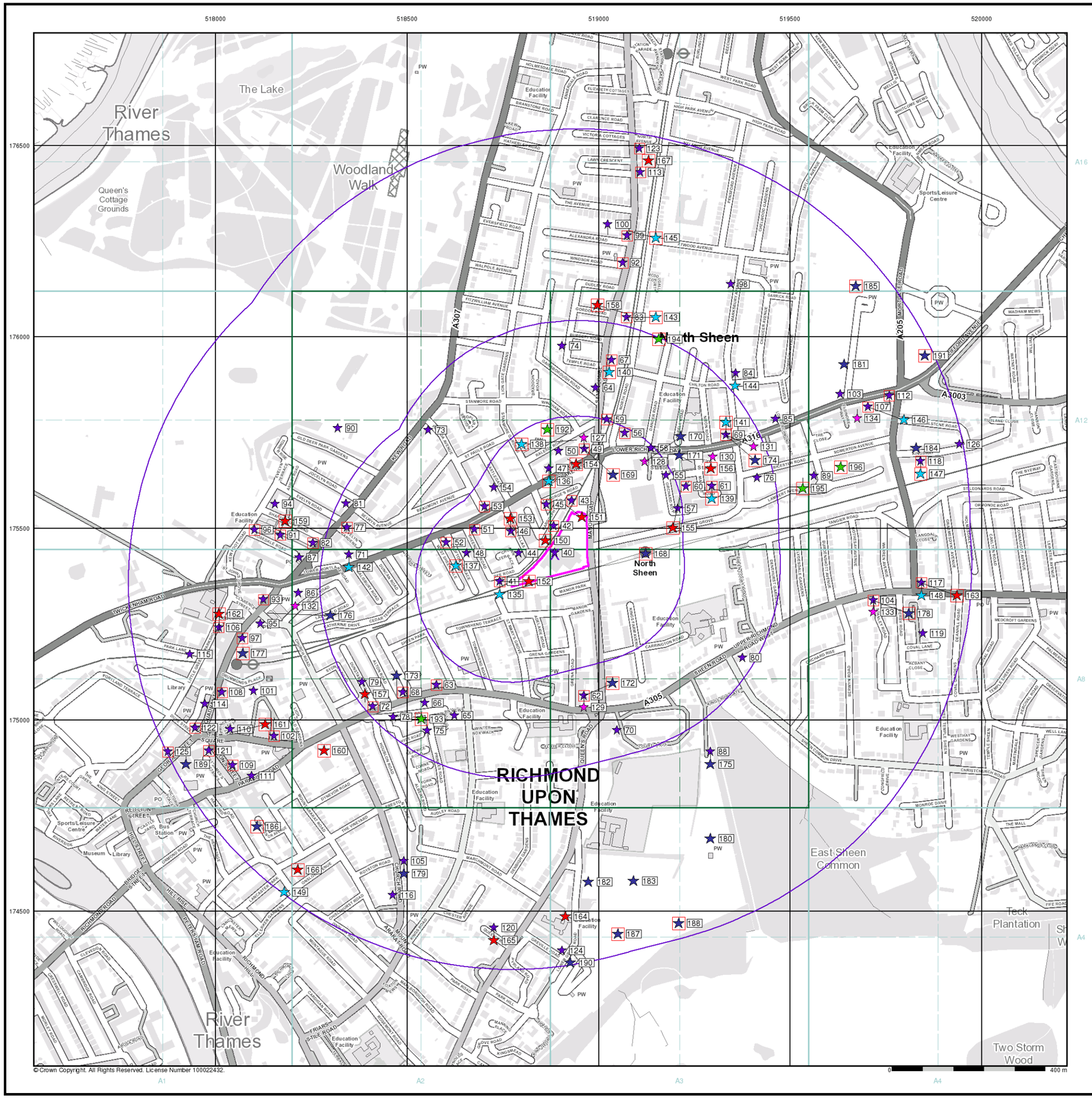


FAIRHURST

Industrial Land Use Map

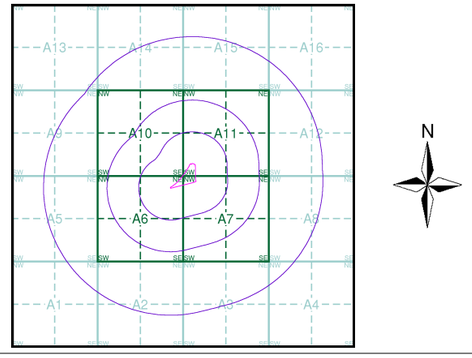
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



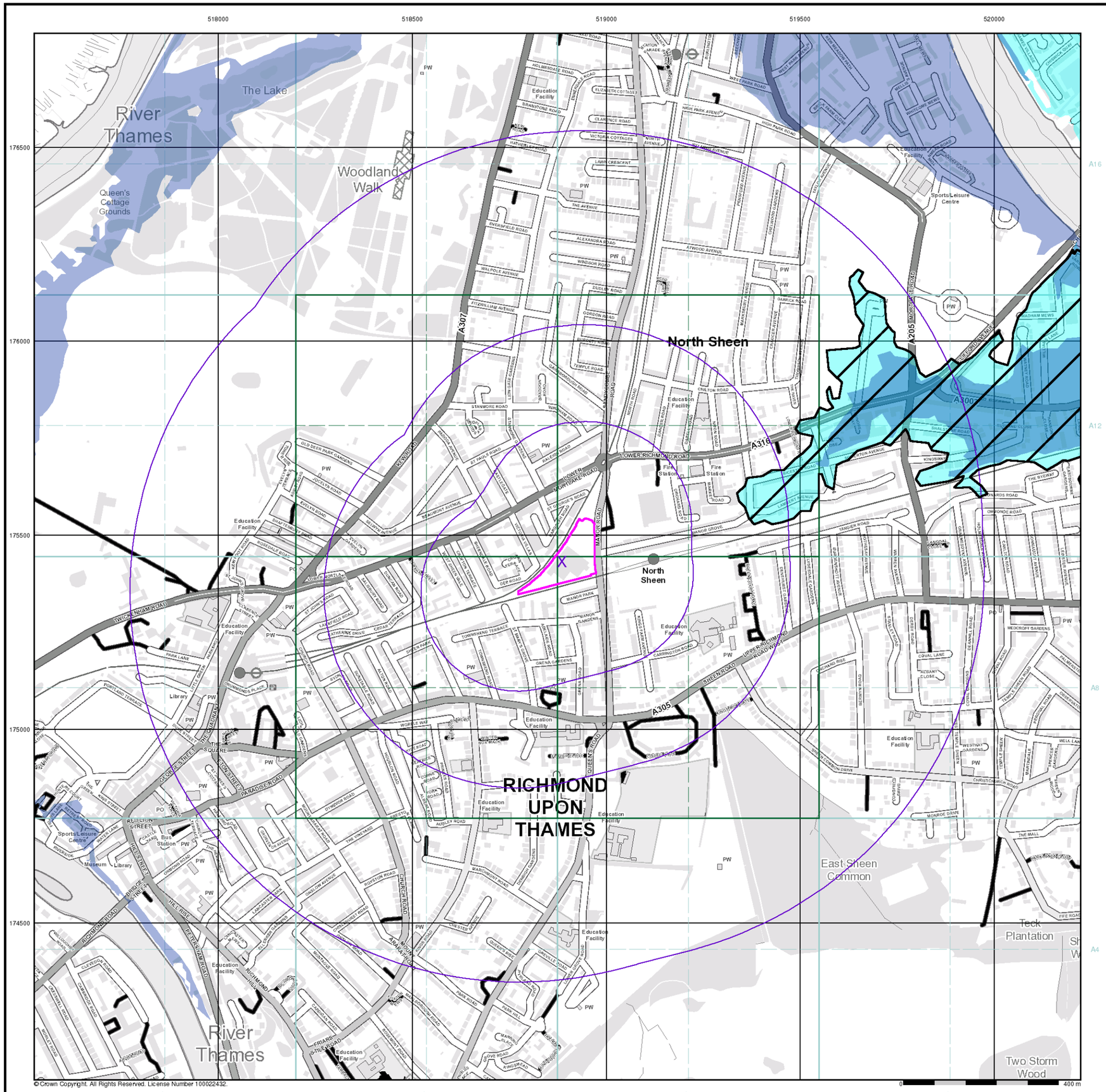
Order Details

Order Number:	142584674_1_1
Customer Ref:	Homebase, Richmond
National Grid Reference:	518890, 175430
Slice:	A
Site Area (Ha):	1.58
Search Buffer (m):	1000

Site Details

Homebase Ltd, 84, Manor Road, RICHMOND, TW9 1YB

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



FAIRHURST

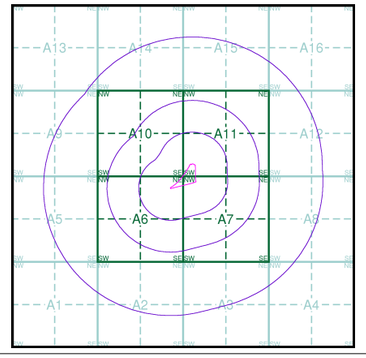
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



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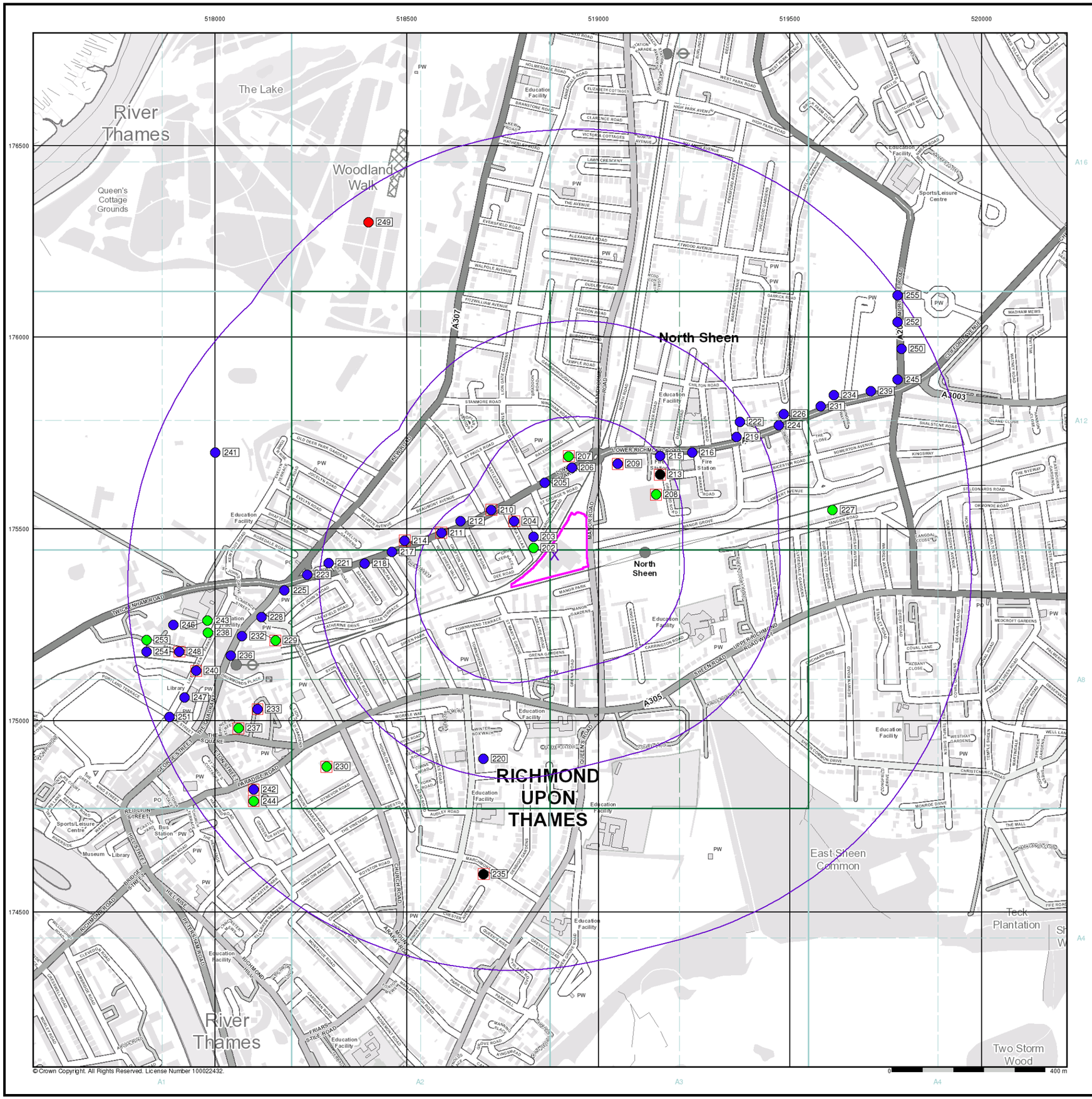


FAIRHURST

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

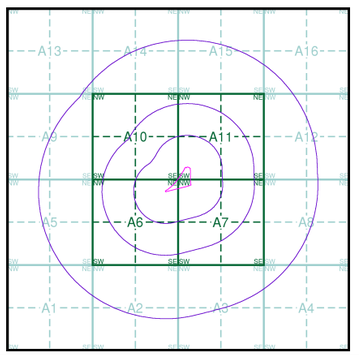
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



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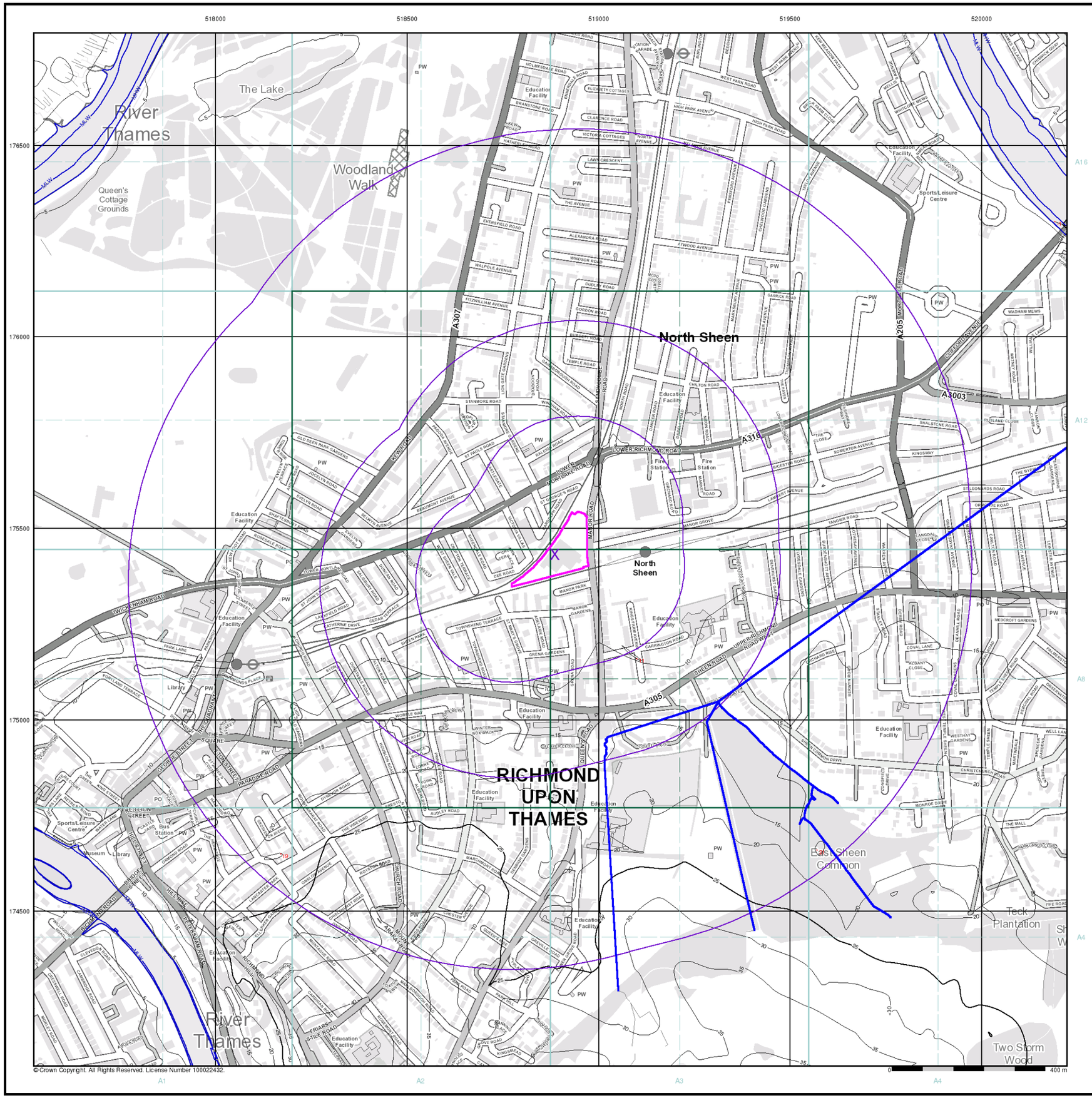


FAIRHURST

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

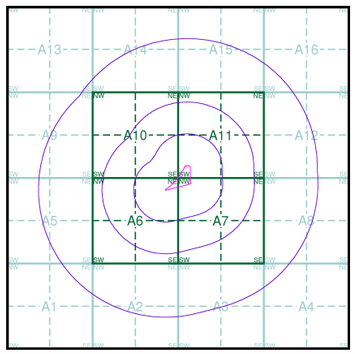
Standard Contour 105 100 95

Master Contour

Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



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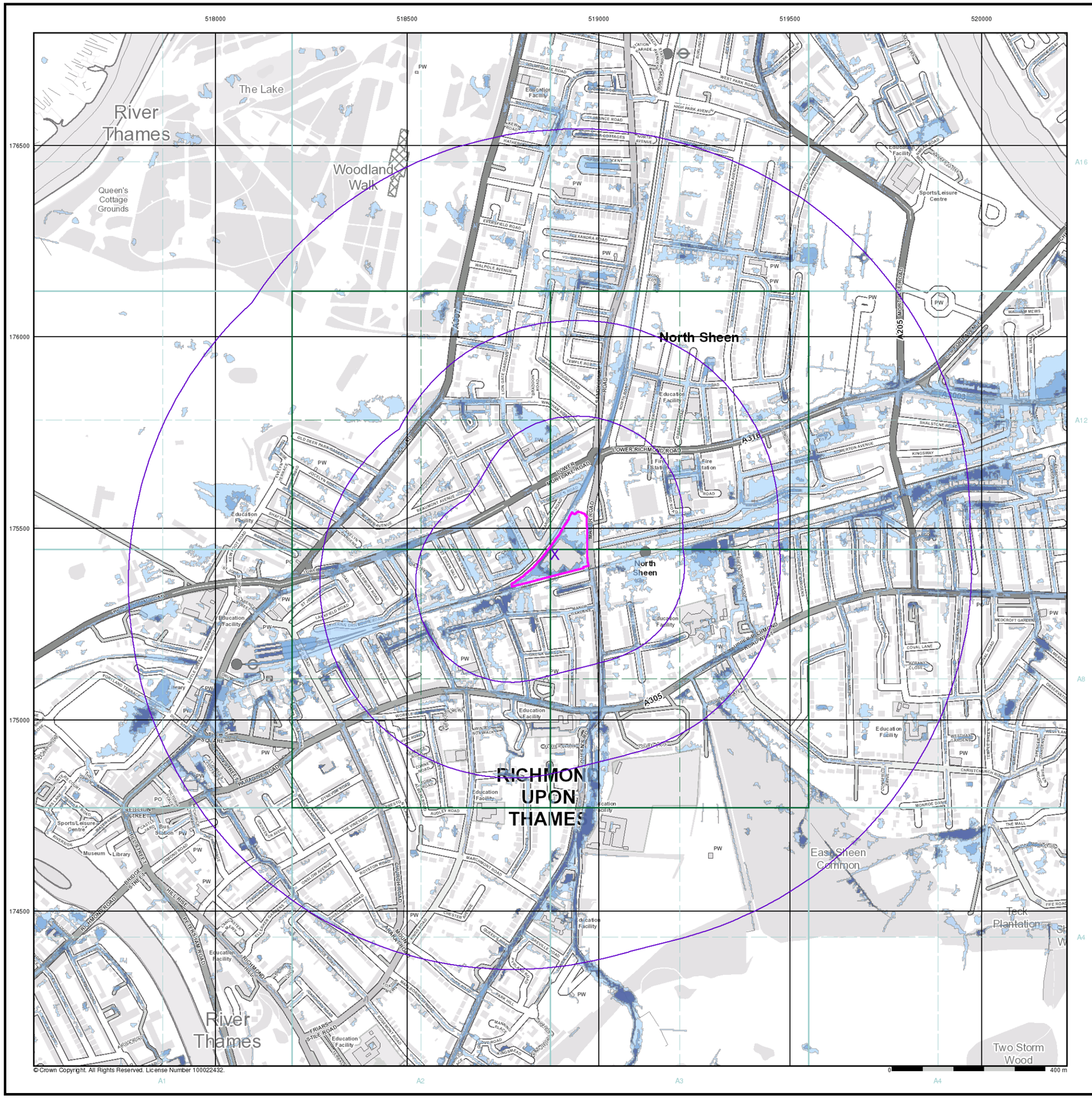


FAIRHURST

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Risk of Flooding from Surface Water

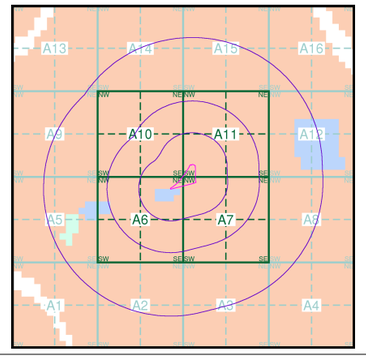
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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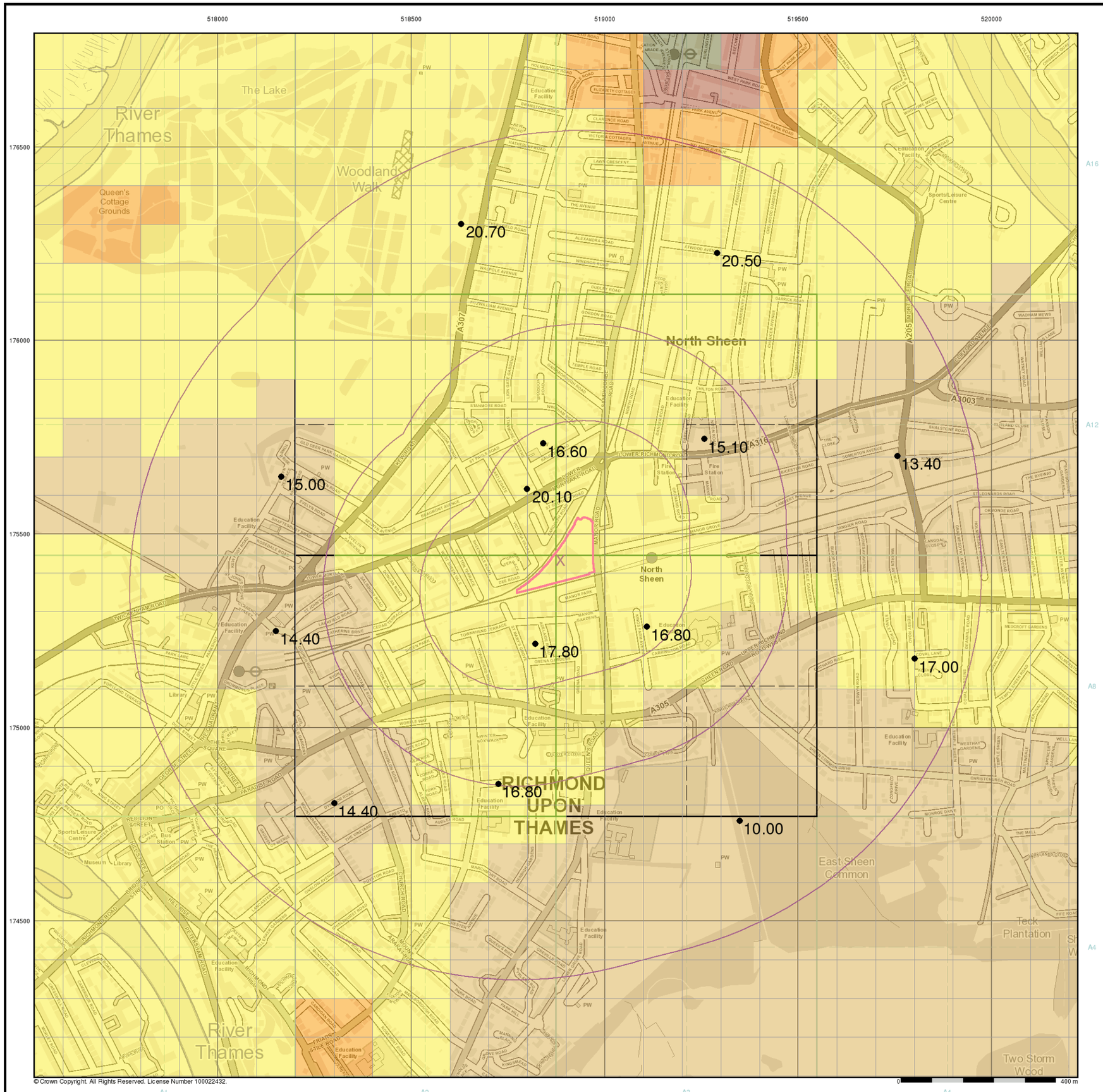


FAIRHURST

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

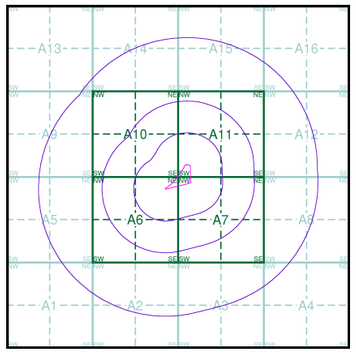
Urban Soil Chemistry Arsenic

● BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Urban Soil Chemistry Arsenic - Slice A



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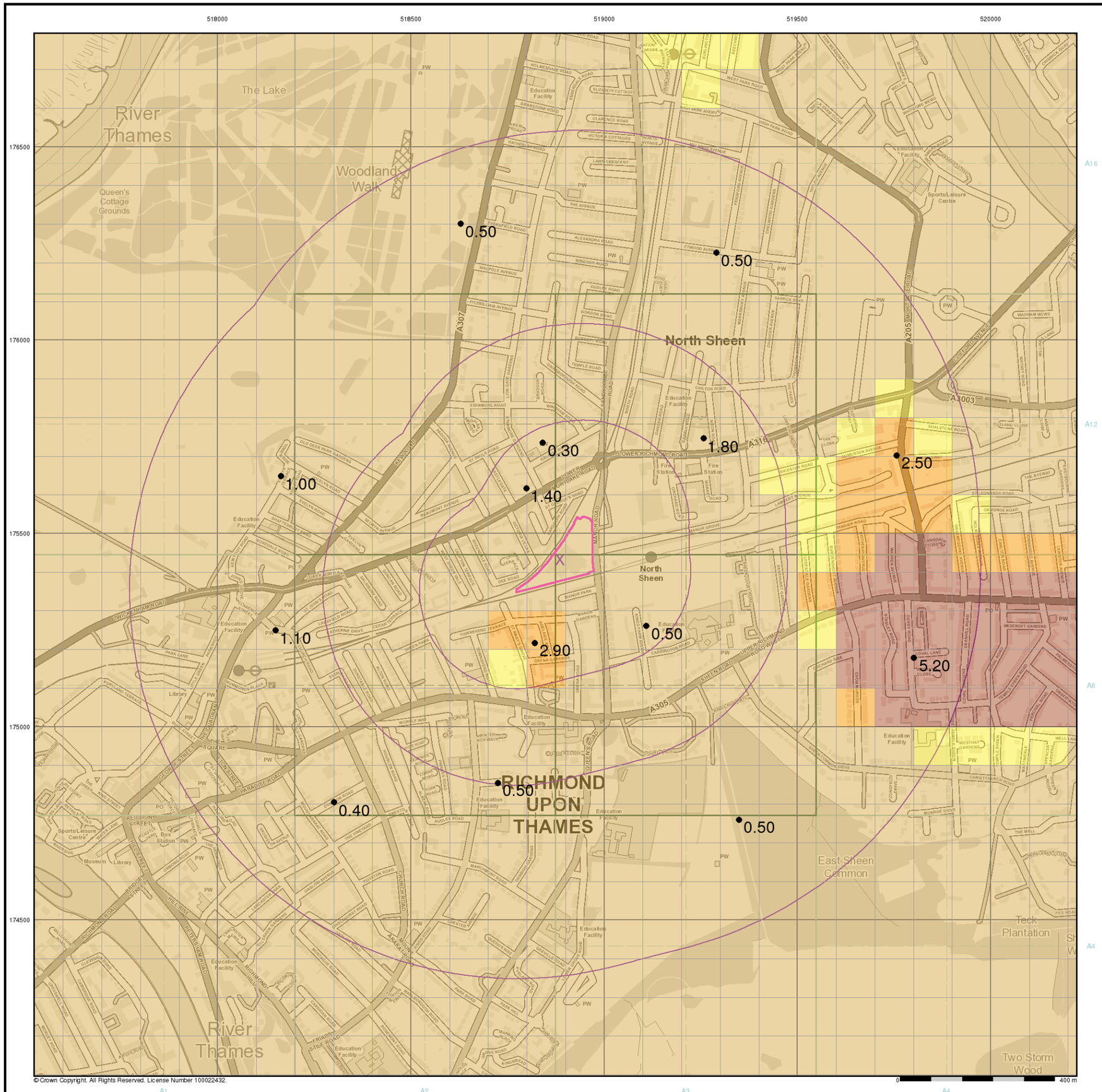


FAIRHURST

General

Specified Site | Specified Buffer(s) | Bearing Reference Point

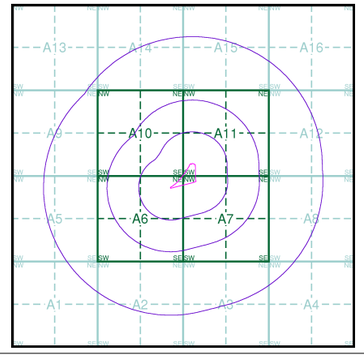
Urban Soil Chemistry Cadmium

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Urban Soil Chemistry Cadmium - Slice A



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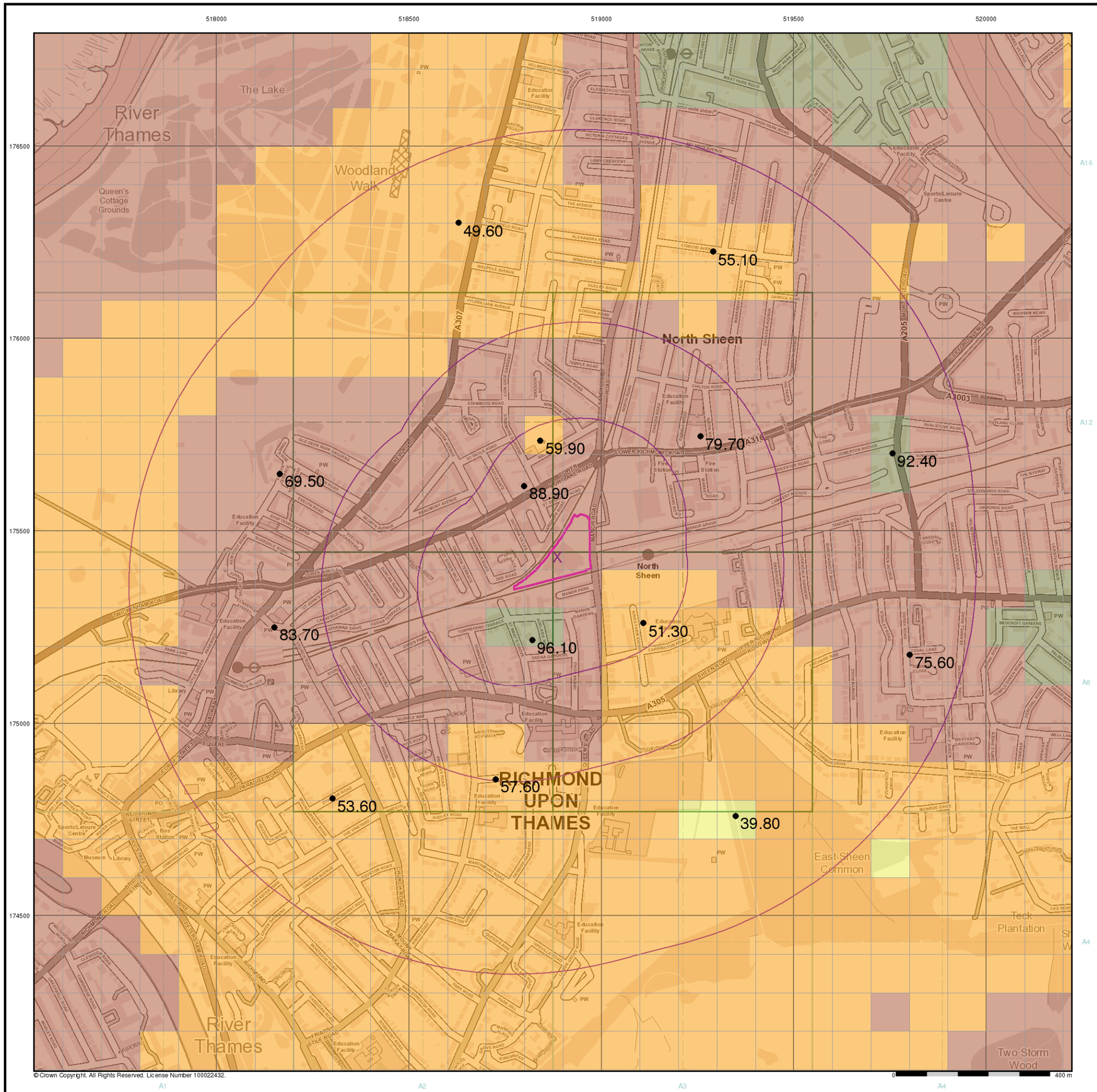


FAIRHURST

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

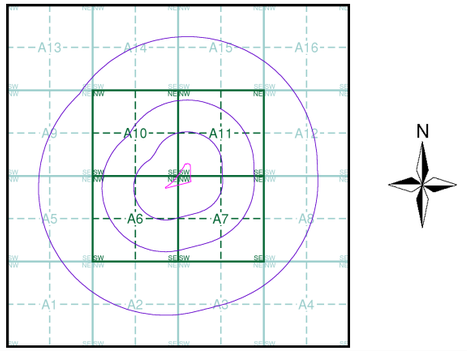
Urban Soil Chemistry Chromium

● BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Chromium Concentrations mg/kg

< 20
20 - 40
40 - 60
60 - 90
90 - 120
120 - 180
> 180

Urban Soil Chemistry Chromium - Slice A



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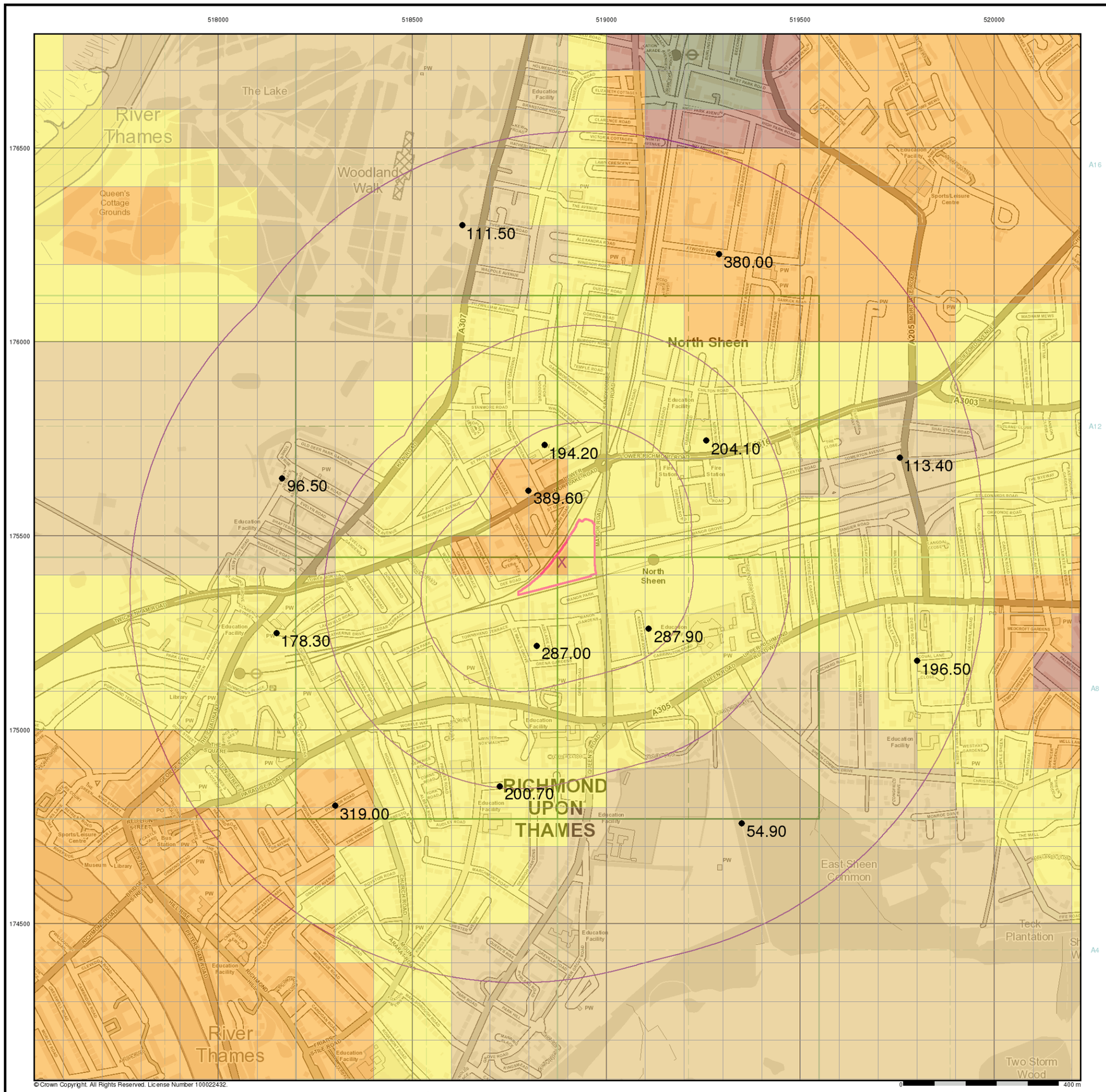


FAIRHURST

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

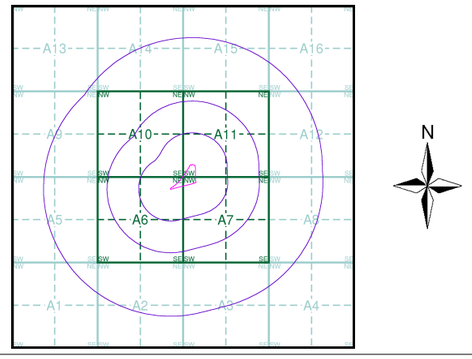
Urban Soil Chemistry Lead

● BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Lead Concentrations mg/kg

- < 150
- 150 - 300
- 300 - 600
- 600 - 900
- > 900

Urban Soil Chemistry Lead - Slice A



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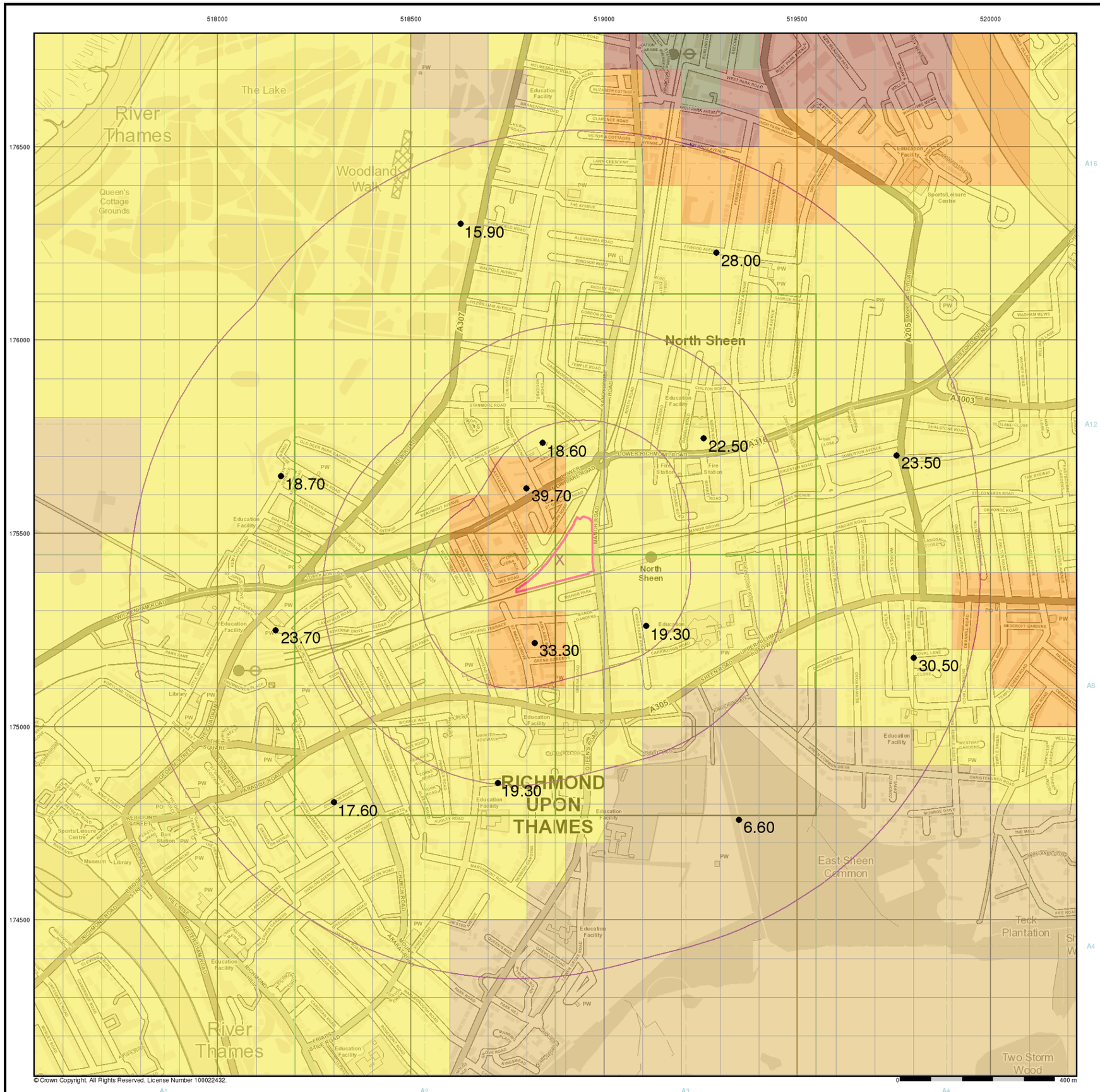


FAIRHURST

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

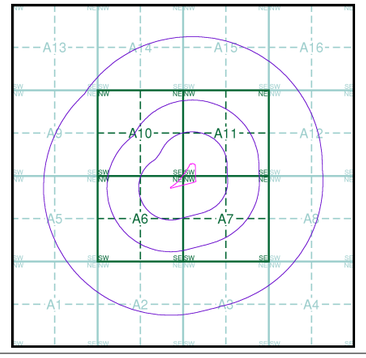
Urban Soil Chemistry Nickel

● BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Urban Soil Chemistry Nickel - Slice A



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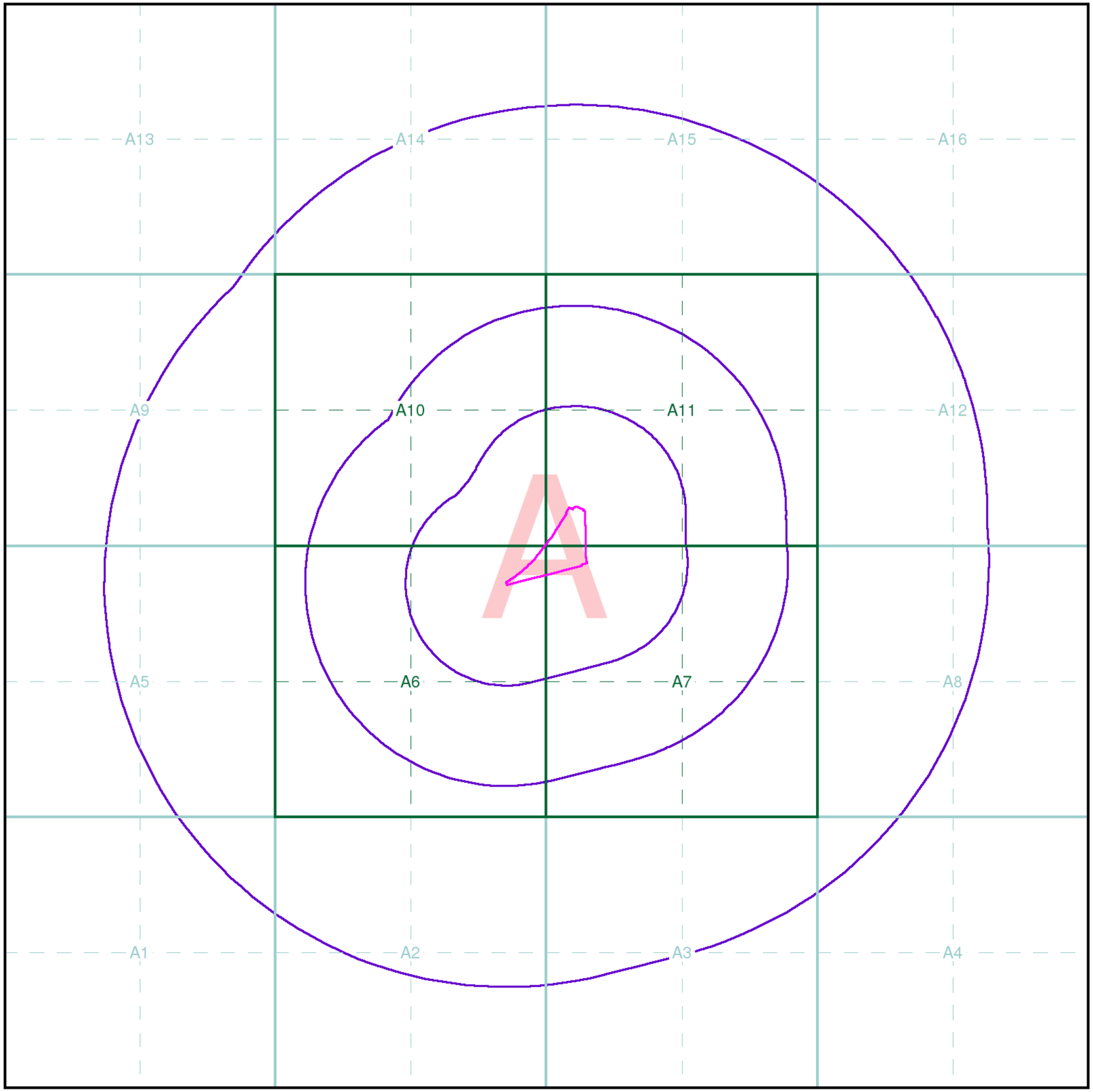

FAIRHURST

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 C Barber, Fairhurst, 135 Park Street, London, SE1 9EA,

Order Details

Order Number:	142584674_1_1
Customer Ref:	Homebase, Richmond
National Grid Reference:	518910, 175440
Site Area (Ha):	1.58
Search Buffer (m):	1000

Site Details

Homebase Ltd, 84, Manor Road, RICHMOND, TW9 1YB

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

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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APPENDIX C

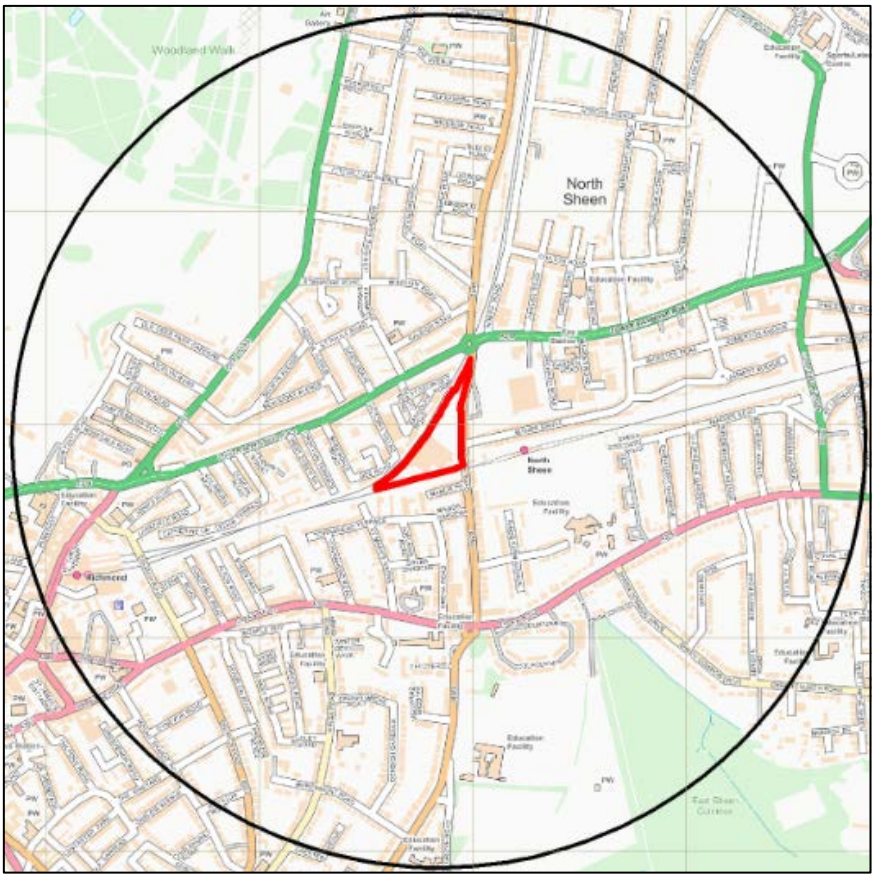
Detailed Unexploded Ordnance (UXO) Threat and Risk Assessment

Landmark Information Group Ltd
Imperium, Imperial Way
Reading, Berkshire
RG2 0TD
United Kingdom

T: +44 (0)844 844 9952
W: www.envirocheck.co.uk

Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment

Meeting the requirements of *CIRIA* C681 'Unexploded Ordnance (UXO) A guide for the Construction Industry' Risk Management Framework



6 ALPHA PROJECT NUMBER	P7115	**ORIGINATOR**	S. Barratt
LANDMARK ORDER NUMBER	190053937_1	**REVIEWED BY**	B. Wilkinson (10th January 2018)
CLIENT REFERENCE	126782	**RELEASED BY**	R. Griffiths (11th January 2018)
SITE	Homebase Ltd, 84, Manor Road, Richmond, TW9 1YB		
RATING	**HIGH** - This Site requires further action to reduce risk to ALARP during intrusive activities.		

Contents

FIGURES

Acronyms and Abbreviations

AA	Anti-Aircraft
AAA	Anti-Aircraft Ammunition
ALARP	As Low As Reasonably Practicable
AOD	Above Ordnance Datum
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
bgl	Below Ground Level
BGS	British Geological Survey
BH	Borehole
BPD	Bomb Penetration Depth
CDP	Cast Driven Piles
CFA	Continuous Flight Auger
CIRIA	Construction Industry Research and Information Association
CPT	Cone Penetration Testing
CS	County Series
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOD	Explosive Ordnance Disposal
GI	Ground Investigation
GIS	Geographic Information Systems
GL	Ground Level
GP	General Purpose
GPS	Global Positioning Systems
HAA	Heavy Anti-Aircraft
HE	High Explosive
HO	Home Office
HSE	Health and Safety Executive
IB	Incendiary Bomb
kg	Kilograms
km	Kilometres
LAA	Light Anti-Aircraft
LCC	London County Council
LE	Low Explosive
LSA	Land Service Ammunition
m	Metres
MoD	Ministry of Defence
mm	Millimetres
NEQ	Net Explosive Quantity
NFF	National Filling Factory
NGR	National Grid Reference
OD	Ordnance Datum
OS	Ordnance Survey
PM	Parachute Mine
PoW	Prisoner of War
RADAR	Radio Detection And Ranging
RAF	Royal Air Force
RN	Royal Navy
RNAS	Royal Naval Air Service
ROF	Royal Ordnance Factory
SAA	Small Arms Ammunition
TA	Territorial Army
TNT	Trinitrotoluene
UK	United Kingdom
UN	United Nations
USAAF	United States Army Air Force
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V Weapons	*Vergeltungswaffe* – Vengeance Weapons
WD	War Department
WWI	World War One
WWII	World War Two

EXECUTIVE SUMMARY

Study Site

The Client has defined the Study Site as "Homebase Ltd, 84, Manor Road, Richmond, TW9 1YB". The Site is located at NGR 518920, 175460.

Risk Level

HIGH

Potential Threat Sources

The most probable UXO threat is posed by WWII *German* HE bombs, whilst IBs and *British* AAA projectiles (which were used to defend against *German* bombing raids) pose a residual threat.

Risk Pathway

Given the types of UXO that might be present on-site, all types of aggressive intrusive engineering activities may generate a significant risk pathway.

Key Findings

During WWII, the Study Site was situated within *Richmond Municipal Borough,* which recorded 22 HE bomb strikes per 100 hectares, a low level of bombing.

Luftwaffe aerial reconnaissance photography associated with the Site did not identify any primary bombing targets located on-site or within 1,000m of the Site boundary.

ARP records associated with the Site did not note any HE bomb strikes within it however, six were recorded; 5m to the south, 50m to the north-west, 55m to the north-west, 70m to the south-west, 130m to the north-west and 155m to the east.

Official bomb damage mapping was not available. However, an analysis of post-war mapping identified "*Ruins"* 40m to the south and 65m to the south. In addition, photographic evidence and further research identified bomb damage along *Stanmore Gardens* located 180m north-west and *Peldon Avenue* located 345m to the south.

Pre-WWII mapping (1934 - 1936) and aerial photography (1945) associated with the Site shows that it was located within a densely developed urban area during WWII, with the Site itself consisting of a timber yard and several small structures. As a result, it is considered likely that employees from the timber yard may have observed and reported any UXB entry holes which would have been dealt with at the time. However, given the trajectory of incoming weapons this in fact may not have been the case.

The Site has undergone significant post-war redevelopment in some areas, with the construction and demolition of small structures between the late-1940s and late-1980s, prior to the development of the large superstore in the 1990s. Consequently, it is considered likely that any UXO within the structural foundations of post-war buildings would have been discovered and removed, however, the potential for deep buried UXO to be present within remaining areas is assessed to be extant. Given the immediate vicinity of the Site was subjected to bombing, the following risk mitigation measures are recommended as a minimum, in order to reduce risks ALARP, during intrusive works in all previously undisturbed ground i.e. that which has not previously been excavated, probed, drilled or otherwise intrusively disturbed since it had potentially become contaminated with UXO.

EXECUTIVE SUMMARY (…continued)

Recommended Risk Mitigation

All Groundworks in All Areas:

1. Operational UXO Emergency Response Plan; appropriate Site Management documentation should be held on-site to guide and plan for the actions which should be undertaken in the event of a suspected or confirmed UXO discovery (this plan can be supplied by *6 Alpha*);

2. UXO Safety & Awareness Briefings; the briefings are essential when there is a possibility of an UXO / UXB encounter and are a vital part of the general safety requirement. All personnel working on the Site should receive a briefing on the identification of an UXO / UXB, what actions they should take to keep people and equipment away from such a hazard and to alert Site management. Information concerning the nature of the UXO / UXB threat should be held in the Site office and displayed for general information on notice boards, both for reference and as a reminder for ground workers. The Safety & Awareness briefing is an essential part of the *Health & Safety Plan* for the Site and helps to evidence conformity with the principles laid down in the *CDM* regulations 2015 (this briefing can be delivered directly, or in some cases remotely, by *6 Alpha*).

Excavations and Trial Pits into Previously Undisturbed Ground:

3. EOD Banksman Support; an EOD Engineer should be on-site, in the EOD Banksman role, to monitor all 'open' intrusive works into previously undisturbed ground as they progress and identify suspicious items which may or may not be UXO / UXB whilst also acting as the first point of contact for all UXO associated matters (this service can be provided by *6 Alpha*).

Cable Percussive Boreholes and Piling into Previously Undisturbed Ground:

4. Intrusive UXO Survey; Where 'blind' intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or MagCone techniques) is strongly recommended. Such a survey should extend to the *assessed average bomb penetration depth* or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as the target UXO in advance of said works. (this service can be provided by *6 Alpha*).

For further information, please contact Envirocheck:

Website: http://www.envirocheck.co.uk

Telephone: +44 (0)844 844 9952

Email: customerservice@envirocheck.co.uk

ASSESSMENT METHODOLOGY

Approach

6 Alpha Associates is an independent, specialist risk management consultancy practice, which has assessed the risk of encountering UXO (as well as buried bulk high explosives) at this Site, by employing a process advocated for this purpose by *CIRIA*. The *CIRIA* guide for managing UXO risks in the construction industry (C681) not only represents best practice but has also been endorsed by the *HSE*. Any risk mitigation solution is recommended *only* because it delivers the Client a risk reduced to ALARP at best value.

UXO hazards can be identified through the investigation of local and national archives associated with the Site, *MoD* archives, local historical sources, historical mapping as well as contemporaneous aerial photography (if it is available). Hazards will have only been recorded if there is specific information that could reasonably place them within the boundaries of the Site. The amalgamation of information is then assessed to enable the researcher to provide relevant and accurate risk mitigation practices.

The assessment of UXO risk is a measure of *probability of encounter* and *consequence of encounter*; the former being a function of the identified hazard and proposed development methodology; the latter being a function of the type of hazard and the proximity of personnel (and/or other 'sensitive receptors', such as equipment) to the hazard, at the moment of encounter.

If UXO risks are identified, the methods of mitigation we have recommended are considered reasonably and sufficiently robust to reduce them to ALARP. We advocate the adoption of the legal ALARP principle because it is a key factor in efficiently and effectively ameliorating UXO risks. It also provides a ready means for assessing the Client's tolerability of UXO risk. In essence, the principle states that if the cost of reducing a risk significantly outweighs the benefit, then the risk may be considered tolerable. This does not mean that there is never a requirement for UXO risk mitigation, but that any mitigation must demonstrate that it is beneficial. Any additional mitigation that delivers diminishing benefits and that consume disproportionate time, money and effort are considered *de minimis* and thus unnecessary. Because of this principle, UXB and UXO risks will rarely be reduced to zero (nor need they be).

Important Notes

Key source material is referenced within this document, whilst secondary/anecdotal information may be available upon request.

Although this report is up to date and accurate at the time of writing, our databases are continually being populated as and when additional information becomes available. Nonetheless, *6 Alpha* have exercised all reasonable care, skill and due diligence in providing this service and producing this report.

The assessment levels are based upon our professional opinion and have been supported by our interpretation of historical records and third party data sources. Wherever possible, *6 Alpha* has sought to corroborate and to verify the accuracy of all data we have employed, but we are not accountable for any inherent errors that may be contained in third party data sets (e.g. *National Archive* or other library sources), and over which *6 Alpha* cannot exercise control.

STAGE ONE – SITE LOCATION AND DESCRIPTION

Study Site

The Client has defined the Study Site as "Homebase Ltd, 84, Manor Road, Richmond, TW9 1YB". The Site is located at NGR 518920, 175460. The Site location and Site boundary are presented at *Figures 1* and *2* respectively.

Location Description

The Study Site is situated within the *London Borough of Richmond-Upon-Thames* and covers an area of 1.8 hectares (ha).

Furthermore, the Site is bounded by:

- North-west: A railway line and industrial facilities*;*
- East: *Manor Road;*
- South: A railway line and residential houses.

Aerial Photography (2018) (*Figure 3*)

Aerial photography (2018) corroborates the information above and shows that the Site is situated within a densely developed urban area. The Study Site itself consists of a large industrial building, hard-standing and a large Hard-standing car park.

Proposed Works

The Client has described the following:

- *"Medium Trial Pit between 1m and 5m below ground level;*
- *Cable percussive boreholes up to 25m bgl;*
- *Basement and piling anticipated".*

Ground Conditions

It is important to establish the specific ground conditions in order to determine the maximum *German* UXB penetration depth as well as the potential for other types of munitions to be buried.

If the Site investigations and/or construction methodologies change, and/or if a specific methodology is to be employed, and/or if the scope of work is focused upon a specific part of the Site, then *6 Alpha* are to be informed so that the prospective UXO risks and the associated risk mitigation methodology might be re-assessed. Certain ground conditions may also constrain certain types of UXO risk mitigative works e.g. magnetometer survey is adversely affected in mineralised and made ground.

It is important to establish the provenance of made ground, where this is recorded as being part of the site ground make-up, in order to accurately determine the ground levels at the time when the site may have become potentially contaminated with UXO and so as to accurately determine the average / maximum bomb penetration depths and make appropriate recommendations aimed at reducing the risk to ALARP.

STAGE ONE – SITE LOCATION AND DESCRIPTION (…continued)

Ground Conditions

BGS borehole log "TQ17NE436 – Victoria Villas Richmond Upon Thames 1" (located 25m to the west), recorded the following strata:

Depth bgl (m)	Strata	Description
0.00m to 0.10m	Made Ground	Concrete
0.10m to 0.80m	Made Ground	Brown clayey silty sand with some gravel of brick, flint, concrete and clinker and some lenses of soft to firm brown sandy clay with occasional brick cobbles (0.70m).
0.80m to 1.50m	Clay	Soft brown sandy clay (0.70m)… from 1.00m, some fine to medium flint gravel.
1.50m to 1.80m	Sand	Medium dense brown fine to coarse silty sand with some lenses of sandy clay and some fine to coarse subrounded to angular flint gravel (0.30m).
1.80m to 2.80m	Sand/Gravel	Medium dense brown fine to coarse sand and fine to coarse angular to rounded flint gravel (1.00m).
2.80m to 3.00m	Clay	Soft grey sandy clay with a little flint gravel.
3.00m to 3.90m	Sand	Medium dense brown fine to coarse sand with some fine to medium angular to subrounded flint and quartzite gravel (0.90m).
3.90m to 6.00m	Sand/Gravel	Medium dense brown slightly clayey silty fine to coarse sand and fine to coarse rounded to angular flint and quartzite gravel (2.10m) …from 5.00m, very sandy gravel.
6.00m to 6.30m	Clay	Stiff grey clay with some brown sand and fine to coarse flint gravel (0.30m).
6.30m to 15.00m	Clay	Stiff extremely closely fissured grey-brown clay with occasional black silt partings (8.70m). …from 10.55m, very closely fissured. …from 13.00m, very stiff …from 13.45m, occasional black silty sand partings.

STAGE TWO – REVIEW OF HISTORICAL DATASETS

Sources of Information Consulted

The following primary information sources have been used in order to establish the background UXO threat:

1. *6 Alpha*'s *Azimuth* Database;
2. *Home Office* WWII Bomb Census Maps;
3. WWII and post-WWII aerial photography;
4. Official Abandoned Bomb Register;
5. Information gathered from the *National Archives* at *Kew*;
6. Historic UXO information provided by *33 Engineer Regiment* (Explosive Ordnance Disposal) at *Carver Barracks, Wimbish*.

Potential Sources of UXO Contamination

In general, there are several activities that might contaminate a site with UXO but the three most common ways are: legacy munitions from military training/exercises; deliberate or accidental dumping (AXO) and ordnance resulting from war fighting activities (also known as the Explosive Remnants of War (ERW)).

During WWII, the *Luftwaffe* undertook bombing campaigns all over the *UK*. The most common type of UXO discovered today is the aerially delivered high explosive (HE) bomb, which are comparatively thick-skinned and dropped from enemy aircraft. If the bomb did not detonate when it was dropped, the force of impact enabled the UXO to penetrate the ground, often leaving behind it a UXB entry hole. These entry holes were not always apparent and some went unreported, leaving the bomb buried and unrecorded. More rarely, additional forms of *German* UXO are occasionally discovered including *inter alia V1* and *V2* rockets, Incendiary Bombs (IBs), and Anti-personnel (AP) bomblets.

Although the *Luftwaffe* had designated primary bombing targets across the *UK*, their high-altitude night bombing was not accurate. As a result, thousands of buildings were damaged and civilian fatalities were common. Bombs were also jettisoned over opportunistic targets and residential areas were sometimes struck.

As the threat of invasion lingered over *Britain* during WWII, defensive actions were undertaken. The *British* and *Allied Forces* requisitioned large areas of land for military training and bomb storage (including HE bombs, naval shells, artillery and tank projectiles, explosives, LSA and SAA). Thousands of tonnes of these munitions were used for the *Allied Forces* weapon testing and military training alone. It has been estimated that at least 20 per cent of the *UK*'s land has been used for military training at some point.

The best practice guide for dealing with your UXO risks on land (CIRIA publication C681) suggests that approximately 10 per cent of all munitions deployed failed to function as designed. ERW are therefore, still commonly encountered, especially whist undertaking construction and civil engineering groundwork.

Furthermore, in exceptional circumstances, UXO is discovered unexpectedly and without apparent rational explanation. There are several ways this might occur:

- When *Luftwaffe* aircraft wished to swiftly escape e.g. from an aerial attack, they would jettison some or all of their bombs and flee. This is commonly referred to as *tip and run* and it has resulted in bombs being found in unexpected locations;
- Transportation of aggregate containing munitions to an area that was previously free of UXO, usually related to construction activities employing material dredged from a contaminated offshore borrow site;
- Poor precision during targeting (due to high altitude night bombing and/or poor visibility) resulted in bombs landing off target, but within the surrounding area.
- *British* decoy sites were also constructed to deliberately cause incorrect targeting. For obvious reasons, such sites were often built in remote and uninhabited areas.

Site History

From an analysis of the CS and OS historical mapping associated with the Site, the following Site history can be deduced:

1896 CS Map	The Study Site was labelled as a "*Timber Yard*" with railway lines in the south-western sector and several small structures located in the central and south-eastern sectors, and along the north-western border.
1913 CS Map	Some structures had been demolished and numerous small structures and railway lines were developed on-site.
1920 CS Map	Changes were not recorded at the Study Site.
1934-1936 CS Map	Several small structures were demolished and others developed on-site.
1938 OC Map	A long linear structure was developed on-site in the central sector.
1949 OS Map	Changes were not recorded at the Study Site.
1960 OS Map	Several structures were demolished and others developed on-site.
1966 OS Map	Changes were not recorded at the Study Site.
1988 OS Map	All structures on-site including railway lines were demolished, and two large structures were developed in the central and western sectors with smaller structures developed in the northern, south-eastern and central sectors.
1991 OS Map	Changes were not recorded at the Study Site.
1999 OS Map	All structures on-site were demolished, and a large "*Superstore*" was developed in replacement.
2006 OS Map	Changes were not recorded at the Study Site.
2018 OS Map	Changes were not recorded at the Study Site.

Aerial Photography (1945) (*Figure 4*)

The aerial photography (1945) associated with the Site shows that it is located within a developed urban area, with the Site itself consisting of various industrial facilities. Nonetheless, the resolution of the photograph is insufficient to be able to identify accurately, the precise local features and/or type of structures, then within the curtilage of the Site.

WWII Bombing of *London*

The most intensive period of bombing over *London* was the nine months between October 1940 and May 1941, known as 'The Blitz'. During this period, the *Luftwaffe* attempted to overwhelm *Britain's* air defences, destroy key military and industrial facilities, as well as logistical capabilities, prior to invasion.

A total of 18,000 tons of bombs were dropped on *London* between 1940 and 1945. Many residential, commercial and industrial buildings were targeted during air raids and sustained large scale damage. Public services were also affected, with gas, electricity and water supplies often cut-off following damage to either the installations themselves or to the supply infrastructure. In addition, thousands of civilians were killed and injured, and many were forced to evacuate as their homes were destroyed.

WWII Luftwaffe Bombing Targets

Prior to WWII, the *Luftwaffe* conducted numerous aerial photographic reconnaissance missions over *Britain*, recording key military, industrial and commercial facilities for attack, in the event of war. In addition, logistics infrastructure and public services, such as railways, canals, power stations, reservoirs, water and gas works were also considered viable bombing targets.

Luftwaffe aerial reconnaissance photography associated with the Site did not identify any primary bombing targets located on-site or within 1,000m of the Site boundary.

WWII HE Bomb Strikes (*Figure 5*)

During WWII, ARP wardens compiled detailed logs of bomb strikes across their respective districts. ARP records associated with the Site did not note any HE bomb strikes within it, however six HE bomb strikes were identified 5m to the south, 50m to the north-west, 55m to the north-west, 70m to the south-west, 130m to the north-west and 155m to the east. Furthermore, whilst IBs may have fallen within the Study Site, they fell in such large numbers that accurate record keeping was either non-existent or perfunctory therefore, their prospective presence cannot be either corroborated or discounted.

In addition to IBs and HE bomb strikes, during the latter part of the war when aerial bombing had significantly declined, the main threat came from *V* type weapons. The first recorded *V1* strike on *London* was on the 13th June 1944, with the first recorded *V2* strike on *London* on the 8th September 1944. *V1* and *V2* rockets were thin-skinned, unmanned and inaccurate weapons. Despite this, there is no evidence to suggest that the Site (or its immediate vicinity) was subjected to rockets strikes during WWII.

The potential penetration depth of an UXB was dependent on a number of factors including but not restricted to those prior to striking the ground e.g. velocity and orientation of the UXB which in turn will be influenced on factors such as the release altitude from the aircraft and encounters with infrastructure during its fall; those encountered at the point of impact i.e. was the impact on concrete, grass, water etc and finally, the below ground level conditions which were encountered such as infrastructure e.g. services, basements, foundations, and geology e.g. made ground, clay, sand, etc. Further, as the UXB penetrated the ground, it's velocity naturally slowed where, it either came to an abrupt stop e.g. against foundations or would continue for 10's of feet along a route of least resistance which often resulted in a curving of the trajectory back towards the surface. This is known as the "J Curve" effect and often resulted in a considerable horizontal off-set from the point of entry. This is often the reason why UXBs have been discovered against or under the foundations of buildings, which were present during WWII, or many meters from the point of impact.

WWII Bomb Damage

Official bomb damage mapping was not available. However, an analysis of post-war mapping identified "*Ruins*" 40m to the south and 65m to the south. In addition, photographic evidence and further research identified bomb damage along *Stanmore Gardens* located 180m north-west and *Peldon Avenue* located 345m to the south.

WWII HE Bomb Density (*Figure 6*)

The Study Site was located within the *Richmond Municipal Borough,* which recorded 22 HE bombs per 100 hectares, a low level of bombing.

Abandoned Bombs

An examination of the official abandoned bomb records has not identified any abandoned bombs within 1,000m of the Site boundary.

Records of WWII UXB Disposal Tasks

Civil defence records did not identify any UXB disposal tasks within *Richmond Municipal Borough* from 1940-45. However, it is known that these records are incomplete, some having been destroyed by enemy action during WWII.

Records of Post-WWII UXB Disposal Tasks

An examination of the post-WWII BDO tasks associated with the area has not identified any BDO operations within 1,000m of the Study Site.

WWII Site Use

The CS mapping prior to WWII (1934 - 1936), shows that the Study Site was located within a densely developed urban area, with the Study Site itself consisting of a timber yard and several small structures. Therefore, it is considered possible that an employee at the timber yard may have observed and reported any UXB entry holes which would have been dealt with at the time. However, given the trajectory of incoming weapons this in fact may not have been the case.

Sources of UXO Contamination

The most likely source of UXO contamination is from *German* aerially delivered ordnance, which ranges from small IBs through to large HE bombs (the latter forms the principal threat). Additional residual contamination may be present from *British* AAA projectiles (which were used to defend the UK against *German* bombing raids).

STAGE THREE – DATA ANALYSIS

Variable	Result	Comment
Was the area considered to be a primary bombing target?	✗	No primary targets were identified within 1,000m.
Was the Site or the immediate area bombed during WWII?	✓	Six HE bomb strikes were recorded within 155m of the Site boundary; the closest being 5m south.
Did the Site or the immediate area experience bomb damage?	✓	An analysis of post-war mapping identified "*Ruins*" located 40m south and 65m south.
Was the ground undeveloped during WWII?	✓	The Site consisted of a timber yard and several small structures, however some areas were left undeveloped.
Would the footfall have been high in the area?	✓	Given that a timber yard was located on-site and was situated within a developed urban area, it is likely that footfall would have been high.
Would a UXB entry hole have been observed during WWII?	✓	Given that the footfall would have been high on-site, it is considered likely that a UXB entry hole would have been observed and reported. However, given the trajectory of incoming weapons this in fact may not have been the case.
Have military personnel ever occupied the Site?	✗	No military facilities were identified within 1,000m.
Would munitions have been manufactured, stored and/or fired from the Site?	✗	There is no evidence to suggest munitions were located or fired from this Site.
Would previous intrusive works have removed the potential for UXO to be present?	✗	The Site has undergone significant post-war redevelopment in some areas, therefore it is likely that any UXO within the structural foundations of post-war buildings would have been discovered and removed, whilst the surrounding areas remain extant.
Are proposed intrusive works likely to extend into previously undisturbed ground?	✓	Some small areas of the Site have remained undeveloped since WWII and therefore some proposed works may extend into previously undisturbed ground.
Is there potential for an unplanned encounter with UXO to occur during proposed intrusive works?	✓	Given that the immediate vicinity was subjected to bomb strikes and bomb damage, combined with some areas of the Site not undergoing any significant post-war redevelopment, it is considered possible for an unplanned encounter with UXO to occur.
Does the probability of UXO vary across the Site?	✓	The probability of discovering UXO within the structural foundations of post-war buildings is considered to be remote, however, the probability of UXO discovery within all previously undisturbed areas of the Site is extant.

STAGE FOUR – RISK ASSESSMENT

Threat Items

The most probable UXO threat items are *German* HE bombs, whilst IBs and *British* AAA projectiles pose a residual threat. The consequences of initiating *German* HE bombs are more severe than initiating IBs or AAA projectiles, and thus they pose the greatest prospective risk to intrusive works.

Bomb Penetration Depth

Considering the ground conditions (highlighted in Stage 1), the average BPD for a 250kg *German* HE bomb is assessed to be approximately 5m bgl, with the maximum BPD considered to be approximately 15m bgl. Although it is possible that the *Luftwaffe* deployed larger bombs in the area, their deployment was infrequent, and to use such larger (or the largest) bombs for BPD calculations are not justifiable on either technical or risk management grounds.

WWII *German* bombs have a greater penetration depth when compared to IBs and AAA projectiles, which are unlikely to be encountered at depths greater than 1m bgl. However, due to the "J Curve" and the potential for structures to impede the penetration into the ground, HE bombs have been discovered at much shallower depths than the average.

Risk Pathway

Given the types of UXO that might be present on-site, all types of aggressive intrusive engineering activities (i.e. excavations, trial pits, cable percussive boreholes and piling) may generate a significant risk pathway. Whilst not all UXO encountered aggressively will initiate upon contact, such a discovery could lead to serious impact on the project especially in terms of critical injury to personnel, damage to equipment and project delay.

Prospective Consequences

Consequences of UXO initiation include:

1. Fatally injure personnel;
2. Severe damage to plant and equipment;
3. Deliver blast and fragmentation damage to nearby buildings;
4. Rupture and damage underground utilities/services.

Consequences of UXO discovery include:

1. Delay to the project and blight;
2. Disruption to local community/infrastructure;
3. The expenditure of additional risk mitigation resources and EOD clearance;
4. Incurring additional time and cost.

UXO RISK CALCULATION

Site Activities

Although there is some variation in the probability of encountering and initiating items of UXO when conducting different types of intrusive activities, excavations, trial pits, cable percussive boreholes and piling have been described for analysis at this Site. The consequences of initiating UXO vary greatly, depending upon, *inter alia* the mass of HE in the UXO and how aggressively it might be encountered. For this reason, *6 Alpha* has conducted separate risk rating calculations for each trial pits, cable percussive boreholes and piling.

Risk Rating Calculation

6 Alpha's Semi-Quantitative Risk Assessment assesses and rates the risks posed by the most probable threat items when conducting a number of different activities on the Site. Risk Rating is determined by calculating the probability of encountering UXO and the consequences of initiating it.

UXO Risk Calculation Table – All Areas				
Activity	**Threat Item**	**Probability (SH+EM=P)**	**Consequence (D+PSR=C)**	**Risk Rating (PXC=RR)**
Excavations	HE Bombs	2+2=4	3+3=6	4x6=24
	AAA Projectiles	1+2=3	3+1=4	3x4=12
	IBs	1+2=3	3+1=4	3x4=12
Trial Pits (between 1m and 5m bgl)	HE Bombs	2+2=4	3+3=6	4x6=24
	AAA Projectiles	1+2=3	3+1=4	3x4=12
	IBs	1+2=3	3+1=4	3x4=12
Boreholes (25 m bgl)	HE Bombs	2+3=5	3+2=5	5x5=25
	AAA Projectiles	1+3=4	3+1=4	4x4=16
	IBs	1+3=4	3+1=4	4x4=16
Piling	HE Bombs	2+3=5	3+2=5	5x5=25
	AAA Projectiles	1+3=4	3+1=4	4x4=16
	IBs	1+3=4	3+1=4	4x4=16
Abbreviations – Site History (SH), Engineering Methodology (EM), Probability (P), Depth (D), Consequence (C), Proximity to Sensitive Receptors (PSR) and Risk Rating (RR).				

STAGE FIVE – RECOMMENDED RISK MITIGATION MEASURES

Do the ground conditions support a geophysical UXO survey?

Non-Intrusive Methods of Mitigation – Magnetometer results may be affected by ferro-magnetic contamination due to previous construction activities and made ground within the Site.

Intrusive Methods of Mitigation – Intrusive magnetometry may be effective on this Site, prior to boreholing and piling especially. However, any ferrous metal/red brick contamination in made ground/old foundations may affect the detection capability of the UXB survey equipment, as it passes through the contaminated layer especially. Nonetheless, beyond the contaminated strata such a survey should prove effective.

Mitigation Measures to Reduce Risk to 'ALARP'

Activity	Risk Mitigation Measures	Final Risk Rating
All Activities in All Areas	**1. Operational UXO Emergency Response Plan;** appropriate Site Management documentation should be held on-site to guide and plan for the actions which should be undertaken in the event of a suspected or real UXO discovery (this plan can be supplied by *6 Alpha*); **2. UXO Safety & Awareness Briefings;** the briefings are essential when there is a possibility of explosive ordnance encounter and are a vital part of the general safety requirement. All personnel working on the Site should receive a briefing on the identification of a UXB, what actions they should take to keep people and equipment away from such a hazard and to alert Site management. Information concerning the nature of the UXB threat should be held in the Site office and displayed for general information on notice boards, both for reference and as a reminder for ground workers. The safety awareness briefing is an essential part of the *Health & Safety Plan* for the Site and helps to evidence conformity with the principles laid down in the *CDM* regulations 2015 (this brief can be delivered directly, or in some cases remotely, by *6 Alpha*).	**ALARP**
Excavations and Trial Pits into Previously Undisturbed Ground	**3. EOD Banksman Support;** an EOD Engineer should be on-site, in the EOD Banksman role, to monitor all 'open' intrusive works into previously undisturbed ground as they progress and identify suspicious items which may or may not be UXO / UXB whilst also acting as the first point of contact for all UXO associated matters (this service can be provided by *6 Alpha*).	
Piling and Boreholing into Previously Undisturbed Ground	**4. Intrusive UXO Survey;** Where 'blind' intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or MagCone techniques) is strongly recommended. Such a survey should extend to the *assessed average bomb penetration depth* or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as the target UXO in advance of said works. (this service can be provided by *6 Alpha*).	

This assessment has been conducted based on the information provided by the Client, should the proposed works change then *6 Alpha* should be re-engaged to refine this risk assessment

Report Figures

Figure One - Site Location

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

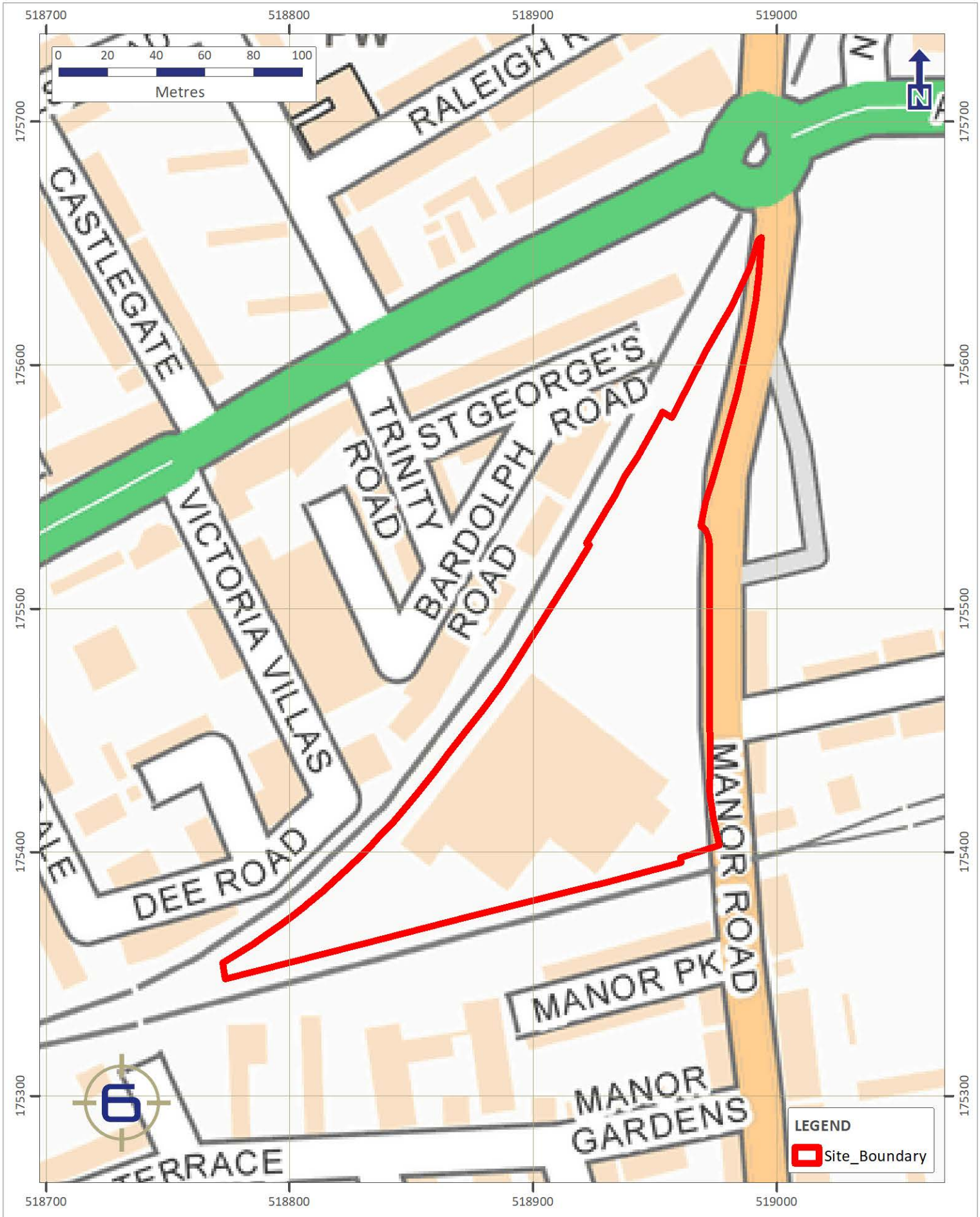
Site Location

PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE			
P7115	1	BL	CC	09 January 2019	Contains Ordnance Survey data © Crown copyright and database right 2017	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.	alpha ASSOCIATES

Figure Two - Site Boundary

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

Site Boundary



PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE			
P7115	2	BL	CC	09 January 2019	Contains Ordnance Survey data © Crown copyright and database right 2017	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.	alpha ASSOCIATES

Figure Three - Aerial Photography (2018)

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

Aerial Photography (2018)

BRITISH NATIONAL GRID

BOMB SEARCH
WWW.6ALPHA.COM

PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE		
P7115	3	BL	CC	09 January 2019	Map data: Google	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.

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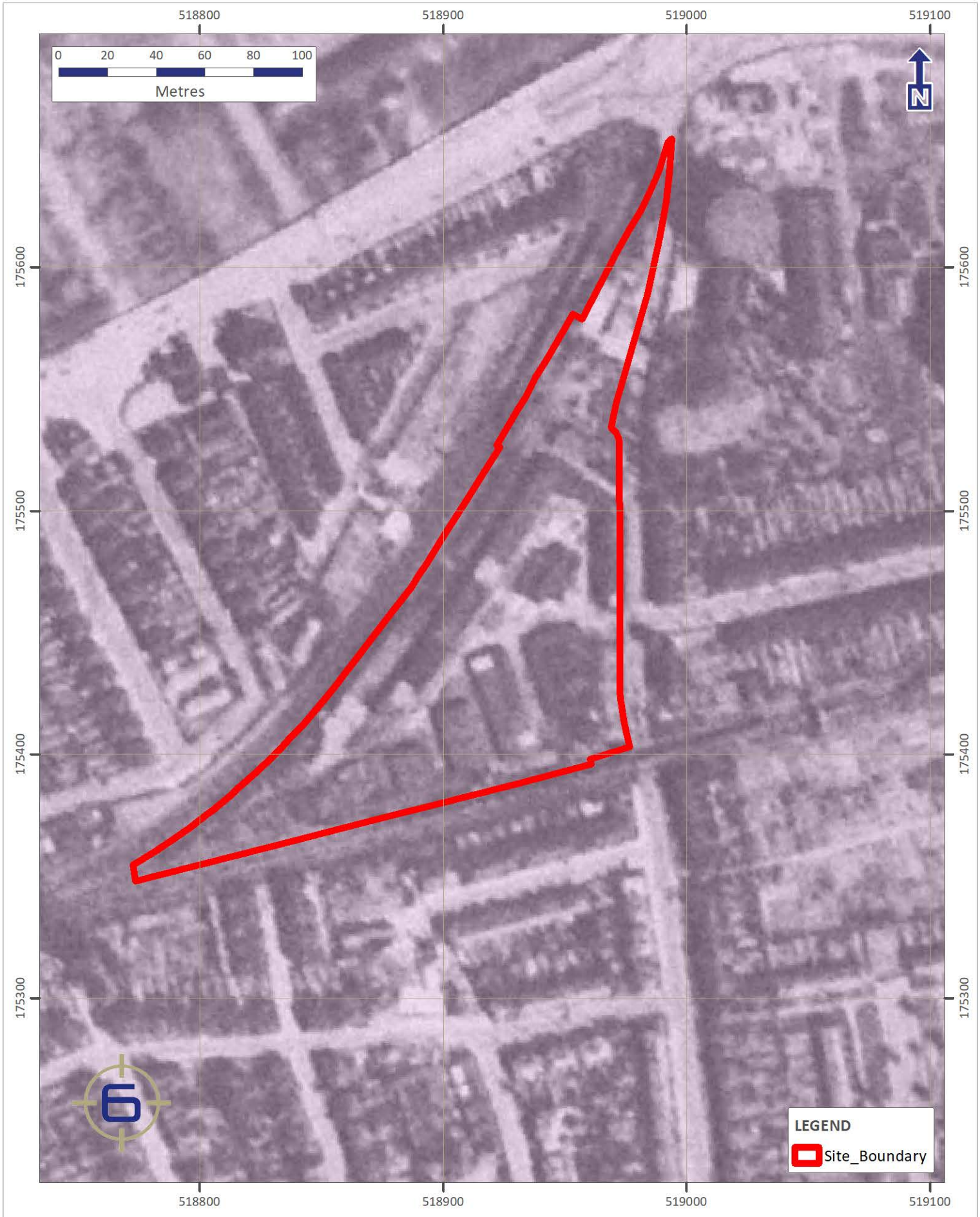
Figure Four - Aerial Photography (1945)

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

Aerial Photography (1945)

BRITISH NATIONAL GRID

BOMB SEARCH
WWW.6ALPHA.COM



PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE			
P7115	4	BL	CC	09 January 2019	Map data: Google, The GeoInformation Group	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.	alpha ASSOCIATES

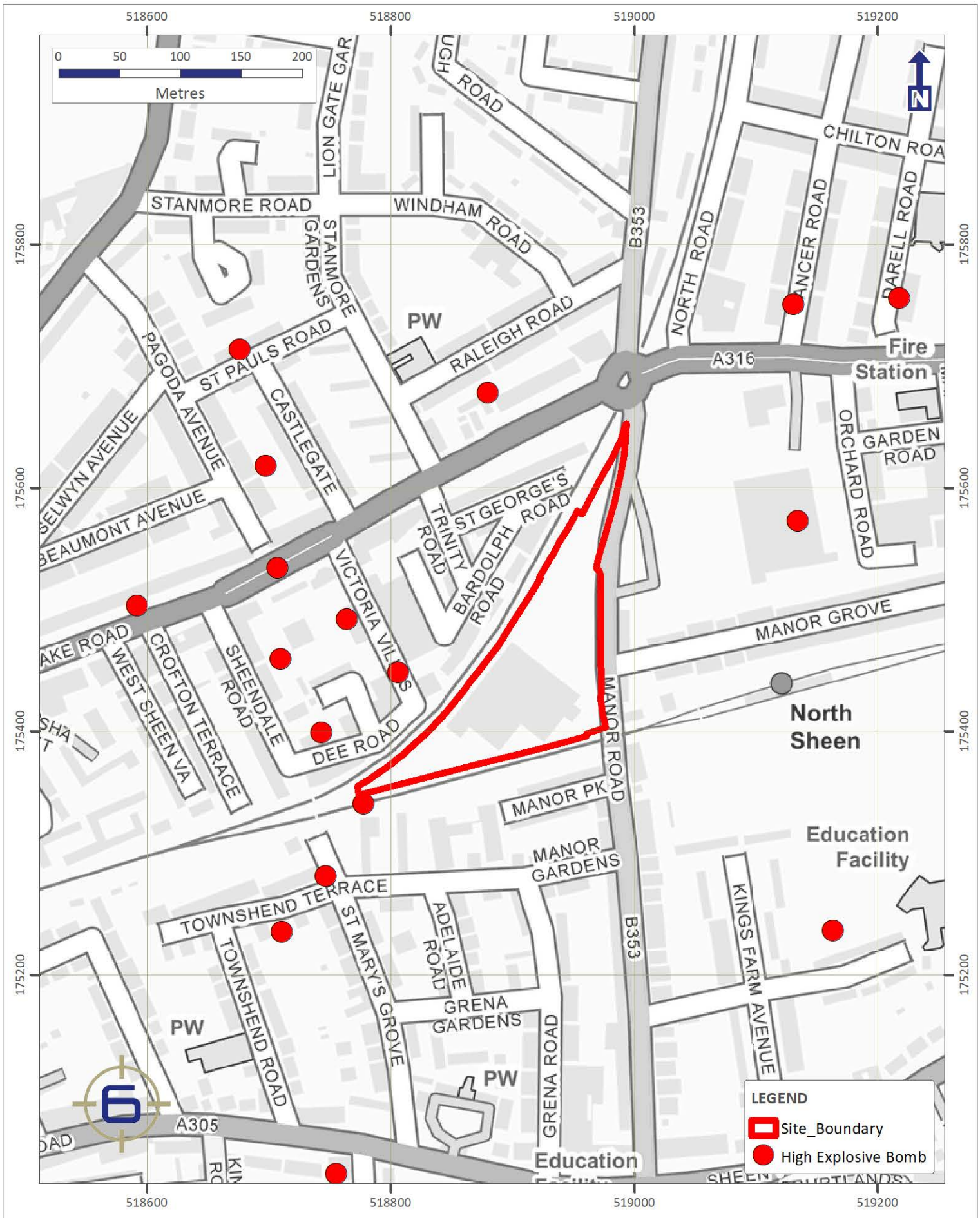
Figure Five - WWII High Explosive Bomb Strikes

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

WWII High Explosive Bomb Strikes

BRITISH NATIONAL GRID

BOMB SEARCH WWW.6ALPHA.COM



PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE
P7115	5	BL	CC	09 January 2019

alpha ASSOCIATES

Figure Six - WWII High Explosive Bomb Density

HOMEBASE LTD, 84, MANOR ROAD, RICHMOND, TW9 1YB

WWII High Explosive Bomb Density

BOMB SEARCH
WWW.6ALPHA.COM

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P7115	6	BL	CC	09 January 2019	Contains Ordnance Survey data © Crown copyright and database right 2017	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.	alpha ASSOCIATES

APPENDIX D

Regulatory Consultation

Frederick Siemers

From: Simon Makoni <Simon.Makoni@richmond.gov.uk>
Sent: 10 August 2018 11:52
To: Frederick Siemers
Cc: Clare Barber
Subject: RE: Environmental Search Enquiry - Homebase 84 Manor Road
Attachments: 3374-GE001B SITE INVESTIGATION_ALL.pdf

Hi Frederick

Unfortunately I do not have any further information on the Power Station.

I have attached all the information I have on my system with regard to the site investigations. Although not mentioned in the Environmental Enquiry, as the site is more than 50m away from your site, I have also attached a Site Investigation for Orchard Road Dairy.

I trust this is helpful.

Regards,

Simon Makoni
Scientific Officer, Consumer Protection
London Borough of Richmond upon Thames
Tel: 0208 831 6454
Email: Simon.Makoni@richmond.gov.uk

From: Frederick Siemers [mailto:frederick.siemers@fairhurst.co.uk]
Sent: 09 August 2018 16:09
To: Simon Makoni
Cc: Clare Barber
Subject: RE: Environmental Search Enquiry - Homebase 84 Manor Road

Simon,

Thanks for your prompt response. I have a couple of queries on this:
• Do you have any further information on the 'power station' identified on-site in 1974?
• You've identified 2no site investigations adjacent to the site. Are you able to pass on details of these?

Thanks,

Frederick

Frederick Siemers
Environmental Engineer

FAIRHURST
engineering solutions, delivering results

135 Park Street
London, SE1 9EA

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Consider the environment. Please don't print this e-mail unless you really need to.

From: Simon Makoni [mailto:Simon.Makoni@richmond.gov.uk]
Sent: 09 August 2018 13:45
To: Frederick Siemers
Subject: Environmental Search Enquiry - Homebase 84 Manor Road

Dear Frederick

Thank you for your enquiry and payment. Please find attached our response.

I trust that this is satisfactory. Please do not hesitate to contact me should you have any further queries.

Regards,

Simon Makoni
Scientific Officer, Consumer Protection
London Borough of Richmond upon Thames
Tel: 0208 831 6454
Email: Simon.Makoni@richmond.gov.uk

From: Richmond Firmstep forms [mailto:FormsNoReply@richmond.gov.uk]
Sent: 02 August 2018 09:41
To: Simon Makoni
Subject: Make a contaminated land enquiry has been submitted - FS-Case-29807964

An online Make a contaminated land enquiry has been submitted.
The reference for this request is FS-Case-29807964
Property details:
You selected
Homebase 84 Manor Road Richmond TW9 1YB

Site boundary map: 126782 - Manor Road Site Boundary.pdf

Additional information / questions: Hello,

In addition to your information, can you please provide any additional information on:
- if the site is classified as Part 2A under the EPA 1990 or if there are any sites within 250m that are. Furthermore is the site or any within 250m designated for inspection
- any records of tanks on site and their details e.g. construction / materials held / decomissioning / any issues
- any records of ground investigation on-site or adjacent to the site
- any further information on the Richmond gas works adjacent to the north-east of the site and any ground investigation / remediation etc
- any historical uses on / adjacent to the site that could present a potential source of contamination
- any water abstractions within 1km
- any records of landfilling within 500m
- details of any authorised processes within 250m

Kind regards

Additional documents:

Type of search: Standard

Company: Fairhurst

Title: Mr

First name: Frederick

Last name: Siemers

Email: frederick.siemers@fairhurst.co.uk

Telephone: 02078288205

Address:
Postcode
Select the address
SE1 9EA
FIRST FLOOR 135 PARK STREET LONDON SE1 9EA

Total cost: 82.00

LONDON BOROUGH OF RICHMOND UPON THAMES

CONTAMINATED LAND ENQUIRY

Site Name: Homebase 84 Manor Road
Richmond
TW9 1YB

Date: 09/08/2018

On Behalf of:
Frederick Siemers
Fairhurst
First Floor 135 Park Street
London
SE1 9EA

Frederick Siemers
Fairhurst
First Floor 135 Park Street
London
SE1 9EA

Date: 09 August 2018

Dear Frederick Siemers,

RE: Request for Information – Homebase 84 Manor Road, Richmond, TW9 1YB
Our ref: EE-00234

I refer to your recent contaminated land enquiry for a site at Homebase 84 Manor Road, Richmond, TW9 1YB.

Richmond Council, as a Local Authority, has a duty under Part 2A of the Environmental Protection Act 1990, to investigate its area for the purpose of identifying contaminated land. In fulfilment of this duty we have compiled a database of land that may be potentially contaminated based on the locations of former historical industrial land uses within the borough. The database currently holds close to 1,500 records.

We have searched our database in response to your enquiry. A table showing all the industrial land use records that were identified by the search of our database is given in the appendix to this response.

In response to your enquiry, I can confirm that:

a) The property under search at this time, does not appear on the Contaminated Land Register maintained under Section 78R (1) of the Environmental Protection Act 1990.

b) The Council has not served any notice under Section 78B (3) of the Environmental Protection Act 1990. Section 78B (3) requires notice to be given to specific persons informing them that land is contaminated land.

c) The Council has not consulted or reserved to consult with the owner or occupier of the property under Section 78G (3) of the Environmental Protection Act 1990 in relation to anything to be done on the property as a result of adjoining or adjacent land being contaminated land. Section 78G (3) requires relevant persons to be consulted before serving a remediation notice for contaminated land.

d) In relation to any adjoining or adjacent land, which has been identified as contaminated land because it is in such a condition that harm or pollution of controlled waters might be

caused on the property, a notice has not been served or resolved to be served under Section 78B (3) of the Environmental Protection Act 1990.

Please note that contaminated land, as referred to above, is strictly defined in legislation namely the Environmental Protection Act 1990, section 78A.

I can also confirm that at this time, the property under search has not been identified for detailed inspection (i.e. intrusive site investigation) under Part IIA of the Environmental Protection Act 1990 and that the Council is not considering taking any action on a formal or informal basis.

Please note that the situation may change at any time in the future if additional information is received suggesting that there is significant risk of significant harm occurring on the property.

In response to your specific queries I can answer as follows:

- Is the site classified as Part 2A under the EPA 1990 or if there are there any sites within 250m that are? Furthermore is the site or any within 250m designated for inspection?

  I refer you to the responses above.

- Are there any records of tanks on site and their details e.g. construction / materials held / decommissioning / any issues?

  We do not hold this information.

- Are there any records of ground investigation on-site or adjacent to the site?

  I refer you to the attached appendices.

- Is there any further information on the Richmond gas works adjacent to the north-east of the site and any ground investigation / remediation etc?

  I refer you to the attached appendices.

- Are there any historical uses on / adjacent to the site that could present a potential source of contamination?

  I refer you to the attached appendices.

- Are there any water abstractions within 1km?

  Yes, I refer you to the attached appendices.

- Are there any records of landfilling within 500m?

  I refer you to the attached appendices.

- Are there any details of any authorised processes within 250m?

  I refer you to the attached appendices.

I would like draw your particular attention to the standard disclaimer notice below.
DISCLAIMER NOTICE

The London Borough of Richmond upon Thames has provided the above information based upon data currently available to the Council. This information has been obtained from the Council's own researches as well as from a number of third party sources. This data set is not yet complete and is constantly being updated and reviewed. Therefore, the information given above, including that regarding the inspection priority of sites, may be subject to change at any time in the future upon the receipt of additional information.

All information is supplied on the distinct understanding that the Council does not warrant the accuracy of any of the information and on the basis that neither the Council nor any officer, servant or agent of the Council is legally responsible, either in contract or in tort, for any inaccuracies, or omissions herein contained whether arising from inadvertence or negligence or from any other cause whatsoever.

I hope you find this information useful. Please do not hesitate to contact me should you require any further information or have any further queries.

Yours Faithfully

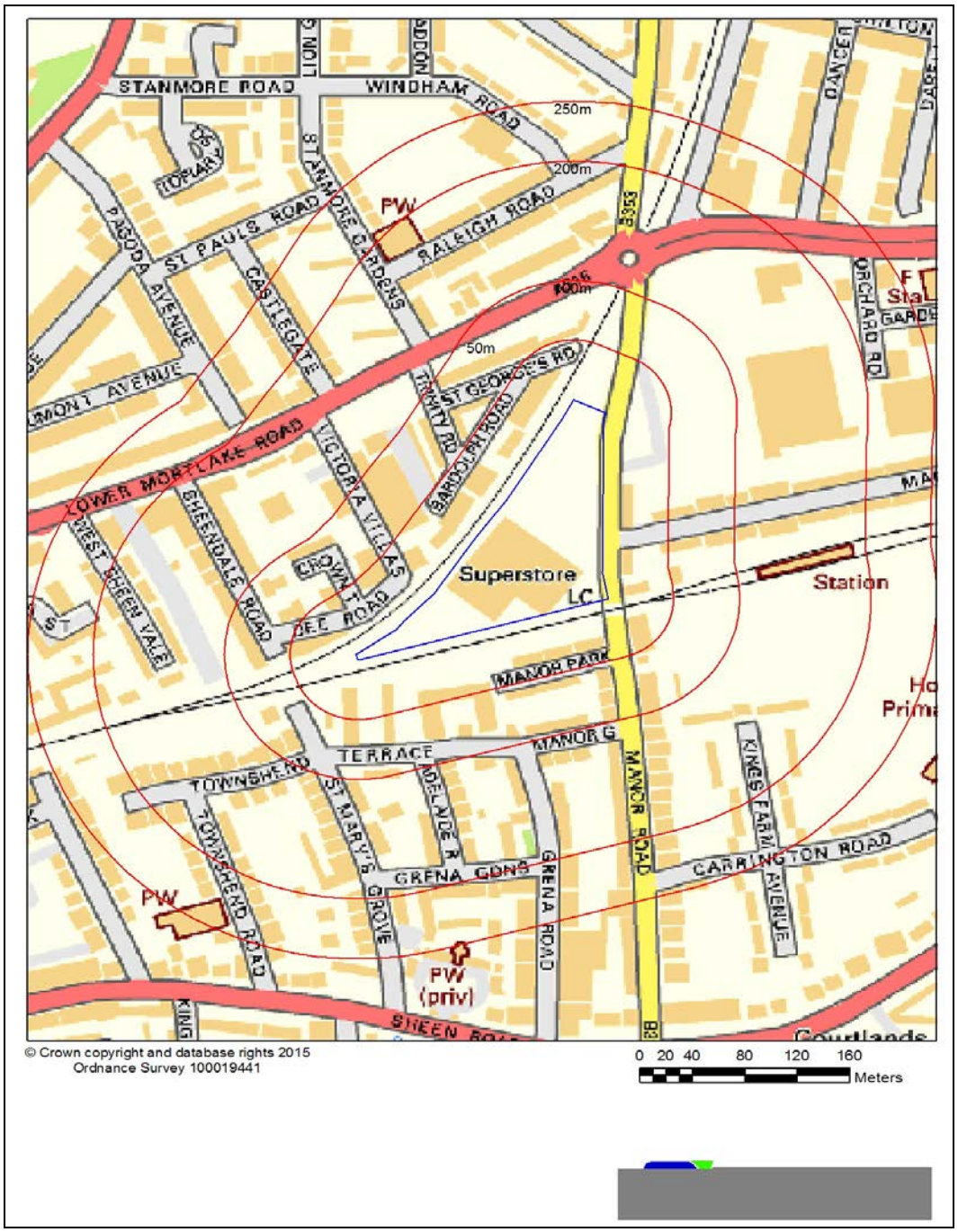
Simon Makoni
Scientific Officer
Direct Tel: **0208 831 6454**
Email: **simon.makoni@richmond.gov.uk**

1. APPENDIX - CONTAMINATED LAND ENQUIRY GIS SEARCH REPORT

DATE: 09 August 2018 TIME: 11:26

Buffer Search Radius: 50, 100, 200, 250, 2000 metres
Search Feature ID: Homebase 84 Manor Road(Name)
Search Feature Layer Name: Environmental Searches
Approx. area of search feature: 15,993m^2
Site Centre Coordinates (British National Grid): 518915, 175448
Selection Summary: A total of 24 features were selected on 5 out of 9 target layers (total includes the search feature).

2. Site Location Map

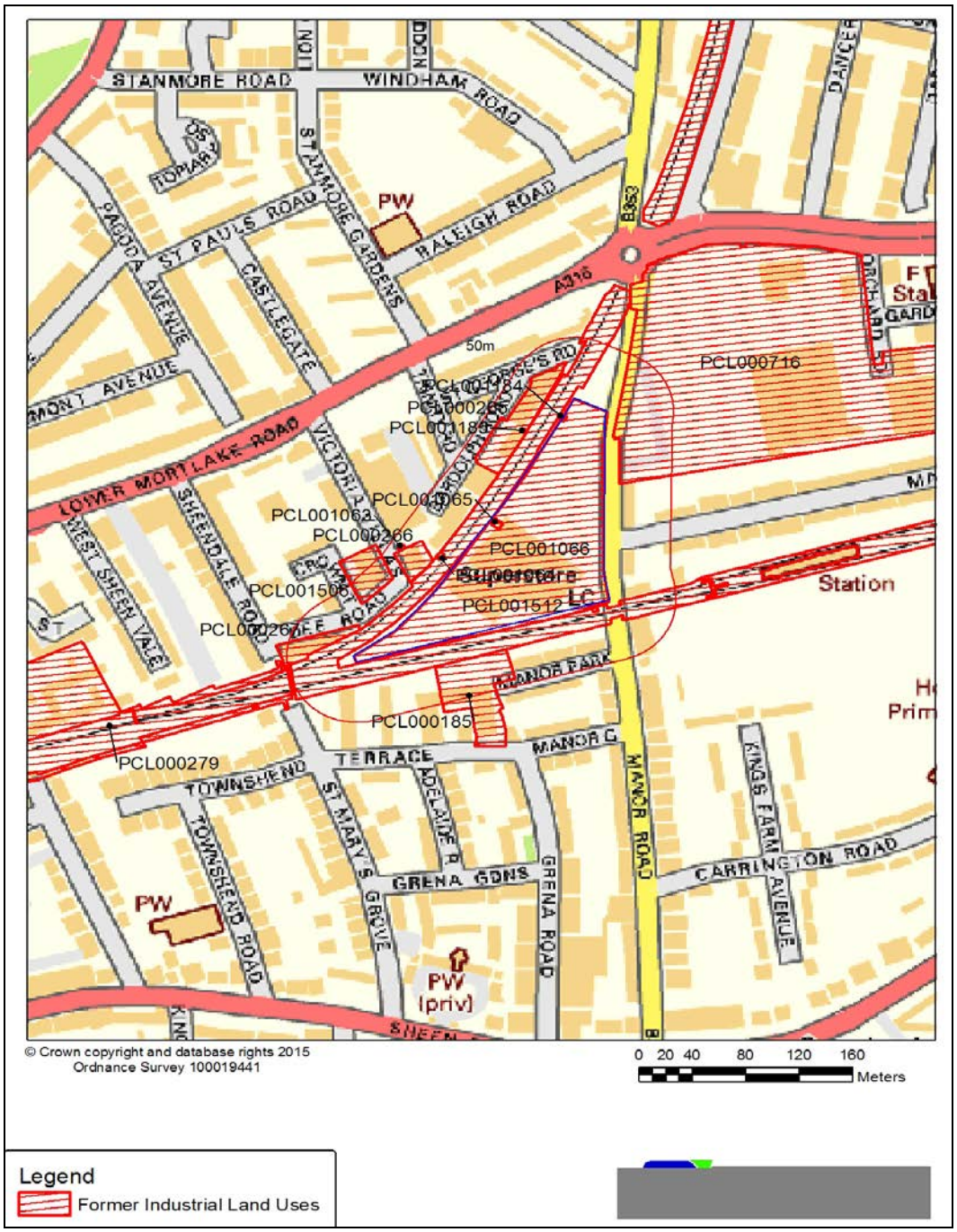


3. Summary Datasheet

Search Layer Name	Search Distance	Data Available	No. of features identified
Former Industrial Land Uses	50 m	Yes	14
Site Investigations	50 m	Yes	2
Private Water Supplies	2000 m	Yes	3
Environmental Permits (LAPPC)	250 m	Yes	2
EA Authorised Landfill Sites	250 m	No	0
EA Historic Landfill Sites	250 m	No	0

4. Former Industrial Land Uses

This layer consists of information that has been collated by the Council as part of its duty to inspect its area for the purposes of identifying contaminated land under Part 2A of the Environmental Protection Act 1990. These records include statutorily determined sites (contaminated land and special sites) and sites where potentially contaminative activities have occurred (former industrial uses).



4.1 GIS Attribute Data for Former Industrial Land Uses

Selection Summary for layer
4 feature(s) identified on site.
10 feature(s) identified off site within 50 metres

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
On Site					
PCL001065	MANOR ROAD TW9 2	MANOR ROAD	0.00	44	518892, 175467
Previous Industrial Uses Industry Profile: Electricity distribution inc large transformer Year Use Established: 1974 Year Use Ended: 1974 Comments: Electrical Sub Station Facilities Note: No Data Area: 44 ***Part 2A Risk Ranking*** PRIORITY: Low Medium					
PCL001066	MANOR ROAD TW9 4	MANOR ROAD	0.00	16258	518914, 175446
Previous Industrial Uses Industry Profile: Power stations (excluding nuclear power stations) Year Use Established: 1974 Year Use Ended: 1974 Comments: Miscellaneous Power Facilities Note: No Data Area: No Data ***Part 2A Risk Ranking*** PRIORITY: Medium					
PCL001184	MANOR ROAD TW9 3	MANOR ROAD	0.00	24	518941, 175554
Previous Industrial Uses Industry Profile: Electricity distribution inc large transformer Year Use Established: 2004 Year Use Ended: 2004 Comments: Electrical Sub Station Facilities Note: No Data Area: 25 ***Part 2A Risk Ranking*** PRIORITY: Medium					
PCL001512	Richmond Railway Line		0.00	675451	516471, 173219
Previous Industrial Uses Industry Profile: Railway land					

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
Year Use Established: No Data Year Use Ended: No Data Comments: No Data Note: No Data Area: No Data ***Part 2A Risk Ranking*** No comment was found in the database					
Identified Off-site - Within 50m					
PCL000185	MANOR PARK 1	MANOR PARK	19.01	2799	518878, 175327
Previous Industrial Uses Industry Profile: Waste recycling, treatment & disposal: Metal recycling sites Year Use Established: 1969 Year Use Ended: 1970 Comments: scrap metal & iron merchants Note: No Data Area: 126 Industry Profile: Waste recycling, treatment & disposal: Metal recycling sites Year Use Established: 1956 Year Use Ended: 1956 Comments: Scrap Iron & Metal Merchants. Manor Park, Richmond Note: Source: Kellys Directory of Richmond, Kew, Petersham etc 1956. Check street directory for position Area: 2800 ***Part 2A Risk Ranking*** PRIORITY: Medium High					
PCL000265	BARDOLPH ROAD 3	BARDOLPH ROAD	16.23	1800	518908, 175550
Previous Industrial Uses Industry Profile: Metal manufacturing: Iron and steelworks Year Use Established: 1971 Year Use Ended: 1976 Comments: current use: industrial Note: Kellys Directory of Richmond 1971 Area: 1800 ***Part 2A Risk Ranking*** PRIORITY: Medium					
PCL000266	VICTORIA VILLAS, CLIVEDEN HOUSE	CLIVEDEN HOUSE, VICTORIA VILLAS	15.74	534	518830, 175437
Previous Industrial Uses Industry Profile: Factory or works - use not specified Year Use Established: 1976 Year Use Ended: 2004 Comments: Industrial. current use: industrial Note: No Data Area: 532 ***Part 2A Risk Ranking*** PRIORITY: Low Medium					

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
PCL000267	DEE ROAD 1	DEE ROAD	15.28	734	518753, 175367

Previous Industrial Uses
Industry Profile: Factory or works - use not specified
Year Use Established: 1976
Year Use Ended: 1994
Comments: Industrial.current use: Industrial
Note: No Data
Area: 760

Part 2A Risk Ranking
PRIORITY: Low Medium

PCL000279	THE QUADRANT 2	THE QUADRANT	49.29	57809	518314, 175219

Previous Industrial Uses
Industry Profile: Railway land
Year Use Established: 1890
Year Use Ended: 1913
Comments: Goods Station. car park
Note: No Data
Area: 57300

Industry Profile: Railway land
Year Use Established: 1870
Year Use Ended: 2004
Comments: LM/0362. LM/0254.LM/0132. LM/0156. LM/0198. LM/0307. Railways
Area: 57300

Industry Profile: Railway land
Year Use Established: 1890
Year Use Ended: 1913
Comments: R/759/02. Railway Land.Salisbury Road,Richmond
Note: Source Map 1894 Surrey 1 verifies the location of the land.
Area: 57300

Industry Profile: Road Vehicles: Transport and haulage centres
Year Use Established: 1980
Year Use Ended: 2004
Comments: LM/0361. Road Haulage.R/1325/03.Road Haulage Contractor.
Note: 1980-1990?s
Yellow Pages 1981
Goods Depot,Cedar Terrace,Richmond
Area: 57300

Part 2A Risk Ranking
PRIORITY: Medium

PCL000716	ORCHARD ROAD 1	ORCHARD ROAD	5.68	36829	519096, 175599

Previous Industrial Uses
Industry Profile: Gas works, coke works, coal carbonisation plants
Year Use Established: 1874
Year Use Ended: 1890
Comments: Gas manufacture & distribution
Note: Producing gas from coal, lignite, oil or other carbonaceous material other than waste
Area: 7651

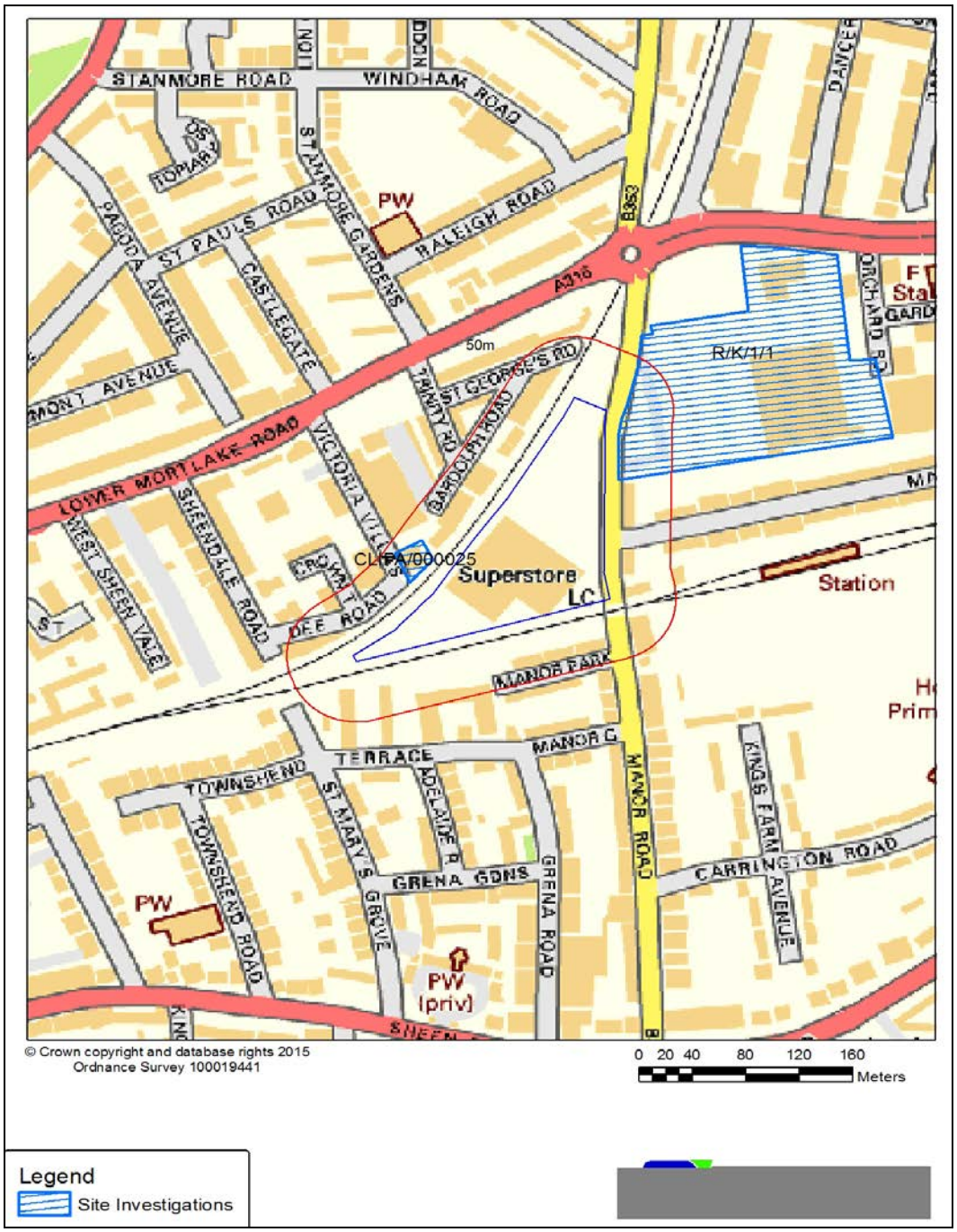
Industry Profile: Gas works, coke works, coal carbonisation plants

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
Year Use Established: 1910 Year Use Ended: 1930 Comments: R/694/02. Gas Works Depot.Orchard Road,North Sheen Note: Map Source: 1910 polygons Area: 19000 Industry Profile: Road Vehicles: Transport and haulage centres Year Use Established: 1980 Year Use Ended: 1990 Comments: LM/0360. Road Haulage Note: 1980-1990?s Dismantling, repairing or maintenance of road transport or road haulage vehicles Area: 36777 Industry Profile: Gas works, coke works, coal carbonisation plants Year Use Established: 1890 Year Use Ended: 1913 Comments: LM/0161.Gas manufacture & distribution Note: 1890?s Area: 19555 Industry Profile: Gas works, coke works, coal carbonisation plants Year Use Established: 1920 Year Use Ended: 1960 Comments: LM/0206.LM/0313. LM/0252.Gas manufacture & distribution Note: 1920?s 1940-1960?s1930?s Area: 34204 Industry Profile: Gas works, coke works, coal carbonisation plants Year Use Established: 1980 Year Use Ended: 2004 Comments: LM/0359 Note: 1980-1990?s Area: 36777 Industry Profile: Gas works, coke works, coal carbonisation plants Year Use Established: 1914 Year Use Ended: 1930 Comments: R/7/02. The Richmond Gas Company.Lower Richmond Road,Richmond Note: Kellys Directory of Richmond 1914 delivery of coke, broken for domestic use. Area: 19555 ***Part 2A Risk Ranking*** PRIORITY: Medium					
PCL001063	VICTORIA VILLAS 2	VICTORIA VILLAS	38.20	16	518821, 175447
Previous Industrial Uses Industry Profile: Oil refineries & bulk storage of crude oil and pet.products Year Use Established: 1974 Year Use Ended: 1974 Comments: Tanks Note: No Data Area: 16 ***Part 2A Risk Ranking*** PRIORITY: Low Medium					
PCL001064	BARDOLPH ROAD 1	BARDOLPH ROAD	11.24	21	518850, 175441

ID	Name	Location	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
Previous Industrial Uses Industry Profile: Electricity distribution inc large transformer Year Use Established: 1974 Year Use Ended: 1974 Comments: Electrical Sub Station Facilities Note: No Data Area: 20 ***Part 2A Risk Ranking*** PRIORITY: Low Medium					
PCL001185	BARDOLPH ROAD 2	BARDOLPH ROAD	16.83	7	518913, 175544
Previous Industrial Uses Industry Profile: Electricity distribution inc large transformer Year Use Established: 2004 Year Use Ended: 2004 Comments: Electrical Sub Station Facilities Note: No Data Area: 10 ***Part 2A Risk Ranking*** PRIORITY: Low Medium					
PCL001506	VICTORIA VILLAS 1	VICTORIA VILLAS	30.36	1068	518795, 175427
Previous Industrial Uses Industry Profile: Warehouse Year Use Established: c. 1978 Year Use Ended: post 2002 Comments: Info source - environmental enquiry Note: No Data Area: No Data Industry Profile: Light Industrial: engines, building & general industrial Year Use Established: 1983 Year Use Ended: No Data Comments: light industrial to manufacture component parts for electrical and motor industries Note: Planning app 82/0276 - 1983 Change of use to light industrial to manufacture component parts for electrical and motor industrie... Area: No Data ***Part 2A Risk Ranking*** PRIORITY: Medium					

5. Site Investigations

This section consists of information on site investigation reports that have been collated by the Contaminated Land Team.



5.1 GIS Attribute Data for Site Investigations

Selection Summary for layer
0 feature(s) identified on site.
2 feature(s) identified off site within 50 metres

ID	name	address	type	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
On Site						
None						
Identified Off-site - Within 50m						
R/K/1/1	Manor Road Gas Works	North Richmond	Planning/Redevelopment	10.11	25075	519085, 175588
CLIPA/000025	Victoria Villas	VICTORIA VILLAS	Planning/Redevelopment	15.73	528	518830, 175437