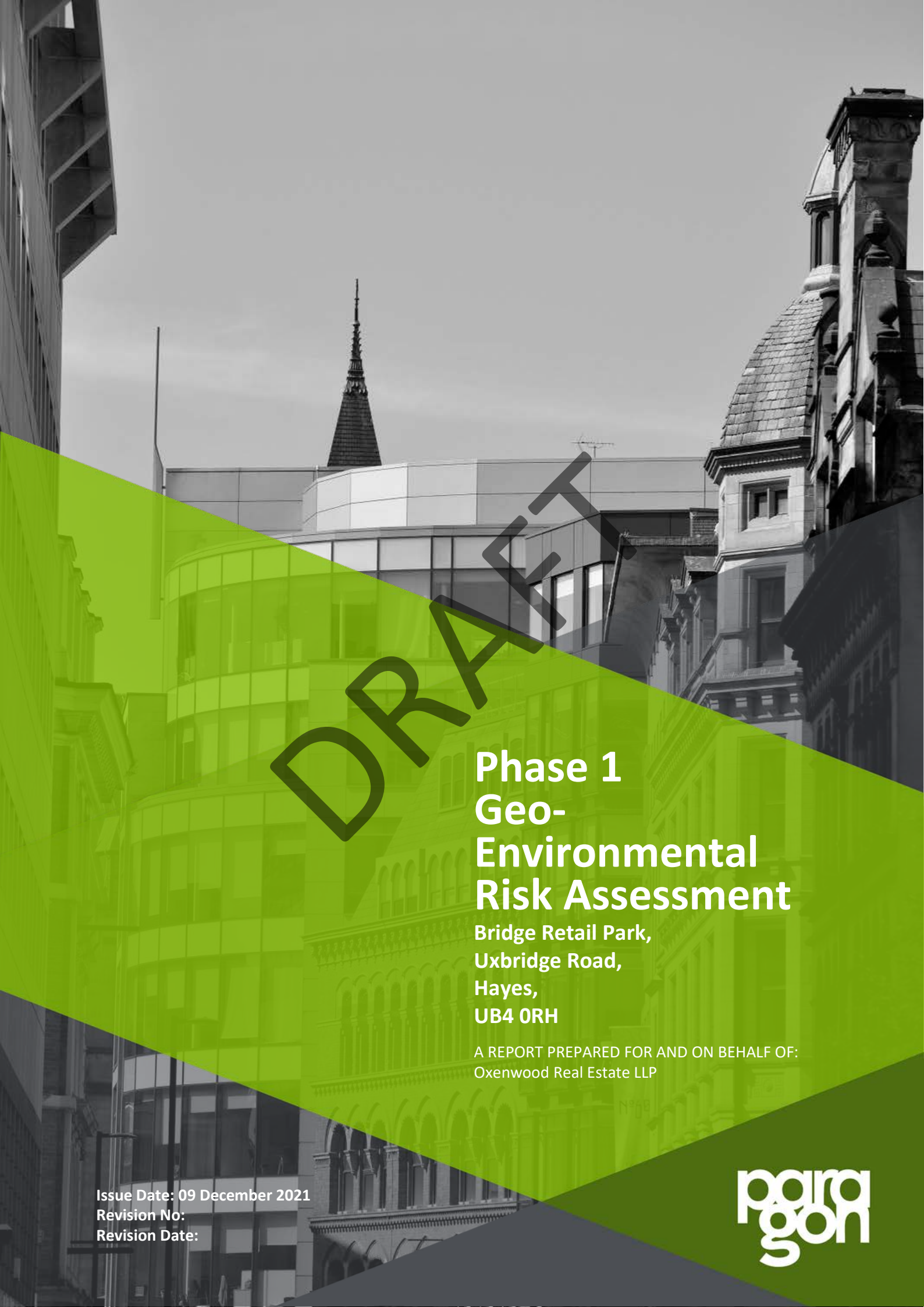


DRAFT

Phase 1 Geo-Environmental Risk Assessment

Bridge Retail Park,
Uxbridge Road,
Hayes,
UB4 0RH

A REPORT PREPARED FOR AND ON BEHALF OF:
Oxenwood Real Estate LLP

Issue Date: 09 December 2021
Revision No:
Revision Date:

Bridge Retail Park, Uxbridge Road, Hayes, UB4 0RH

Issuing Office:	Paragon, The Harlequin Building, 65 Southwark Street, London, SE1 0HR Tel: 020 7125 0112
Date:	09 December 2021
Reference:	21.2188/CB/LC
Report Prepared By:	Charlie Bruinvels BSc MSc CEnv C.WEM
Signature:	
Report Checked By:	Tim Cawood MSc MBA CEng CEnv FCIWEM ASoBRA SiLC
Signature:	

For and on behalf of
Paragon Building Consultancy Limited

DASHBOARD SUMMARY

KEY SURVEY FINDINGS

H *Critical or high risk issue for urgent management attention*

M H *Moderate to high risk issue considered as a significant management item*

M *Medium risk issue for ongoing management or action*

L M *Low to medium risk issue that may require management or action*

L *Low risk item or for information only*

	The following issues represent the key matters for consideration as a result of our Geo-Environmental Risk Assessment, with regards to ground conditions, as part of the proposed development to provide single commercial unit with associated hardstanding and areas of soft landscaping.	
1.	The site has historically been used as a factory with multiple phases of extensions to the main building, since approximately 1935 until around 1995. As such, there is the potential for Made Ground to be present as a result of the redevelopment at the site. There is also a pond which is likely to have been infilled. Based on the foregoing, there is the potential for contaminants and ground gas to be present within the underlying soils. These sources could impact receptors including construction workers, future site users, offsite residents/users of the adjacent properties and the proposed building. As such, recommendations have been made to quantify the risks from these sources by means of a ground investigation.	M
2.	The risk to Controlled Waters is considered to be moderate. Whilst the Yeading Brook is adjacent to the eastern boundary, the underlying geology for the majority of the site is considered to have a low permeability. There is a small area in the southern part of the site which is underlain by permeable strata which could allow contaminants (if present) to migrate offsite. This unit is also classified as a Principal Aquifer. As such, further assessment is recommended to understand the risks associated with Controlled Waters in more detail.	M

ENVIRONMENTAL RISK RATING

Based on the findings of this report, there are likely to be viable pollutant linkages associated with the proposed development site that would be considered as posing risks to human health and Controlled Waters. Therefore, the risk associated with the development is **moderate** and requires further investigation for land contamination purposes.

There is also a Geotechnical risk due to the likely presence of Made Ground onsite. As such, recommendations have been made for further assessment below.

RECOMMENDATIONS AND COSTS

Environmental and Geotechnical

A ground investigation for environmental and geotechnical purposes is required to quantify the risks at the site. Based on the various stages of redevelopment shown on the historical maps, it is likely that the site is underlain by Made Ground. There is also the potential for subsidence and aggressive ground conditions for concrete due to volume change potential and sulphates relating to the underlying London Clay. Based on the above, the following scope is deemed to be appropriate.

The investigation should comprise:

- Provision of statutory utility plans and onsite utilities tracing including Ground Penetrating Radar;
- Shallow investigation of the Made Ground by means of window sampling with in-situ geotechnical testing and installation of monitoring wells for gas and groundwater monitoring;
- Deep investigation of the natural strata by means of cable percussive drilling with in-situ geotechnical testing and installation of monitoring wells for gas and groundwater monitoring;
- Photoionisation Detector (PID) headspace analysis during drilling;
- Environmental laboratory analysis for a comprehensive suite of testing to assess source pathway linkages listed above, including heavy metals, sulphates, pH, petroleum hydrocarbons, Polyaromatic Hydrocarbons (PAH) asbestos, Volatile / Semi Volatile Organic Compounds (VOCs / SVOCs);
- Geotechnical laboratory testing in line with the geotechnical risk assessment i.e. Atterberg Limit testing, moisture content tests and sulphate testing;
- A minimum of three rounds of gas and groundwater monitoring (water level); and
- Provision of a Phase 2 Environmental and Geotechnical Risk Assessment Report.

In addition, a Stage 2 Detailed UXO Risk Assessment is recommended. This would determine whether a UXO specialist would be required to be present on site during future ground investigation works to clear safe drilling locations.

The Flood Risk Assessment prepared as part of the Pre-Acquisition Surveys should be updated to reflect the proposed development and support the planning application.

Regulatory

We would recommend that this report is submitted to the Local Authority for their comments and approval.

CONTENTS

PHASE 1 PRELIMINARY RISK ASSESSMENT

CLIENT NAME: Oxenwood Real Estate LLP

PROPERTY ADDRESS: Bridge Retail Park,
Uxbridge Road,
Hayes,
UB4 0RH

INSPECTION DATE: 20 July 2021

1.0 KEY FINDINGS

1.1	**Introduction**
1.1.1	This assessment has been carried out in general accordance with current best practice, requirements of the National Planning Policy Framework (NPPF) and guidance as given in the Land contamination: risk management (LCRM, 2020), Contaminated Land Exposure Assessment (CLEA) framework, Part 2A of the Environmental Protection Act (EPA) 1990 (and subsequent amendments), DEFRA (2012) Part 2A Contaminated Land Statutory Guidance and CIRIA Contaminated Land Risk Assessment Guide to Good Practice C552 (2001).
1.2	**Development Proposals**
1.2.1	Currently no proposals have been submitted to Planning. At this stage, it is considered that the proposed development is to include the demolition of the existing retail park and to redevelop the plot to a single commercial unit with associated hardstanding and areas of soft landscaping. It is understood the warehouse is to have an estimated area of 176,212 sq ft.
1.2.2	A site location plan and a figure showing the proposed development are provided in Appendix 1.
1.3	**Environmental Site Assessment**
1.3.1	A site walkover was completed on 20 July 2021 as part of the pre-acquisition surveys completed by Paragon to assist with the purchase of the site. A summary of the site layout is provided below. Additional information is present in Appendix 2.
1.3.2	The site currently comprises a retail park with 9no. units, a large service yard and associated car parking.
1.3.3	The surrounding area comprises Uxbridge Road and residential dwellings to the north, a car dealership and warehouses to the east, Bulsbrook Road and warehouses to the south and offices and warehouses to the west. The Yeading Brook (also known as the River Crane) is situated immediately to the east of the site.

1.4	**Historical Land Use**
1.4.1	Paragon has reviewed historical mapping dating from 1865 to present day. The historical maps are provided in Appendix 3 and a summary is presented below.
1.4.2	The earliest available historical map from 1865 indicated that the site comprised open land with a row of unspecified buildings along the northern boundary and a pond in the south eastern corner. By 1935, the row of buildings and pond were no longer shown. A tyre factory with associated chimney, 2no. smaller buildings and railway sidings were also shown on site. By 1960, the factory had been extended and further unspecified buildings were shown. An outfall also ran along the eastern boundary of the site. By the 1970s, unspecified tanks were present to the south of the factory, and in the south-eastern and north western corners of the site. The site was subsequently redeveloped into the existing retail park by 1999. Minor alterations to the unit in the northeast corner of the site were shown on the 2017 aerial mapping.
1.4.3	Historical mapping indicates that potentially contaminative land uses in the surrounding area included the Brookside Brick Works (situated 100m west of the site) which had a tramway and engine house. In addition, various other potentially contaminative land uses were identified within the vicinity of the site, these included various works and depots.
1.4.4	The site is considered to be in a low to moderate risk area for Unexploded Ordnance (UXO), based on Zetica and Bomb Sight mapping. Recommendations have been made for additional surveys for UXO.
1.5	**Environmental Setting**
	Geology
1.5.1	Geological mapping and environmental data records indicate that the site is underlain by superficial deposits comprising Langley Silt Member (clay and silt) in the western part of the site and the Lynch Hill Gravel Member (sand and gravel) in the southern part of the site. No superficial deposits are mapped in the eastern part of the site. The superficial deposits are underlain by the London Clay Formation.
1.5.2	No third party boreholes have been identified on the British Geological Survey (BGS) borehole database within 50m of the site. However, 7no. boreholes were drilled as part of a third party ground investigation undertaken onsite in 2018 (Ref: 12817). This report is reviewed in Appendix 6, and in summary the ground conditions encountered typically comprised Made Ground to a maximum depth of 2.35m below ground level (bgl), over Gravel and Clay to 3.00mbgl where the boreholes terminated. Groundwater was encountered at between 2.70mbgl and 2.90mbgl.
	Hydrogeology
1.5.3	The Langley Silt Member and London Clay Formation are classified by the Water Framework Directive (WFD) as Unproductive strata, and the Lynch Hill Gravel is classified as a Principal Aquifer.
1.5.4	There are no active potable groundwater abstractions within a 1km radius and the site is not located within a groundwater Source Protection Zone (SPZ).

	Hydrology and Flooding
1.5.5	The nearest water feature is the Yeading Brook which is located immediately to the east of the site. However, there are no surface water abstractions within a 1km radius of the site.
1.5.6	As part of the pre-acquisition surveys, Paragon completed a review of the environmental data which indicated that the site is situated within Flood Zone 2 and is susceptible to fluvial, pluvial and groundwater flooding. As such, a Flood Risk Assessment (FRA) was completed as part of the surveys.
1.5.7	The FRA was prepared by GeoSmart (dated: 22 September 2021, reference: 75292R1). In summary, GeoSmart concluded: • The risk of river flooding is expected to be low, as the site is unlikely to flood during 1 in 100 year return period + 25% climate change allowance event; • The risk of surface water flooding is low. • The groundwater flood risk was reported to be negligible; As such, the risk of onsite flooding is considered to be low. Nevertheless, this report will need to be updated in line with the proposed development.
1.6	**Environmental Databases & Previous Reports**
1.6.1	No significant issues of environmental concern have been identified from third-party databases.
1.6.2	The site is not reported as being within a Coal Risk Area.
1.6.3	The site is not situated within a Radon Risk Area.
1.6.4	The following data is obtained from the Groundsure report, obtained to complete this risk assessment, which is based on natural subsidence information provided by the British Geological Survey. The maximum Shrink-Swell hazard rating identified on the study site – **Low.** The maximum Landslide hazard rating identified on the study site – **Very Low.** The maximum Soluble Rocks hazard rating identified on the study site – **Negligible.** The maximum Compressible Ground hazard rating identified on the study site – **Very Low.** The maximum Collapsible Rocks hazard rating identified on the study site – **Low.** The maximum Running Sand hazard rating identified on the study site – **Very Low.**
1.7	**Regulatory Consultation**
1.7.1	Consultation with the Local Authority Contaminated Land Officer has not been completed at this stage. The London Borough of Hillingdon Contaminated Land Register has been reviewed and the site is not listed.

1.7.2	As part of the environmental report review completed by Paragon, it was identified that the London Borough of Hillingdon identified the site for review under its Contaminated Land Strategy. The site was inspected in November 2009 and in March 2010 and it was determined to be suitable for use as a retail park. No further information was available for review.
1.7.3	No specific enquiries have been made with the Environment Agency at this stage.

2.0 ENVIRONMENTAL RISK ASSESMENT

2.1 Qualitative Risk Assessment of Pollutant Linkages

2.1.1 In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors need to be established and evaluated. This is in accordance with Part 2A of the Environmental Protection Act (EPA) 1990 (and relevant amendments), which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

2.1.2 Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential pathways between them. A contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants.

2.1.3 This assessment is based on the potential current and historical sources identified, the site's environmental setting and the development proposals to evaluate the potential source-pathway-receptor linkages, which must exist to define a site as contaminated land. The risk assessment considers the site within an area context and assesses potential risks to identified receptors in relation to the existing site setting and the proposed development.

2.2 Sources

2.2.1 Potential sources of contamination that have been identified include Made Ground as a result of redevelopment at the site. Potential contaminants of concern include heavy metals, polyaromatic hydrocarbons (PAH), petroleum hydrocarbons (PHC), ground gas, vapours and asbestos.

2.2.2 Potential offsite sources of contamination associated with the historical uses within the surrounding area include Made Ground beneath the properties and the infilling of the brickworks. The Made Ground may contain heavy metals, polyaromatic hydrocarbons (PAH), petroleum hydrocarbons (PHC), ground gas, vapours and asbestos.

2.2.3 There is the potential for naturally occurring sulphate within the natural soils or Made Ground to produce ground that is aggressive to concrete.

2.3	**Pathways**
2.3.1	Potential pathways associated with the risks to onsite receptors include: • Migration of ground gas and vapour from Made Ground through soil pore space to the surface and / or via service entry points to the building at the commercial ground floor level. • Permeation of contaminants to pipework materials / structural elements. • Ingestion, inhalation and dermal contact with contaminated soils, by site users, arising from potentially contaminated Made Ground exposed via soft landscaped areas. • Ingestion, inhalation and dermal contact with contaminated soils and vapours by site workers. • Plant uptake in soft landscaped areas.
2.3.2	Potential pathways associated with the risks to offsite receptors include: • Ingestion, inhalation and dermal contact with contaminated soils, by users of the neighbouring commercial properties in areas of soft landscaping, arising from potentially contaminated Made Ground onsite. • Ingestion, inhalation and dermal contact with contaminated soils, by residents of offsite residential properties with private gardens, arising from potentially contaminated Made Ground onsite. • Migration of contaminants in groundwater to Controlled Waters.
2.3.3	Groundwater migration is limited as the Langley Silt, which underlies the majority of the site, is considered to have a low permeability. However, the southern part of the site is underlain by the Lynch Hill Gravel which has the potential to transmit groundwater.
2.4	**Receptors**
2.4.1	Receptors identified include: • Future site users. • Construction workers during development. • Offsite users including residential properties (50m north) and commercial units (surrounding the site). • The proposed development building (site users) through water supply pipework. • Plants in areas of soft landscaping. • Controlled Waters (Surface Water Features) including the Yeading Brook which is adjacent to the east of the site, and the Grand Union Canal which is approximately 170m east of the site.

2.5 Risk Evaluation

2.5.1 CIRIA C552 (2001) has been used to define the risk rating presented in the Preliminary Qualitative Risk Assessment below in Table 1. The methodology and definition of risk associated with these linkages is set out in detail in Appendix 7. In summary, an evaluation of each viable pollutant linkage is made in relation to the 'probability of a risk being realised' (P) against the 'consequence of a risk being realised' (C) to establish a 'risk classification' (R). From this, the potential risk management requirements are established.

2.5.2 A simplified diagrammatic representation of the CSM is also provided in Appendix 7.

2.6 Table 1 Preliminary Qualitative Risk Assessment

2.6.1

Receptor	Sources	Pathways	P	C	R	Justification
Human Heath						
Future Site Users	Contaminants within Made Ground on and offsite	Ingestion, inhalation and dermal contact with contaminated soils	Likely	Medium	M	**Moderate Risk**: The risk to site users is considered to be moderate as the composition of the Made Ground anticipated to be beneath the hardstanding is unknown. Based on the presence of soft landscaping within the proposed development plan, the potential for site users coming into contact with contamination cannot be discounted at this stage.
	Ground Gas and Vapour within the Made Ground on and offsite	Inhalation of gas and vapour	Likely	Medium	M	**Moderate Risk**: As the composition of the Made Ground is unknown the potential for gas and vapour cannot be discounted.
Construction Workers during development	Contaminants within Made Ground on and offsite	Ingestion, inhalation and dermal contact with contaminated soils	Likely	Medium	M	**Moderate Risk**: The potential for construction workers coming into contact with Made Ground is considered to be likely. As such, Personal Protective Equipment and safe systems of work will need to be adopted throughout the project.
	Ground Gas and Vapour within the Made Ground on and offsite	Inhalation of gas and vapour	Likely	Medium	M	**Moderate Risk**: As the composition of the Made Ground is unknown the potential for gas and vapour cannot be discounted. Personal Protective Equipment and safe systems of work will need to be adopted throughout the project.
Offsite Users (Residential and Commercial units adjacent to the site)	Contaminants within Made Ground onsite	Ingestion, inhalation and dermal contact with contaminated soils	Likely	Medium	M	**Moderate Risk:** The risk from contaminants impacting offsite users is considered to be moderate as the composition of the Made Ground is currently unknown.
	Ground Gas and Vapour within Made Ground onsite	Inhalation of gas and vapour	Low likelihood	Medium	L M	**Moderate / Low Risk:** The risk to offsite users from ground gas and vapour is considered to be moderate to low as gases would dissipate in areas of soft landscaping before potentially entering the building through cracks and service entry points.

2.6.2

Receptor	Sources	Pathways	P	C	R	Justification
Property						
Proposed buildings and services (potable water supply pipework)	Contaminants within Made Ground onsite	Migration of contaminants through supply pipework.	Likely	Medium	M	**Moderate Risk**: The risk to property (site users) as a result of contaminants migrating through supply pipework is considered moderate as the composition of the Made Ground anticipated to be beneath the hardstanding is unknown.
	Ground Gas and Vapour within Made Ground onsite	Migration of gas and vapour through cracks and service entry points.	Likely	Medium	M	**Moderate Risk**: As the composition of the Made Ground is unknown the potential for gas and vapour migrating through cracks and service entry points cannot be discounted.
Building Foundations	Sulphates within the Made Ground and natural strata	Aggressive ground conditions for concrete.	Likely	Medium	M	**Moderate Risk:** There is the potential for naturally occurring sulphate within the natural soils or Made Ground to produce ground that is aggressive to concrete. Sulphate testing is required for final design purposes.
Vegetation	Contaminants within Made Ground onsite	Migration of contaminants through soils and uptake by plants.	Likely	Mild	L M	**Moderate / Low Risk:** The risk to vegetation from contaminants within the Made Ground is moderate to low based on the unknown nature of the Made Ground onsite.
Controlled Waters						
Yeading Brook (Adjacent east)	Contaminants within Made Ground	Migration of contaminants	Likely	Medium	M	**Moderate Risk:** The risk to the Yeading Brook is moderate due to its proximity to the site and the unknown nature of the Made Ground.
Grand Union Canal (170m east)	Contaminants within Made Ground	Migration of contaminants	Low likelihood	Medium	L M	**Moderate / Low Risk:** The risk to the Grand Union Canal is low to moderate as it is likely to be concrete lined canal (subject to further inspection) and therefore the potential for contaminants within the groundwater to impact the canal has a low likelihood.
Principal Aquifer: Lynch Hill Gravel	Contaminants within Made Ground	Migration of contaminants	Likely	Medium	M	**Moderate Risk:** The risk to the underlying aquifer is moderate due to the unknown nature of the Made Ground.

3.0 RECOMMENDATIONS

3.1	**Ground Investigation**
3.1.1	A ground investigation for environmental and geotechnical purposes is required to quantify the risks at the site. Based on the various stages of redevelopment shown on the historical maps, it is likely that the site is underlain by Made Ground. There is also the potential for subsidence and aggressive ground conditions for concrete due to volume change potential and sulphates relating to the underlying London Clay. Based on the above, the following scope is deemed to be appropriate.
3.1.2	The investigation should comprise: • Provision of statutory utility plans and onsite utilities tracing including Ground Penetrating Radar; • Shallow investigation of the Made Ground by means of window sampling with in-situ geotechnical testing and installation of monitoring wells for gas and groundwater monitoring; • Deep investigation of the natural strata by means of cable percussive drilling with in-situ geotechnical testing and installation of monitoring wells for gas and groundwater monitoring; • Photoionisation Detector (PID) headspace analysis during drilling; • Environmental laboratory analysis for a comprehensive suite of testing to assess source pathway linkages listed above, including heavy metals, sulphates, pH, petroleum hydrocarbons, Polyaromatic Hydrocarbons (PAH) asbestos, Volatile / Semi Volatile Organic Compounds (VOCs / SVOCs); • Geotechnical laboratory testing in line with the geotechnical risk assessment i.e. Atterberg Limit testing, moisture content tests and sulphate testing; • A minimum of three rounds of gas and groundwater monitoring (water level); and • Provision of a Phase 2 Environmental and Geotechnical Risk Assessment Report.
3.1.3	In addition, a Stage 2 Detailed UXO Risk Assessment is recommended. This would determine whether a UXO specialist would be required to be present on site during future ground investigation works to clear safe drilling locations.
3.1.4	The Flood Risk Assessment prepared as part of the Pre-Acquisition Surveys should be updated to reflect the proposed development and support the planning application.
3.2	**Regulatory**
3.2.1	We would recommend that this report is submitted to the Local Authority for their comments and approval.

4.0 CONFIRMATION OF INSTRUCTIONS

4.1	We have been instructed to undertake a Geo-Environmental Risk Assessment of Bridge Retail Park, Uxbridge Road, Hayes, UB4 0RH. The purpose of the report is to highlight environmental considerations with respect to ground conditions as part of the proposed development to provide a single commercial unit with associated hardstanding and areas of soft landscaping.

APPENDIX 1: FIGURES

building & project consultants
paragon

Paragon Building Conultancy
The Harlequin Building
65 Southwark Street
London
SE1 0HR
020 7125 0112
www.paragonbc.co.uk

Key

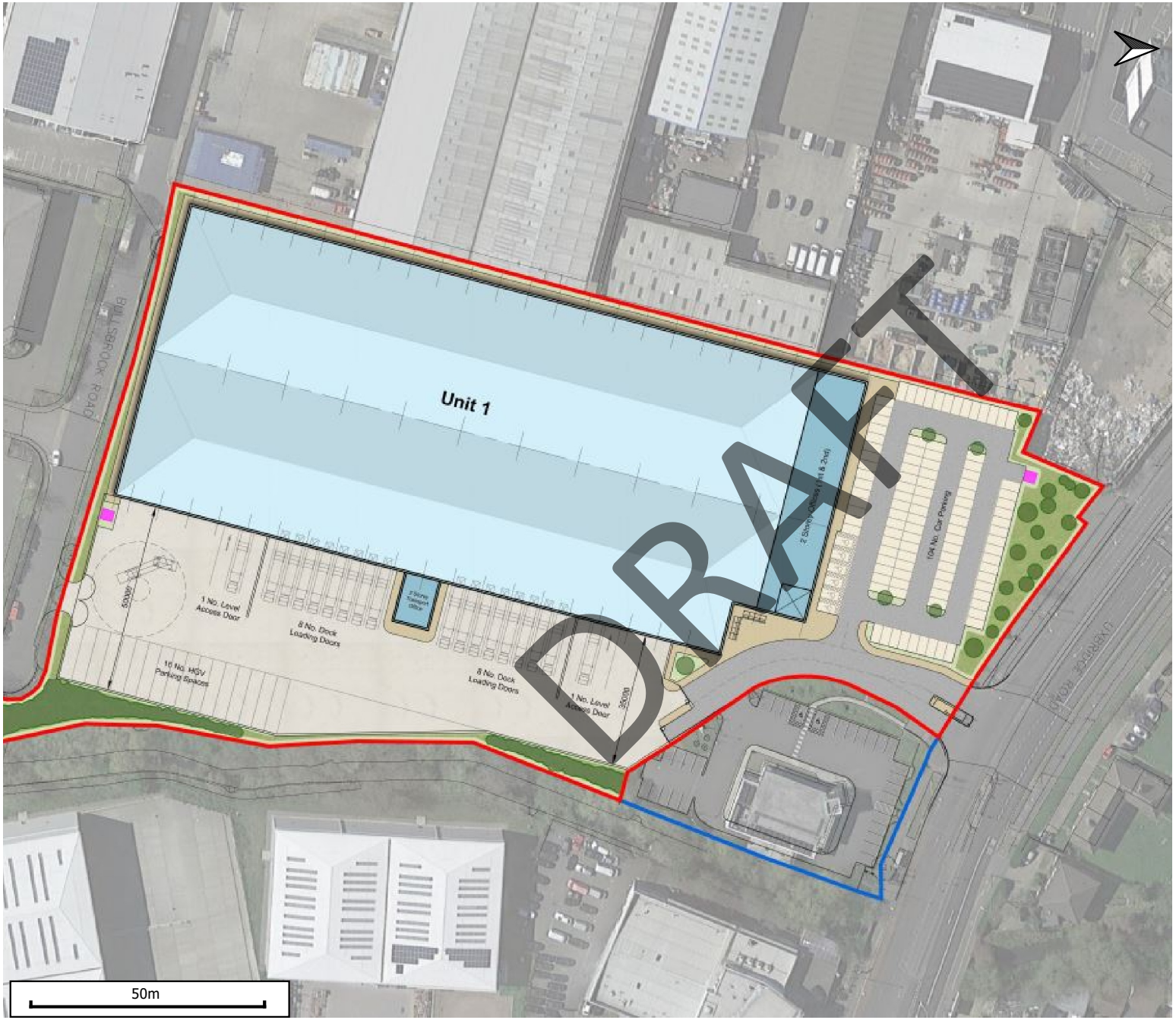
Site Boundary

Notes

Basemap: Google 2021

Rev	Description	Date

Project: 212188 Bridgewater Retail Park, Hayes	Scale: See bar
	Drawn by: CB
	Approved By: TC
Title: Site Location Plan	Drawing Number: 1
	Date: 8 December 2021



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Key

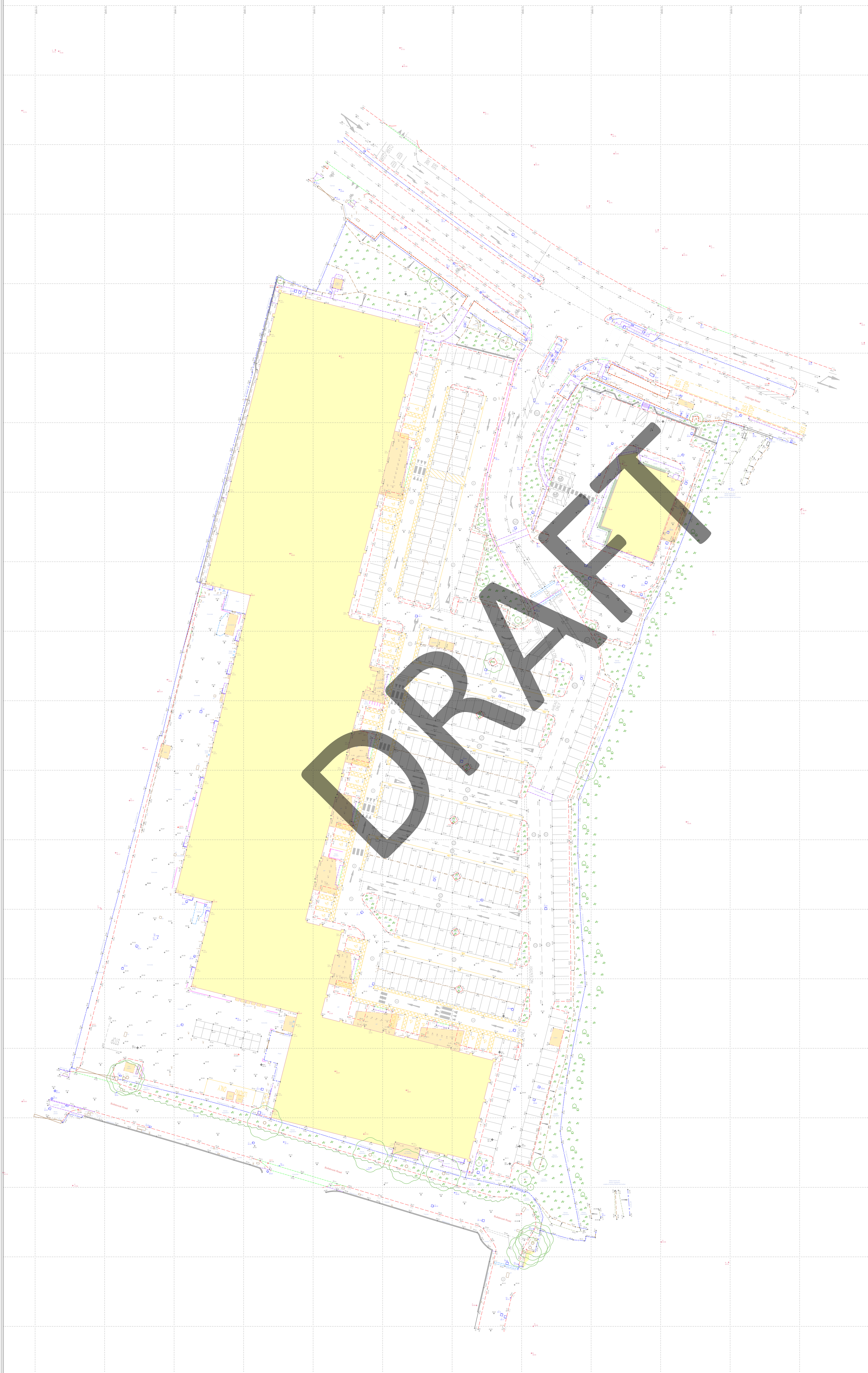
Site Boundary

Notes

Basemap: UMC Architects, 2021. Drawing number: 21048 F0003 Rev F.

Rev	Description	Date

Project: 212188 Bridgewater Retail Park, Hayes	Scale: See bar
	Drawn by: CB
	Approved By: TC
Title: Proposed Development Plan	Drawing Number: 2
	Date: 8 December 2021



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N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	511545.051	180404.489	29.305
GH2	511559.052	180440.337	29.293
GH3	511540.027	180504.795	29.562
GH3	511540.027	180504.795	29.562
GH5	511551.944	180651.887	30.132
GH6	511579.823	180634.188	30.202
GH7	511631.133	180631.268	29.916
GH10	511559.896	180392.387	28.075
GH11	511487.056	180406.941	29.119
GH12	511432.397	180422.375	30.288
GH13	511435.867	180446.653	30.010
GH14	511461.178	180503.603	29.311
GH15	511478.584	180438.221	29.233
GH16	511467.401	180570.002	29.365
GH17	511532.099	180648.275	29.357
GH18	511578.642	180585.224	29.378
GH19	511489.690	180658.966	29.372

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings, Wall, Kerb line, Line marking, Drop kerb, Centre line, Top of bank, Overhead Cable, Concrete edge, Tarmac edge, Grass verge, Canopy/Overhang, Verge, Bottom of bank

1 100.000 — Station and Name, Station Level

Tree / Bush / Sapling; Area of Undergrowth; Woodland

R: Ridge Level; E: Eaves Level; F: Flat Roof Level; Gate

Fence types: I\W Interwoven; I\R Iron Railings; W\M Wire Mesh; P\R Post & Rail; P\W Post & Wire; C\L Chain Link; W\P Wooden Panels; C\B Close Boarded; S\P Steel Palisade

IC Inspection chamber; PInv Pipe invert; Gy Gully; Bg Back gully; Dp Down pipe; Pipe Pipe above ground; MH Manhole; WL Water level; Fl Flood light; Lp Lamp post; Tp Telegraph post; Ep Electricity post; Tl Traffic light; Bus Bus stop; Sv Stop valve; St Stop tap; Er Earth rod; Wm Water meter; Gas Gas valve; Av Air valve; ICU Unidentified inspection; Wo Wash out; Re Rodding eye; BB Belisha beacon; CTV Cable tv; Mkr Marker post; Gmkr Gas marker post; So Soffit; Fh Fire hydrant

Bo Bollard; IB Illuminated bollard; Bin Rubbish bin; Vp Vent pipe; Grl Ground light; Lbox Letter box; Stmp Tree Stump; Sty Stile; IFL Internal floor level; THL Threshold level; Sp Sign post; TH Trialhole; BH Borehole; ELC Electric; BT British Telecom; C'box Control box; TT Tactile; BP Brick paved; CPS Concrete paving slabs; CVR Cover; R/wall Retaining wall; TWL Top of Wall Level; TCL Tree canopy level; G: Girth; MG Multi girth; IC Inspection chamber; CL: Cover level; IL: Invert level; UTR Unable to raise

Rev	Date	Description	Drawn	Q. Ref.

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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NE4 7YL
t. (01912) 736391

London
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Regents Park
London
NW1 5LL
t. (02072) 241806

CLIENT
Burrows Graham

PROJECT
Hayes Bridge Retail Park, Uxbridge Road, Hayes UB4 0RH

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 500	08.11.21
DRAWN	QUALITY REF
LB	GH12132

Level datum	See note
Grid orientation	See note
Job number	42047
Drawing No.	Rev.
42047_T	0

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

APPENDIX 2: SITE DESCRIPTION

2.0 SITE DESCRIPTION

2.1 Site Description and Location

2.1.1 The site is located Hayes Bridge Retail Park, Uxbridge Road, Hayes, UB4 0RH. The site is centred around National Grid Reference 511517, 180530. The site area is approximately 3.16 hectares.

2.1.2 The surrounding area comprises Uxbridge Road and residential dwellings to the north, car dealership and warehouses to the east, Bulsbrook Road and warehouses to the south and offices and warehouses to the west. The Yeading Brook (also known as the River Crane) is situated immediately to the east of the site.

2.1.3 Site photographs are provided below.

2.2 Current Land Use/Site Activities

2.2.1 The site comprises a retail park with 9no. units, a large service yard and an associated car park.

2.2.2 The properties are currently occupied by the following tenants:

2.2.3

Address:	Occupant	Brief Description of Site Activities
Unit 1	Currys PC World	Retail
Unit 2	Halfords	Retail
Unit 3	Harveys and Bensons for Beds	Retail
Unit 4	Dreams	Retail
Unit 5	Office Outlet	Vacant
Unit 6	Argos	Retail
Unit 7A	AHF Furniture & Carpets	Retail
Unit 8B	Tapi Carpets	Retail
Unit 8	Metro Bank	Retail

2.2.4 An inspection of the site was undertaken on 20 July 2021. The following key details were identified.

2.3 General Site Details

2.3.1 In general, the site is occupied by 9no. units under commercial use, with the exception of Unit 5 which was vacant. Metro Bank is a separate building with a canopy at the rear of the building which operates as a drive-thru bank.

2.3.2 The external areas comprise a car park and a large service yard. The service yard is situated in the southwest part of the site (to the rear of units 2-7A).

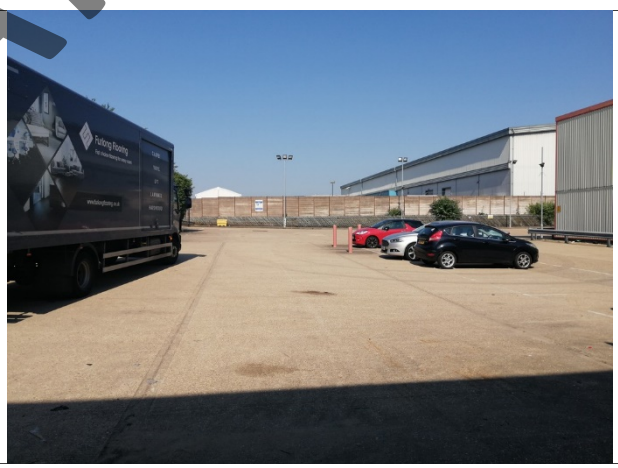
2.3.3 An electrical substation is situated in the service yard. This is managed by a third party.

2.3.4	Three monitoring wells were identified in the car parking area of the site. These were later identified to be part of a third party ground investigation.
2.3.5	Although this inspection is not intended to be definitive, no evidence for Japanese Knotweed or Giant Hogweed was identified during the site inspection.
2.3.6	No significant waste streams are generated from the site activities. Bins and one potential green storage/waste enclosure were identified in the service yard.
2.3.7	No above ground bulk storage tanks were noted on the site.
2.3.8	No obvious evidence or equipment was noted on the surface that indicates the presence of any underground storage tanks (USTs). Furthermore, the site representatives and information provided from the client has not revealed such storage tanks to be present.
2.3.9	No significant issues of environmental concern are anticipated in connection with the current uses of the site.

01: General site overview

02: Metro Bank

03: Rear Service yard



04: Rear Service yard

05: Internal area of Unit 5

06: Waste Area

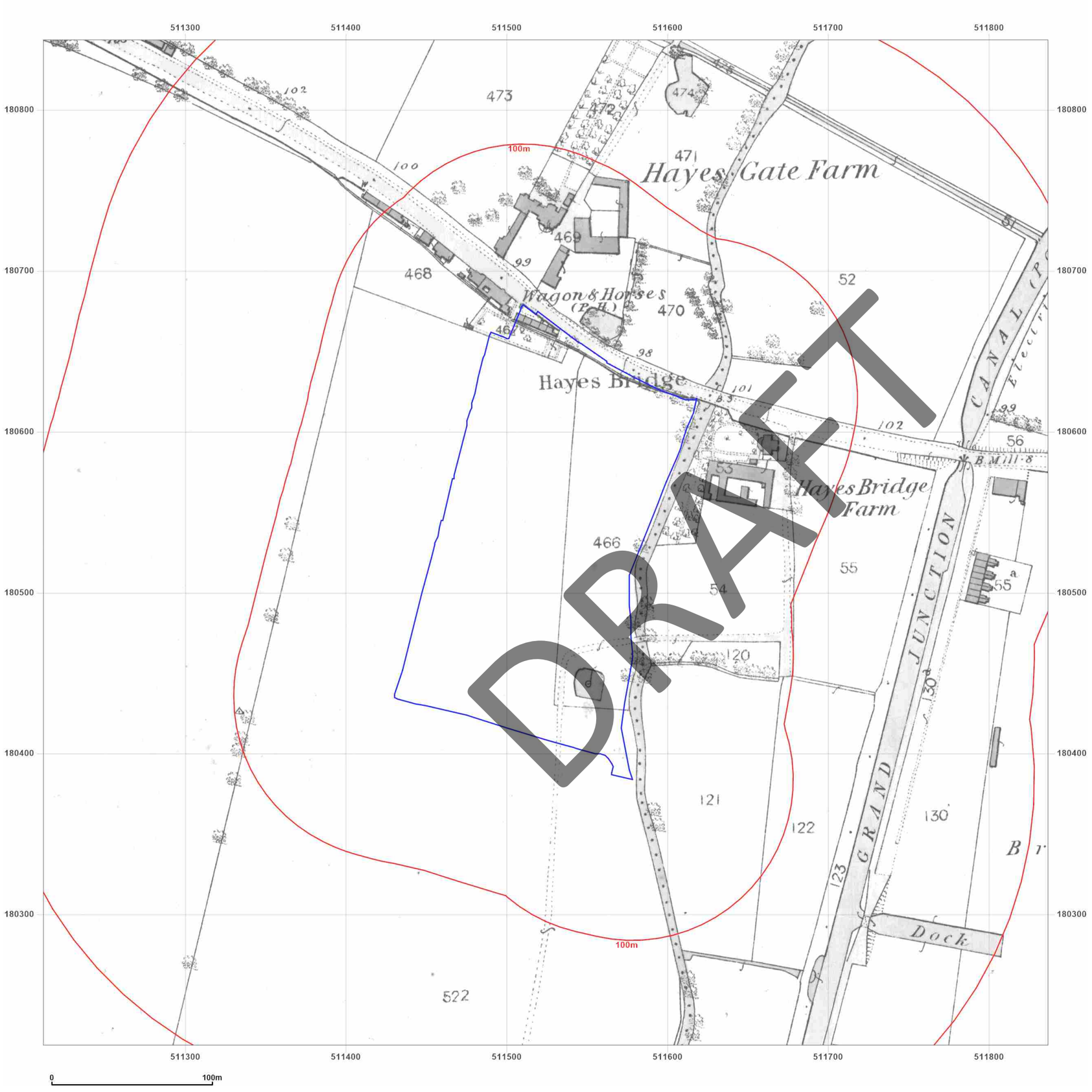
07: Electricity substation

08: Monitoring Well

APPENDIX 3: LAND USE

3.0 LAND USE

3.1	**Former Land Use**
3.1.1	A study of historical Ordnance Survey maps, the site's planning history and local history information has been undertaken to identify any potentially contaminative former land uses. A selection of historical mapping extracts are included below.
3.1.2	A search of relevant planning applications on the London Borough of Hillingdon's planning portal was completed and the following planning applications were identified: 1. 71371/APP/2019/2699 – Physical works to reconfigure and extend Unit 7B to create a foodstore (Class A1)
3.1.3	This application was granted with a contaminated land condition. This has been summarised below. Condition 17: • Requirement for a strategy to deal with contamination. • Provision of a preliminary risk assessment. • Completion of a ground investigation to quantify the risk. • Provision of a written remediation scheme. • Provision of a verification report upon completion of the remediation scheme. • Chemical testing of all imported soils. This was discharged under application 71371/APP/2020/3343.



Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: County Series

Map date: **1865**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

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Map legend available at:
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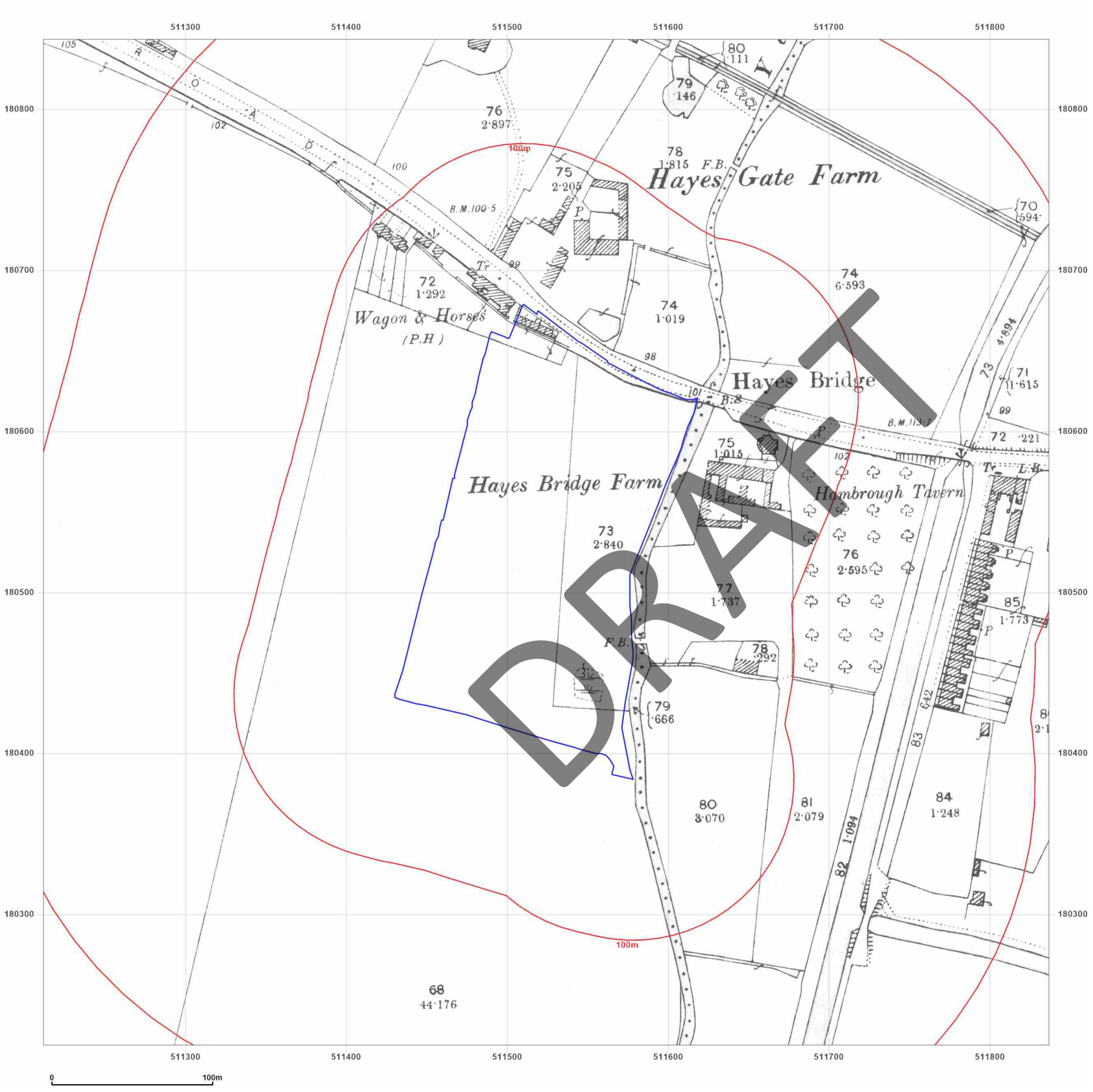

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Groundsure INSIGHTS

Site Details:

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UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: County Series

Map date: **1896**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1896
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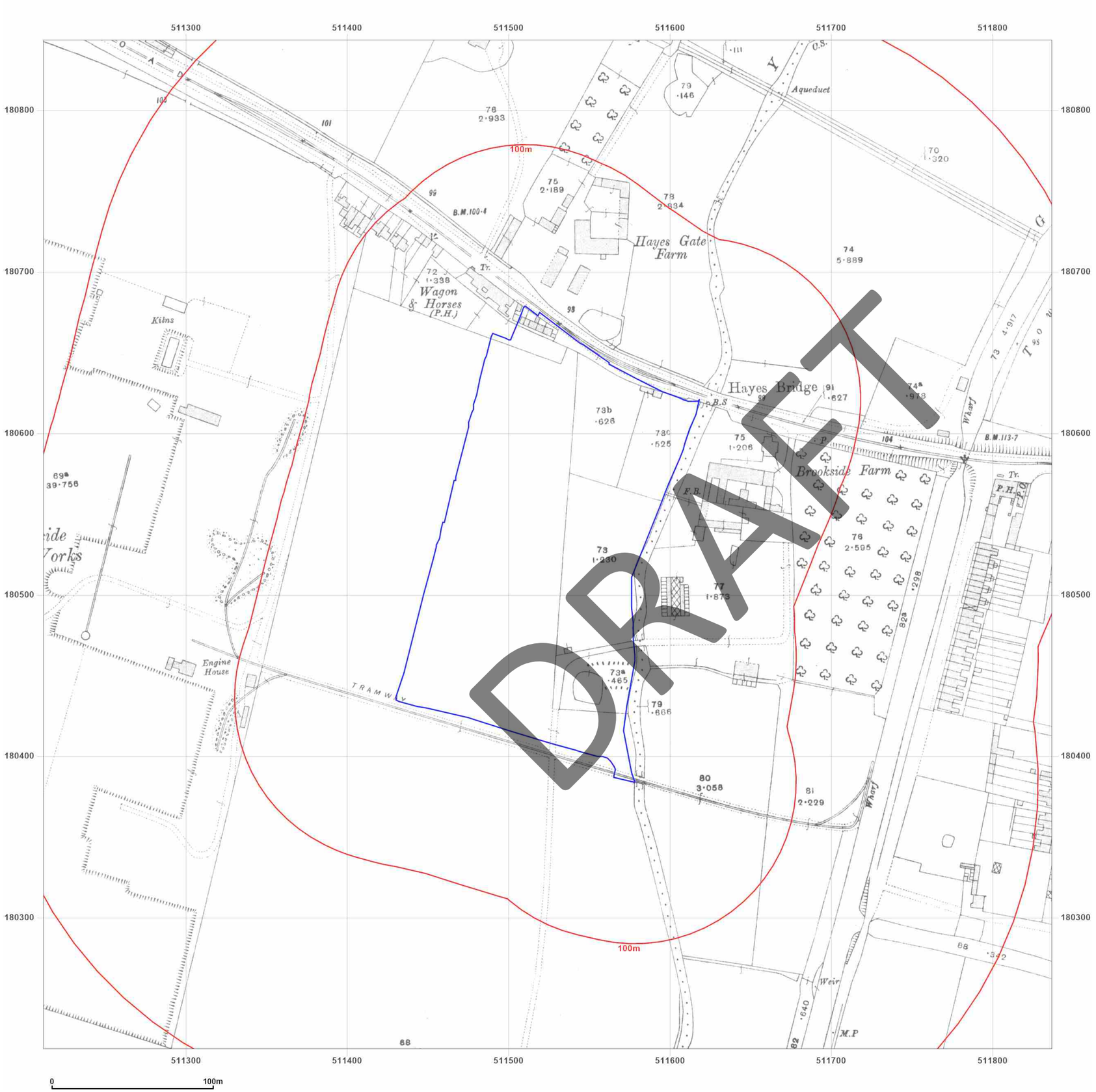

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: County Series

Map date: **1914**

Scale: 1:2,500

Printed at: 1:2,500

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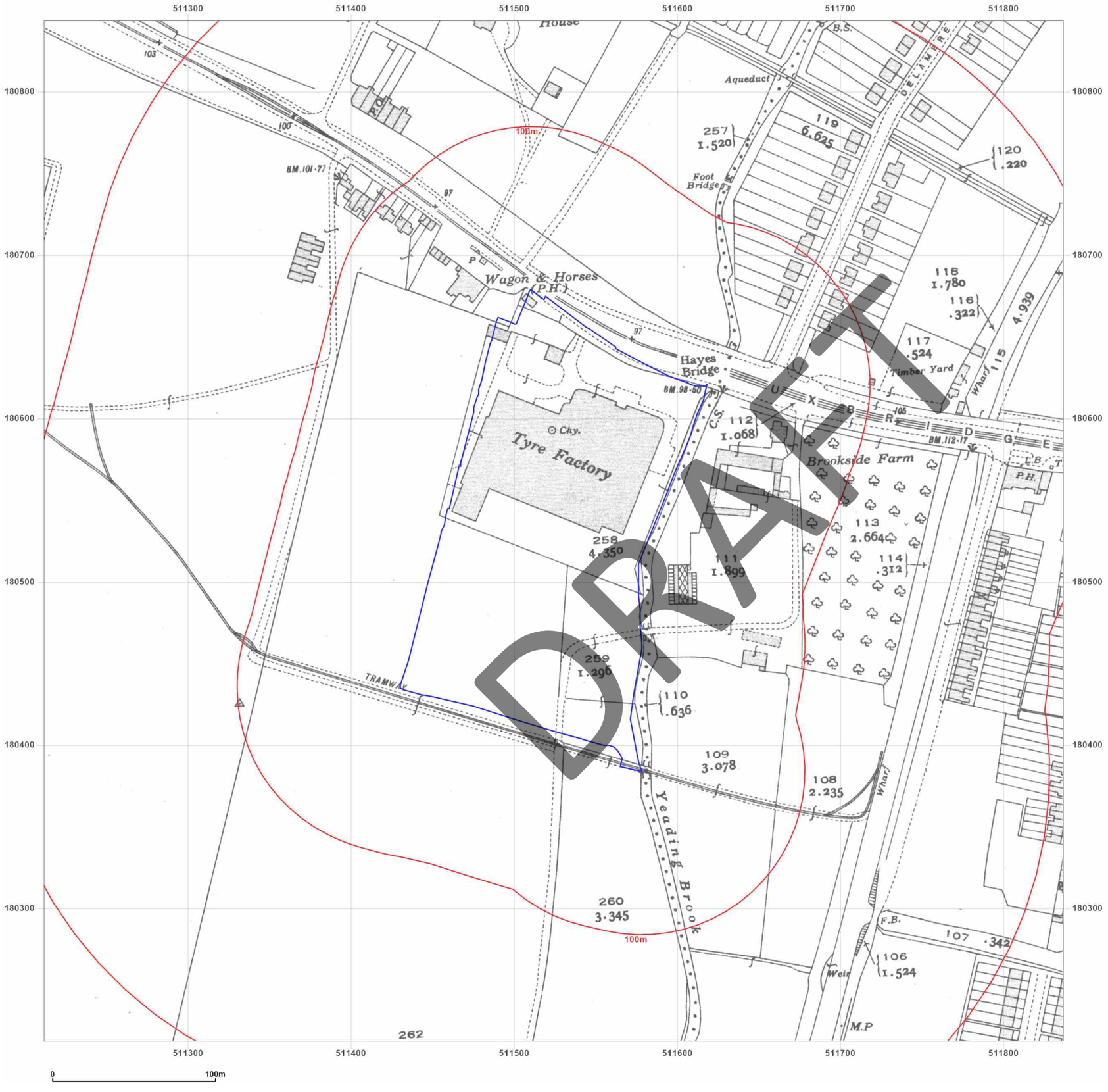

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: County Series

Map date: **1935**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1935
Edition N/A
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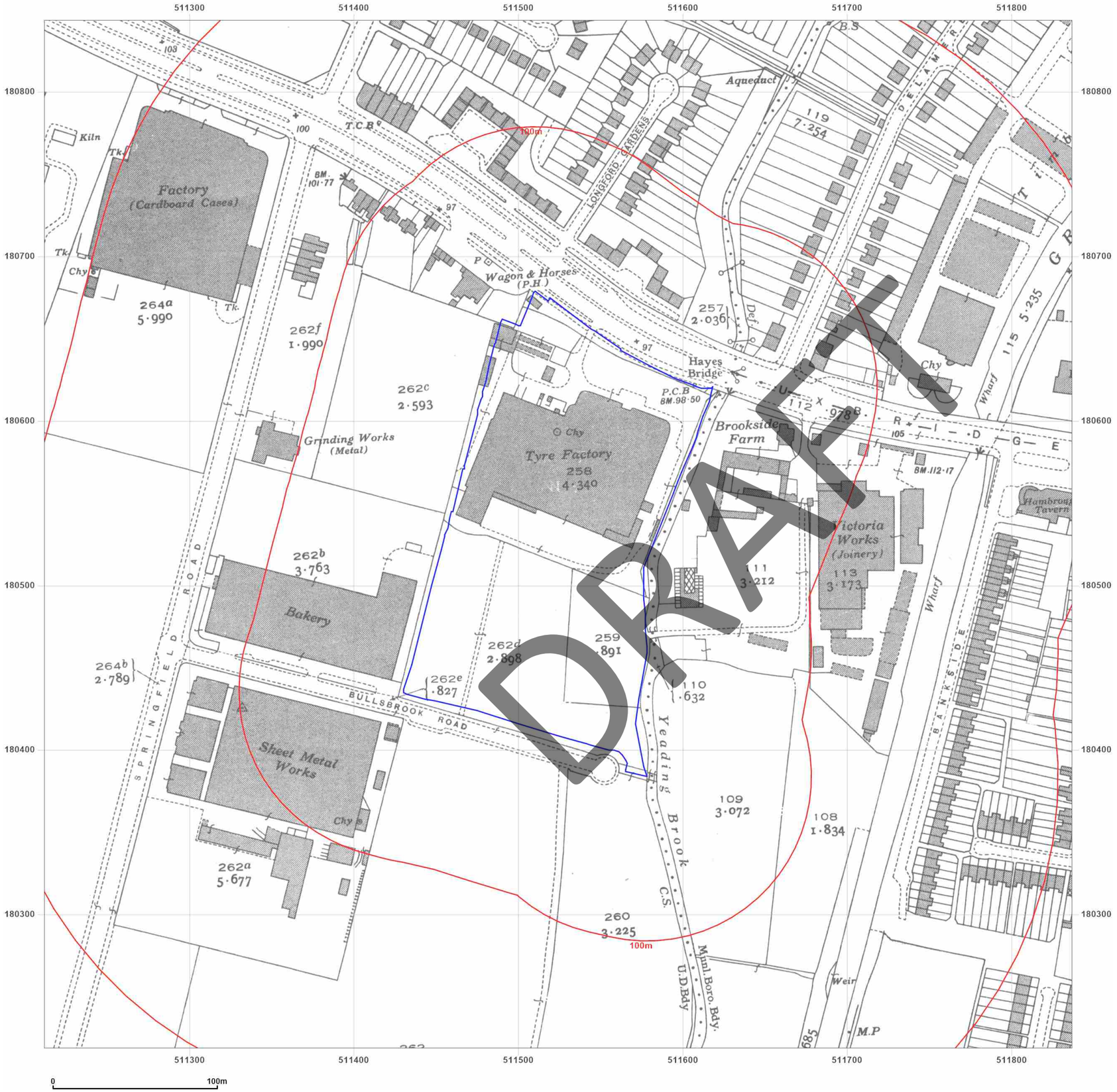

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: County Series

Map date: **1940**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1940
Edition N/A
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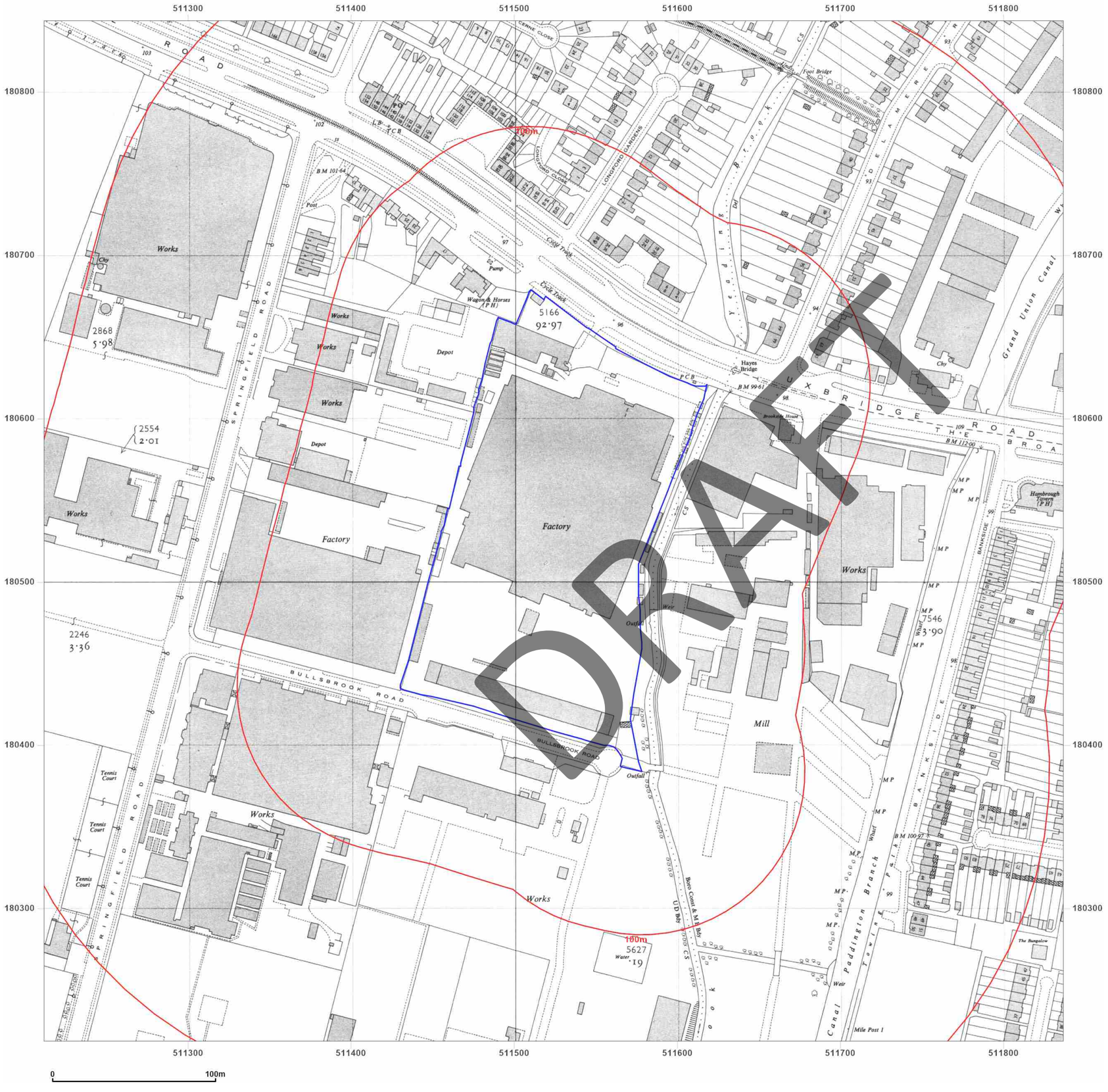

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid

Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

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Edition 1962
Copyright 1962
Levelled 1957

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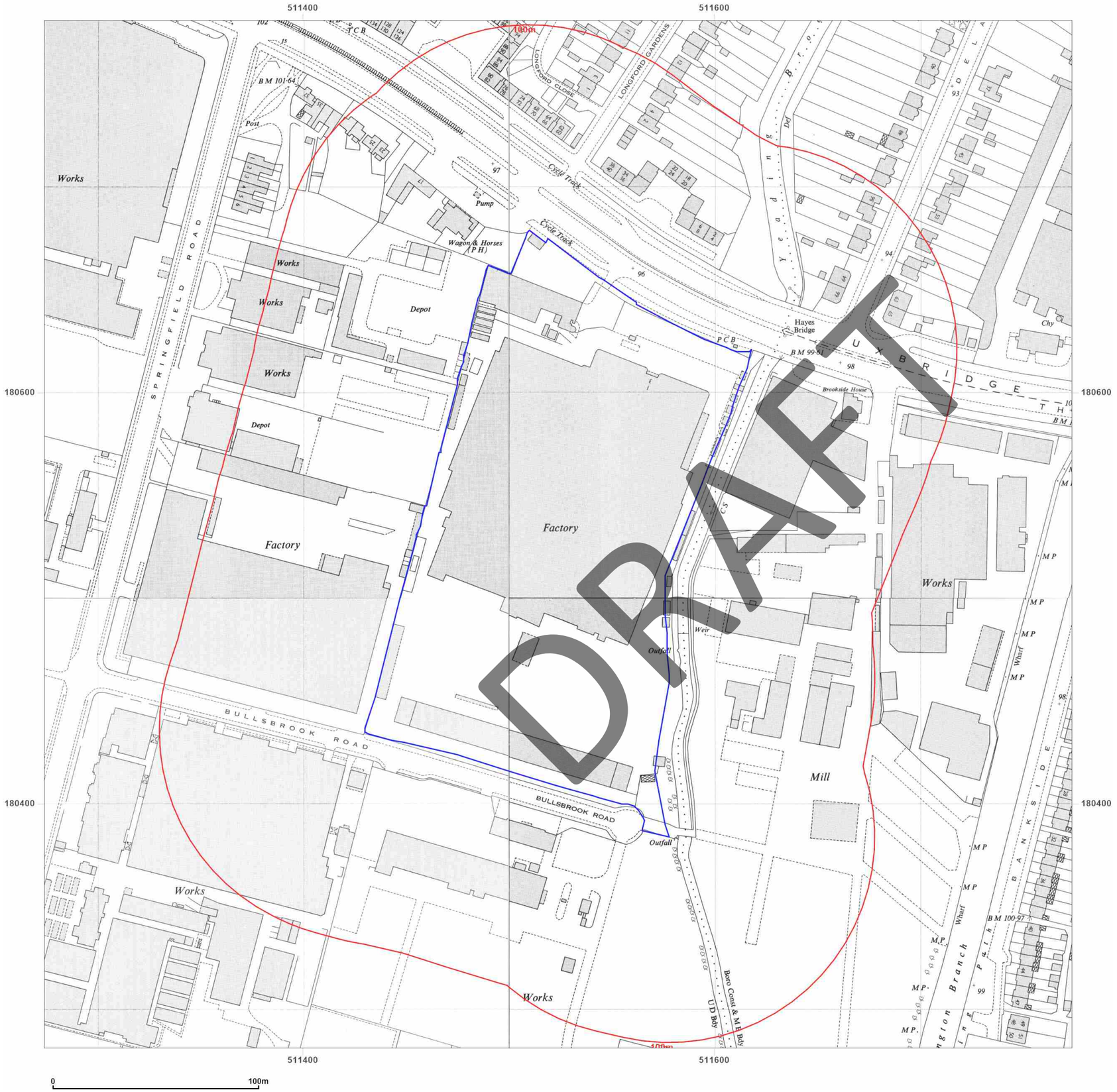

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

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Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid

Map date: **1961**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960 Revised 1960 Edition N/A Copyright 1961 Levelled 1957			Surveyed 1960 Revised 1960 Edition N/A Copyright 1961 Levelled 1957
Surveyed 1960 Revised 1960 Edition N/A Copyright 1961 Levelled 1957			Surveyed 1960 Revised 1960 Edition N/A Copyright 1961 Levelled 1957

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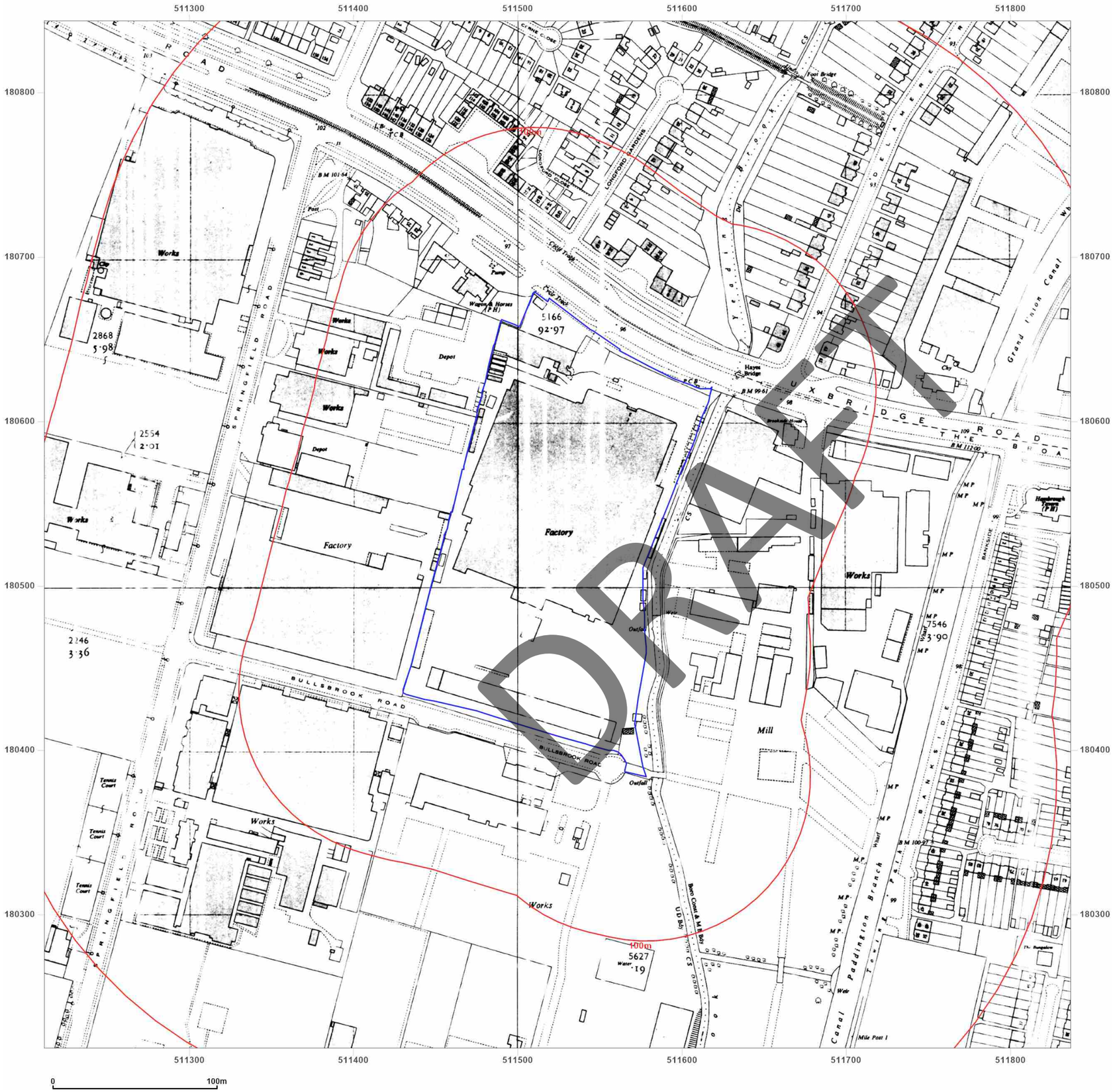

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Site Details:

HAYES BRIDGE RETAIL PARK,
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0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid

Map date: **1962**

Scale: 1:2,500

Printed at: 1:2,500

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Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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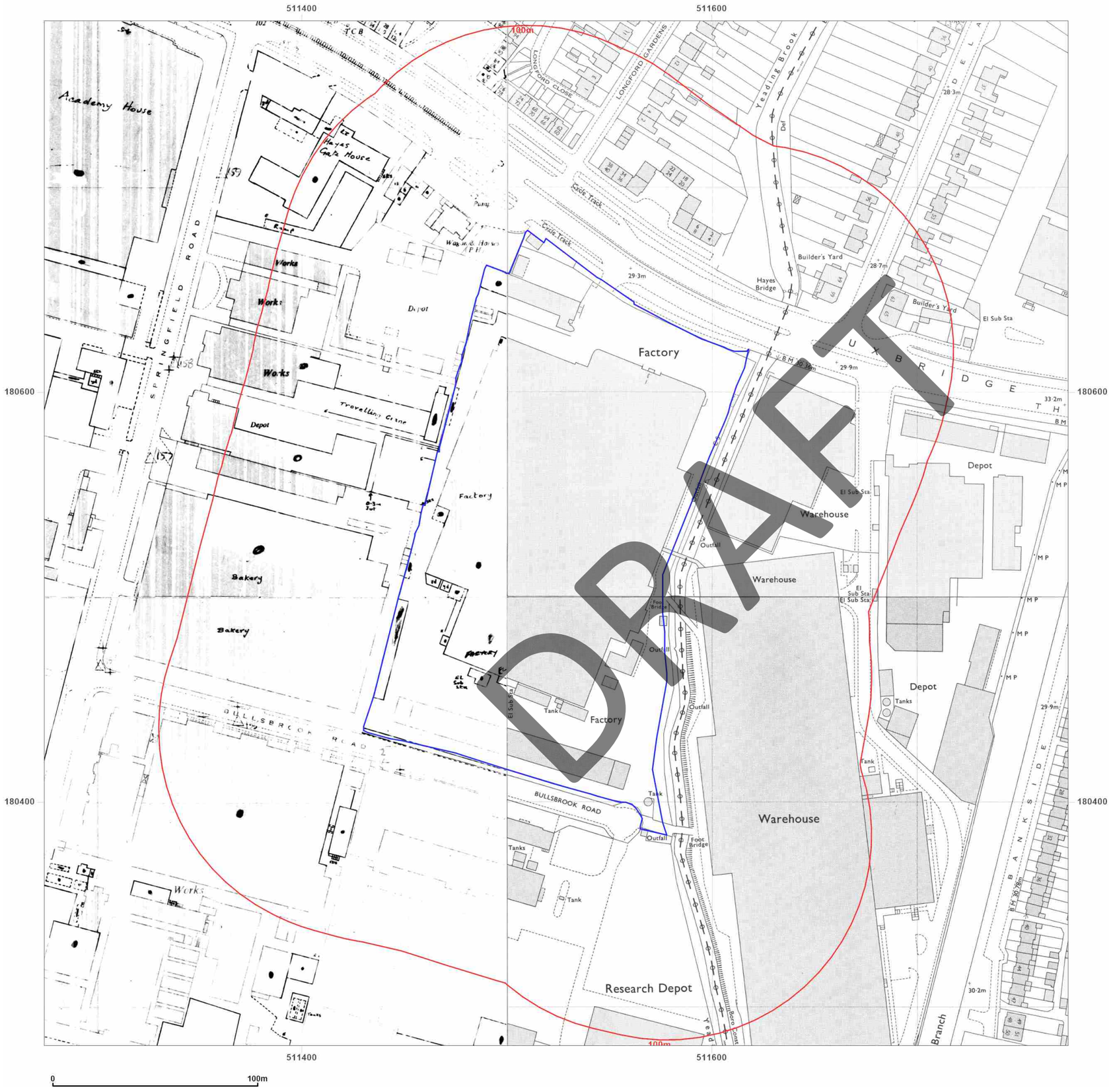

Groundsure INSIGHTS

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UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid

Map date: **1973**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A		Surveyed 1960 Revised 1972 Edition N/A Copyright 1973 Levelled 1957
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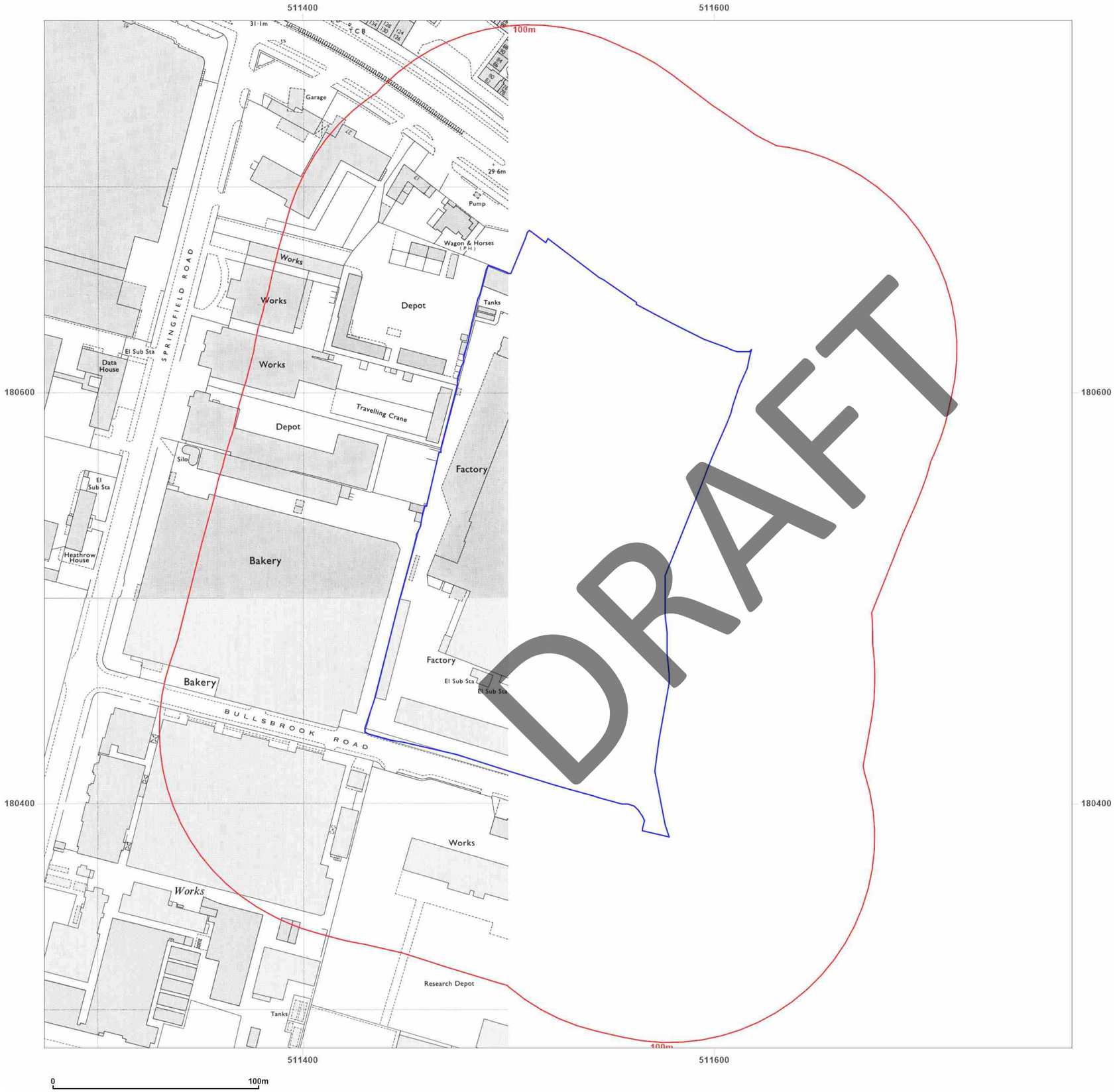

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
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Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1974-1976**
Scale: 1:1,250
Printed at: 1:2,000

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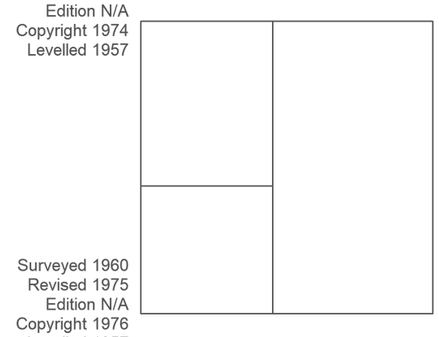
Surveyed 1960
Revised 1974
Edition N/A
Copyright 1974
Levelled 1957

Surveyed 1960
Revised 1975
Edition N/A
Copyright 1976
Levelled 1957



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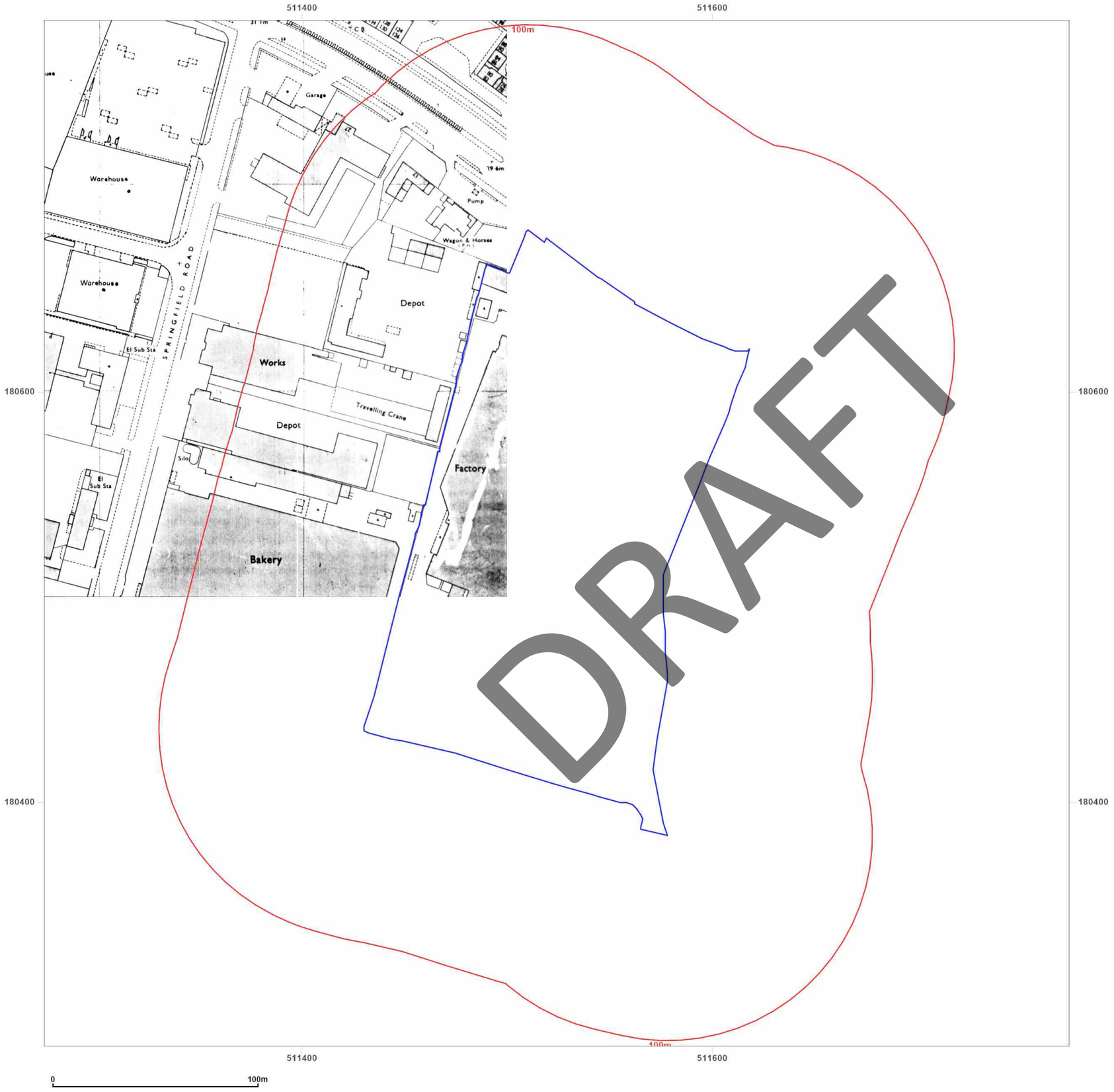

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1986**
Scale: 1:1,250
Printed at: 1:2,000

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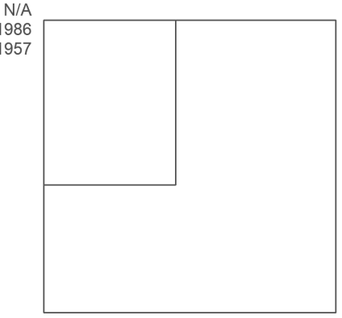
Surveyed 1957
Revised 1986
Edition N/A
Copyright 1986
Levelled 1957



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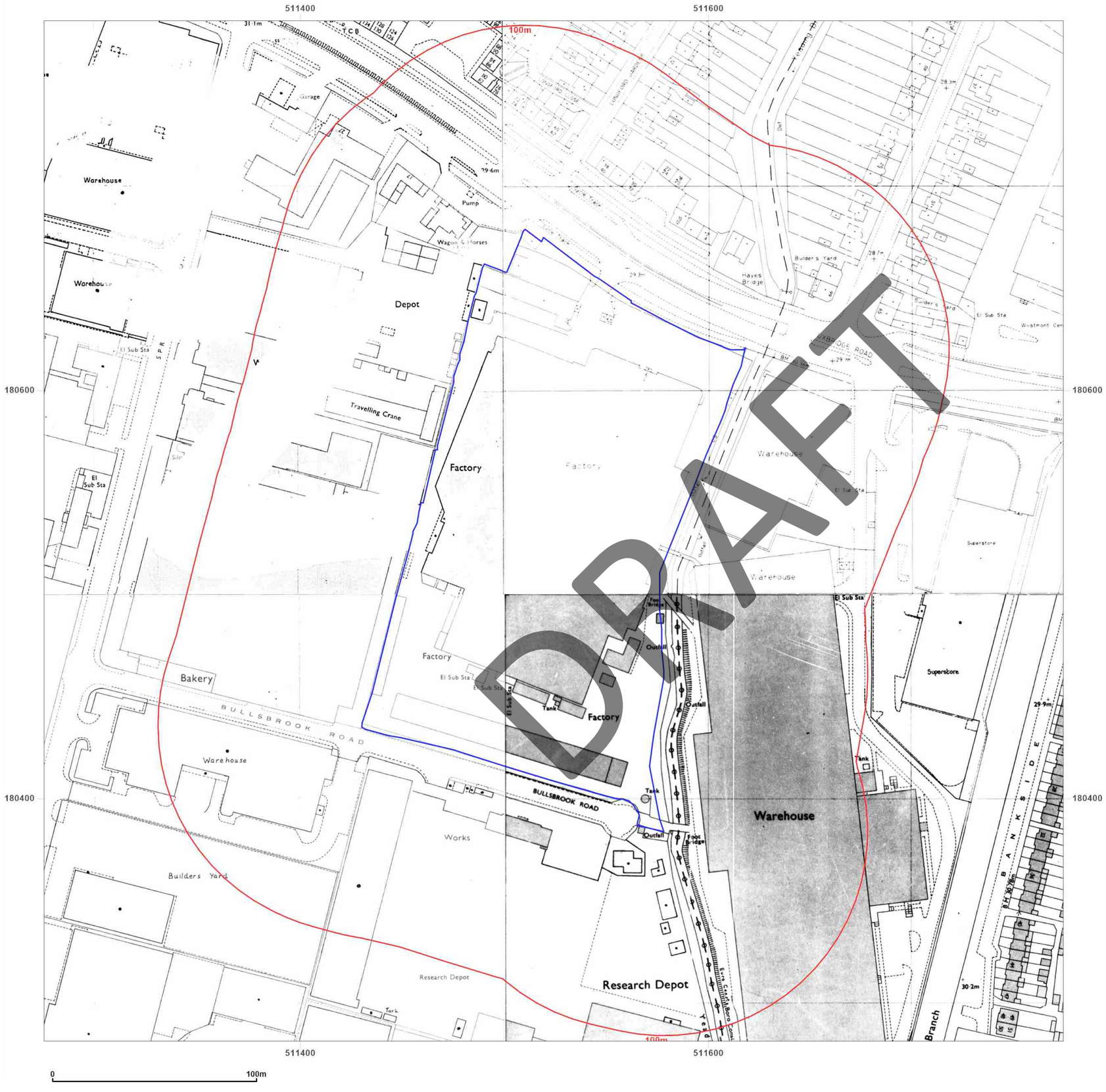

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid

Map date: **1986-1991**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1986
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1991
Levelled N/A

Surveyed 1957
Revised 1989
Edition N/A
Copyright 1989
Levelled 1957

Surveyed 1957
Revised 1988
Edition N/A
Copyright 1988
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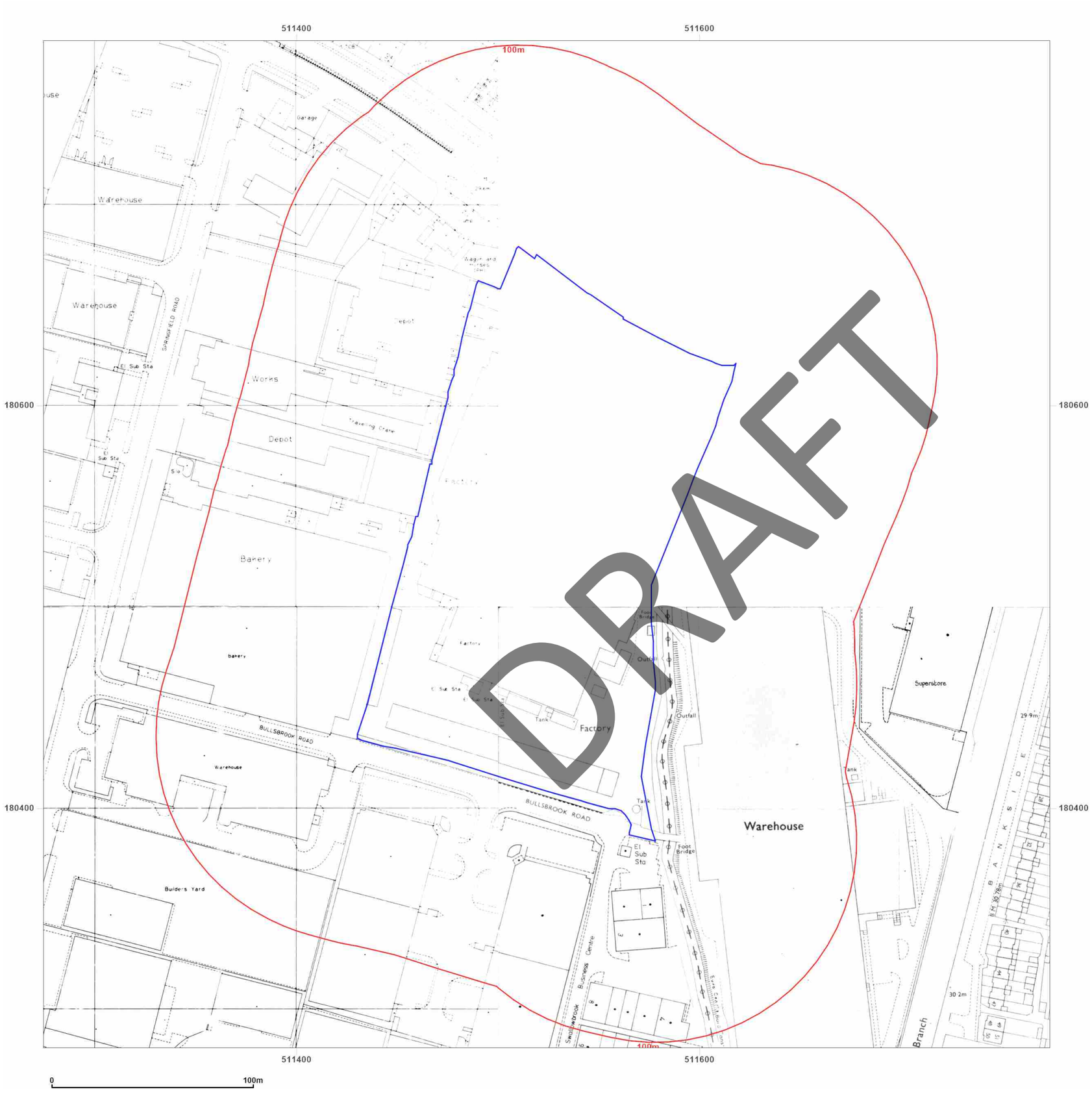

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1990-1991**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1991
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1991
Levelled N/A

Surveyed 1957
Revised 1990
Edition N/A
Copyright 1990
Levelled 1957

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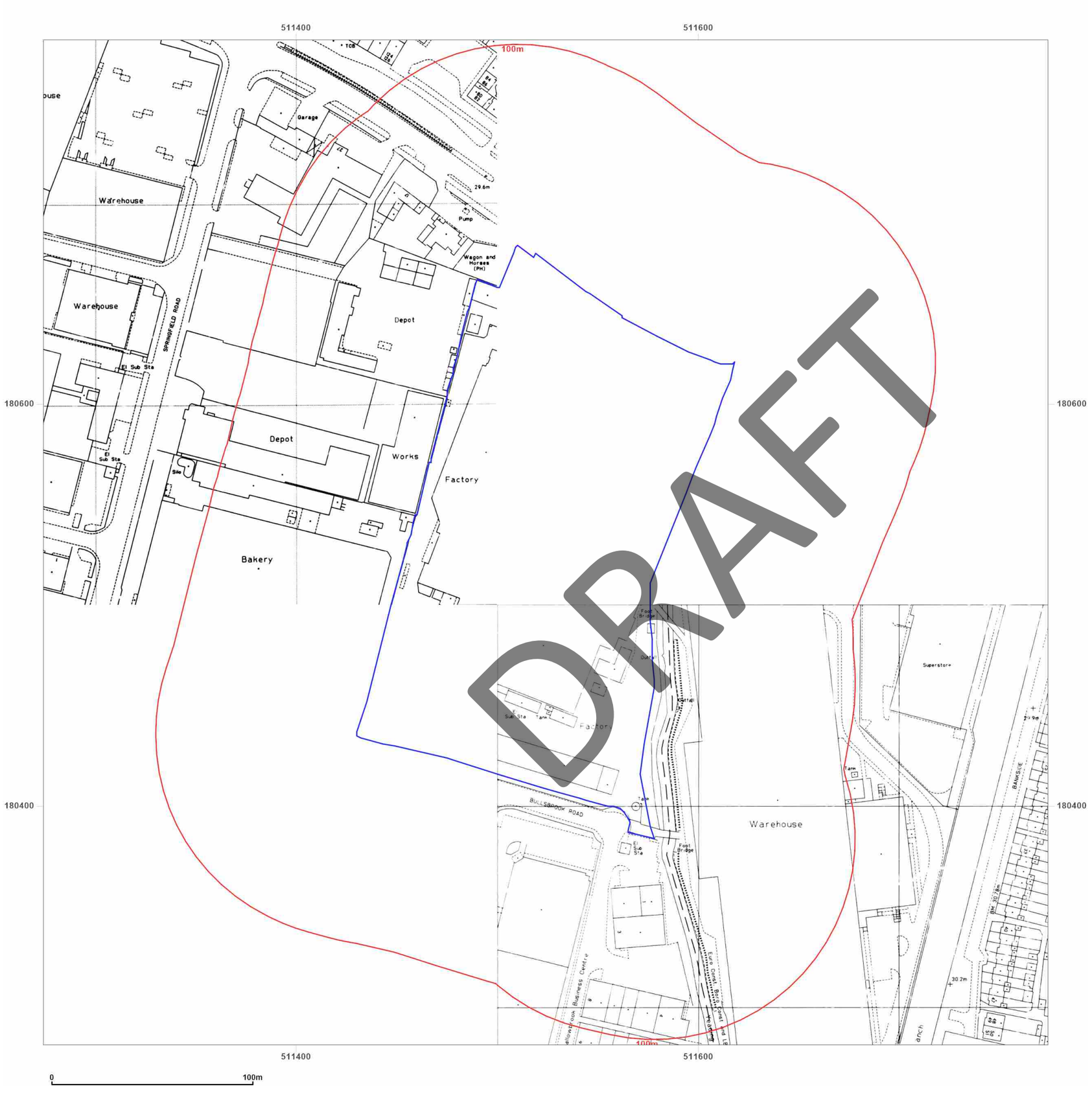

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1991-1993**
Scale: 1:1,250
Printed at: 1:2,000

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1991
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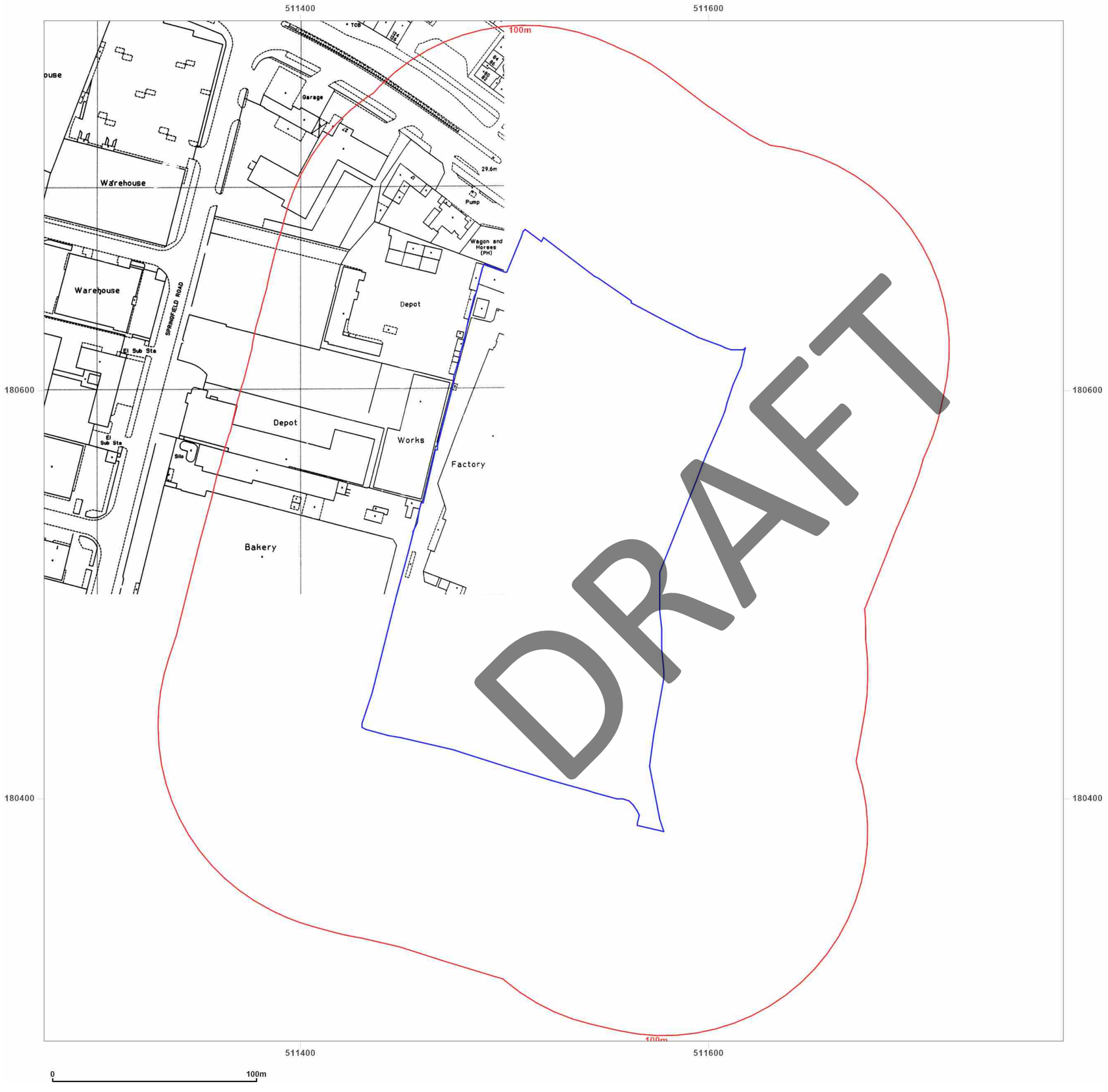

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

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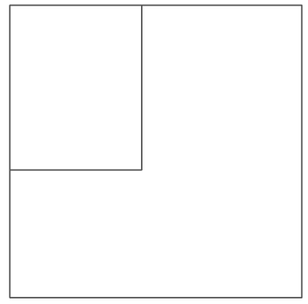
Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



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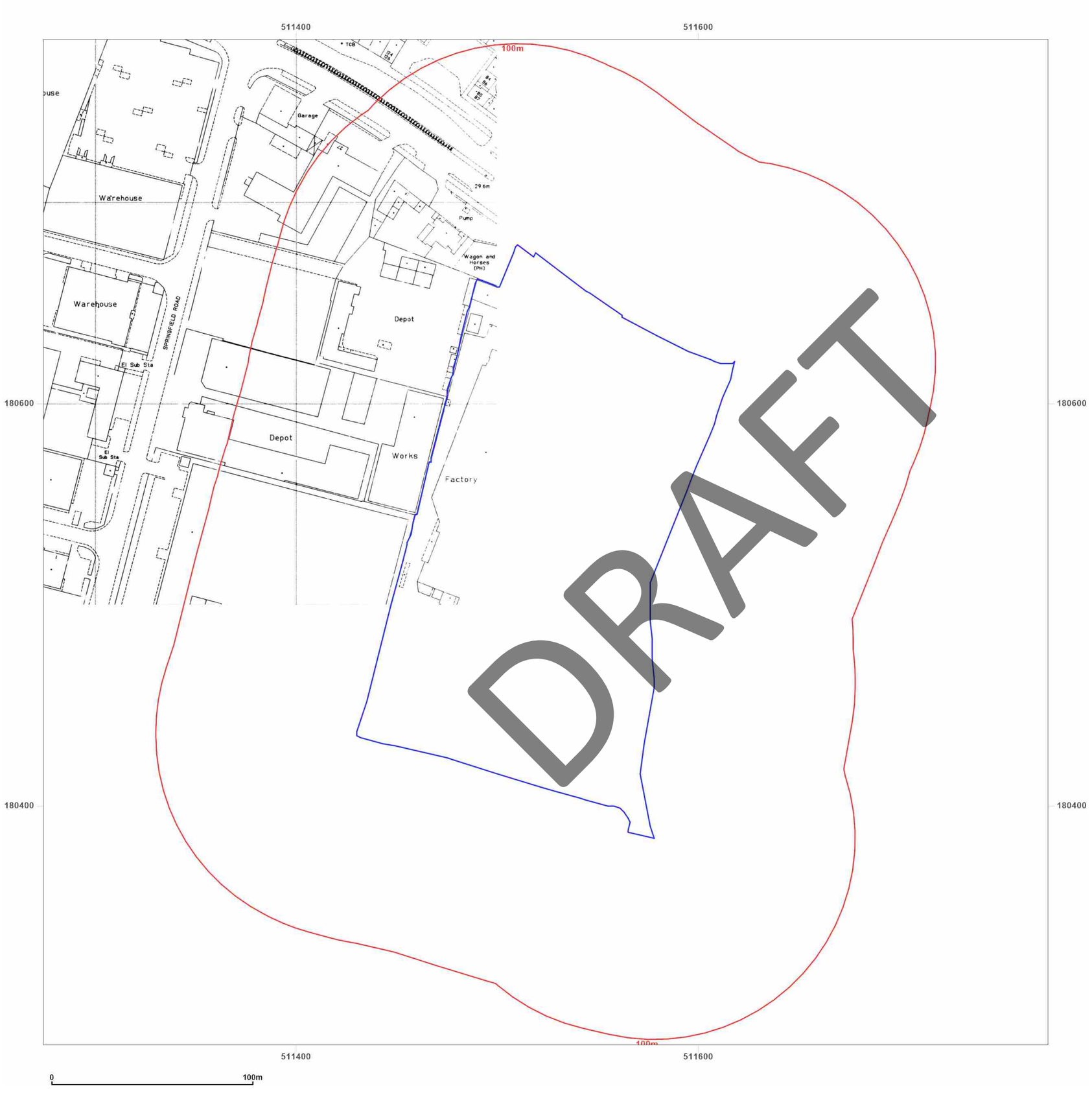

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1995**
Scale: 1:1,250
Printed at: 1:2,000

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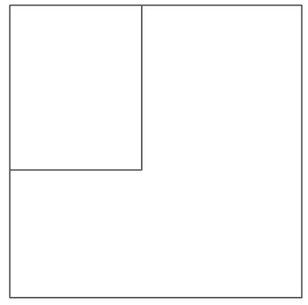
Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A



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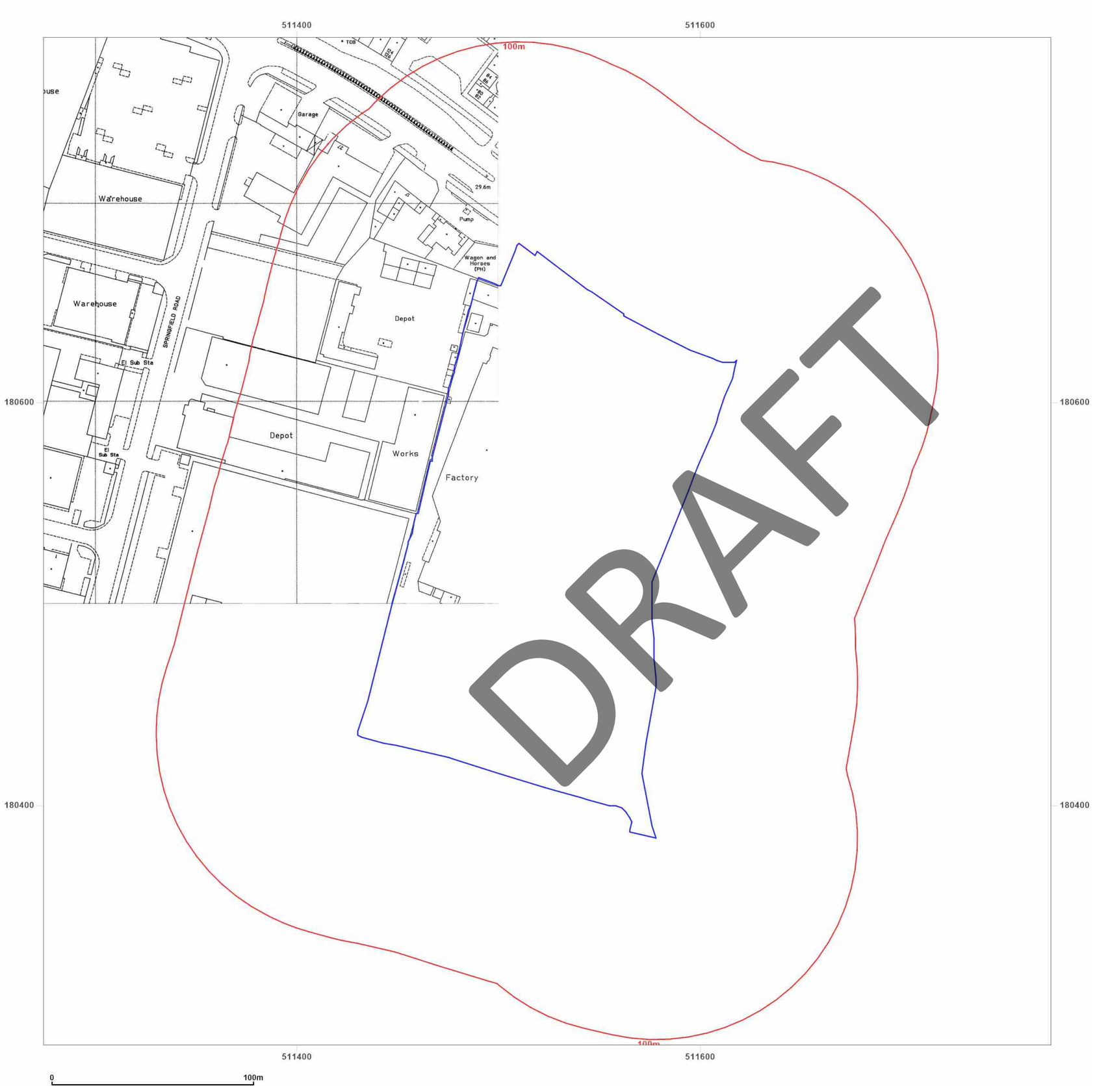

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: National Grid
Map date: **1995**
Scale: 1:1,250
Printed at: 1:2,000

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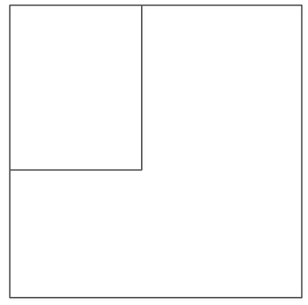
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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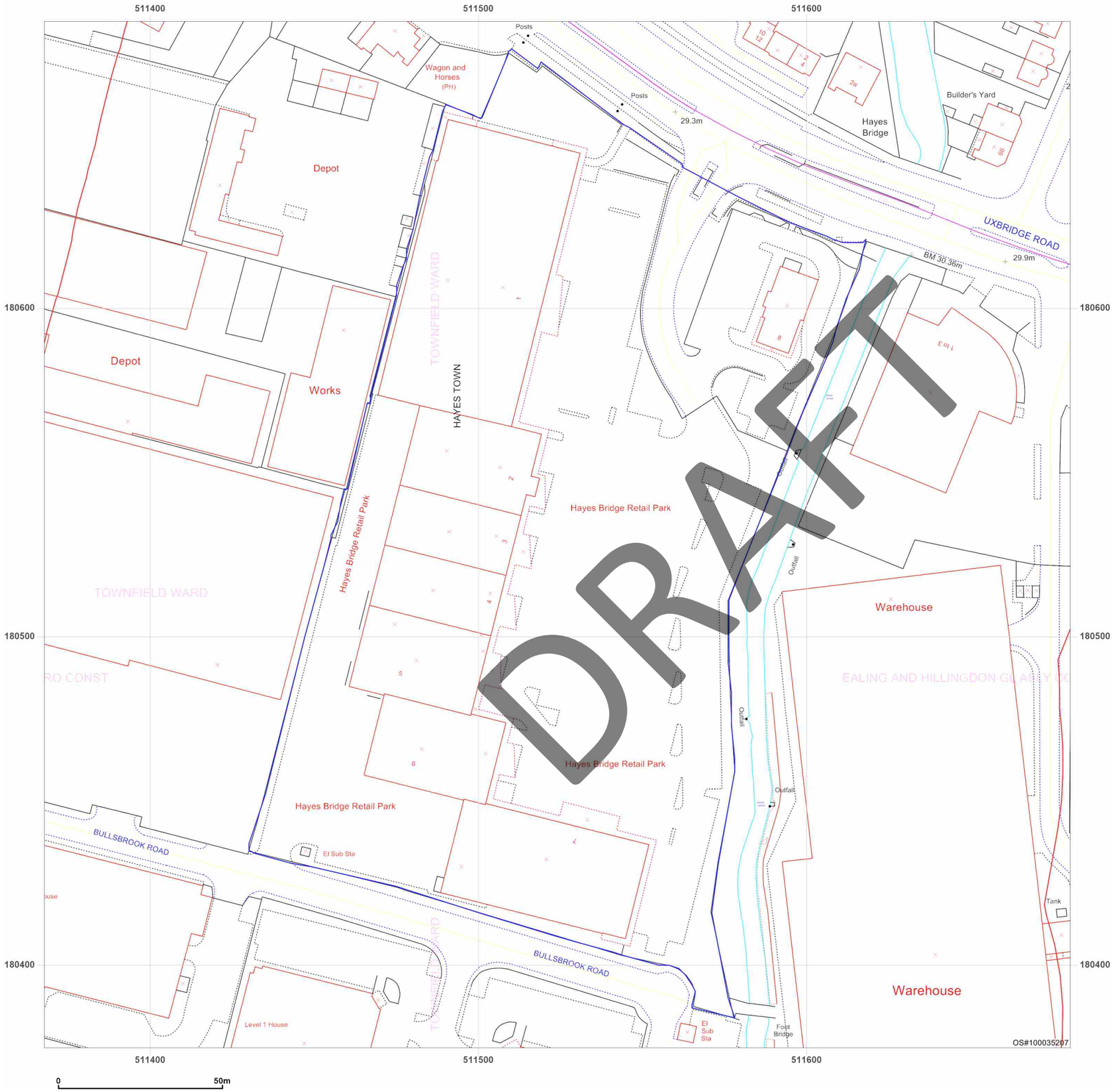

Groundsure INSIGHTS

Site Details:

HAYES BRIDGE RETAIL PARK,
UXBRIDGE ROAD, HAYES, UB4
0RH

Client Ref: 211425
Report Ref: GS-8054966
Grid Ref: 511524, 180531

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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2003

Powered by OS

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Production date: 19 July 2021

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

APPENDIX 4: ENVIRONMENTAL DATA

4.0 ENVIRONMENTAL DATA

4.1 Environmental Data

4.1.1 The following information has been ascertained from publicly available Environment Agency, BGS, Local Authority and NRPB records.

Environmental Records	On site	0-250m	Description
Pollution Incidents to controlled waters	0	4	No significant pollution incidents have occurred onsite or within 250m of the site.
Registered landfill or other waste disposal sites	0	0	N/A
Waste transfer sites	0	3	Licensed waste sites, which were identified within 250m of the site, include Hayes Depot 60m west of the site which is used for the storage of electrical insulating oils and has been active since 2015. Historical waste sites, which were identified within 250m of the site, include a recycling facility 10m east of the site and a recycling facility 30m east of the site. Despite the presence of the above, these are not considered to have a significant impact on the site.
Part A(2) and B activities	0	1	Vee Tec Ltd located 196m south of the site currently hold a Part B Permit for respraying of road vehicles. Due to the highly regulated nature of such licences, the presence of these is unlikely to represent a significant concern for the subject site.
Integrated Pollution Prevention and Control authorisations	0	0	N/A
Licensed radioactive substances	0	0	N/A
Enforcements, prohibitions or prosecutions	0	0	N/A
Fuel sites	0	0	N/A

Environmental Records	Description
Is the site in an area where there is a known risk of subsidence?	Records indicate that the area in general has a low – very low risk of subsidence hazards as a result of shrinking/swelling of underlying clay.
Is the site in a radon-affected area?	Less than 1% of homes are above the radon action levels, as such, no radon protection measures are considered necessary.
Are there any overhead transmission lines, masts or pylons for electricity on or within 250 metres of the site?	There are no obvious masts or pylons within 250 metres of the subject site.

APPENDIX 5: ENVIRONMENTAL CONTEXT

5.0 ENVIRONMENTAL SETTING

5.1 Geology/Hydrogeology

5.1.1 Geological mapping from the BGS website and environmental data from Groundsure shows the geological sequence outlined below. Reference has been made to the Water Framework Directive, to provide the following aquifer descriptions.

5.1.2

Formation	Aquifer Designation	Hydrogeological Significance
Lynch Hill Gravel Member (southern part of the site)	Principal Aquifer	These are 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. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Langley Silt Member (northern part of the site)	Unproductive Strata	Are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
London Clay Formation		

5.1.3 No third party boreholes have been identified on the British Geological Survey (BGS) borehole database within 50m of the site. However, 7no. boreholes were drilled as part of a third party ground investigation undertaken in 2018 (Ref: 12817). The ground conditions encountered varied across the site, but typically comprised Made Ground to a maximum depth of 2.35m below ground level (bgl), over Gravel and Clay up to 3.00mbgl where the boreholes terminated. Groundwater was encountered at between 2.70mbgl and 2.90mbgl.

5.1.4 There are reportedly no licensed groundwater abstractions within 1km of the subject site.

5.1.5 The site is not located within a groundwater Source Protection Zone (SPZ) as designated by the Environment Agency.

5.2 Hydrology

5.2.1 Surface water features in the vicinity of the subject site are as follows:

5.2.2

Surface Water Feature	Quality*	Distance	Direction
Yeading Brook	Good	0m	East

*Chemical water quality as classified under the EA's General Quality Assessment (GQA) Scheme.

5.2.3 In addition, the Grand Union Canal is situated some 170m east of the site.

5.2.4 No licensed surface water abstractions have been identified within a 1km radius of the site.

5.3	**Surrounding Land Use**
5.3.1	The subject site is surrounded by residential use to the north and Yeading Brook is located immediately to the east of the site. The site uses on the remaining boundaries are commercial/light industrial.
5.3.2	No Areas of Outstanding Natural Beauty, Environmentally Sensitive Areas, Sites of Special Scientific Interest or Special Protection Areas have been identified within a 1km radius.

APPENDIX 6: REVIEW OF PREVIOUS REPORTS

6.0 REVIEW OF PREVIOUS REPORTS

6.1	**Reports Reviewed**
6.1.1	Paragon has reviewed the following reports: • Phase I Environmental Review, produced by Ramboll in July 2016. Report Reference: UK11-23259. • Land Quality Statement, produced by Campbell Reith Consulting Engineers in September 2020. Report Reference: 12817.
6.2	**Key Details**
	Ramboll, 2016. Phase I Environmental Review
6.2.1	The Phase I Environmental review details that during a number of intrusive site investigations undertaken at the site between 1994 and 1997 two hotspots of contamination were identified in the southern and southeast parts of the site. Following the removal of a black tarry residue, it was considered at the time that the source of contamination had been removed. Groundwater monitoring was completed which identified contaminants concentrations were reducing and this was considered by Ramboll to be due to the remedial work. Given the setting and industrial context of the site, no specific groundwater remediation was required.
6.2.2	The London Borough of Hillingdon (LBH) Council reported that the Environment Agency was satisfied with the level of investigation and remediation undertaken and the site was deemed appropriate for the proposed end use. LBH also confirmed that the site has been identified for review under its Contaminated Land Strategy. The site was inspected in November 2009 and in March 2010 and it was determined to be suitable for use as a retail park. No further information was available for review.
	Campbell Reith, 2020. Land Quality Statement
6.2.3	An intrusive site investigation was undertaken by Campbell Reith Consulting Engineers in March 2018 as part of the planning application for a new development in the southeast corner of the site. The investigation comprised 7no. boreholes and 3no. monitoring visits for gas and groundwater. Soil samples were recovered and were sent for chemical analysis and no exceedances were identified when the results were compared against the generic assessment criteria (GAC) for a commercial end use. However, asbestos was identified in the majority of the samples tested.
6.2.4	Typically groundwater was encountered between 2.70m bgl and 2.90m bgl. It was considered by Campbell Reith that this was likely to be discontinuous, perched groundwater and occurs only where there is a confining layer beneath. 3no. groundwater samples were submitted for chemical analysis. The results found that two of the samples exhibited copper concentrations marginally in excess of the screening criteria. These values were considered by Campbell Reith to marginally exceed the Environmental Quality Standards (EQS) for a freshwater watercourse and were not considered further in the assessment.

6.2.5	3no. monitoring visits were undertaken over a five-week period. The Gas Screening Value (GSV) has been calculated using the worst case, representative ground gas concentrations and flow rates. The results found 4.6% v/v carbon dioxide with a flow rate of <0.1 l/hr. Campbell Reith concluded that the site would be classified under CIRIA Characteristic Situation 1 whereby gas protection measures would not be required.
6.2.6	Campbell Reith concluded the following: • "A very low risk has been identified associated with soils as no active pollutant linkages have been identified with regard to human health". • "A very low risk has been identified associated with groundwater as no concentrations of contaminants of concern were reported to be elevated above Environmental Quality Standards in groundwater samples. Furthermore, the unproductive Langley Silt and London Clay are considered protective of the underlying Principal Aquifer". • "A very low risk has been identified associated with surface water as no concentrations of contaminants in samples of groundwater were reported to be elevated above Environmental Quality Standards, protective of surface waters. Furthermore, a pathway between the aquifer and the surface water is likely to be broken by the concrete lining of the brook". • "The site has been classified as a CIRIA Characteristic Situation CS1 and gas protection measures are not required".
6.3	**Paragon Opinion**
6.3.1	Paragon has completed a review of third party reports for the site which were downloaded from the planning portal. These reports highlight that various phases of investigation and remediation have been completed at the site. A phase of investigation was completed in part of the site post remediation, and no signs of residual contamination were identified. Therefore, Paragon considers that the likelihood of significant sources of contamination remaining onsite is reduced. Nevertheless, the ground conditions will need to be re-assessed as part of the new planning application.

APPENDIX 7: PRELIMINARY RISK ASSESSMENT MATRIX

7.0 PRELIMINARY RISK ASSESSMENT MATRIX

7.1 Preliminary Risk Assessment

7.1.1 The method of risk evaluation is a qualitative method taken from CIRIA (2001) Contaminated land risk assessment. A guide to good practice (C552). The risk evaluation process involves the classification of the:

- Magnitude of the potential consequence (severity) of risk occurring; and
- Magnitude of the probability (likelihood) of the risk occurring.

7.2 Classification of Consequence

7.2.1 The potential consequences of contamination risks occurring at the site have been classified in accordance with Table A below, which is adapted from the CIRIA C552 guidance (2001):

Table A Classification of Consequence

Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part 2A. 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.	High concentrations of a contaminant at the surface in an area of landscaping / recreation. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse or asphyxiation.
Medium	Chronic damage to human health ("significant harm" as defined by DEFRA, 2012). Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceed the generic, or site specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary Aquifer. Death of a species within a designated nature reserve, e.g. a SSSI.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined by DEFRA, 2012). Damage to sensitive buildings/structures or the environment.	Pollution of non-classified groundwater. Damage to the building rendering it unsafe to occupy (e.g. 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.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

7.3 Classification of Probability

7.3.1 The process of risk assessment is an evaluation of the probability of harm, and comprises the identification of sources of contamination, receptors that may be affected by the contamination and pathways by which the receptors may be harmed.

7.3.2 The classification of probability, which is adapted from the CIRIA C552 guidance (2001), is set out in Table B below.

Table B Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Moderate Likelihood	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.

7.4 Risk Matrix

7.4.1 Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned from Table C below, adapted from CIRIA (2001).

7.4.2 ***Table C Consequence Against Probability***

		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

7.5 Risk Description

7.5.1 Definitions of the risk categories are as shown in Table D, adapted from C552, with an assessment of the further work that might be required:

Table D Description of the Classified Risks and Likely Action Required

Classification	Definition
Very High Risk	There is a high probability that severe harm could occur or there is evidence harm is currently happening. This risk, if realised, could result in substantial liability and urgent investigation and remediation are likely to be required.
High Risk	Harm is likely to occur. Realisation of the risk is likely to present a substantial liability and urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate Risk	It is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could occur and if realised the harm is not likely to be severe.
No Potential Risk	There is no potential risk if no pollution linkage has been established. The pollutant linkage will be discounted from the final Conceptual Site Model.

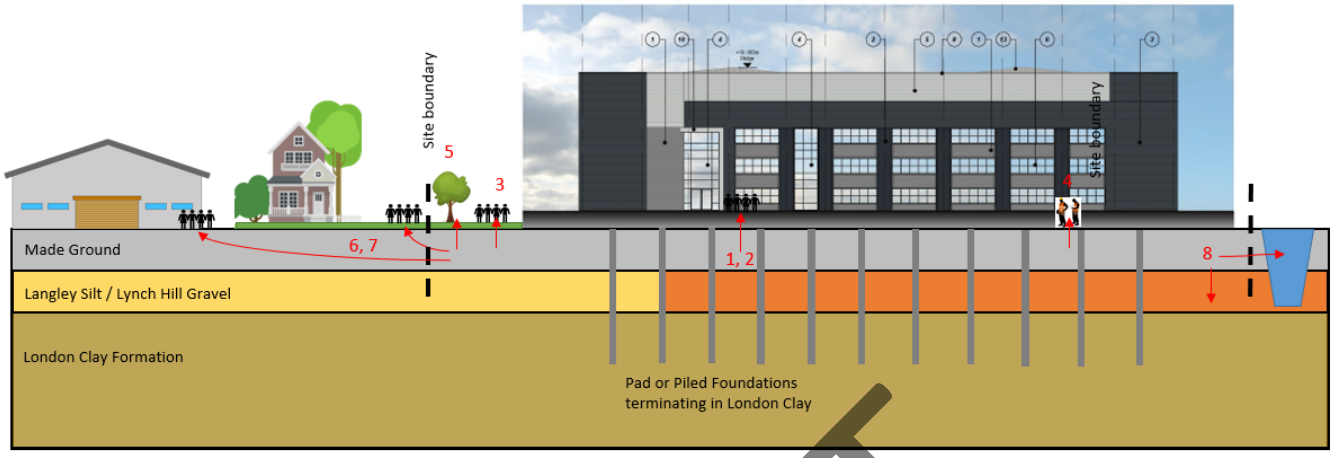
7.5.2 In some cases there may be some pollutant linkages that have a degree of risk that is considered between the classifications above, for example, low to moderate and moderate to high. In this scenario, Paragon would apply a precautionary principle and assess the risk in relation to the more conservative aspect of the risk until further data can be obtained to make an informed judgement of the risk.

7.6 Preliminary Conceptual Site Model (CSM)

7.6.1 Using the foregoing approach, a risk based assessment has been completed to assess the potential pollutant linkages associated with the development to assess the need for further action (if any).

7.6.2 The detailed conceptual site model is provided in Table 1 (Section 2) of the main report. A simplified diagrammatic representation is provided below.

PRELIMINARY CONCEPTUAL SITE MODEL



Potential pathways associated with the risks to onsite receptors include:

1. Migration of ground gas and vapour from Made Ground through soil pore space to the surface and / or via service entry points to the building at the commercial ground floor level.
2. Permeation of contaminants to pipework materials / structural elements.
3. Ingestion, inhalation and dermal contact with contaminated soils, by site users, arising from potentially contaminated Made Ground exposed via soft landscaped areas.
4. Ingestion, inhalation and dermal contact with contaminated soils and vapours by site workers.
5. Plant uptake in soft landscaped areas.

Potential pathways associated with the risks to offsite receptors include:

6. Ingestion, inhalation and dermal contact with contaminated soils, by users of the neighbouring commercial properties in areas of soft landscaping, arising from potentially contaminated Made Ground onsite.
7. Ingestion, inhalation and dermal contact with contaminated soils, by residents of offsite residential properties with private gardens, arising from potentially contaminated Made Ground onsite.
8. Migration of contaminants in groundwater to Controlled Waters.

APPENDIX 8: EXTENT OF SURVEY AND LIMITATIONS

EXTENT OF SURVEY AND LIMITATIONS

The report has been designed to identify potential source, pathway and receptor pollutant linkages by assessing the following:

- Current, former and proposed land uses on site including an inspection of the site and the immediate environs, information provided by the client on the current use of the site and a review of historical data;
- Environmental sensitivity of the site location as determined by factors including geology, hydrogeology, surface watercourses and neighbouring land uses; and
- Pertinent information provided by environmental regulators.

The environmental risk assessment will be undertaken with due regard to Contaminated Land Guidance documents (available and relevant at the time of issuing our report) issued by (but not limited to) the Environmental Protection Act Part IIA 1990 (and subsequent amendments), Department for Environment, Food and Rural Affairs (DEFRA) and its predecessors, the Environment Agency (and its devolved equivalents), British Standards Institute (BSi), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-13. No liability can be accepted for the effects of any future changes to such guidelines and legislation. In the event that guidance / legislation changes it may be necessary for Paragon to update or modify reports.

Specific comment is made regarding the site's status under Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012 (or devolved nation equivalents where relevant). Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

The risk assessment is dictated by the finite data on which it is based and is relevant only for the purpose of which the report is commissioned. If additional information or data becomes available which may affect the opinions expressed in our report, we reserve the right to review such information and, if warranted, to modify the risk assessment accordingly. We reserve the right to charge an additional fee for un-anticipated second opinion reviewing of previous reports. A site inspection was carried out within the scope of this assessment.

Paragon has been able to identify perceived risks based on the information reviewed and made available. Our Phase I Environmental Audit will be based on a visual inspection of the site, a review of available historical and environmental setting records, consultations with site representatives, pertinent information provided from the client and regulatory consultations. No samples will be taken as part of this study. No intrusive ground investigation work was carried out and, as such, actual risks have not been established. Actual risks can only be assessed following an intrusive investigation of the site.

With regard to flooding our commentary is based on the publicly available mapping only, which is available at the time of writing via the EA, NRW, SEPA and / or the BGS. We cannot accept any liability where the information is updated following the issue of our report. No inspection or comment is made on the below ground drainage installations or service conduits unless instructed otherwise.

Where budget costs are included in our report, these costs are for guidance purposes only.

Our report will be for the attention and purposes of the Addressee only and consequently we cannot accept any third party liability for the whole or any part thereof. Neither may the whole nor any part of our report, nor any reference thereto, be published in any way nor included in any published document, circulate or statement without our prior written approval of the form and context in which it may appear.

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