977 had been completely redeveloped for further residential use.

2.4.2 A number of pits and evidence of earthworks, including redevelopment of the railway embankment, were recorded in the surrounding area, together with industrial land uses to the south and southwest, though none close enough to be considered a risk to the site.

2.5 Preliminary Unexploded Ordnance (UXO) Risk Assessment

2.5.1 A Preliminary UXO risk assessment was undertaken by 6 Alpha Associates in conjunction with Landmark Envirocheck. A full copy of the report is included in Appendix 5 and the key findings are summarised below.

2.5.2 During WWII, was situated within Uxbridge Urban District, which recorded five High Explosive (HE) bomb strikes per 100 hectares, a very low level of bombing.

2.5.3 Luftwaffe aerial reconnaissance photography associated with the site did not identify any primary bombing targets on or within 1km of the site. However, sewage works, railway lines, works and a factory located either on-site or in the vicinity may have been considered secondary bombing targets.

2.5.4 Air Raid Precaution (ARP) records did not cover the site. However, five HE bomb strikes were identified within 705m, the closest being 325m to the east/southeast.

- 2.5.5 Official bomb damage mapping was not available. An analysis of post-war mapping did not identify any evidence of potential bomb damage on or in the immediate vicinity of the site. However, further research identified bomb damage at the hospital 910m to the northeast of the site.
- 2.5.6 As there was no bombing or bomb damage recorded in the immediate vicinity of the site during WWII, there is no evidence to suggest that further investigation into UXO is warranted.
- 2.5.7 The site was given a low risk rating for potential UXO encounter and no further action is required.

3.0 SITE SETTING

3.1 Geological Setting

- 3.1.1 Details of the geology underlying the site have been obtained from the relevant geological map of the area, ref. 8.6.
- 3.1.2 The geological map indicates the site to be underlain by superficial deposits of the Langley Silt Member, which broadly varies from silt to clay, commonly yellow-brown and massively bedded.
- 3.1.3 These deposits are underlain by further superficial deposits of the Lynch Hill Gravel Member, comprising sand and gravel, locally with lenses of silt, clay or peat.
- 3.1.4 The superficial deposits are underlain by the London Clay Formation, briefly described as bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay.
- 3.1.5 Although not indicated as present on the site from the geological maps, there is the possibility that Made Ground may exist resulting from previous development.
- 3.1.6 Areas of worked ground are recorded in the vicinity of the site, the closest being approximately 60m to the northwest. In these areas, the Langley Silt is no longer present and the surface geology comprises the Lynch Hill Gravel.
- 3.1.7 Existing boreholes some 600m to the northwest of the site indicate Made Ground extending to depths of between 0.9m and 1.5m below ground level (bgl), over deposits of Langley Silt, comprising coarse sand and gravel, compact sandy silt and clayey sand with flint, to between 2.0m and 2.3m bgl, over deposits of Lynch Hill Gravel, comprising very dense coarse sand and gravel, to between 3.6m and in excess of 4.0m bgl, over weathered London Clay, described as very stiff dark brown clay with high silt content, to depths in excess of 5.0m bgl. Groundwater was observed at depths of 2.0m and 3.0m bgl, standing at 4.6m and 3.7m respectively. This information is based upon records provided by the British Geological Survey.

3.2 Hydrogeological Setting

- 3.2.1 The hydrogeological records, provided by the Environment Agency, indicate that the site is situated above unproductive strata relating to the negligibly permeable superficial deposits of the Langley Silt Member and deeper London Clay Formation, whilst the superficial deposits of the Lynch Hill Gravel Member that lie in between are highly permeable and therefore designated a Principal aquifer.

- 3.2.2 The Environment Agency defines Principal aquifers as 'layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale'.
- 3.2.3 The Environment Agency defines unproductive strata as 'rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'. However, groundwater flow through such rocks, although imperceptible, does take place and will need to be considered in assessing the risk associated with persistent pollutants.
- 3.2.4 The site is classified as being within an urban setting as designated by the Environment Agency, which therefore means that the soils are classified as having a high leaching potential.
- 3.2.5 Soils of high leaching potential are soils that readily transmit liquid discharges because they are either shallow or susceptible to rapid by-pass flow directly to rock, gravel or groundwater.
- 3.2.6 However these soils are overlain by low permeability superficial deposits, Langley Silt, which will have significantly reduced leaching potential.
- 3.2.7 The site is not located within a groundwater source protection zone.
- 3.2.8 There are no licensed groundwater abstractions recorded within 1km of the site. There are seven between 1km and 2km, the closest of which is recorded approximately 1203m to the northeast of the site for drinking, cooking, sanitary and washing use at Hillingdon Hospital. The remainder are for the same use, commercial/industrial use or spray irrigation.
- 3.2.9 The implication of rising groundwater has been considered. The current data, ref. 8.7, would imply that the site is within an area where exceptional structures, deep foundations and deep basements are at potential risk from rising groundwater.
- 3.2.10 The site is not indicated to be located within an area that is susceptible to groundwater flooding.

3.3 Hydrological Setting

- 3.3.1 The nearest surface watercourse is the River Pinn, which lies approximately 220m to the southeast of the site at its closest point. The Grand Union Canal also lies approximately 450m to the southwest of the site, beyond which are a series of rivers and lakes.
- 3.3.2 The surface water levels of the River Pinn and Grand Union canal are approximately 2m and 1m below the level of the site respectively.
- 3.3.3 The site is not situated within an area defined by the Environment Agency as being at risk of flooding from rivers or the sea.

- 3.3.4 The site is not identified as being within an area at risk from surface water flooding. However, a low to medium risk from surface water flooding is indicated immediately to the northwest and southeast of the site.
- 3.3.5 The available river quality classification for the River Pinn is grade E and for the Grand Union Canal is grade D (Environment Agency, 2000). The main parameters for this classification are provided below:

GQA Grade	Environmental Quality	Chemical Parameters			Biological Parameters	
		DO (%)	BOD (mg/l)	Ammonia (mgN/l)	EQI for ASPT	EQI for no. of taxa
D	Fair	50	8	2.5	0.65	0.45
E	Poor	20	15	9.0	0.50	0.30
Ref: Landmark Envirocheck						

- 3.3.6 There are two licensed surface water abstractions recorded within 1km of the site, and a further two between 1km and 2km. The closest is recorded approximately 587m to the south of the site for use in cooling. The remainder are also for commercial/industrial use.

3.4 Radon

- 3.4.1 The British Geological Survey, in conjunction with the Radiation Protection Division of the Health Protection Agency, ref. 8.8, indicates the site to lie within an area where there is a probability of <1% of present or future homes being above the action level of 200Bq/m³.
- 3.4.2 As such, the site is not classified as a Radon Affected Area and no radon protective measures are deemed necessary for the proposed development. This is confirmed by the Building Research Establishment, Report BR211, ref. 8.9.

3.5 Soil Geochemistry

- 3.5.1 The British Geological Survey data indicates the following concentrations of naturally occurring metals to be representative of the average background levels in natural soil underlying the site. The levels are based on those present in urban soils and are not necessarily representative of levels within Made Ground which may be encountered on site:

Element	Concentration (mg/kg)
Arsenic	17
Cadmium	0.9
Chromium	79
Lead	280
Nickel	28

4.0 ASSESSMENT OF GEOTECHNICAL RISK

4.1 Geological Constraints

4.1.1 The following are brief findings relating to factors identified during the research from the Envirocheck data that may have a potential impact upon the engineering of the proposed development.

Potential Hazard	Assessed Risk	Comment
BGS Recorded Mineral Sites	Low to Moderate	There are six BGS recorded mineral sites within 500m, the closest of which is approximately 179m to the northwest at Cowley Peachey Brick Works. The site was used for the excavation of the Langley Silt and activity at the site has since ceased.
Other shallow mine workings	Very low	No other economic minerals are known to have been worked locally.
Collapsible Ground	Low	The Envirocheck data indicates a very low risk of collapsible ground stability hazards.
Compressible Ground	Low to Moderate	Compressible materials in the form of Made Ground are anticipated beneath the site.
Ground Dissolution	None	The anticipated geological sequence is not known to be susceptible to dissolution.
Landslide	Very Low	The site is essentially level.
Running Sand	Very Low	The Envirocheck data does not indicate a risk from running sand stability hazards.
Shrinking or Swelling Clay	Low to High	The London Clay Formation is of high plasticity. Should a significant thickness of Superficial Deposits be present underlying the site then the associated risk is low, however, if this is not the case then the associated risk is considered to be high.
Unconsolidated Made Ground	Moderate	The site partially comprised filter beds historically and has previously been developed. Therefore, a degree of Made Ground is anticipated.
Aggressive conditions for construction materials	Low to High	London Clay is known to contain potentially high concentrations of sulphates and sulphides. Should foundations be placed within this material then the associated risk is high. However, should any foundations be placed within the overlying superficial deposits, the associated risk is considered to be low.

Potential Hazard	Assessed Risk	Comment
Shallow or high groundwater table	Low to Moderate	Site is within an area where deep structures are at potential risk from high/rising groundwater, though not within an area that is susceptible to groundwater flooding.

4.2 Geotechnical Risk Assessment

4.2.1 An assessment of the main hazards associated with the site is detailed below. Unless stated otherwise, the presence of such hazards are based on information from the research or reconnaissance and have not been confirmed by an intrusive investigation.

- Soil Conditions

The presence of highly plastic cohesive soils, in this instance, the London Clay Formation, represents a risk to structures. Volume changes brought about by shrinkage and swelling of the cohesive soil, exacerbated by the presence of trees, could result in structures supported on this stratum experiencing differential settlement. The associated risk is considered to be low should a substantial thickness of superficial deposits be present, and high if the London Clay Formation is present at shallow depths across the site, which may result in either deeper trench fill foundations or even piled foundations being employed.

Should the superficial terrace deposits be of a relatively fine nature (i.e. a sand), then a high groundwater table may cause subsidence due to running sand. It is considered the risk associated with this is very low.

The London Clay Formation is known to contain significant quantities of sulphates that may cause concrete attack. Should any proposed structure come into contact with that material, then the associated risk is high. However, should any proposed structures be founded in the terrace deposits, then the risk of concrete attack is considered to be low.

The presence of a significant thickness of granular Made Ground or Superficial Deposits, particularly if they are water bearing, may cause instability in excavations for foundations or services trenches.

The location and anticipated geology of the site suggests there to be a low to moderate risk from high groundwater. Groundwater may be perched above the London Clay Formation, or within deposits of Made Ground underlying the site. Should this be the case, then pumping may be required from any excavations on site.

- Topography

The Envirocheck data provided indicates only a very low risk of landslip subsidence.

- Previous Use

Historical mapping indicates previous development on the site. Therefore, the presence of buried structures such as services and old foundations is a potential risk.

4.3 Conclusions of Geotechnical Risk Assessment

- 4.3.1 The research has identified evidence of potential hazards associated with underlying ground conditions, either natural or man-made, and therefore it is recommended that further work be carried out to confirm the presence, nature or extent of those hazards anticipated to impact on the site.

5.0 ENVIRONMENTAL SEARCHES

5.1 Potential Sources of Contamination

5.1.1 A search was made of records held by the various regulatory authorities and other statutory bodies to determine the presence or otherwise of past and current activities on or within 500m of the site which have the potential to give rise to the presence on site of contaminants. The findings are given in the table below:

Activity	On Site	Off Site (distance / direction)	Detail
Contaminated Land Register Entries	None	None within 500m	
Discharge Consents	None	One at 376m south	Relates to the discharge of surface water to the River Pinn, now revoked.
Integrated and Local Authority Pollution Prevention and Controls	None	None within 500m	
Pollution Incidents to Controlled Waters	None	None within 250m, seven at 251-500m, closest at 275m east	Closest relates to Category 3 – minor incident involving an unknown pollutant, dated October 1989.
Prosecutions Relating to Authorised Processes or Controlled Waters	None	None within 500m	
Registered Radioactive Substances	None	None within 500m	
Substantiated Pollution Incident Register	None	None within 500m	
Water Abstractions	None	None within 500m	
BGS Recorded Landfill Sites	None	None within 500m	
Historical Landfill Sites	None	None within 250m, two at 251-500m, closest at 444m southwest	Closest relates to British Waterways site, which operated between 1890 and 1996. Deposited waste included inert, industrial, commercial and household waste, and liquid sludge.
Licensed Waste Management Facilities	None	None within 500m	
Local Authority Recorded Landfill Sites	None	None within 500m	
Registered Landfill Sites	None	None within 500m	
Registered Waste Transfer Sites	None	None within 500m	

Activity	On Site	Off Site (distance / direction)	Detail
Registered Waste Treatment or Disposal Sites	None	None within 500m	
Potentially Infilled Land	None	One at 405m east	Relates to unknown filled ground (non-water – pit, quarry, etc.) dated 1990.
Hazardous Substances	None	None within 500m	
Explosive Sites	None	None within 500m	
Contemporary Trade Entries	None	Five within 250m, thirty-five at 251-500m, closest at 63m west	Closest relates to domestic cleaning services, now inactive. Remainder relate to a wide range of commercial and retail activities commonplace in an urban setting, and the closest active entry is 362m to the southwest of the site.
Points of Interest (Commercial)	None	Two within 250m, seven at 251-500m, closest at 44m west	Closest relates to vehicle repair, testing and servicing.
Points of Interest (Manufacturing and Production)	None	None within 250m, five at 251-500m, closest at 338m southwest	Closest relates to tanks.
Points of Interest (Public Infrastructure)	None	Two within 250m, two at 251-500m, closest at 139m southwest	Closest relates to waste storage, processing and disposal.
Fuel Station Entries	None	None within 500m	

5.2 Green Belt Areas

- 5.2.1 There are five designated areas of Adopted Green Belt land within 1km of the site, the closest of which is recorded approximately 128m to the southeast of the site.
- 5.2.2 Green Belt Areas are generally areas that are designated as being under special consideration for development. Local Authorities may restrict the type of development, place particular planning constraints on proposed developments, or potentially restrict any development within a designated Green Belt area.

5.3 Designated Sites

- 5.3.1 The Envirocheck data does not indicate any Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) or Local Nature Reserves (LNR), or any other sensitive designated areas that may be impacted by the development within 1km of the site.

5.4 Nitrate Vulnerable Zone

5.4.1 The site is located within an area designated as a nitrate vulnerable zone.

5.4.2 The Nitrates Directive defines this nitrate vulnerable zone as:

- a) Surface freshwater which contains or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l.

5.5 Contemporary Trade Entries

5.5.1 There are forty contemporary trade entries, together with eighteen commercial, manufacturing and production or public infrastructure points of interest recorded within 500m of the site, all of which relate to a range of commercial and retail activities commonplace in an urban setting, and none of which are considered likely to have significantly impacted on ground conditions beneath the site.

6.0 ASSESSMENT OF GEOENVIRONMENTAL RISK

6.1 General

- 6.1.1 The definition of ‘contaminated land’, along with the relevant details on legislation and guidance is set out in Appendix 3.
- 6.1.2 The assessment of potential risk has been based on the guidelines given in CIRIA report C552, ref 8.10. These guidelines are summarised in Appendix 3.
- 6.1.3 The assessment of environmental risk is aimed at identifying the possible risk, if any, arising from substances used or deposited on the site, or from any other sources of land contamination, based on the principles of the pollutant linkage.
- 6.1.4 The assessment is based on the proposed development end use, taking account of present and previous use. It is based only on a review of historical maps, desk based data and site reconnaissance; therefore it contains some elements of conjecture based on professional judgement. A comprehensive risk assessment can only be made following an intrusive investigation and testing regime.
- 6.1.5 The proposed development comprises 5 No. three bedroom houses with private gardens and parking.

6.2 Potential Sources of Contamination Identified

- 6.2.1 The research has identified the following potential sources of contamination which may form part of a pollutant linkage:
 - Made Ground and nearby worked ground.
 - Previous commercial use of the site.
 - Former sewage works and filter beds on the site and adjacent land.
 - Former railway approximately 15m to the west of the site.
 - Ground gas.

6.3 Potential Pathways Identified

- 6.3.1 The research has identified a number of potential pathways which are relevant to the potential sources of contamination identified above and may form part of a pollutant linkage.
- 6.3.2 Those identified are detailed within the Conceptual Site Model, along with the receptors relevant to the development on a site specific basis.

6.4 Hazard Identification

- 6.4.1 The research has identified a number of potential sources and pathways which are considered 'likely' to be present which, taking into account the potential receptors identified, form potential pollutant linkages and have been used in the formulation of the Conceptual Site Model.

6.5 Hazard Assessment

- 6.5.1 An assessment of the main sources of contamination and the potential for unacceptable risk to receptors is detailed below. Unless stated otherwise, it is considered 'likely' that a potential source is present at this stage, in order to provide a preliminary estimation of the risk and therefore determine the need for further work.

- **Human Health**

There is the potential for contamination associated with any Made Ground on the site together with possible migration of contaminants from areas of potentially infilled land in close proximity to the site. The previous unknown commercial use of the site, indicated during the site walkover, together with the historical use of the site as filter beds within a sewage works are additional potential sources of contamination. Contaminants particularly associated with sewage works include heavy metals. The main receptor is anticipated to be site end users and there is considered to be a moderate risk.

There is the potential for the migration of contaminants from the nearby former railway to the west of the site. Additional contaminants associated with railway not usually found in Made Ground include PCBs. The main receptor is anticipated to be site end users and there is considered to be a low to moderate risk.

There is also a risk of ground gas associated with any Made Ground or organic contaminants that may be present. The main receptor is anticipated to be site end users and there is considered to be a low to moderate risk.

- **Services and Construction Material**

There is considered to be a low to moderate risk of chemical attack on services and construction materials emplaced within the Made Ground. If organic contaminants are present in any form, there may be a risk to plastic water supply pipes.

- **Controlled Waters**

The site is situated above unproductive strata relating to the negligibly permeable superficial deposits of the Langley Silt Member and deeper London Clay Formation, whilst the superficial deposits of the Lynch Hill Gravel Member that lie in between are highly permeable and therefore designated a Principal aquifer.

The site is not located within a groundwater source protection zone and there are no licensed groundwater abstractions recorded within 1km. There are seven between 1km and 2km, the closest of which is recorded approximately 1203m to the northeast of the site for drinking, cooking, sanitary and washing use at Hillingdon Hospital. The remainder are for the same use, commercial/industrial use or spray irrigation.

The nearest surface watercourse is the River Pinn, which lies approximately 220m to the southeast of the site at its closest point. The Grand Union Canal also lies approximately 450m to the southwest of the site, beyond which are a series of rivers and lake

Given the limited sensitivity of the site, with protection to the aquifer being afforded by overlying low permeability deposits, and distance to receptors, the overall risk to controlled waters is considered to be low, to both groundwater and surface water.

6.6 Conceptual Site Model

6.6.1 The research has therefore identified the following pollutant linkages that require further consideration and have been used to formulate the Conceptual Site Model.

Source	Potential Contaminants of Concern	Potential Pathways	Receptor Group	Risk
Made Ground, nearby worked ground, previous commercial use and former sewage works/filter beds	Asbestos Heavy Metals PAHs TPHs	Ingestion of contaminated soil by direct contact Ingestion of vegetables grown in contaminated soil Entry of contaminants by skin or eye contact with contaminated soils or dust Inhalation of contaminated dust Inhalation or migration of toxic/explosive gases/vapours	Humans - Site users - Construction workers - Neighbouring site users Water Environment - Groundwater - Surface Water Buildings, Materials and Services - Plastic pipes and services	Moderate Negligible ^{1,2} Negligible ² Low Low Low/Moderate
Railway	Heavy Metals PAHs TPHs PCBs	Ingestion of contaminated soil by direct contact Ingestion of vegetables grown in contaminated soil Entry of contaminants by skin or eye contact with contaminated soils or dust Inhalation of contaminated dust Inhalation or migration of toxic/explosive gases/vapours	Humans - Site users - Construction workers - Neighbouring site users Buildings, Materials and Services - Plastic pipes and services	Low/Moderate Negligible ^{1,2} Negligible ² Low/Moderate
Ground Gases	Methane Carbon dioxide	Migration Ingression	Humans and buildings - Gas ingress into buildings - Site occupants	Low/Moderate Low/Moderate
¹ – Assumes that PPE is worn at all times ² – Pathway exists only during the construction period				

6.7 Conclusions of Geoenvironmental Risk Assessment

- 6.7.1 The research has identified evidence of potential sources of contamination on or which may impact on the site, with plausible pathways to the likely receptors, and therefore potential pollutant linkages have been suggested.
- 6.7.2 It is recommended that further work be carried out to confirm the presence, nature or extent of any contamination which is anticipated to impact on the site.

6.8 Consultation

- 6.8.1 During development, consultation may be required for a number of reasons with a number of regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required:
- **Local Authority.** There may be a planning condition regarding contamination and consultation will be required with a designated Contaminated Land Officer within the Environmental Health Department. The Local Authority is generally concerned with human health risks.
 - **Environment Agency.** Where a site is within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.
 - **National House Building Council, NHBC.** Section 4.1 of the NHBC Standards, ref 8.11, requires land management to be addressed. For a new housing development to be approved by the NHBC, any contamination will require remediation accompanied by a validation report.
- 6.8.2 Based on the results of any consultation, there may be specific investigation and/or remediation requirements imposed by one or more of the Authorities.

7.0 RECOMMENDATIONS

7.1 Further Work

7.1.1 An intrusive investigation should be undertaken to address the issues raised in Chapter 4.0 and Chapter 6.0.

7.1.2 The following scope of works is suggested in order to collect the required data:

- The sinking of boreholes for the recovery of samples for geotechnical and chemical contamination analysis.
- The installation and monitoring of gas and groundwater monitoring standpipes.

7.2 Other Considerations

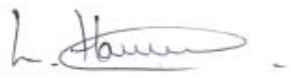
7.2.1 There are several other areas of research which are beyond the scope of this report. All or none of the following may be applicable to the site, either on the outcome of consultation with a regulatory body or as a result of the research for this Preliminary Investigation. They include:

- **Archaeology.** Should the site be situated on or within an area of archaeological sensitivity, the advisor to the relevant local authority should be consulted. The requirement for an archaeological report may be identified within a planning condition, if appropriate, for the site.
- **Ecology.** There may be a requirement for a detailed ecological report, dependant on the type or size of the development, or due to evidence identified during the site reconnaissance or desk study. This requirement may be identified within a planning condition, or recommended within Section 7.0.

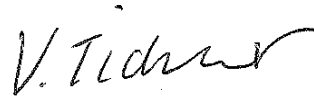
8.0 REFERENCES

- 8.1 CLR 3, '*Documentary research on industrial sites*', Report by RPS Consultants Ltd, DoE, 1994
- 8.2 CLR 11, '*Model Procedures for the Management of Land Contamination*' Report by Defra and the Environment Agency, 2004
- 8.3 BS 10175: 2011 '*Investigation of potentially contaminated sites. Code of practice*', British Standards Institute, 2011
- 8.4 GPLC1, '*Guiding principles for land contamination*', Environment Agency, 2010
- 8.5 CLR 2, '*Guidance on preliminary site inspection of contaminated land*', Report by Applied Environmental Research Centre Limited, DoE, 1994
- 8.6 British Geological Survey, Sheet No. 255, '*Beaconsfield*', solid and drift edition, 1:50000 scale, published 2005
- 8.7 SP69, '*The engineering implications of rising groundwater levels in London*', CIRIA, 1989
- 8.8 HPA-RPD-033, '*Indicative Atlas of Radon in England and Wales*', Health Protection Agency, 2007
- 8.9 BR211, '*Radon: Protective measures for new dwellings*'. BRE, 2007
- 8.10 C552, '*Contaminated Land Risk Assessment, A Guide to Good Practice*', CIRIA, 2001
- 8.11 Standards, '*Land Quality – Managing Ground Conditions*', Chapter 4, NHBC, 2010
- 8.12 The Environmental Protection Act, Part IIA, Section 78, 1990
- 8.13 Environment Act 1995, Section 57, DoE, 1995
- 8.14 Water Environment and Water Services (Scotland) Act, 2003
- 8.15 Planning Policy Statement 23: Planning and Pollution Control, ODPM, 2004
- 8.16 Science Report SC050021/SR2, '*Human health toxicological assessment of contaminants in soil*'. Environment Agency, 2009
- 8.17 Science Report SC050021/SR3, '*Updated technical background to the CLEA model*'. Environment Agency, 2009

For and on behalf of Ian Farmer Associates (1998) Limited

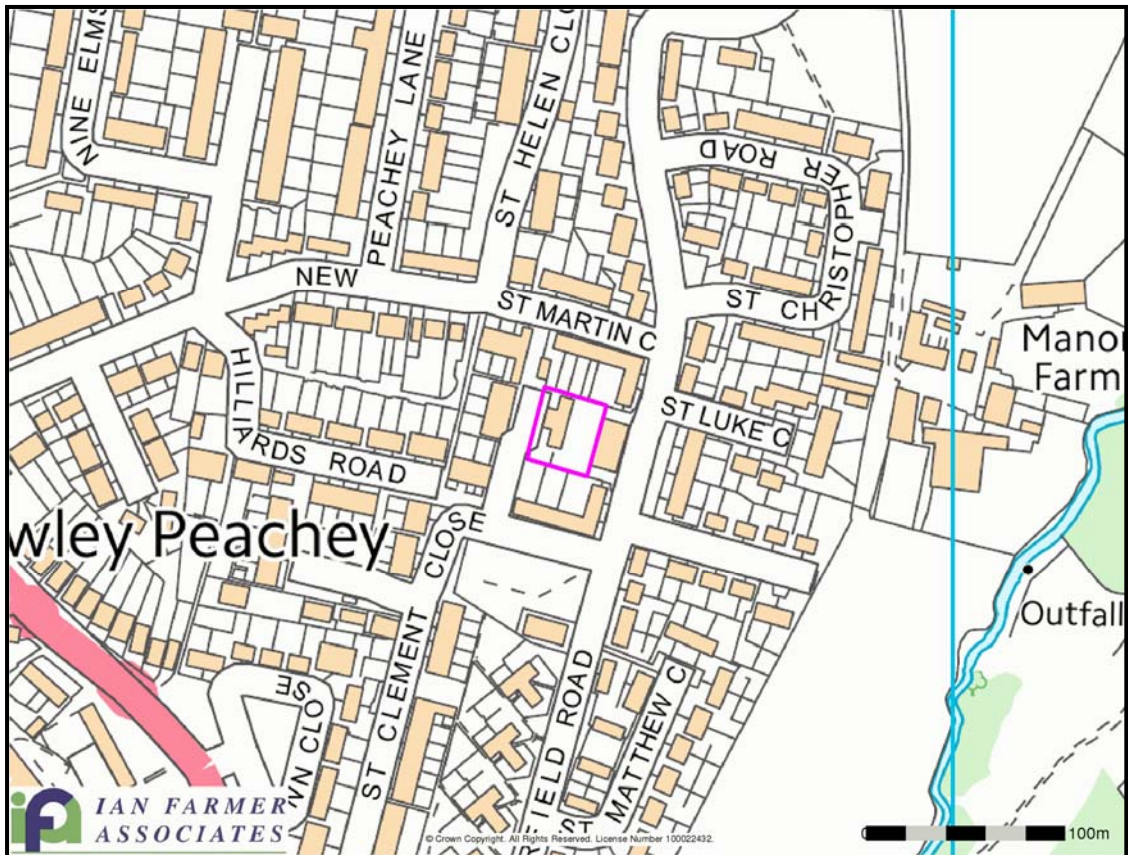
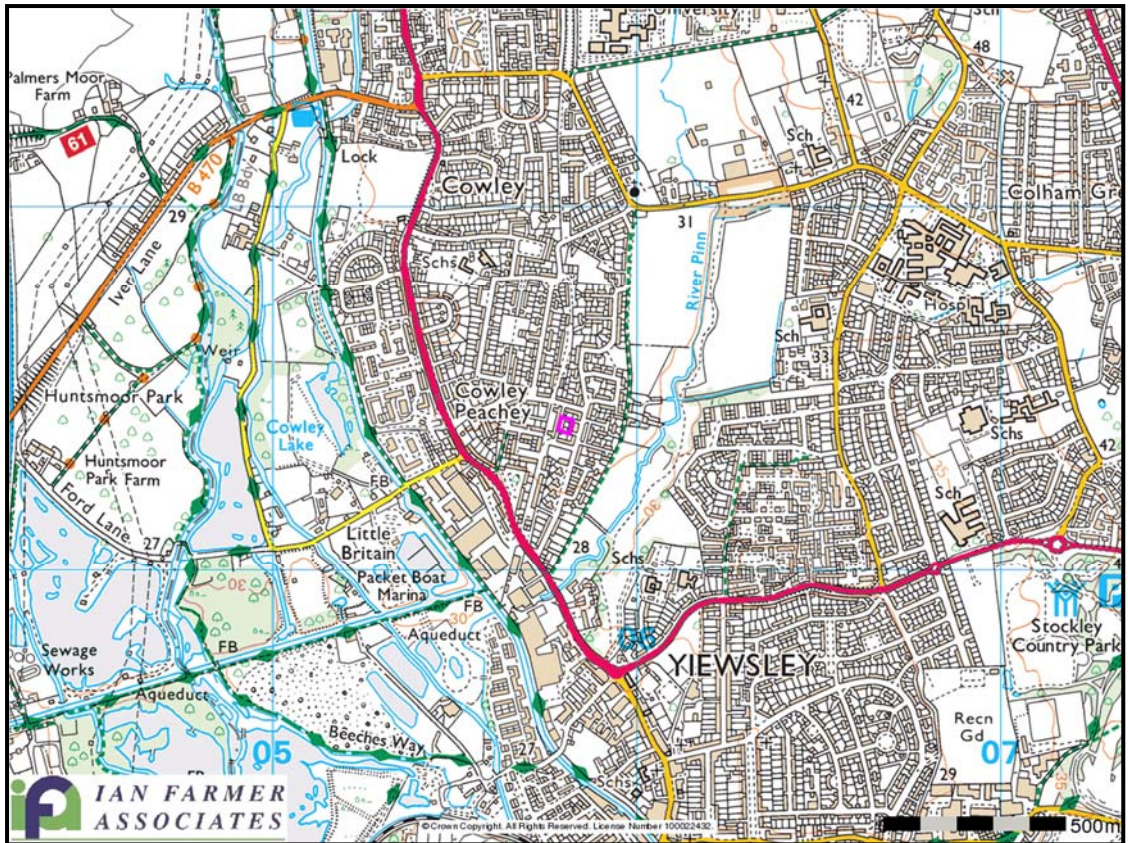


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APPENDIX 1
DRAWINGS





APPENDIX 2
SITE WALKOVER PHOTOGRAPHS



Photograph 1 – Looking east along the southern site boundary.



Photograph 2 – Looking north west from the south western area of the site.



Photograph 3 – Evidence of fly tipping and former commercial use of buildings on site.



Photograph 4 – Electricity fuse boxes adjacent to the north eastern site entrance.



Photograph 5 – Air conditioning units and altered brickwork immediately to the south east of the site.



Photograph 6 – Man hole cover within the site boundaries.



Photograph 7 – Cooling vents adjacent to the western boundary of the site.



Photograph 8 – Looking north west from the central area of the site.

APPENDIX 3
ENVIRONMENTAL RISK

APPENDIX 3

ENVIRONMENTAL RISK ASSESSMENT

A3.1 STATUTORY FRAMEWORK AND DEFINITIONS

A3.1.1 The statutory definition of ‘contaminated land’ is defined in Part IIA of the Environmental Protection Act 1990, ref 8.12, which was inserted by Section 57 of the Environment Act 1995, ref 8.13, and came into force in England in 2000, as;

‘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) pollution of controlled waters is being, or is likely to be, caused’.

A3.1.2 In Scotland, this has been amended by the Water Environment and Water Services (Scotland) Act 2003, ref 8.14, to *‘significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused’.*

A3.1.3 The purpose of Part IIA was to help address the problems caused by historical contamination, with the voluntary remediation of such land encouraged without the use of the Act. The planning regime assists in this, with Planning Policy Statement 23: Planning and Pollution Control (PPS23), ref 8.15, published in 2004, setting out the minimum requirements for the remediation of land affected by contamination as *‘after carrying out the development and commencement of its use, the land should not be capable of being determined as contaminated land under Part IIA of the EPA 1990’.*

A3.1.4 The UK guidance on the assessment of contaminated has developed as a direct result of the introduction of these two Acts. The technical guidance supporting the legislation was originally summarised in a number of key documents collectively known as the Contaminated Land Reports (CLRs), a proposed series of twelve documents. Seven were originally published in March 1994, four more were published in April 2002, while the final guidance document, CLR 11 was published in 2004. CLR7 to 10 were withdrawn in 2008, with CLR 9 and 10 effectively replaced by the Environment Agency in the form of Science Reports SR2, ref 8.16 and SR3, ref 8.17.

A3.1.5 CLR11 remains valid and sets out the framework of the investigation process, with the overall approach one of risk management, with risk given the definition of *‘a combination of the probability or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence’.* In establishing whether a site fulfils the statutory definition of ‘contaminated land’ it is necessary to identify whether the three essential elements of risk exist. These are defined as:

- A contaminant - a substance which is in, on or under the land and has the potential to cause harm or to cause pollution of controlled waters;
- A receptor - something which could be adversely affected by a contaminant, such as people, an ecological system, property or a water body; and
- A pathway – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

A3.1.6 A *‘pollutant linkage’* may be defined as the link between a contaminant *‘source’* and a *‘receptor’* by means of a *‘pathway’*. There may be none, one or many pollutant linkages

existing on a site, which may utilise the same or different sources, pathways and receptors, which may change over the passage of time.

A3.1.7 Each pollutant linkage that exists in respect of the land in question must fulfil one or more of the following criteria:

- significant harm is being caused to the receptor in the pollutant linkage,
- there is a significant possibility of significant harm being caused to that receptor,
- there is (significant) pollution of controlled waters (the water environment) which constitute the receptor, or
- pollution of controlled waters is likely to be caused
- (there is a significant possibility of such pollution being caused).

A3.1.8 A pollutant linkage indicates that all three elements have been identified. The site can only be defined as ‘Contaminated Land’ under Part IIA if a pollutant linkage exists and the criteria above are met.

A3.1.9 The main potential receptors include:

- 1) Humans – current site occupants, construction workers, future site users and neighbouring site users.
- 2) Controlled Waters – surface water and groundwater resources
- 3) Property – including buildings, crops, livestock and pets
- 4) Ecological systems – including current/future site and neighbouring vegetation

A3.1.10 The main potential pathways to be considered include:

- a) Ingestion and/or inhalation.
- b) Uptake of contaminants via cultivated vegetables.
- c) Dermal contact
- d) Migration through permeable strata
- e) Drains or services
- f) Direct contact with building materials and services
- g) Fire and explosion

A3.2 ASSESSMENT METHODOLOGY

A3.2.1 The guidance proposes a four-stage assessment process for identifying potential pollutant linkages on a site. These stages are set out in the table below:

No.	Process	Description
1	Hazard Identification	Establishing contaminant sources, pathways and receptors (the conceptual model).
2	Hazard Assessment	Analysing the potential for unacceptable risks (what linkages may be present and what could be the effects?).
3	Risk Estimation	Trying to establish the magnitude and probability of the possible consequences (what degree of harm might result and to what receptors, and how likely is it).
4	Risk Evaluation	Deciding whether the risk is unacceptable.

A3.2.2 Stages 1 and 2 develop a '*conceptual model*' based upon information collated from desk based studies, and reconnaissance of the site (a walkover survey). The walkover survey should be conducted in general accordance with CLR 2. The formation of a conceptual model is an iterative process and as such, it should be updated and refined throughout each stage of the project to reflect any additional information obtained.

A3.2.3 The extent of the desk based research and enquiries to be conducted should be in general accordance with CLR 3. The information from these enquiries is presented in a preliminary investigation report with recommendations, if necessary, for further work based upon the conceptual model. In the absence of specific information on contamination anticipated to be encountered, specific DoE 'Industry Profiles' provide guidance on the nature of contaminants relating to a variety of industrial processes and should be used as the basis for determining which contaminants are more likely to be present on a site.

A3.2.4 If potential pollutant linkages are identified within the conceptual model, an intrusive ground investigation and report will be recommended. The investigation should be planned in general accordance with CLR 4, and BS10175. The number of exploratory holes and samples collected for analysis should be consistent with the size of the site and the level of risk envisaged. This will enable a generic quantitative risk assessment (GQRA) to be conducted, at which point the conceptual model can be updated and relevant pollutant linkages can be identified.

A3.2.5 A two-stage investigation may be more appropriate where time constraints are less of an issue. The first stage investigation may be conducted as an initial assessment for the presence of potential sources, with the second being more refined in order to delineate or further characterise any contamination or the physical properties of the site.

A3.3 RISK EVALUATION

A3.3.1 The risk evaluation is a qualitative method for interpreting the data from the hazard estimation stage. It involves the classification of the:

- magnitude of the potential 'consequence' (severity) of the risk occurring and:
- magnitude of the 'probability' (likelihood) of the risk occurring.

A3.3.2 These are defined in the following sections:

A3.4 CLASSIFICATION OF CONSEQUENCE

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High Concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse can also equate to a short-term human health risk if buildings are occupied.
Medium	Chronic damage to Human Health ('significant harm' as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem, (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in the <i>Draft Circular on Contaminated Land</i> , DETR 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified ground water. Damage to building rendering it unsafe to occupy (eg foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in landscaping scheme. Discoloration of concrete

A3.4.1 In theory, both severe and medium classification can result in death. The differential is that severe relates to short term risk while medium relates to long-term risk. Therefore, the classification of severe requires urgent action while medium may require urgent action but usually long term action would be sufficient.

A3.5 CLASSIFICATION OF PROBABILITY

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears 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	There is a pollution 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 likelihood	There is a pollution linkage and circumstances are possible under which an event could occur However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term

A3.5.1 For the purposes of this preliminary investigation, any source of contamination that has been identified by professional judgement as potentially impacting on the site has been classified as being 'likely' to be present, unless proven otherwise by intrusive investigation.

A3.6 COMPARISON OF CONSEQUENCE AGAINST PROBABILITY

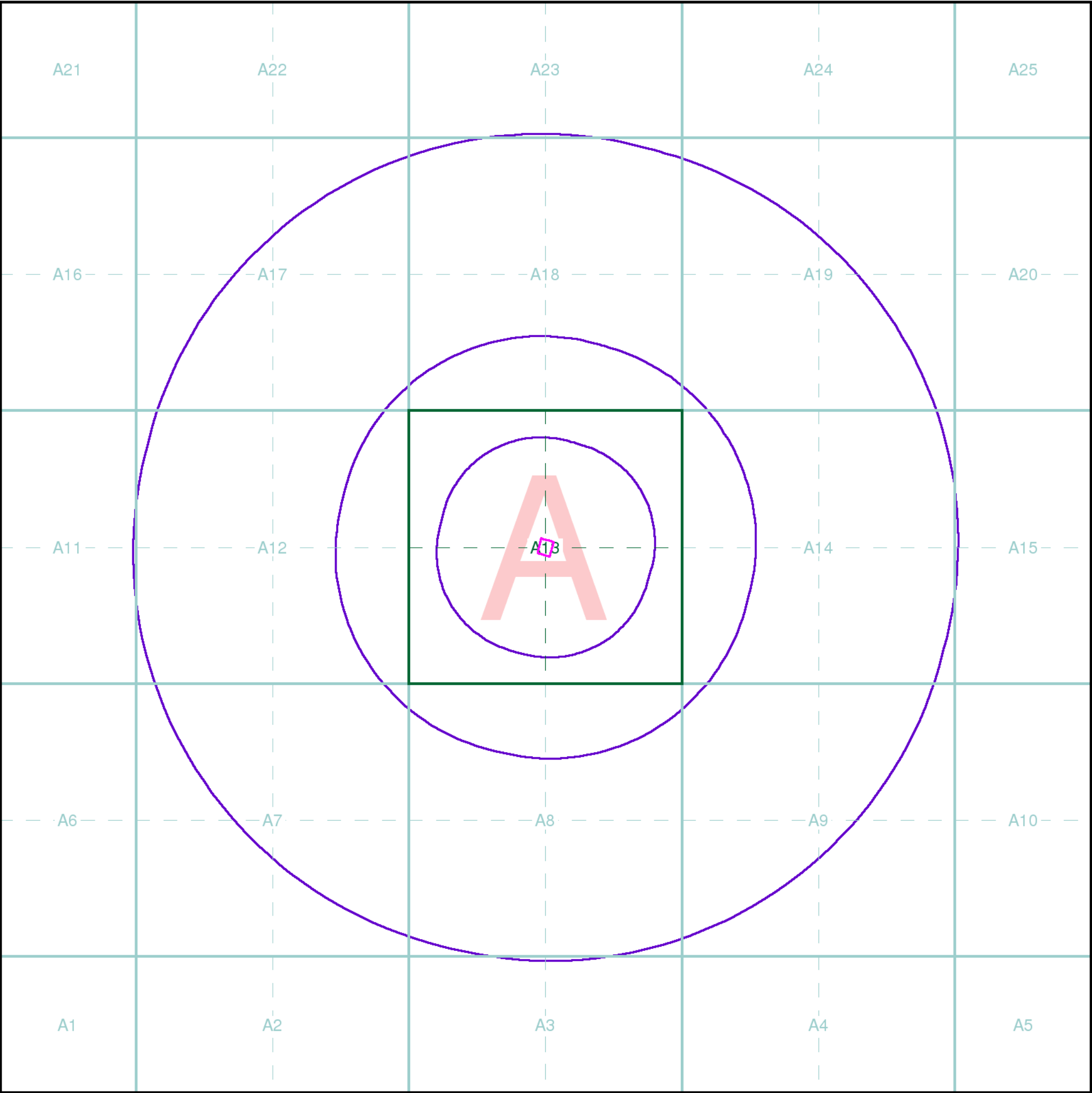
A3.6.1 These classifications are compared to indicate the risk presented by each pollutant linkage. Once the consequence and probability have been classified they can be used to produce a risk category as below:

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

A3.6.2 The action required for the classified risks are as follows:

Very high risk	There is a high probability that severe harm could a risk to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required
High risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term
Moderate risk	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, or if any harm were to occur it is more likely that the harm would be relatively mild Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

APPENDIX 4
ENVIROCHECK REPORT



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details

Ms V Tickner, Ian Farmer Associates, 1A Batford Mill, Lower Luton Road, Harpenden, Hertfordshire, AL5 5BZ

Order Details

Order Number: 153561279_1_1
Customer Ref: 52693
National Grid Reference: 505810, 181400
Site Area (Ha): 0.12
Search Buffer (m): 1000

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH

Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>

Ordinance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

	Quarry		Gravel Pit		Sand Pit
	Clay Pit		Shingle		Refuse Heap
	Sloping Masonry		Flat Rock		
	Marsh		Reeds		Osiers
	Rough Pasture		Furze		Wood
	Mixed Wood		Brushwood		Orchard
	Fir		Ford		Stepping Stones
	Ferry		Waterfall		Lock
	Trig. Station	507	Altitude at Trig. Station		
B.M. 325.9	Bench Mark	342 +	Surface Level		
	Arrow denotes flow of water		Antiquities (site of)		
	Cutting		Embankment		
	Railway crossing Road		Level Crossing		Road crossing Railway
	Railway crossing River or Canal		Road over single stream		Road over River or Canal
-----	County Boundary (Geographical)				
- . - . - .	County & Civil Parish Boundary				
+ . + . + .	Administrative County & Civil Parish Boundary				
Co. Boro. Bdy.	County Borough Boundary (England)				
Co. Burgh Bdy.	County Burgh Boundary (Scotland)				
B.P. B.S.	Boundary Post or Stone	P.C.B.	Police Call Box		
B.R.	Bridle Road	P	Pump		
E.P.	Electricity Pylon	S.P.	Signal Post		
F.B.	Foot Bridge	Sl.	Sluice		
F.P.	Foot Path	Sp.	Spring		
G.P.	Guide Post or Board	T.C.B.	Telephone Call Box		
M.S.	Mile Stone	Tr.	Trough		
M.P. M.R.	Mooring Post or Ring	W	Well		

	Inactive Quarry, Chalk Pit or Clay Pit		Active Quarry, Chalk Pit or Clay Pit
	Rock		Boulders
	Cliff		Slopes
	Roofed Building		Glazed Roof Building
	Sloping Masonry		Archway
	Non-Coniferous Tree (surveyed)		Coniferous Tree (surveyed)
	Non-Coniferous Trees (not surveyed)		Coniferous Trees (not surveyed)
	Orchard Tree		Scrub
	Coppice, Osier		Reeds
	Rough Grassland		Heath
	Direction of water flow		Bench Mark
	Cave Entrance		Triangulation Station
	Electricity Transmission Line		Antiquity (site of)
	County Boundary (Geographical)		Electricity Pylon
	County & Civil Parish Boundary		Symbol marking point where boundary mereing changes
	Civil Parish Boundary		
	Admin. County or County Bor. Boundary		
	London Borough Boundary		
BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

	Cliff		Slopes		Top
	Rock		Rock (scattered)		Boulders (scattered)
	Boulders		Scree		Non-Coniferous Tree (surveyed)
	Positioned Boulder		Coniferous Tree (surveyed)		Non-Coniferous Trees (not surveyed)
	Non-Coniferous Tree (surveyed)		Coniferous Trees (not surveyed)		Orchard Tree
	Non-Coniferous Trees (not surveyed)		Scrub		Bracken
	Orchard Tree		Coppice, Osier		Reeds
	Coppice, Osier		Marsh, Saltings		Rough Grassland
	Reeds		Heath		Culvert
	Marsh, Saltings		Direction of water flow		Triangulation Station
	Rough Grassland		Antiquity (site of)		Electricity Transmission Line
	Culvert		Electricity Pylon		Bench Mark
	Direction of water flow		Buildings with Building Seed		Roofed Building
	Triangulation Station		Glazed Roof Building		Civil parish/community boundary
	Antiquity (site of)		District boundary		County boundary
	Electricity Transmission Line		Boundary post/stone		Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)
	Bench Mark				
	Roofed Building				
	Glazed Roof Building				
	Civil parish/community boundary				
	District boundary				
	County boundary				
	Boundary post/stone				
	Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)				
Bks	Barracks	P	Pillar, Pole or Post		
Bty	Battery	PO	Post Office		
Cemy	Cemetery	PC	Public Convenience		
Chy	Chimney	Pp	Pump		
Cis	Cistern	Ppg Sta	Pumping Station		
Dismtd Rly	Dismantled Railway	PW	Place of Worship		
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station		
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge		
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light		
FB	Filter Bed	Spr	Spring		
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track		
Gas Gov	Gas Valve Compound	Tr	Trough		
GVC	Gas Governor	Wd Pp	Wind Pump		
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap		
MH	Manhole	Wks	Works (building or area)		
MP, MS	Mile Post or Mile Stone	W	Well		



Mapping Type	Scale	Date	Pg
Middlesex	1:2,500	1865 - 1892	2
Buckinghamshire	1:2,500	1880	3
Middlesex	1:2,500	1895 - 1896	4
Buckinghamshire	1:2,500	1899	5
Middlesex	1:2,500	1914	6
Buckinghamshire	1:2,500	1932	7
Middlesex	1:2,500	1934 - 1935	8
Ordnance Survey Plan	1:1,250	1963 - 1965	9
Additional SIMs	1:1,250	1963 - 1987	10
Ordnance Survey Plan	1:2,500	1966 - 1972	11
Ordnance Survey Plan	1:1,250	1971 - 1975	12
Supply of Unpublished Survey Information	1:1,250	1975	13
Additional SIMs	1:1,250	1983 - 1989	14
Additional SIMs	1:1,250	1990	15
Ordnance Survey Plan	1:1,250	1991	16
Large-Scale National Grid Data	1:1,250	1992	17
Large-Scale National Grid Data	1:1,250	1993	18
Large-Scale National Grid Data	1:1,250	1996	19
Historical Aerial Photography	1:2,500	1999	20

A 5x5 grid map with horizontal and vertical axes labeled A1 through A5. A 2x2 square area is highlighted in black, centered on the intersection of A3 and A12. A purple circle is drawn around the intersection of A3 and A12. A compass rose is located to the right of the grid, pointing North.

Order Number: 153561279_1_1
Customer Ref: 52693
National Grid Reference: 505810, 181400
Slice: A
Site Area (Ha): 0.12
Search Buffer (m): 100

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH

Middlesex

Published 1865 - 1892

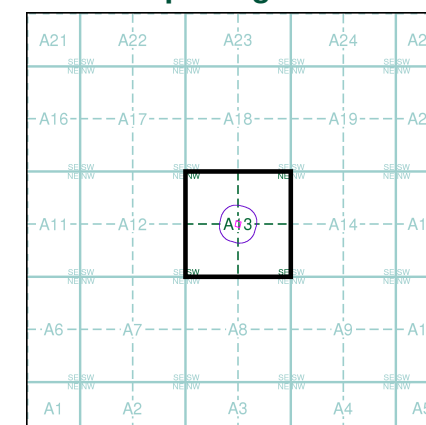
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

014_07 1892 1:2,500	014_08 1865 1:2,500
014_11 1885 1:2,500	014_12 1878 1:2,500

Historical Map - Segment A13

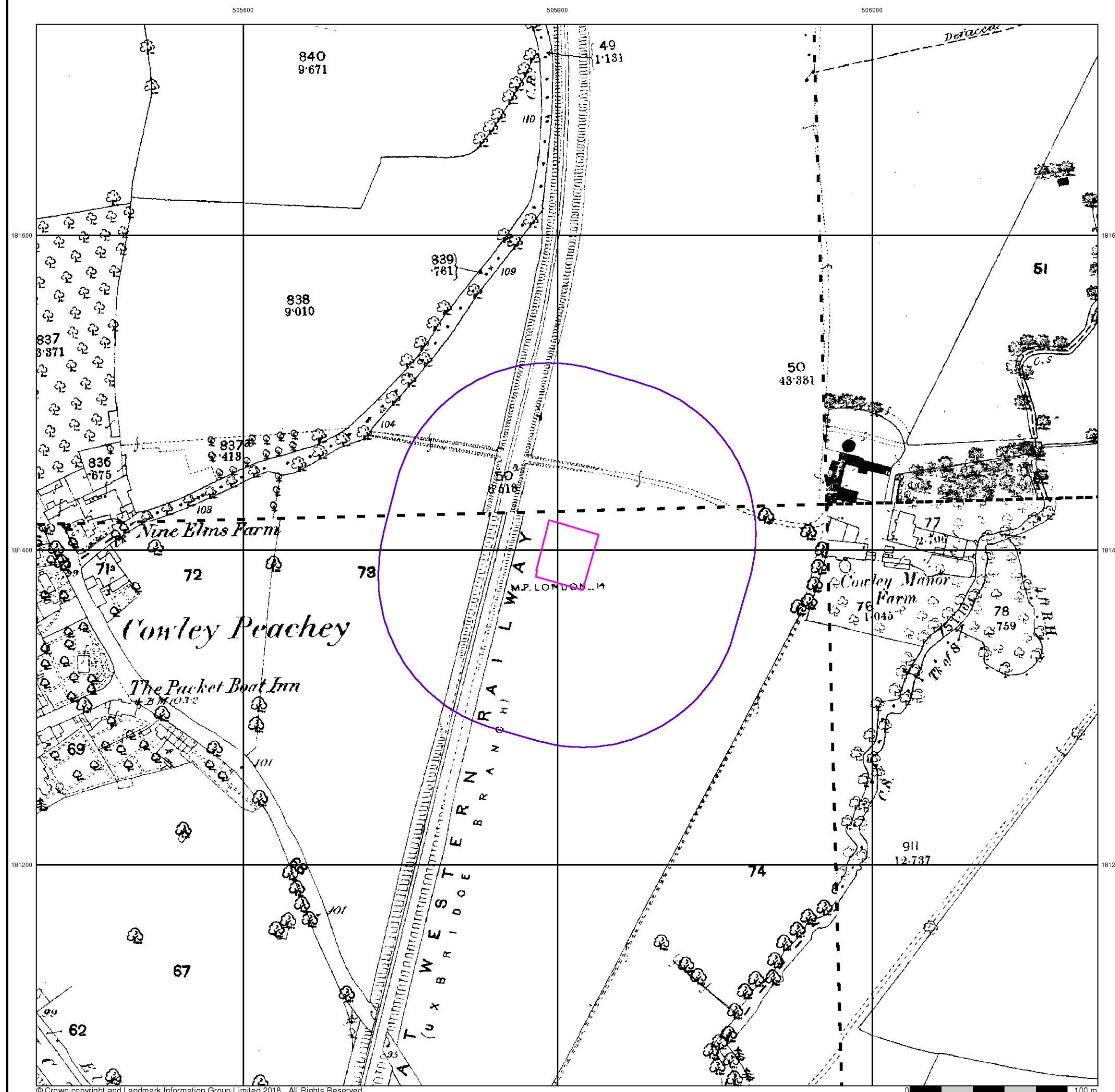


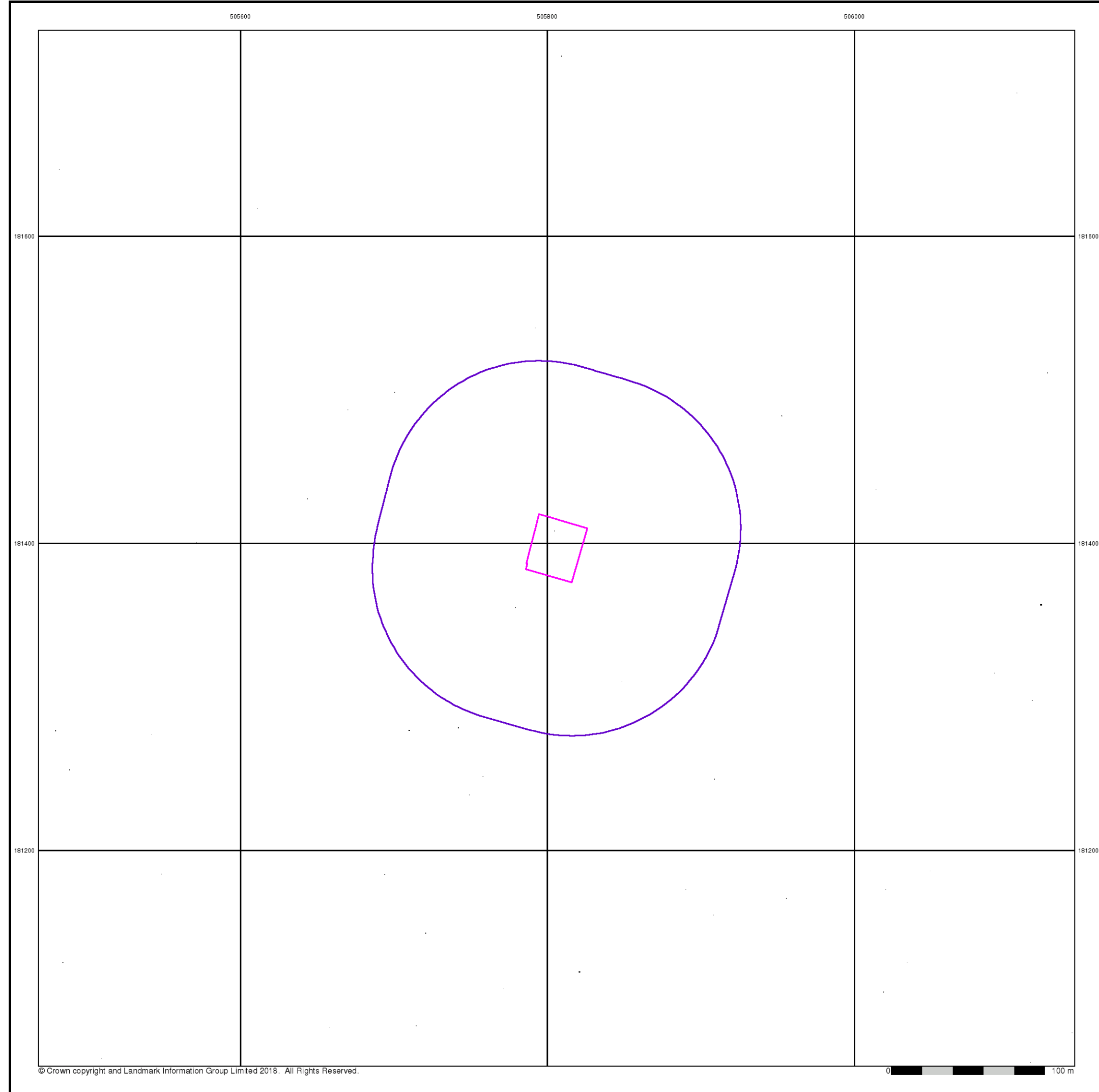
Order Details

Order Number: 153561279_1_1
 Customer Ref: 52693
 National Grid Reference: 505810, 181400
 Slice: A
 Site Area (Ha): 0.12
 Search Buffer (m): 100

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH







Buckinghamshire

Published 1880

Source map scale - 1:2,500

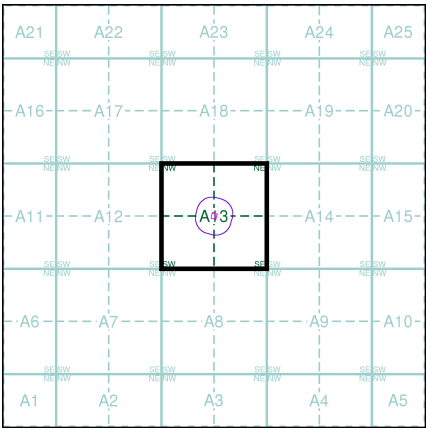
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

054_13
1880
1:2,500



Historical Map - Segment A13



Order Details

Order Number:	153561279_1_1
Customer Ref:	52693
National Grid Reference:	505810, 181400
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH



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A Landmark Information Group Service v50.0 18-Jan-2018 Page 3 of 20

Middlesex

Published 1895 - 1896

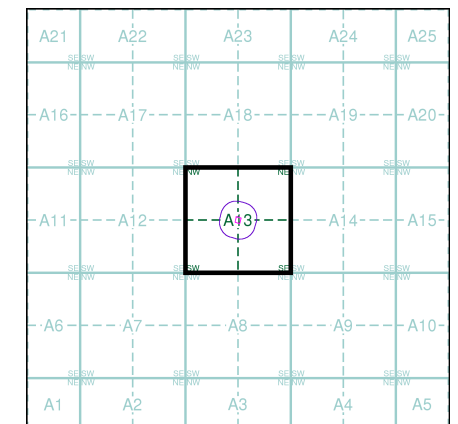
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

014_07 1896 1:2,500	014_08 1895 1:2,500
014_11 1896 1:2,500	014_12 1895 1:2,500

Historical Map - Segment A13

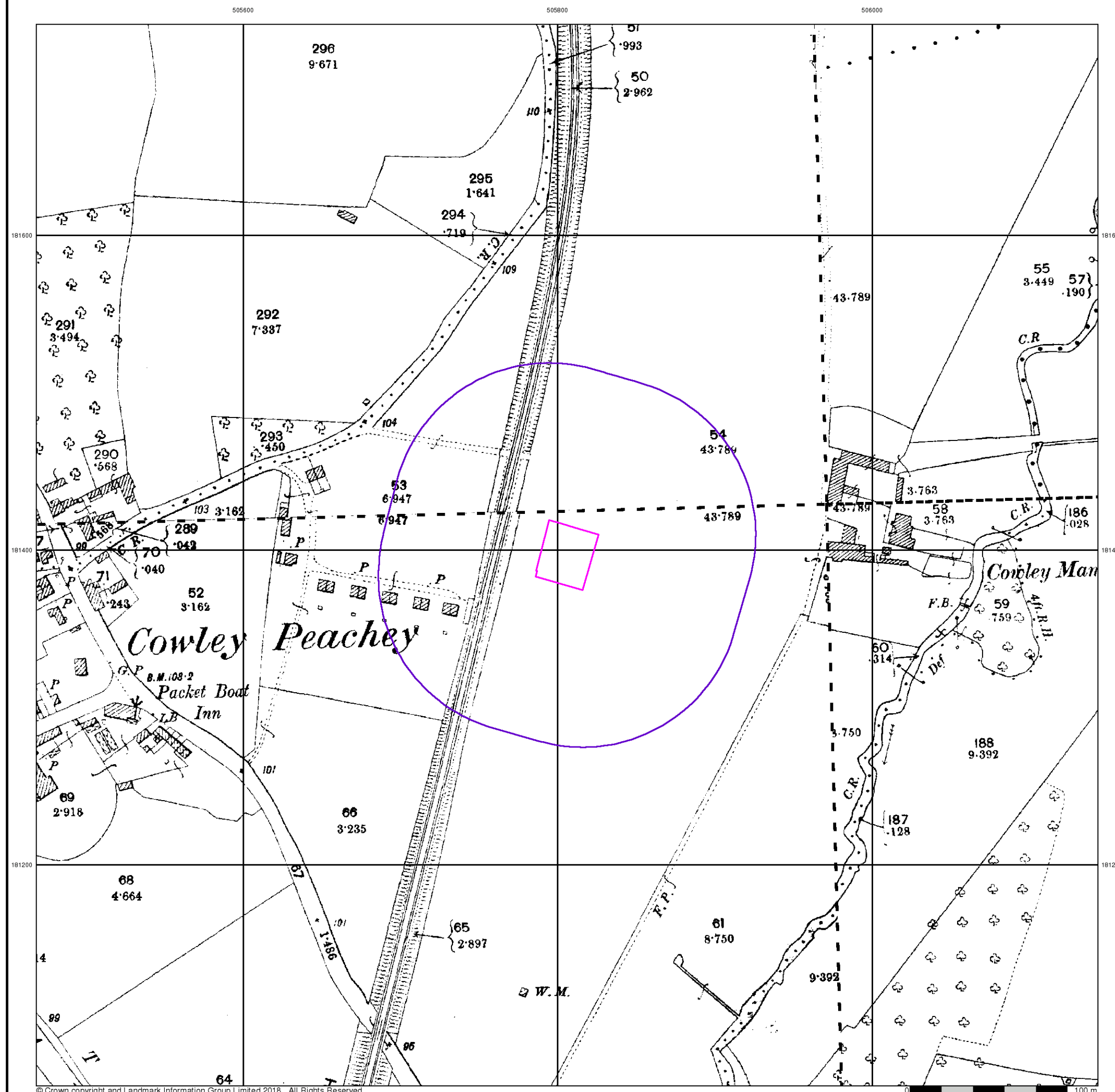


Order Details

Order Number: 153561279_1_1
 Customer Ref: 52693
 National Grid Reference: 505810, 181400
 Slice: A
 Site Area (Ha): 0.12
 Search Buffer (m): 100

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH



Middlesex

Published 1914

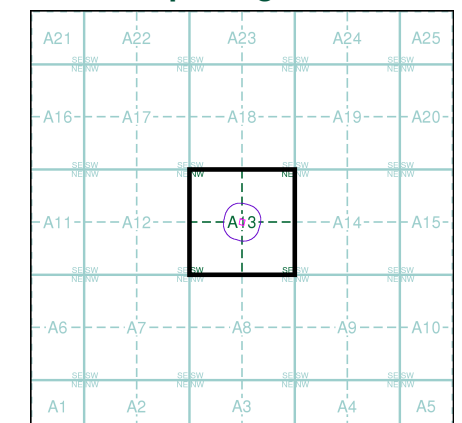
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

014_07 1914 1:2,500	014_08 1914 1:2,500
014_11 1914 1:2,500	014_12 1914 1:2,500

Historical Map - Segment A13

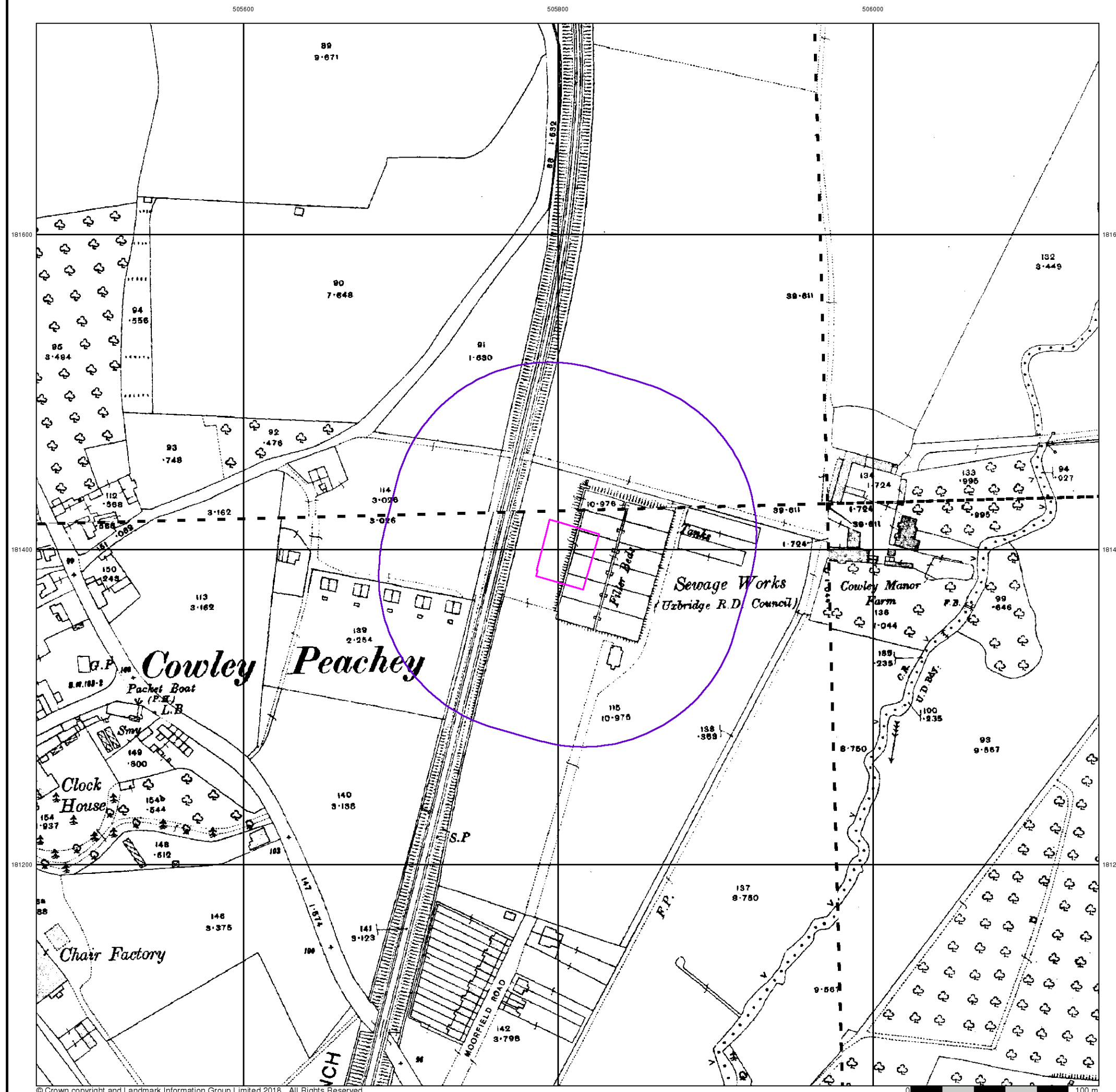


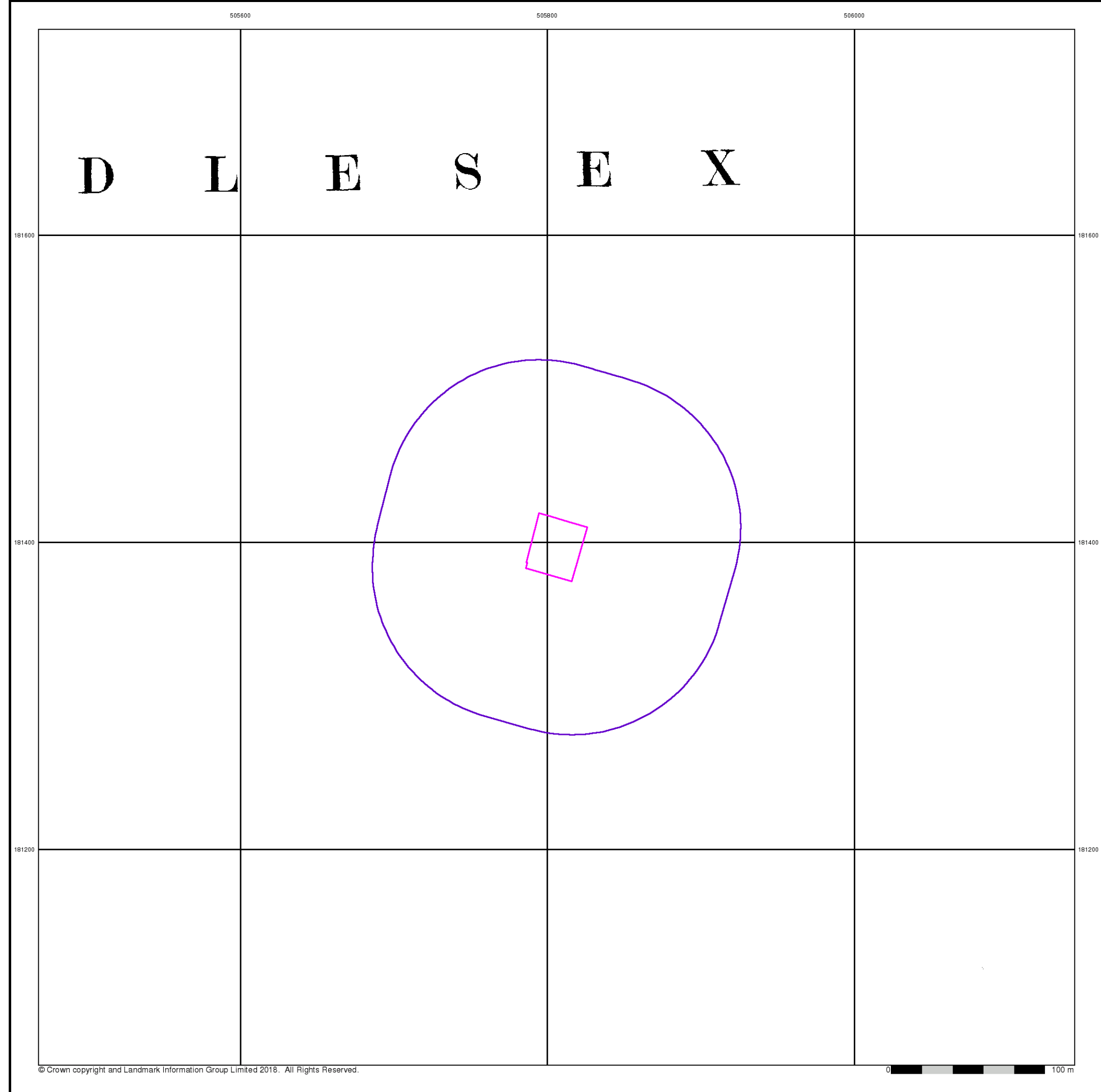
Order Details

Order Number: 153561279_1_1
Customer Ref: 52693
National Grid Reference: 505810, 181400
Slice: A
Site Area (Ha): 0.12
Search Buffer (m): 100

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH





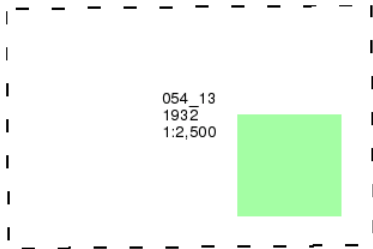
Buckinghamshire

Published 1932

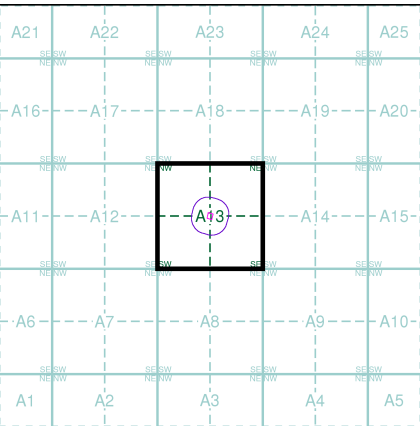
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 153561279_1_1
Customer Ref: 52693
National Grid Reference: 505810, 181400
Slice: A
Site Area (Ha): 0.12
Search Buffer (m): 100

Site Details

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Middlesex

Published 1934 - 1935

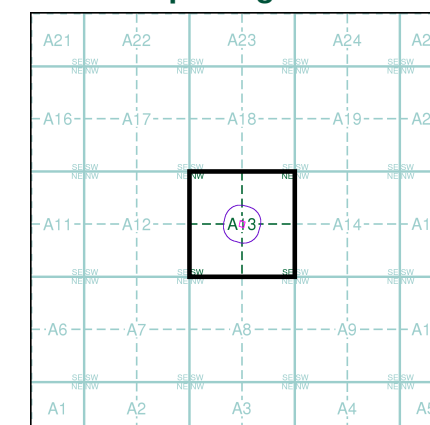
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

014_07 1934 1:2,500	014_08 1935 1:2,500
014_11 1934 1:2,500	014_12 1935 1:2,500

Historical Map - Segment A13

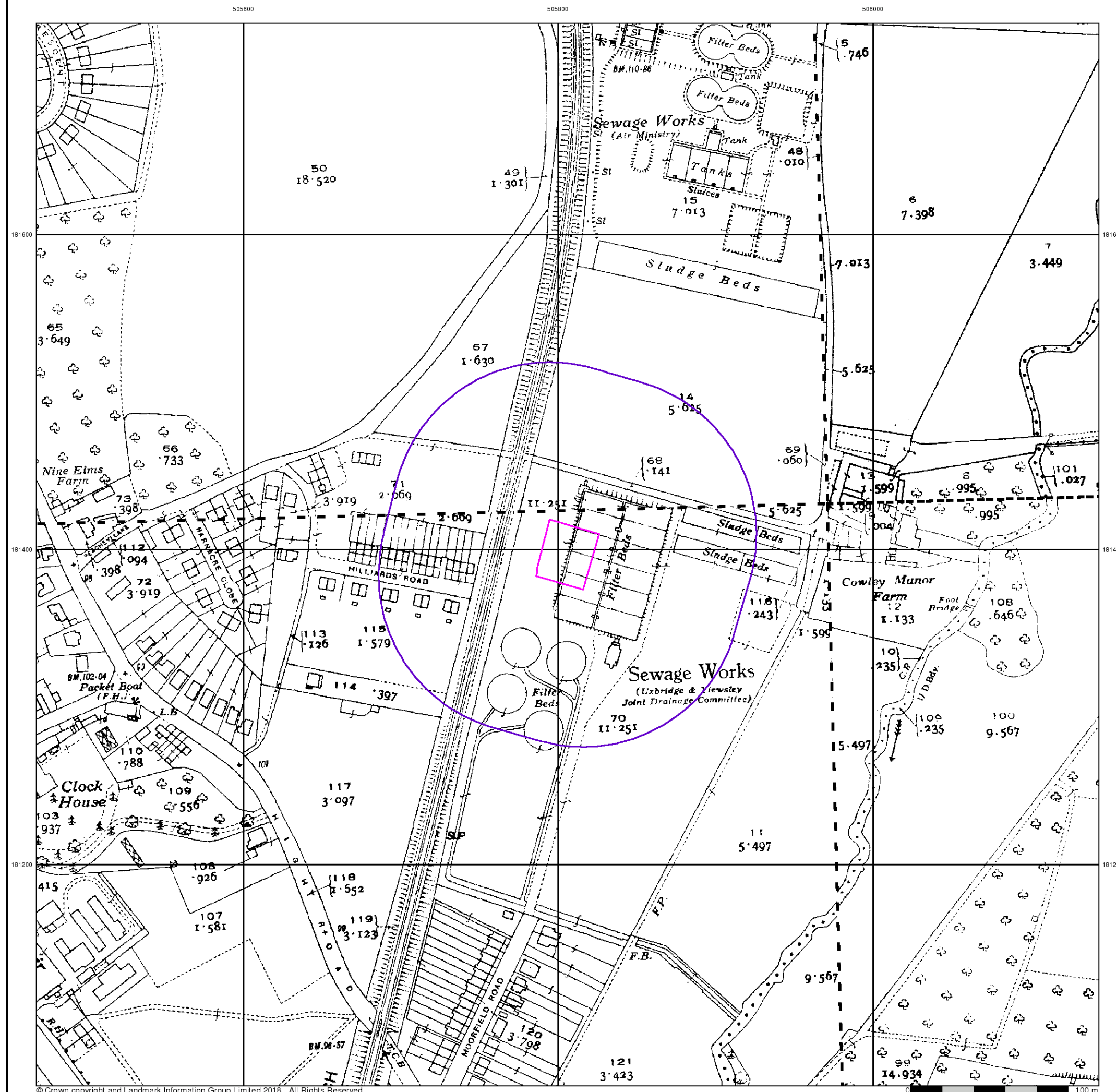


Order Details

Order Number: 153561279_1_1
Customer Ref: 52693
National Grid Reference: 505810, 181400
Slice: A
Site Area (Ha): 0.12
Search Buffer (m): 100

Site Details

Land rear of 113-127, Moorfield Road, UXBRIDGE, UB8 3SH



Ordnance Survey Plan

Published 1963 - 1965

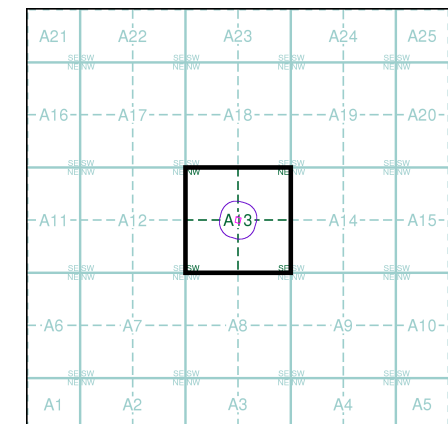
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

TQ0581NW 1963 1:1,250	TQ0581NE 1963 1:1,250	TQ0681NW 1965 1:1,250
TQ0581SW 1963 1:1,250	TQ0581SE 1963 1:1,250	TQ0681SW 1965 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 153561279_1_1
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Site Details

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