



**BROWNFIELD
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GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

BRT PROPERTIES LIMITED

Vale Road, Northfleet, Gravesend

Desk Study Assessment Report

BM/C3476/6655

February 2017

PROJECT QUALITY CONTROL DATA SHEET

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**DESK STUDY ASSESSMENT REPORT
FOR A SITE OFF
VALE ROAD, GRAVESEND.**

1.0 INTRODUCTION

1.1 Objectives

- 1.1.1 This report describes a Desk Study Assessment carried out by Brownfield Solutions Limited (BSL) for BRT Properties Limited on a site off Vale Road, Northfleet, Gravesend.
- 1.1.2 The objectives of the Desk Study Assessment were to determine the site's environmental setting and likely site conditions, highlighting potential areas of concern that may govern the site's redevelopment.
- 1.1.3 The report has been completed to fulfil the requirements of a preliminary risk assessment in accordance with CLR11 "Model Procedures for the Management of Land Contamination".

1.2 Proposed Development

- 1.2.1 The proposed development is residential end use comprising a mixture of terraced houses, flats and associated car parking areas.

1.3 Limitations

- 1.3.1 This Desk Study Assessment has been carried out based on information obtained from a number of areas, BSL have assumed that this information is correct.
- 1.3.2 There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.
- 1.3.3 This report has been prepared for the sole use of the client. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report they rely on it at their own risk and BSL do not owe them any Duty of Care.

2.0 THE SITE

2.1 Location & Access

- 2.1.1 The site covers an area of approximately 0.85 hectares and is situated circa 1.8km south west of Gravesend Town Centre.
- 2.1.2 The site is centred on National Grid Reference 562763, 173634 as shown on the Site Location Plan, Drawing No. C3476/01.
- 2.1.3 Access to the site is gained off Vale Road to the east.

2.2 Site Description

- 2.2.1 A site walkover has yet to be undertaken; the description below is based on satellite imagery and aerial photography.
- 2.2.2 The site is irregular in shape with a large garage along the majority of the northern edge, the south west corner of the site is fenced off and occupied by a van hire company and associated buildings. Much of the east and south east of the site house a number of coaches and lorries associated with the coach rental company occupying that area. To the centre of the site is a two storey compound comprising storage containers, porta cabins, it is also occupied by a large number of parked cars.
- 2.2.3 The property is bounded to the south by mature trees and vegetation; to the east by a combination of circa 2 m high wooden /metal picket fencing and mature trees and thick vegetation. The western boundary is bordered by circa 2m high metal picket security fencing and has a disused gate in the north west corner. A brick wall topped with barbed wire runs along the northern boundary.
- 2.2.4 The site appears to be at or close to street level and covered in a mixture of concrete, macadam and gravel hardstanding.
- 2.2.5 Abutting the site to the east is Vale Road, to the north are residential properties and garages, to the west is Shepherd Street and to the south is railway land comprising of thick vegetation and a steep embankment down to railway tracks.
- 2.2.6 These details are shown on the Pertinent Site Features Plan, Drawing No. C3476/02.

3.0 ENVIRONMENTAL SETTING

3.1 Geological Search

3.1.1 The following publications of the British Geological Survey (BGS) were examined in respect of the geology underlying the site:

- 1:50,000 Scale Geological Sheet 271, Dartford, Solid and Drift edition.
- BGS Geology View of Britain.

Made Ground

3.1.2 Made ground is likely to be encountered beneath the site.

Superficial Deposits

3.1.3 The site is not indicated to be underlain by any superficial deposits.

Solid Geology

3.1.4 The solid geology is shown to be the Seaford Chalk Formation and Newhaven Chalk Formation.

3.1.5 No faults are shown on or within an influencing distance of the site.

3.2 Hydrogeology

3.2.1 The bedrock is classified as a Principal Aquifer. These are layers of rock 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.

3.2.2 The site is indicated to lie on a Source Protection Zone, Zone I, Inner catchment (the area needed to support the discharge from the protected groundwater source).

3.2.3 There are no active Groundwater Abstraction Licences within 500m of the site. The closest historical licence was 237m to the west.

3.2.4 There are no Potable Water Abstraction Licences within 1.5km of the site.

3.3 Hydrology

3.3.1 There are no watercourses within 500m of the site and no surface water features are within 250m.

3.3.2 Information obtained from the Environment Agency indicates that the site will not be affected by an extreme flood event.

3.3.3 There are no Surface Water Abstraction Licences within 1.5km of the site.

3.4 Historical Setting

3.4.1 Information has been obtained from historical Ordnance Survey Maps with the pertinent issues that may have affected the site or its environs summarised below.

3.4.2 The following plans produced by the Ordnance Survey were examined.

Scale	Date
1:1250	1952, 1972, 1977.
1:2500	1865, 1897, 1909, 1933, 1952.
1:10000/10560	1865, 1895, 1907, 1916, 1923, 1932, 1938, 1946, 1955, 1966, 1971, 1977, 1990, 2002, 2010, 2014.

The Site

3.4.3 The earliest map dated 1865 indicates the site to be an undeveloped field.

3.4.4 The site's use is now designated as allotments on the 1909 map, there has been construction of two glass houses in the south west corner. A building is also present in the north east corner.

3.4.5 By 1932 the allotments and glass houses are gone and the southern two thirds of the site is now a **chalk pit**. A larger building is now indicated in the north eastern part of the site.

3.4.6 The 1939 map shows a reduction in size of the chalk pit, the building has now increased in size to cover the majority of the northern edge of the site.

3.4.7 The building in the northern part is now labelled as a **garage** on the 1952 map. The chalk pit has further reduced in size and a new small structure has been constructed in the centre of the site.

3.4.8 A series of structures labelled as **tanks** have been constructed along the centre of the southern boundary on the 1972 map. The chalk pit now only occupies the south east corner of the site. Buildings are also shown along the north east boundary.

3.4.9 The 1977 map shows a small building constructed immediately to the west of the row of tanks.

3.4.10 No major changes until 2010 when the tanks have now been removed. No further changes occurred after this map.

Surrounding Area

3.4.11 The earliest map available of 1865 shows undeveloped land abutting the site to the east and west, residential properties to the north along Dover Road and the North Kent **Railway** line directly to the south running east to west.

3.4.12 The 1895 map shows further residential development to the north and east, a number of large **chalk pits** are shown in the surrounding area. A **brick works** and

the British White **lead works** are shown circa 550m and 650m respectively to the north.

- 3.4.13 By 1907 the lead works is now a **whiting works**, the Portland **cement works** has been constructed circa 700m to the north and an isolation hospital is shown approximately 500m to the south west. **Chalk pits** are now shown to the east and north east at a distance of circa 150m and 300m respectively.
- 3.4.14 The brick works, the whiting works and the hospital have all been demolished by 1932. A number of works have also been constructed these include a **sewage works** circa 700m to the west, a large **paper mill** approximately 750m to the north and two large **chalk pits** circa 50m and 150m to the south and south west. The chalk pit to the north east is now labelled as an 'old' chalk pit and the chalk pit to the east has increased in size.
- 3.4.15 The 1938 map shows further residential development to the north and south along with the construction of a number of schools.
- 3.4.16 By 1946 the large chalk pit to the south west is now shown as a lake with a pump house on its eastern edge.
- 3.4.17 The area south of the railway is described as 'old' chalk pit on the 1952 map.
- 3.4.18 The Portland cement works have been demolished by 1955 and all the chalk pits in the area are no longer in use.
- 3.4.19 The 1966 map shows the construction of a dock and further works approximately 500m to the north, including a **mineral/mining works** supplied by a mineral railway which joins the North Kent Railway line further to the east.
- 3.4.20 The chalk pits to the south and north east are listed as **refuse tips** on the 1972 map.
- 3.4.21 One of the works circa 700m to the north is now a **power station** by 1977 and a **depot** has been constructed approximately 300m to the south west.
- 3.4.22 In 1990 a business park was constructed circa 400m to the south west.
- 3.4.23 No major changes take place except further residential development and the diminution of the works to the north up to the most recent map 2014.
- 3.4.24 The Historical Maps are presented in Appendix A.

3.5 Environmental Searches

- 3.5.1 A formal request has been made to Gravesham Borough Council Contaminated Land Officer for information pertaining to the site. To date no information has been received.
- 3.5.2 An Environmental Search has been conducted through Groundsure, which utilises British Geological Survey and Environment Agency databases. The full report can be found in Appendix B, although a summary of the more relevant findings is presented below.

Entry	0 – 249m	250 – 500m	Details
Authorised Industrial Processes (IPC/IPPC/LAPPC)	0	0	
Pollution Incidents	2	1	The closest was 11m north east and pertained to a diesel spill which had a minor (Category 3) impact to water. The next closest was 81m south and was contaminated water from firefighting run-off, it had no impact to water, land or air.
Landfill and Waste Treatment	5	0	The closest two historic landfills are located 24m to the south and 51m to the north east. The south landfill contained inert, industrial, commercial and household waste and the landfill to the north east only contained inert waste.
Discharge Consents	0	2	The closest was 472m north west for sewage discharges.
Control of Major Accident Hazard (COMAH) sites	0	0	
Consents issued under planning (Hazardous Substances) Act 1990	0	0	
Radioactive Substances	0	0	
Historical Tank database	3	13	One instance of unspecified tanks on site, the next closest is 194m to the north east.
Fuel Station entries	0	0	
Other Current industrial land uses	14	NA	On site land uses include, two vehicle repair garages, one skip hire company, two vehicle hire companies and a vehicle parts and accessories retailer. An electricity substation is located 73m to the north east and a number of vehicle repair garages are located around the site between 150m – 200m away.

3.6 Radon

- 3.6.1 Map 5 'London, Sussex and west Kent' was inspected which defines areas requiring radon protective measures. Vale Road, Gravesend is not an area requiring Radon precautions in foundations in accordance with BRE Report 211 'Radon – Guidance on protective measures for new dwellings' 2015 Edition; however a site specific assessment is advised.
- 3.6.2 BRE Report 211 provides a general indication of which areas require radon protection, a site specific assessment can be carried out through UK Radon or BGS.

3.7 Coal Authority Search

- 3.7.1 The site is outside the area of a designated coalfield, the Law Society and Coal Authority state a mining search is not required.

3.8 BGS Boreholes

- 3.8.1 There are no BGS boreholes within 50m of the site.

4.0 DESK STUDY SUMMARY AND RISK ASSESSMENT

4.1 Introduction

- 4.1.1 The risk posed by any contaminants in soil or groundwater will depend on the nature and level of the source, the probability of exposure occurring, the potential pollution pathway and the likely effects on the receptors.
- 4.1.2 A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present a receptor could be exposed to the contaminant.
- 4.1.3 The following sections discuss the identified potential on-site and off-site sources, and any pollution that could impact receptors associated with the proposed development. Pollution linkages are assessed which may represent a risk to human health and/or controlled water receptors from the information gained from the desk study searches. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model.
- 4.1.4 Three potential impacts exist for any given site and all three need to be considered in the qualitative risk assessment, these are:
- On-site impacts;
 - The site impacting its surroundings;
 - Off-site sources impacting the subject site.

4.2 Potential Contaminative Sources

On-Site

- 4.2.1 From the information obtained during the desk study potential sources of contamination which may affect the redevelopment of the site for residential end use include:
- Two garages currently on-site;
 - Historic unspecified tanks;
 - Made ground from the previously infilled chalk pit and possible demolished buildings.

Off-Site

- 4.2.2 Possible off-site sources of contamination have also been identified through desk study searches these include:
- Neighbouring railway;
 - Refuse pits/infilled chalk pits;
 - Vehicle repair garages;
 - Electricity substation;
 - Brick works;
 - Lead works;

- Whiting works;
- Cement works;
- Sewage works;
- Paper mill;
- Mineral/mining works;
- Power station;
- Depot.

Associated Contaminants

- 4.2.3 The contaminants commonly associated with the potential sources of contamination identified include the following.
- 4.2.4 Made ground can commonly contain contaminants such as metals, polycyclic aromatic hydrocarbons (PAHs) and asbestos.
- 4.2.5 If deep made ground or organic material is encountered associated with the chalk pit or demolished buildings on site then ground gases such as carbon dioxide or methane may be produced. The refuse tips nearby may give rise to the production of landfill gases (carbon dioxide, methane and hydrogen sulphide). Leachate from the tip will also be a potential source of contamination depending on the landfill precautions in place.
- 4.2.6 The Department of the Environment (DoE) Industry profile for road vehicle fuelling, service and repair garages and filling stations lists the following potential contaminants: petroleum spirit, petrol additives, diesel, metals and metal compounds, waste oil, anti-freeze, brake fluids, solvents, paints, thinners and inorganic compounds.
- 4.2.7 The DoE profile for Railway Lands lists the following potential contaminants: PCBs, PAHs, ethylene glycol, creosote, herbicides, ferrous residues, metal fines, ash and sulphate.
- 4.2.8 The DoE profile for Cement Works lists the following potential contaminants: Inorganic compounds, blast furnace slag, pulverised fuel ash (PFA), air entering agents, plasticisers, cement dusts and flue gas dusts.
- 4.2.9 The DoE profile for Pulp and Paper Manufacturing lists the following potential contaminants: metals and metallic compounds, inorganic elements and compounds, acids, alkalis, solvents, organic compounds, oils, PCBs and asbestos.
- 4.2.10 The DoE profile for Sewage Works lists the following potential contaminants: metals, metalloids and their compounds, inorganic ions, organics, other organics, micro-organisms, treatment chemicals, hazardous gas generation potential in buried sludge and asbestos.
- 4.2.11 Polychlorinated biphenyls (PCBs) may have been used within the electricity substation located 73m to the north east.

4.3 Pathways

4.3.1 A pathway is defined as a medium by which a contaminant comes into contact with, or otherwise impacts a receptor. Due to the site's proposed end use being residential potential pollution pathways for contaminant migration at the site will exist.

4.3.2 At this stage the potential contaminants identified above are considered to present potential risks to site end users and controlled waters through the following pathways:

- Ingestion of contaminated soils;
- Dermal contact with contamination;
- Inhalation of gases or vapours in both indoor and outdoor air;
- Direct contact by buried structures such as service pipes;
- Surface run-off;
- Leaching of mobile contamination into groundwater;
- Migration of perched groundwater in any permeable soils or along existing or proposed service runs;
- Saturated zone flow through the Principal Aquifer underlying the site.

4.4 Receptors

4.4.1 Receptors generally fall into the categories of human health or controlled waters. The identified receptors are listed below:

- End users – Residents of the proposed dwellings
- Underlying Principal Aquifer

4.4.2 Contaminants within the soil and groundwater could potentially attack the clean potable water supply pipe. The contaminants should be assessed to determine the correct pipe material and level of precautions.

4.5 Preliminary Conceptual Site Model

4.5.1 The information obtained in the previous sections has been used to compile a Preliminary CSM. The identified potential contaminants and receptors have been assessed in the table below as to whether a plausible source-pathway-receptor pollutant linkage for the proposed end use of the site exists. The risk classification has been estimated in accordance with information in Appendix D.

Human Health

4.5.2 The Preliminary CSM for human health is presented in the table below.

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Made ground	Ingestion, direct contact, inhalation of dusts.	End users	Likely	Medium	Moderate

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Garage	Ingestion, direct contact, inhalation of dusts and vapours.	End users	Low likelihood	Medium	Moderate to Low
Ground gas	Migration into confined spaces.	End users	Low likelihood	Severe	Moderate
Tanks	Ingestion, direct contact, inhalation of dusts and vapours.	End users	Likely	Medium	Moderate
OFF-SITE					
Railway	Ingestion, direct contact, inhalation of dusts.	End users	Unlikely	Medium	Low
Electricity Substation	Ingestion, direct contact, inhalation of dusts.	End users	Unlikely	Medium	Low
Vehicle Repair Garages	Ingestion, direct contact, inhalation of dusts.	End users	Unlikely	Medium	Low
Cement works, Brick works, Lead works, Sewage works, Mineral/mining works, Paper mill, depot, power station.	Ingestion, direct contact, inhalation of vapours.	End users	Unlikely	Medium	Low
Landfill gases	Migration into confined spaces.	End users	Likely	Medium to Severe	Moderate to High
Ground gas	Migration into confined spaces.	End users	Unlikely	Severe	Moderate to Low

Human Health Justification

- 4.5.3 Made ground will be encountered at the site associated with the infilled chalk pit and possible demolished buildings. As the extent, depth and composition of the made ground is unknown and the proposed residential development will have gardens and areas of soft landscaping, the risk is considered moderate until intrusive site investigations are undertaken.
- 4.5.4 The on-site service garage will be a potential source of hydrocarbons, MTBE and possibly VOCs and SVOCs. Spillages into underlying soils are considered low likelihood with concrete floors within the garage where works are undertaken, the risk is considered moderate to low at this stage.
- 4.5.5 Made ground pertaining to the chalk pit and possible demolished buildings is likely on site. The depth and composition of the made ground is currently unknown and as such the risk from ground gas is considered moderate. There is potential risk of vapours from any hydrocarbons present within the ground.
- 4.5.6 The storage contents/use of the tanks on site is unknown, but considering the sites prolonged use as a car repair garage, fuel storage is the most likely use. As it is

unknown if the tanks have been removed or infilled, there is potential risk of vapours from any hydrocarbons present therefore the risk is considered moderate to high until intrusive site investigations are undertaken.

- 4.5.7 Railway land abuts the site to the south. The contaminants associated with this source are generally immobile and it is unlikely they will affect the site and as such the risk is considered low.
- 4.5.8 Made ground may be associated with the nearby railway and chalk pits but due to the distance from site many of these sources can be discounted. The depth of nearby made ground is unknown and due to this the risk is considered moderate to low.
- 4.5.9 The risk associated with the refuse tip includes possible putrescible made ground, ground gas and leachate. The close proximity, recent age and the waste material of the tip will also result in landfill specific gas generation such as methane. Based on guidance, landfills active in this time frame (1950 to late 1970s) have a moderate to very high generation potential, risk of lateral gas migration, risk for on site development and potential for leachate migration on to site. The risk from landfill ground gas is considered to be high.
- 4.5.10 Potential contamination associated with the cement works, brickworks, lead works, sewage works, mineral/mining works, paper mill, power station and depot is unlikely to have migrated onto the site given the large distance from site therefore the risk is considered low.
- 4.5.11 The risk of contamination migrating on-site from the electricity substation 73m to the north east is considered to be low as PCBs are generally immobile.
- 4.5.12 The vehicle repair garages located 150m to 200m away are not considered to be a significant source of contamination given the distance from the subject site and as such the risk is considered to be low.

Controlled Waters

4.5.13 The Preliminary CSM for controlled waters is presented in the table below.

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Garage	Migration through groundwater or granular soils	Principal Aquifer	Likely	Medium	Moderate
Tanks	Migration through groundwater or granular soils	Principal Aquifer	Likely	Medium	Moderate
Made ground	Migration through groundwater or granular soils	Principal Aquifer	Likely	Medium	Moderate

Controlled Waters Justification

- 4.5.14 It is likely that spills and leakages will have occurred over the garage's history and with no superficial deposits to protect the underlying Principal Aquifer the risk from the on-site garage is considered moderate at this stage.
- 4.5.15 With no superficial deposits to protect the underlying Principal Aquifer and no information regarding the use and/or removal of the tanks the risk to controlled waters is considered moderate.
- 4.5.16 Made ground will be present beneath site as the former chalk pit will have been backfilled. Any mobile contaminants within the made ground may have the potential to leach into the underlying Principal Aquifer. At this stage, the risk is considered to be moderate.

4.6 Ground Gas Risk Assessment

- 4.6.1 Potential on-site and off-site gas sources have been identified and the preliminary CSM considers ground gas to be a moderate risk to site end users.
- 4.6.2 In accordance with CIRIA C665 as set out in Appendix E of this report, the recommended gas monitoring should comprise twelve visits over a six month period.

5.0 DEVELOPMENT CONSTRAINTS

5.1 Foundations

- 5.1.1 The anticipated ground conditions are chalk bedrock, underlying an unknown thickness of made ground. At this early stage specific foundation recommendations cannot be provided. It is recommended that a detailed intrusive investigation is carried out to confirm the depth of any made ground and underlying ground conditions.
- 5.1.2 It is likely that foundations will require piling through the made ground materials used to backfill the former chalk pit transferring load to the underlying chalk bedrock.

5.2 Other Constraints

- 5.2.1 Asbestos was not covered in this report. It should be noted that a demolition asbestos survey will be required prior to demolition of any building that are on site.
- 5.2.2 Investigation should be made as to whether there are any service pits beneath the garage structure and whether any tanks remain in situ in the southern part of the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Environmental

- 6.1.1 The site was a chalk pit from the 1930s, housed a garage from the 1950s and a number of unspecified tanks from the 1970s; prior to that it was mostly undeveloped. The on-site risk from made ground associated with the infilled chalk pit is considered moderate and the risk from the unspecified tanks is considered moderate to high.
- 6.1.2 Surrounding the site there has been a railway, electricity substation, vehicle repair garages, landfill, brick works, lead works, cement works, sewage works, paper mill, mineral/mining works, power station and depot. The risk from all of these barring the landfill is considered low.
- 6.1.3 Potential sources of ground gas have been identified on-site and off-site. At this stage, the risk to on-site end-users is considered to be moderate to high risk. Investigation is recommended to quantify the risk.
- 6.1.4 The risk to the underlying Principal Aquifer from the on-site garage and tanks is considered moderate.

6.2 Geotechnical

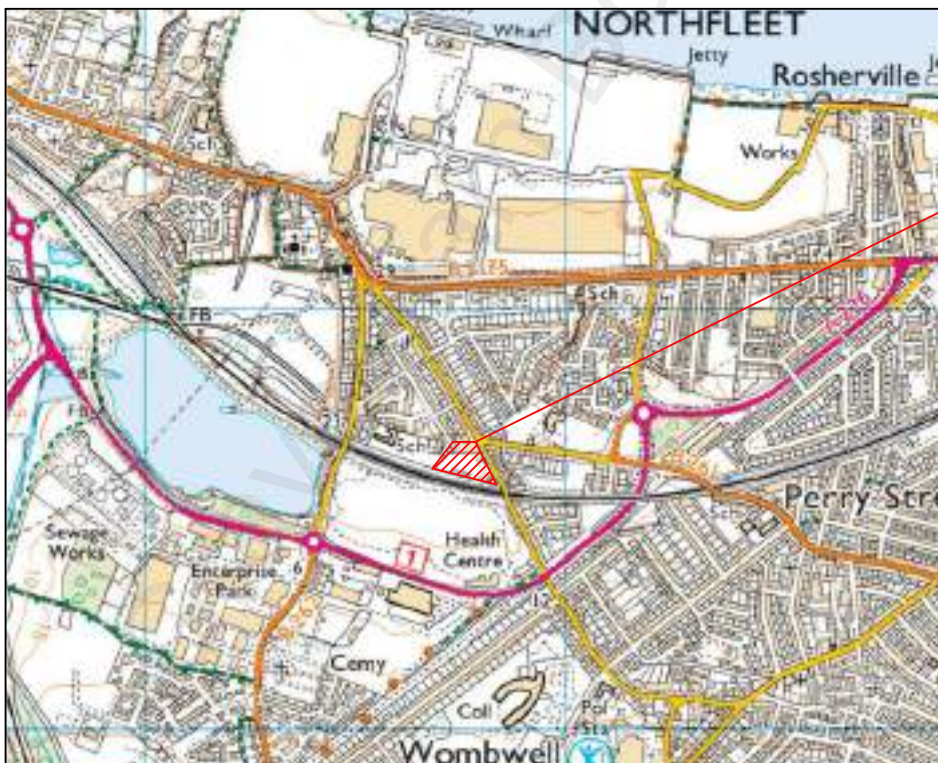
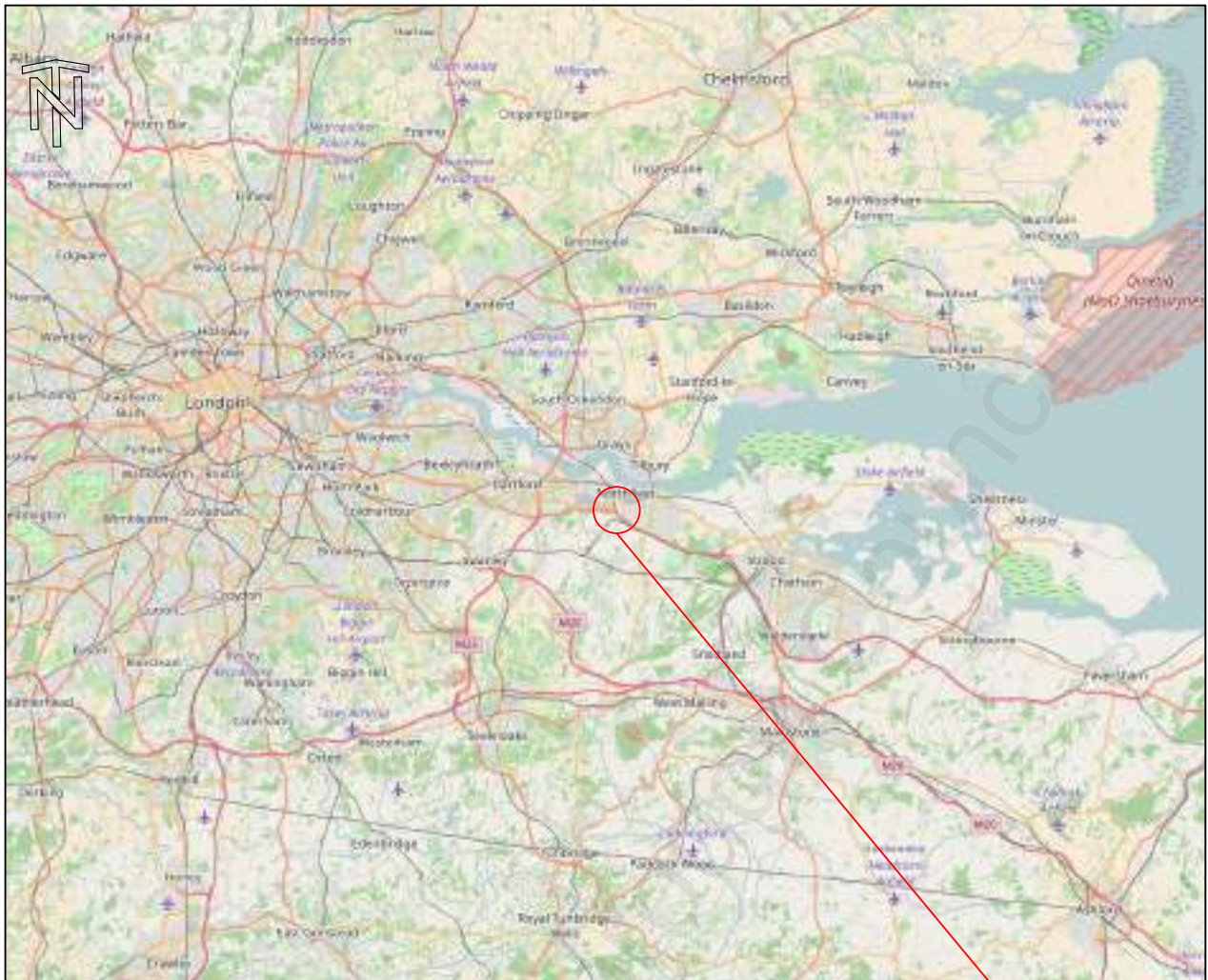
- 6.2.1 As the depth of the made ground is unknown specific foundation recommendations cannot be provided. It is recommended that a detailed intrusive investigation is carried out to confirm the depth of any made ground and underlying ground conditions.

6.3 Further Work

- 6.3.1 Therefore to allow future development of the site the following further works are recommended, although this list is not exhaustive and should be read in conjunction with any planning conditions that are applicable to the site.

- Detailed site walkover to confirm features on site.
- Intrusive site investigations comprising cable percussive boreholes and window sample boreholes.
- Contamination testing of soils and groundwater.
- Installation of gas and water monitoring wells.
- Gas monitoring and assessment.
- Demolition Asbestos survey of existing buildings.
- Foundation design.
- Design of remedial strategy, if required.
- Confirmation of any remediation strategy with the Local Authority.

DRAWINGS



SITE

CLIENT BRT PROPERTIES LIMITED	DRAWING DETAIL SITE LOCATION PLAN		
	DATE FEB 2017	SCALE NTS	
PROJECT TITLE VALE ROAD, NORTHFLEET GRAVESEND	DRAWING NUMBER C3476/01	REVISION —	DRAWN BM
			CHECKED RW

**APPENDIX A
Historical Maps**

Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1865

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1865
Revised 1885
Edition N/A
Copyright N/A
Levelled N/A



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Groundsure Insights
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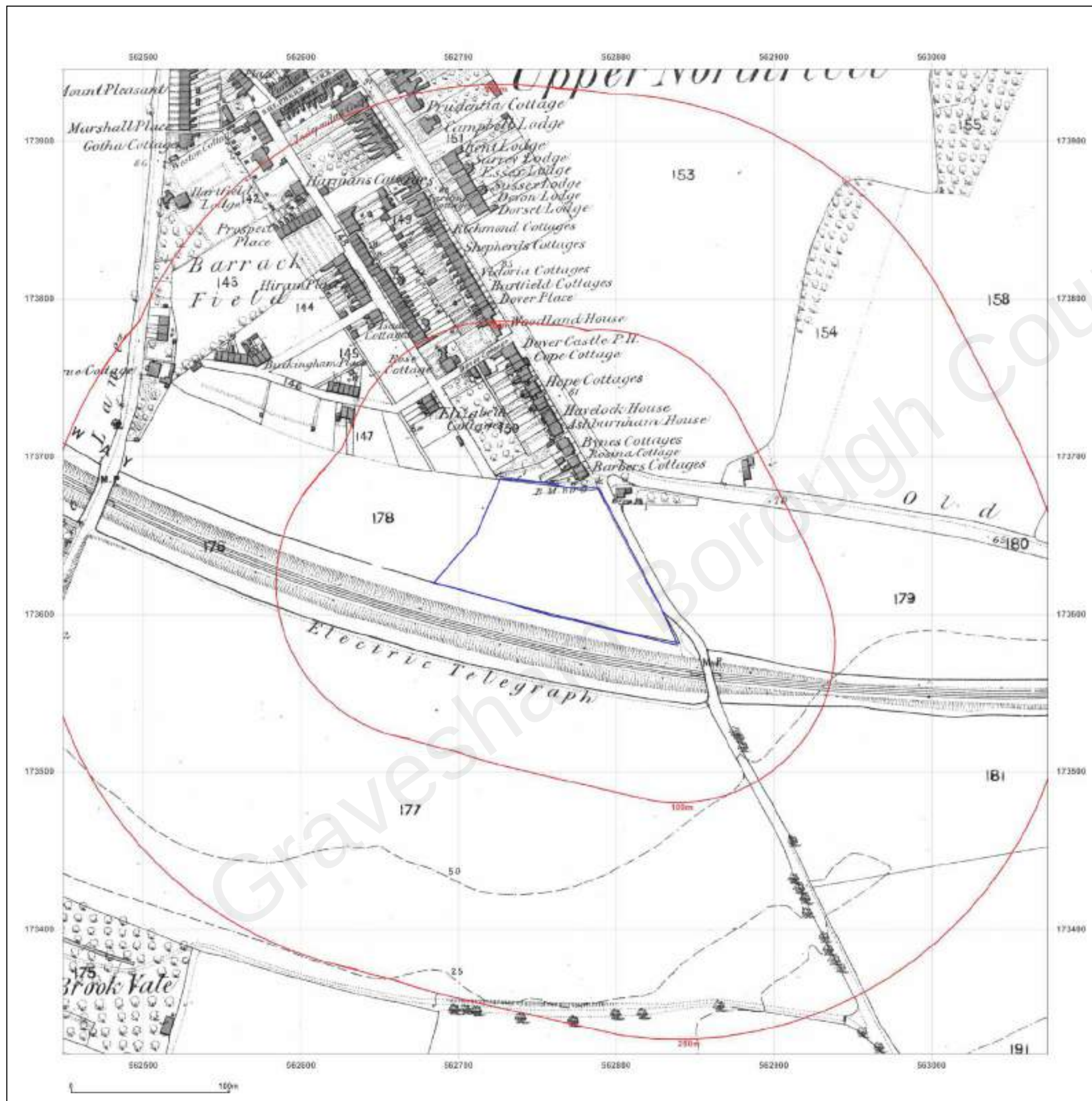


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Production date: 25 January 2017

To view map legend click here [Legend](#)



Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1897
Revised 1897
Edition N/A
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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
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Map Name: County Series

Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1908
 Revised 1909
 Edition N/A
 Copyright N/A
 Levelled N/A



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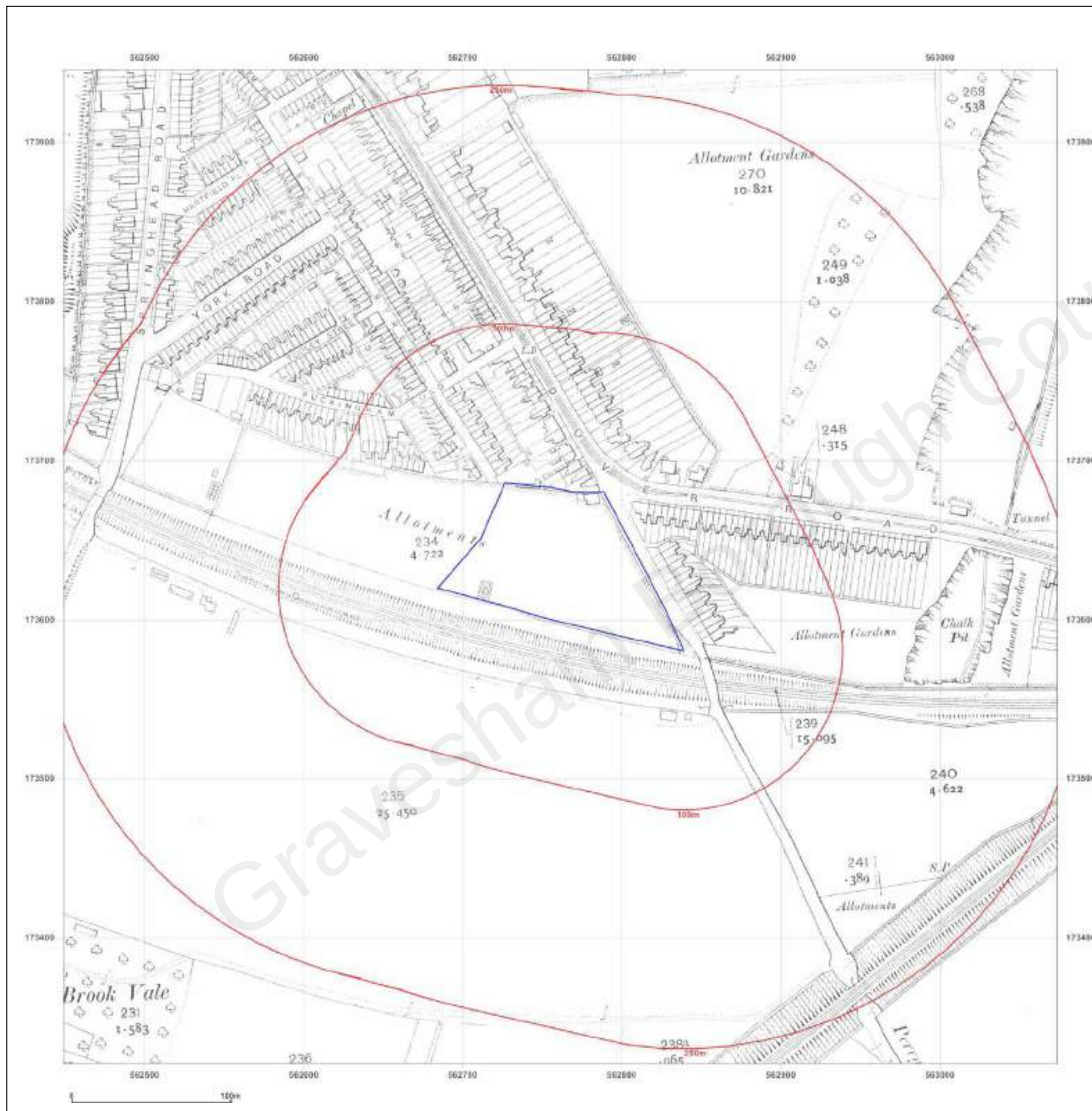


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1933

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1939

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1938
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A



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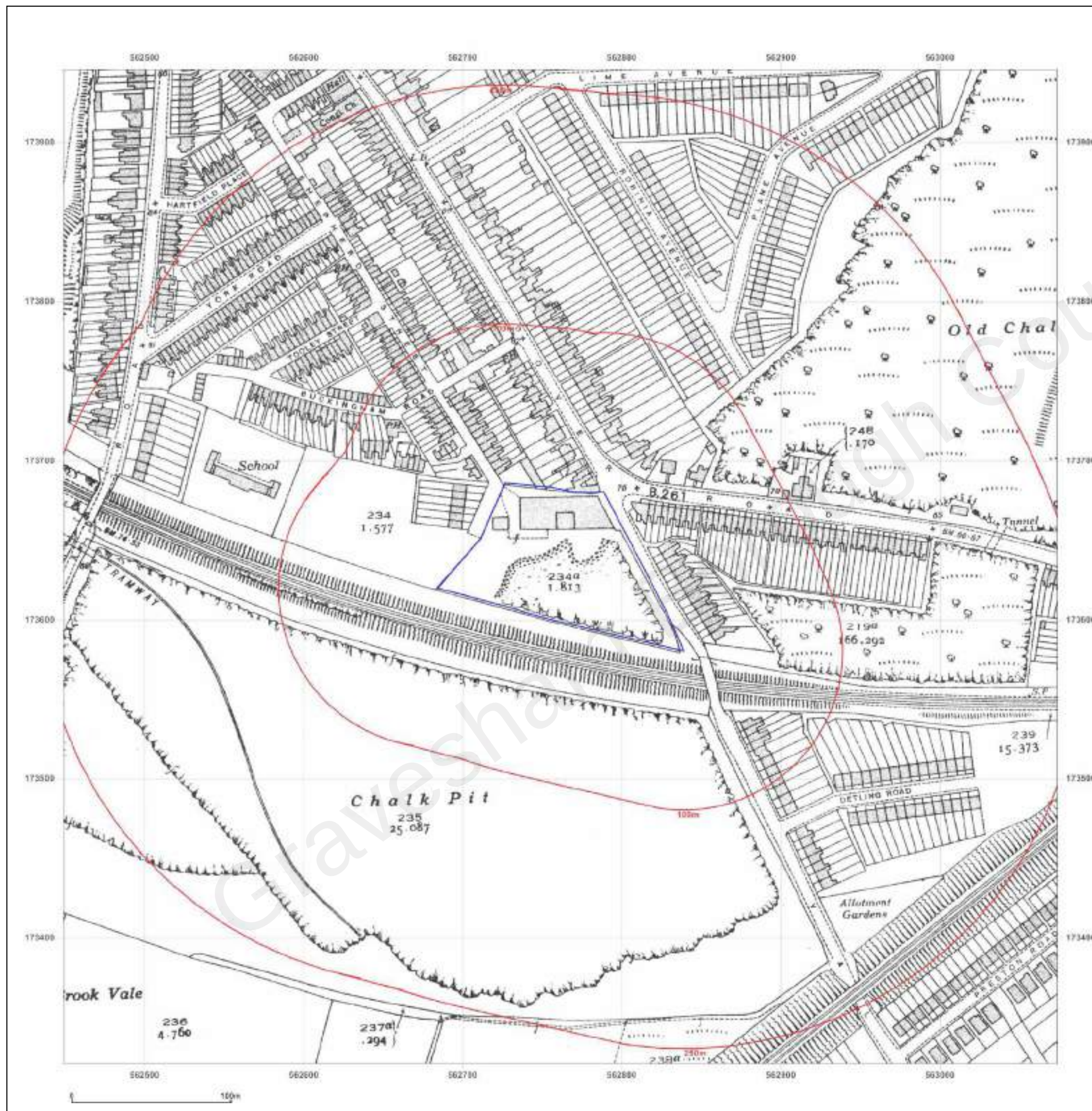


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1952

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952	Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952
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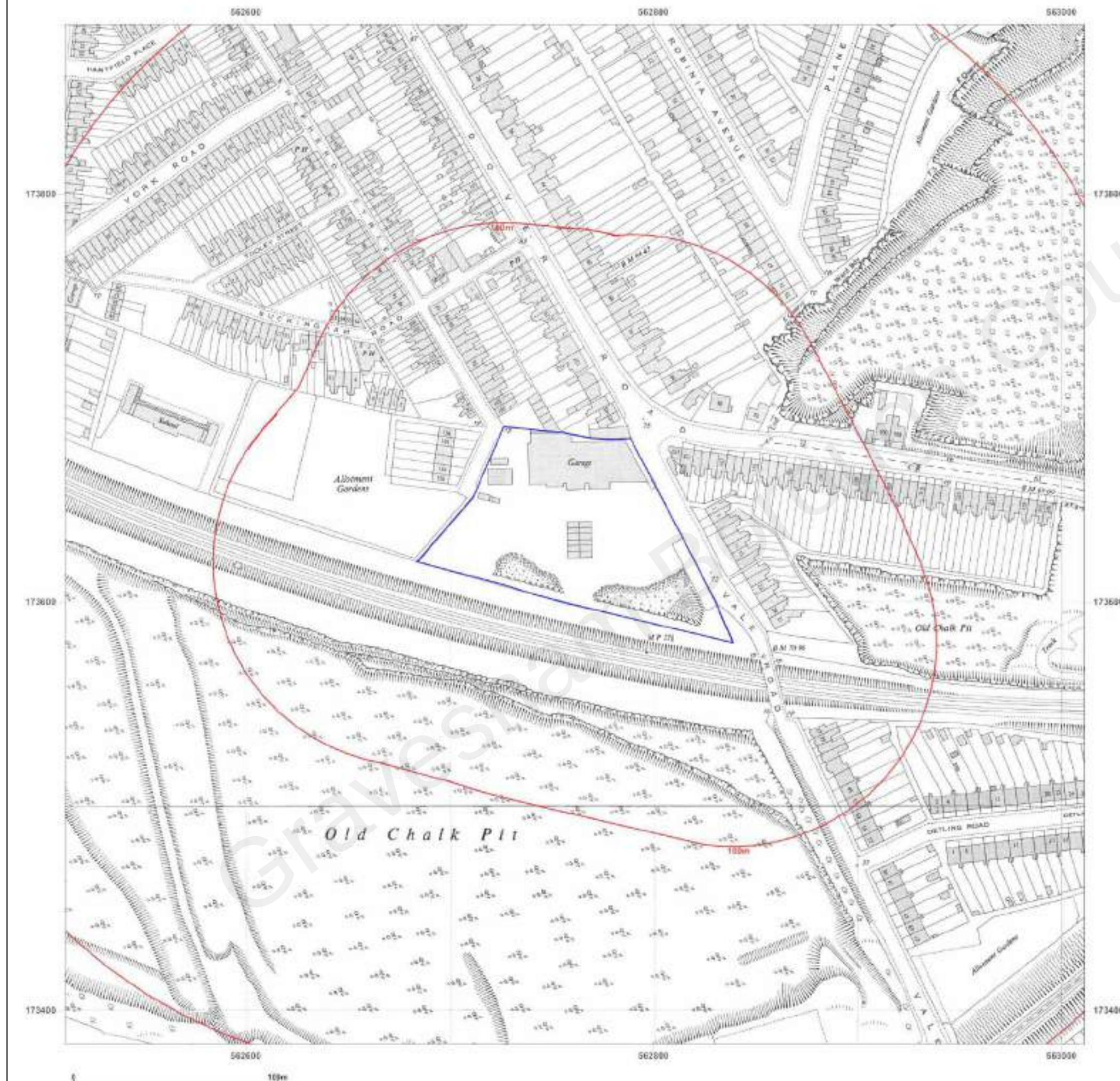


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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1952

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1952
Revised 1952
Edition 1954
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Revised 1952
Edition 1954
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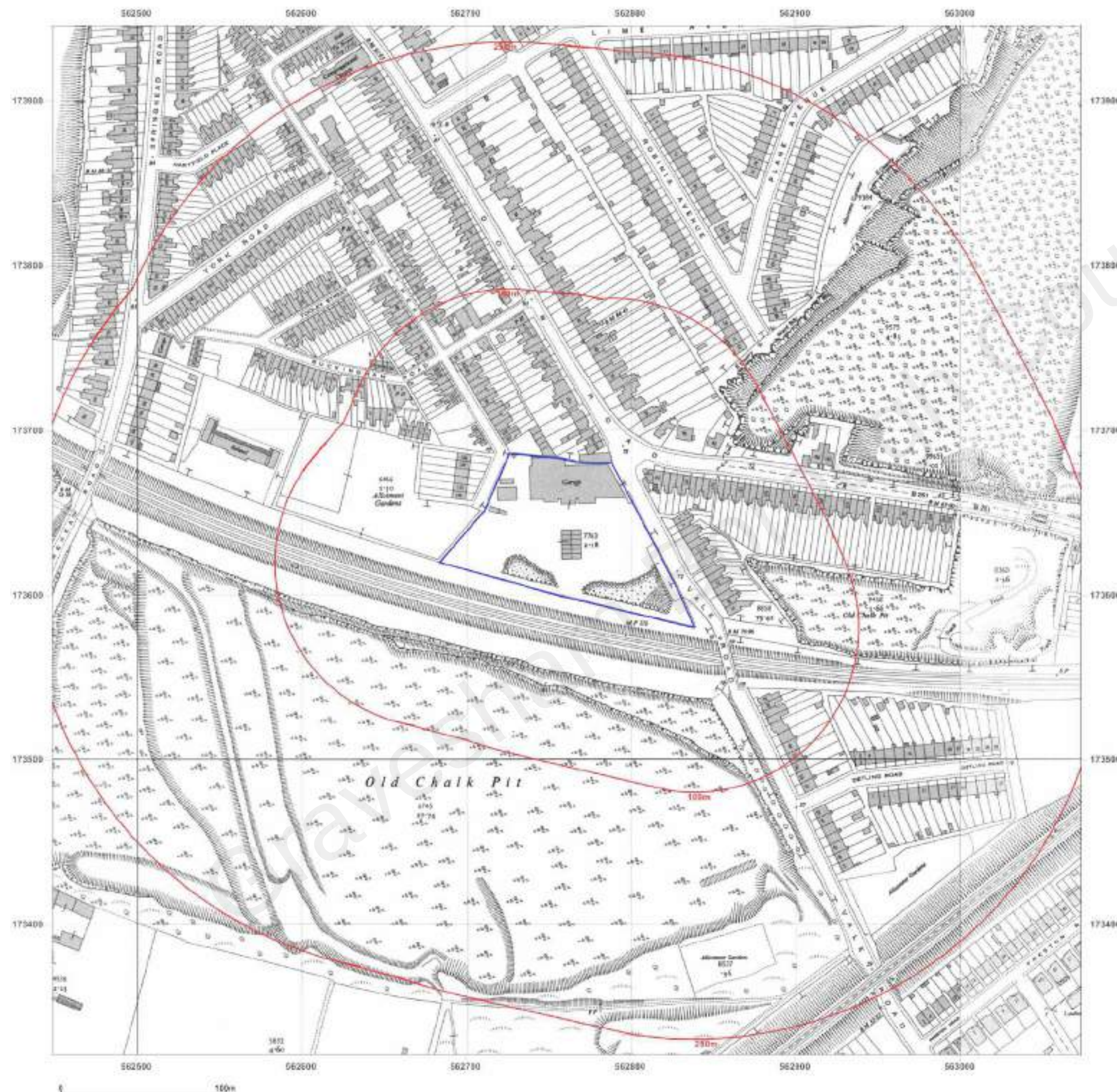


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1972

Scale: 1:1,250

Printed at: 1:2,000



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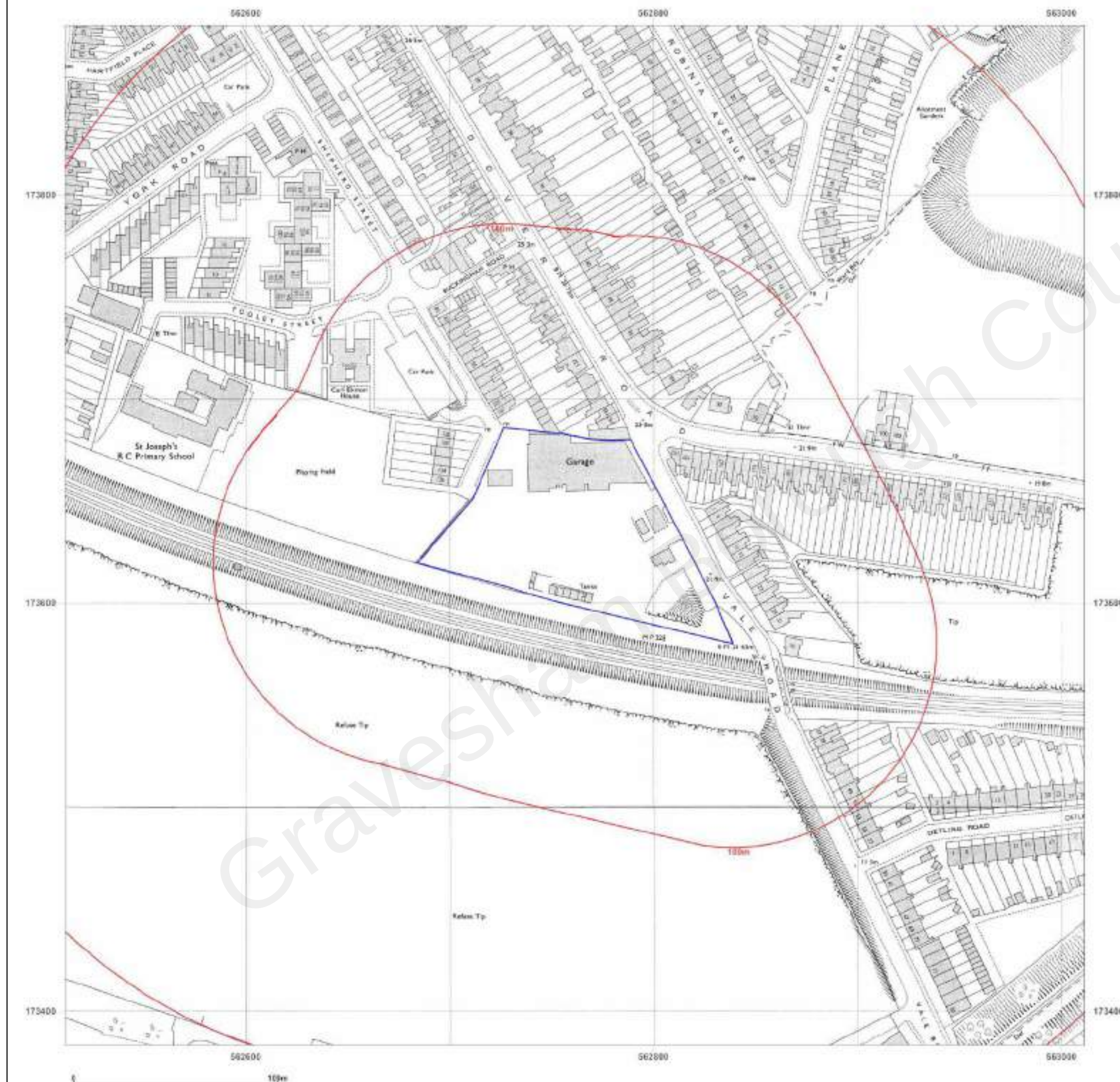


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Client Ref: EMS_402946_538738

Report Ref: EMS-402946_538738

Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1977

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1977
Levelled N/A



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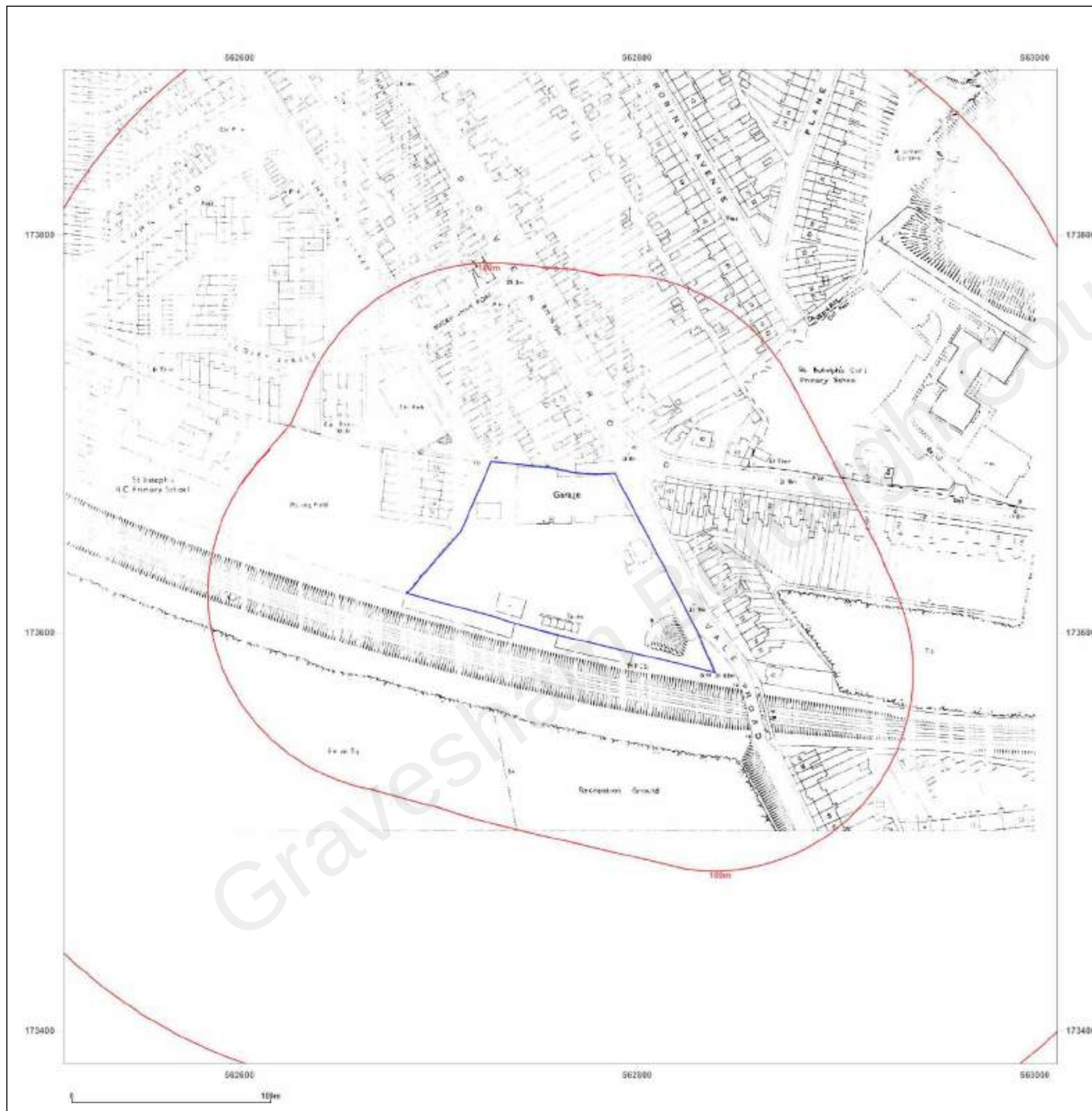


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1865

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1885
Revised 1885
Edition N/A
Copyright N/A
Levelled N/A



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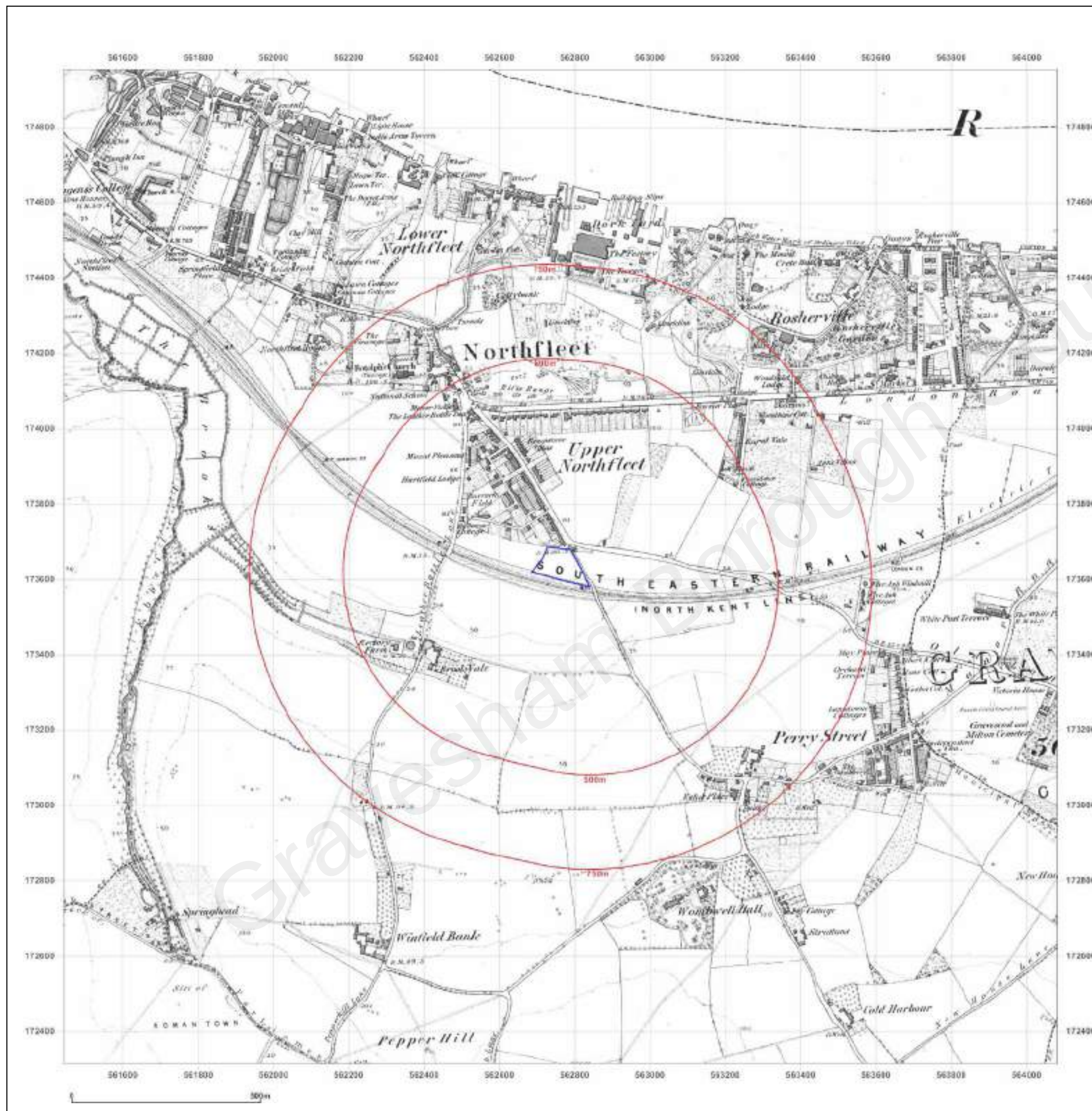


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A



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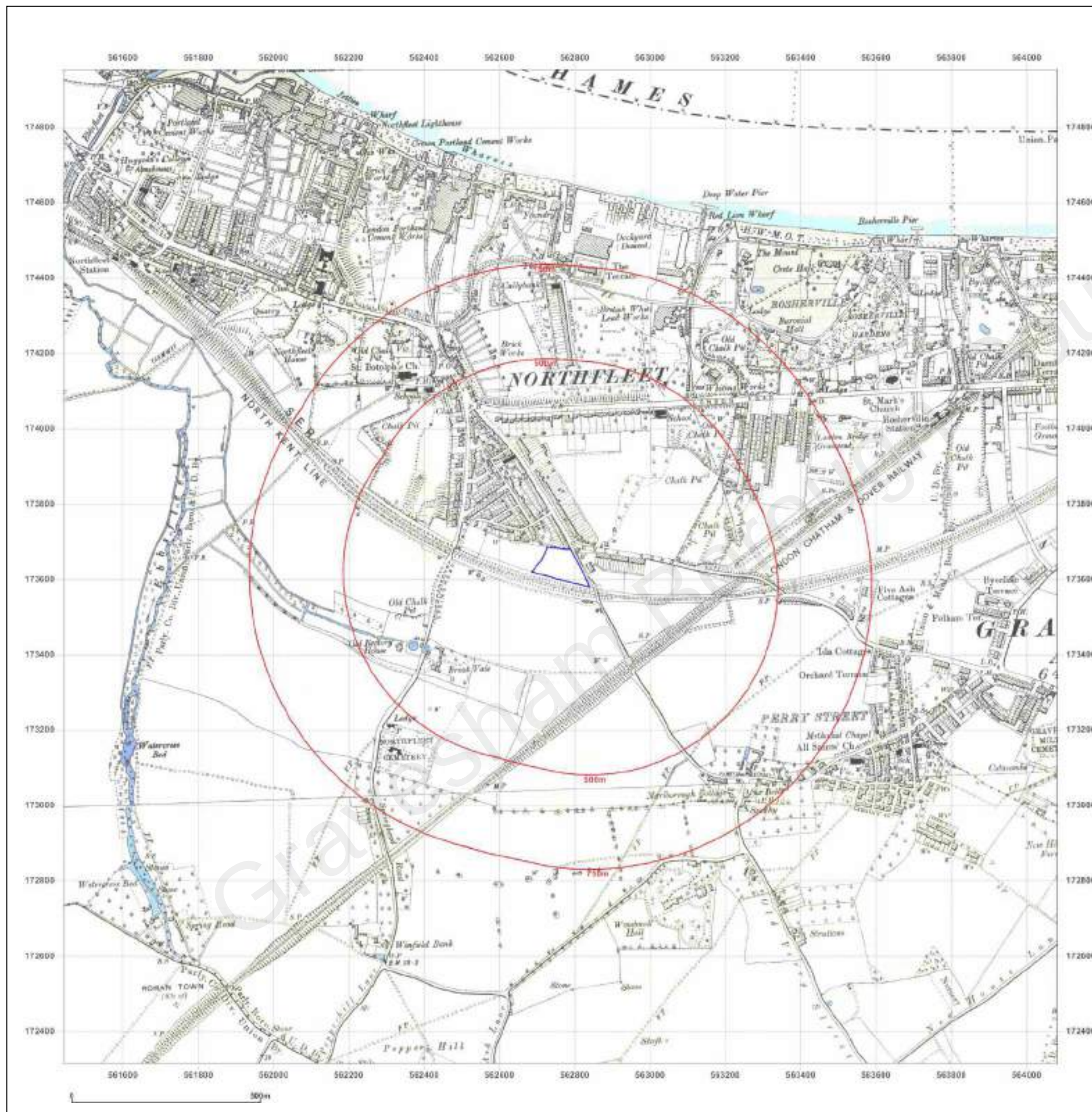


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1907

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1907
Edition N/A
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Surveyed 1864
Revised 1907
Edition N/A
Copyright N/A
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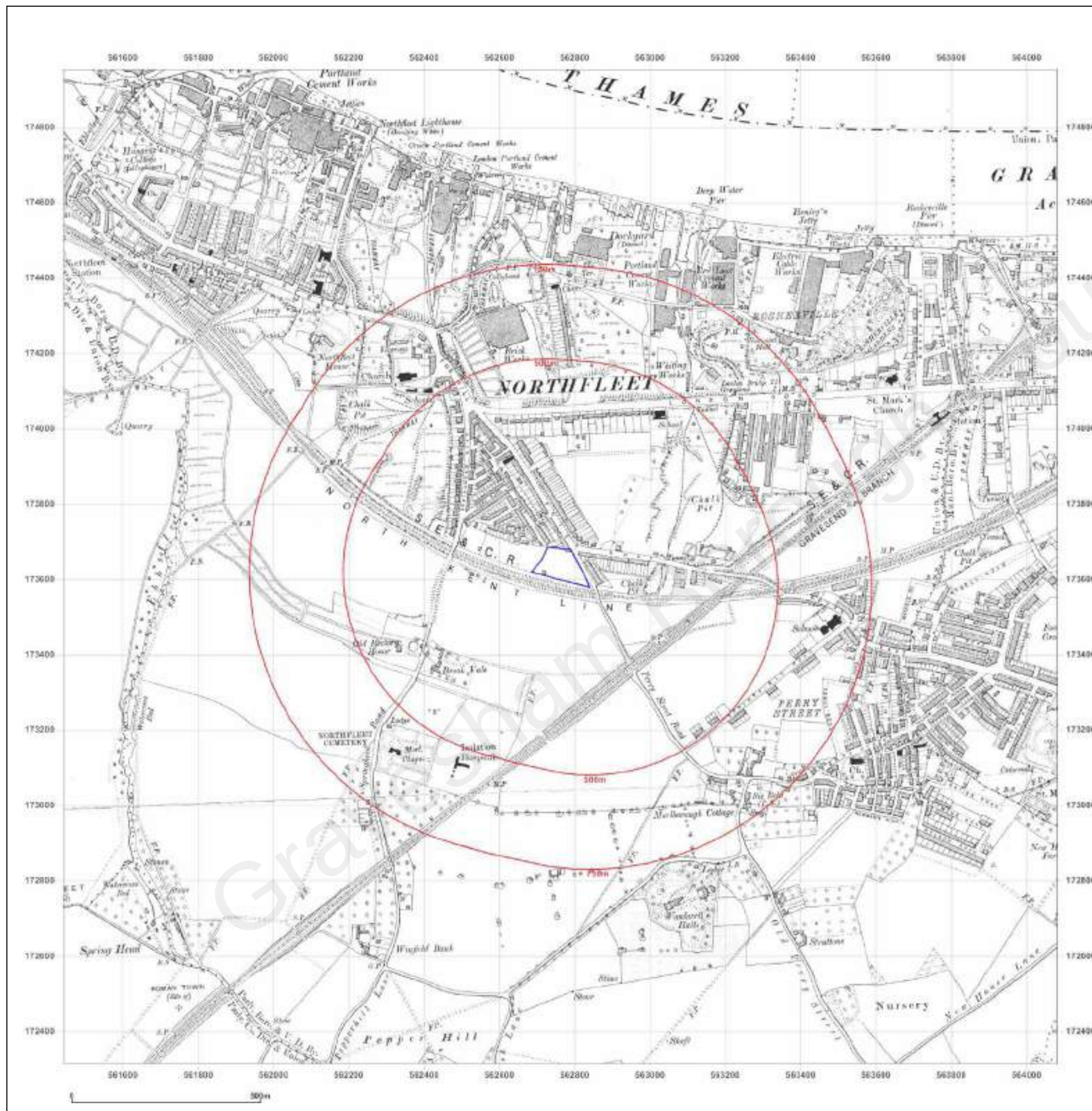


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1916

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1854
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A



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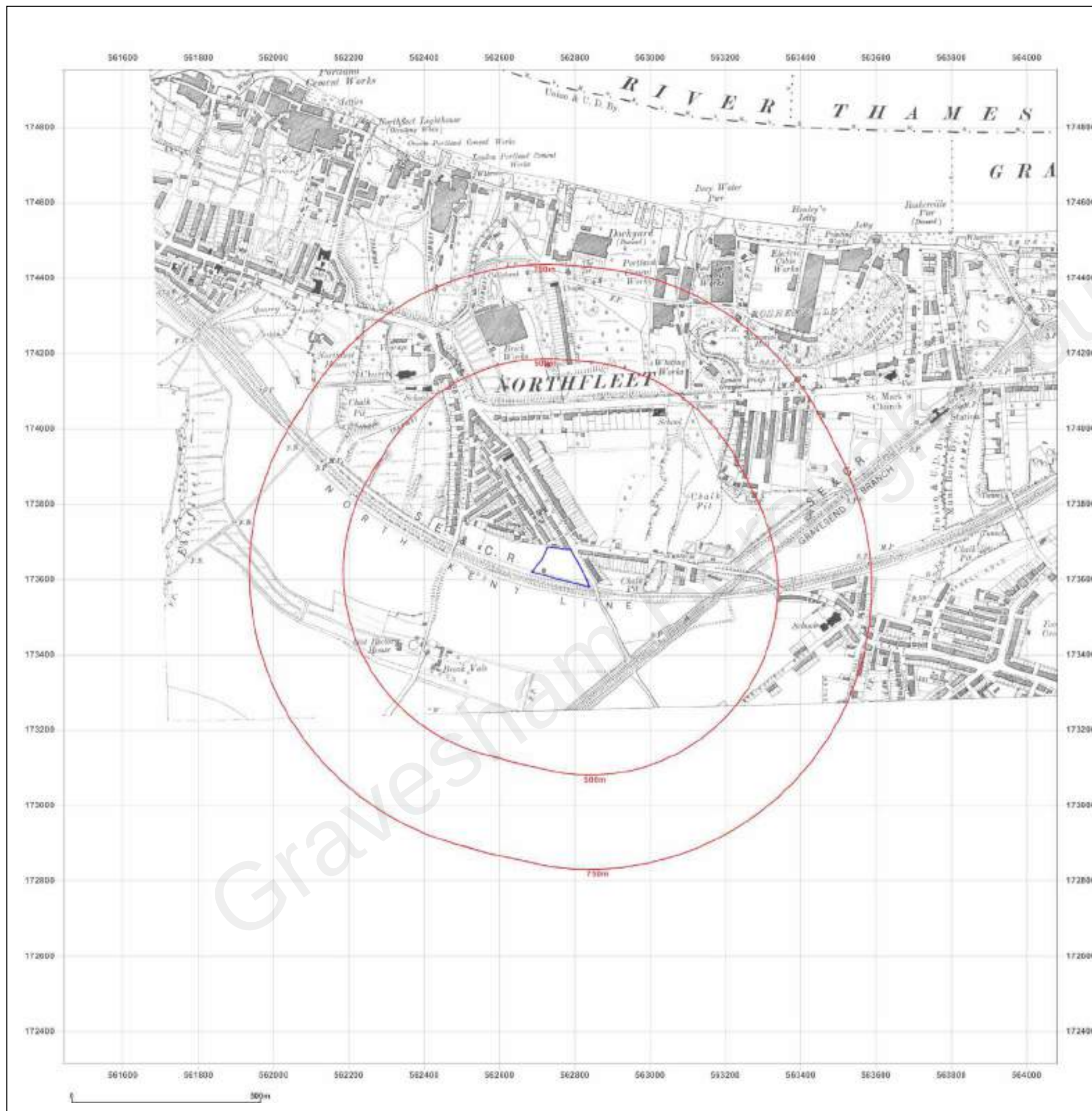


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

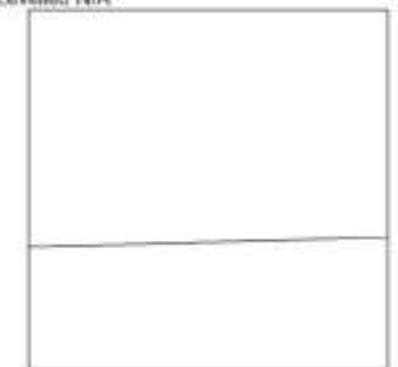
Map date: 1923

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



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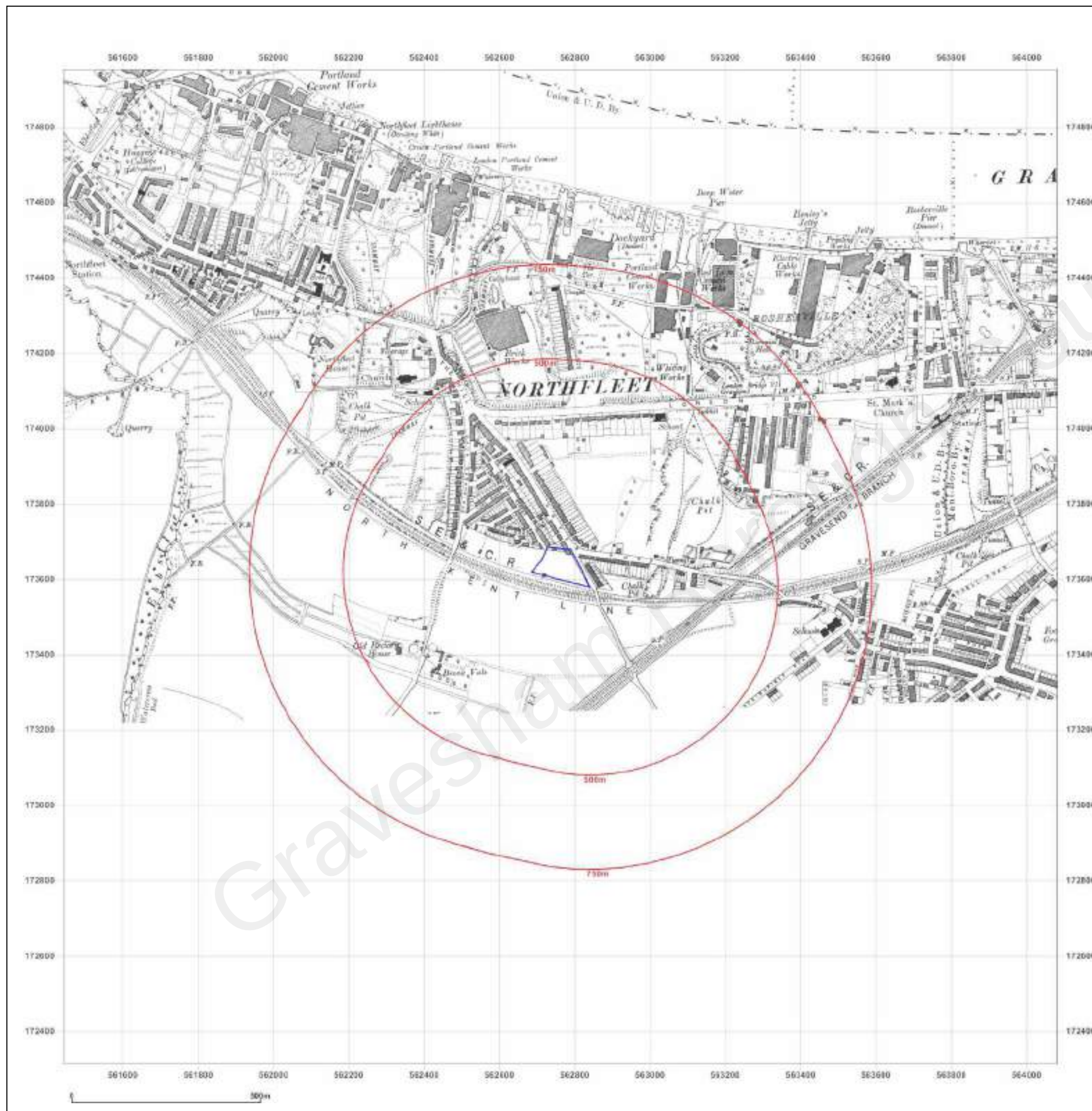


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1931-1932

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A



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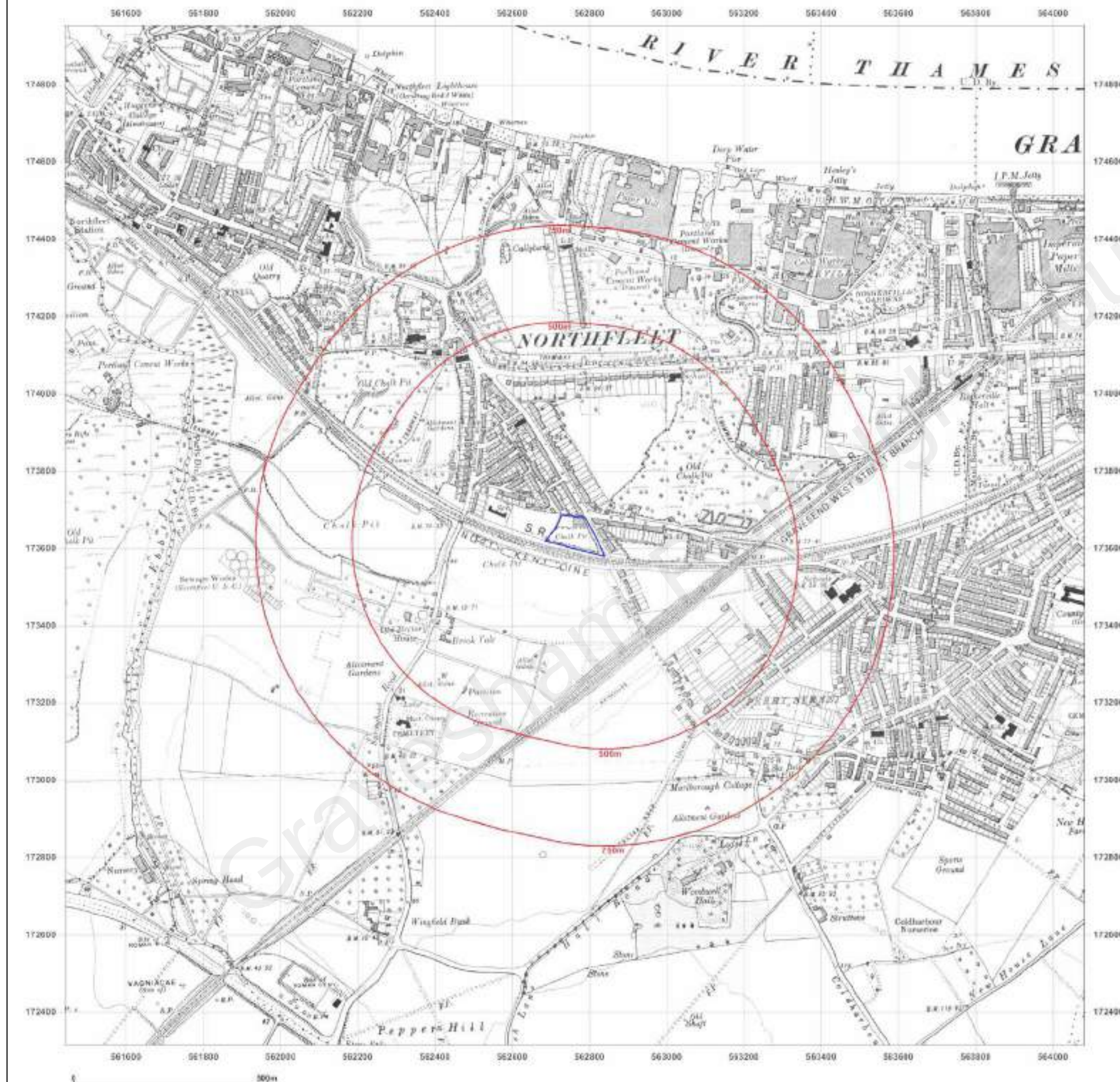


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A



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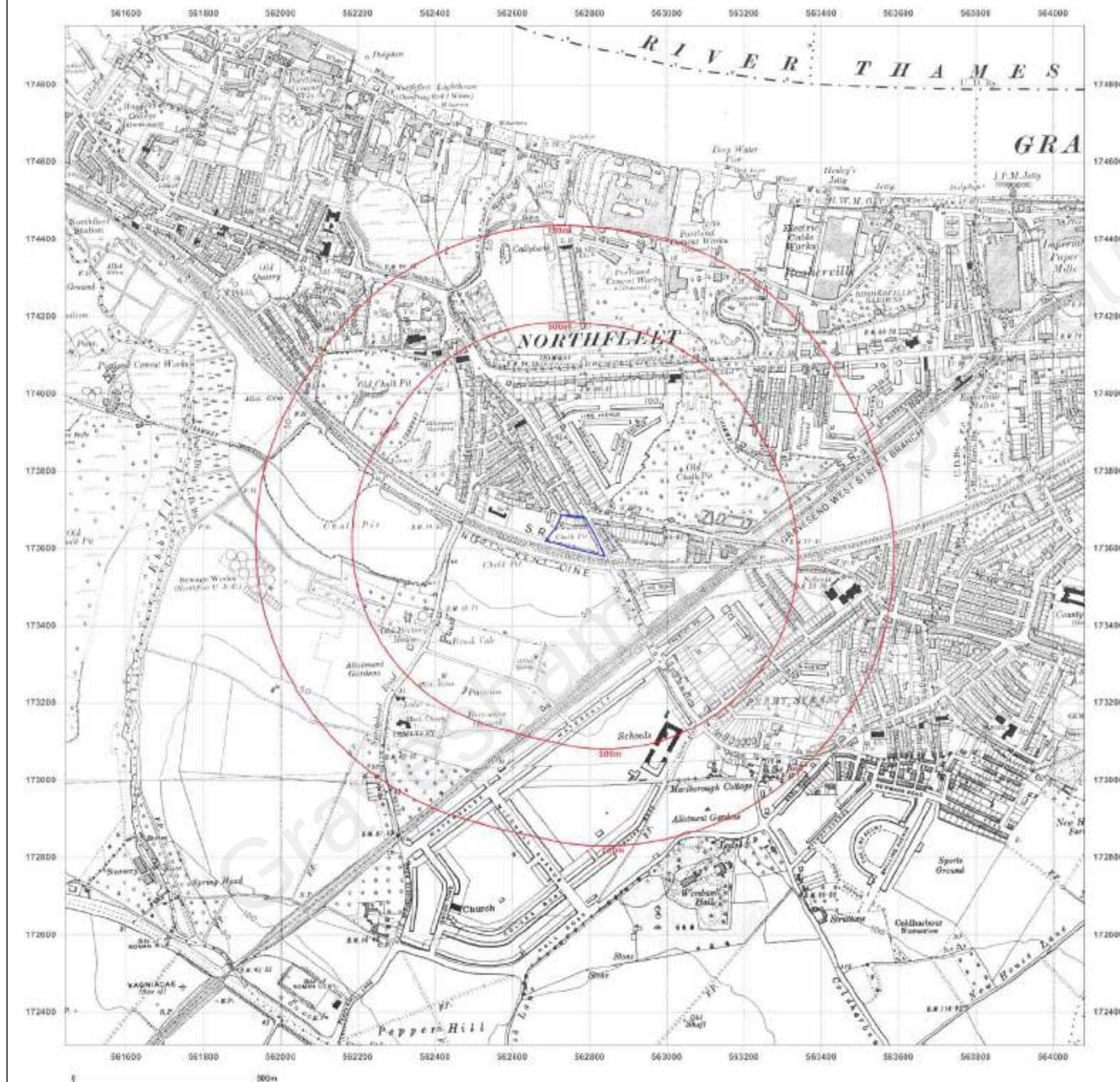


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: County Series

Map date: 1946

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1946
Edition N/A
Copyright N/A
Levelled N/A



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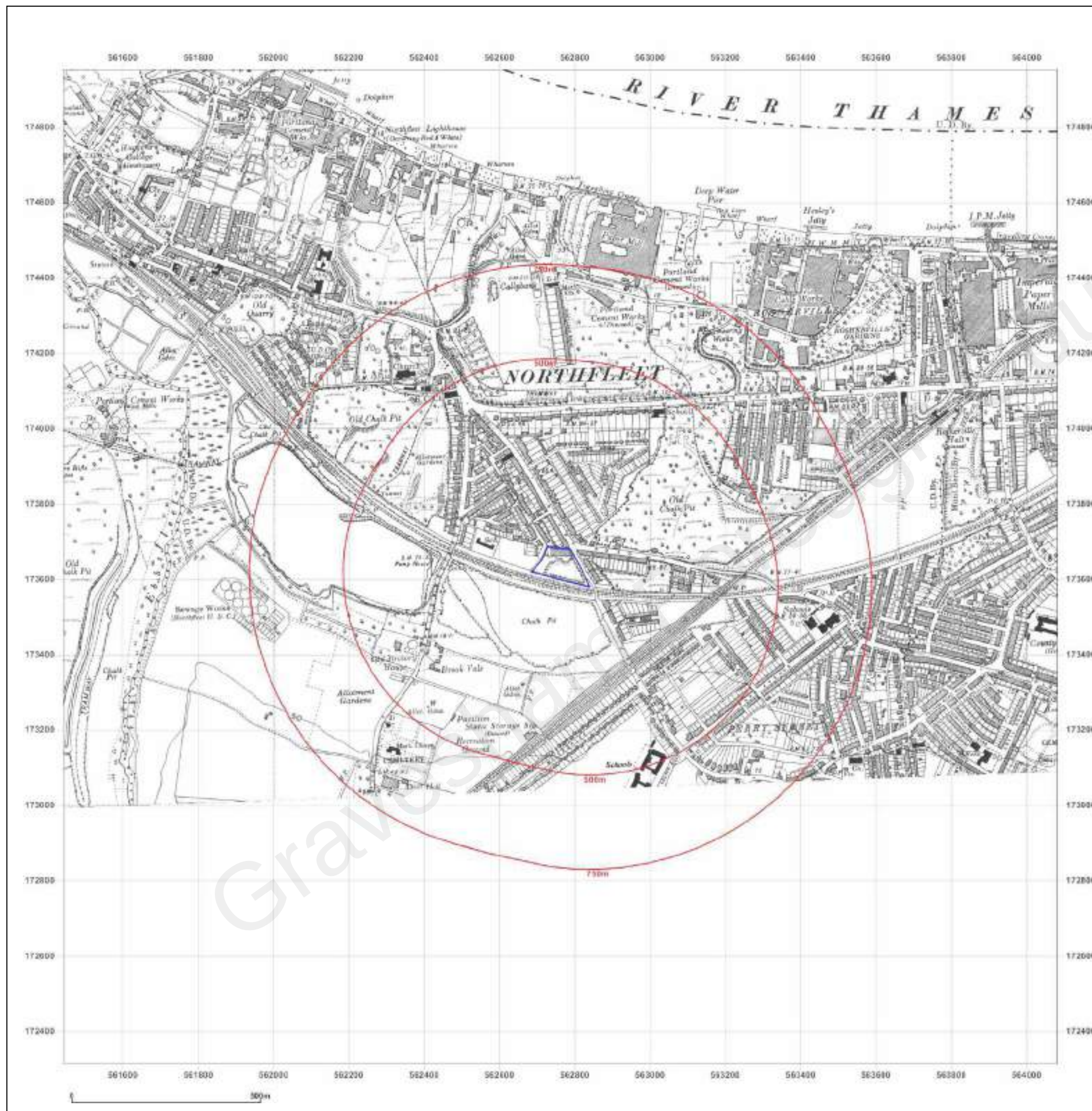


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: Provisional

Map date: 1955

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1884
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A



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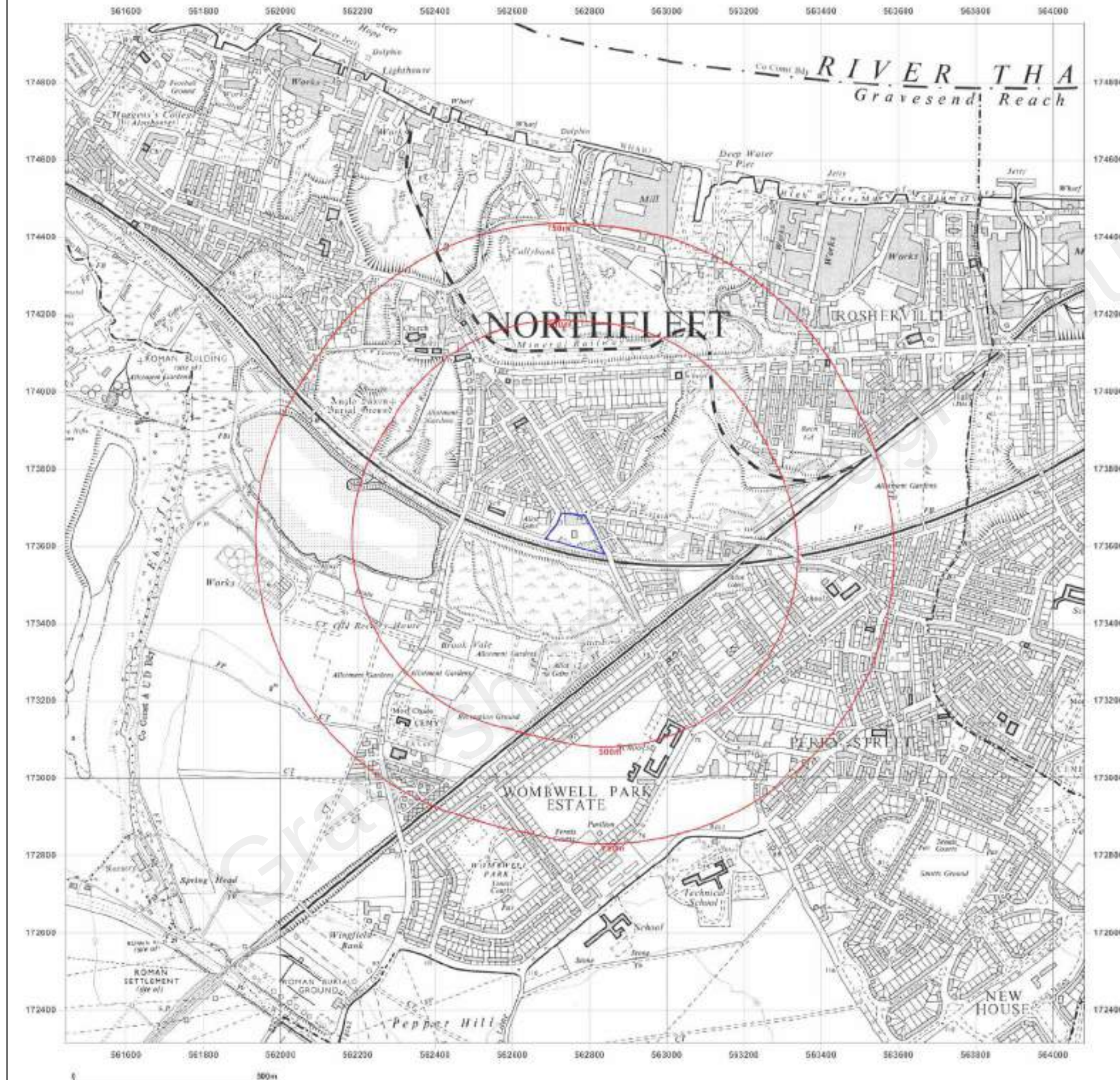


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: Provisional

Map date: 1966

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A



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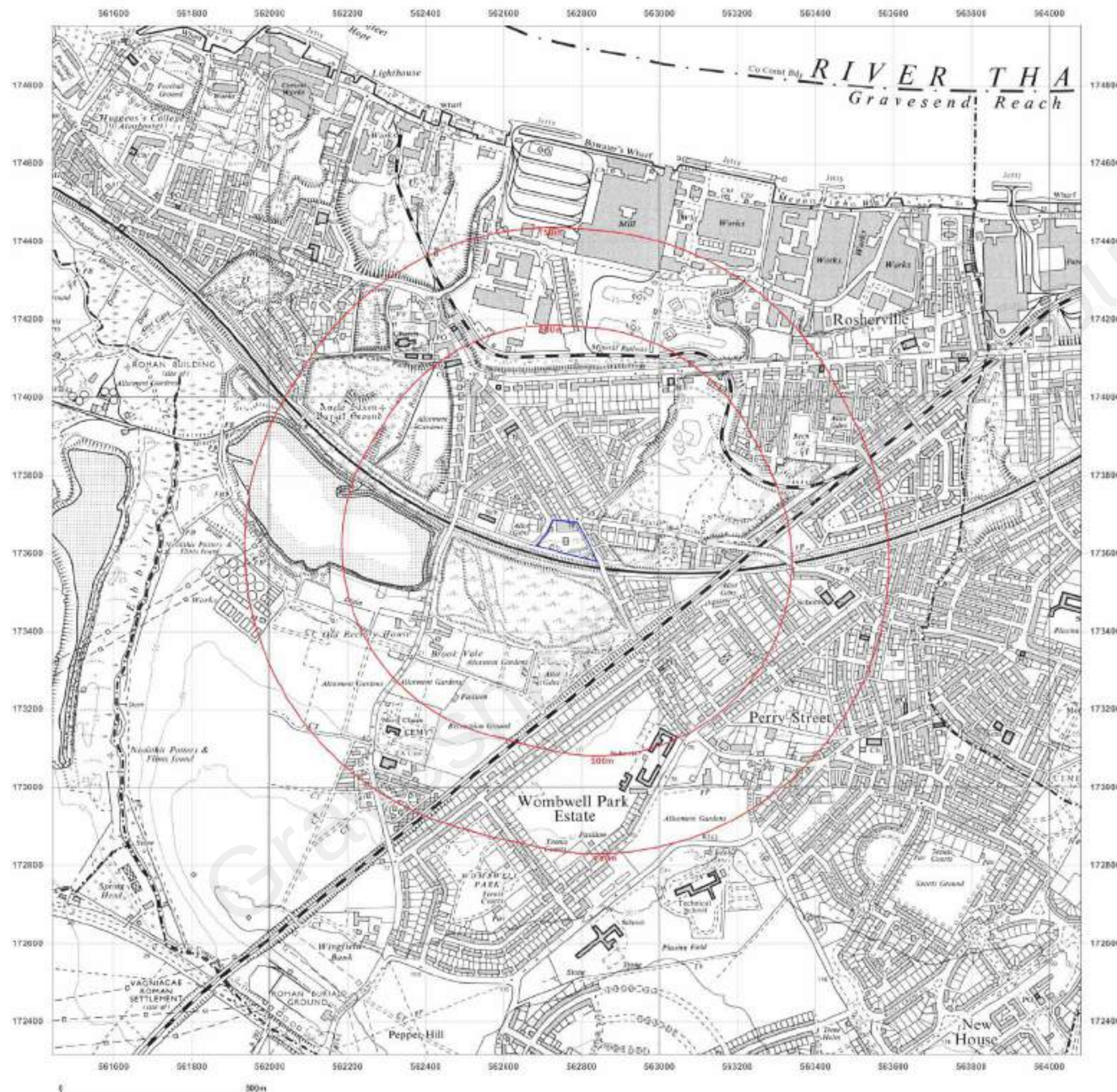


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1971

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1971
Revised 1971
Edition N/A
Copyright N/A
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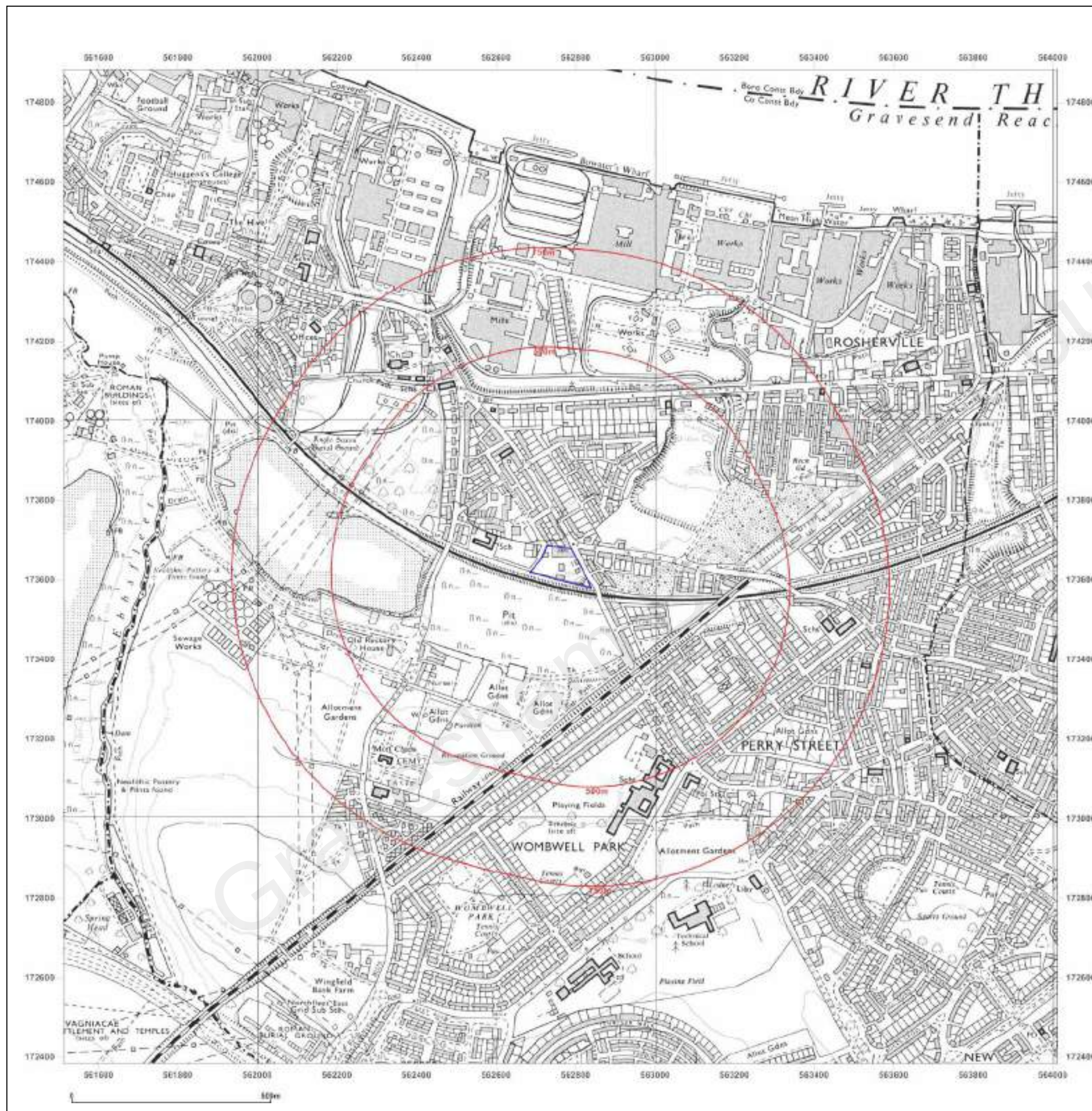


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1977

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1977
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A



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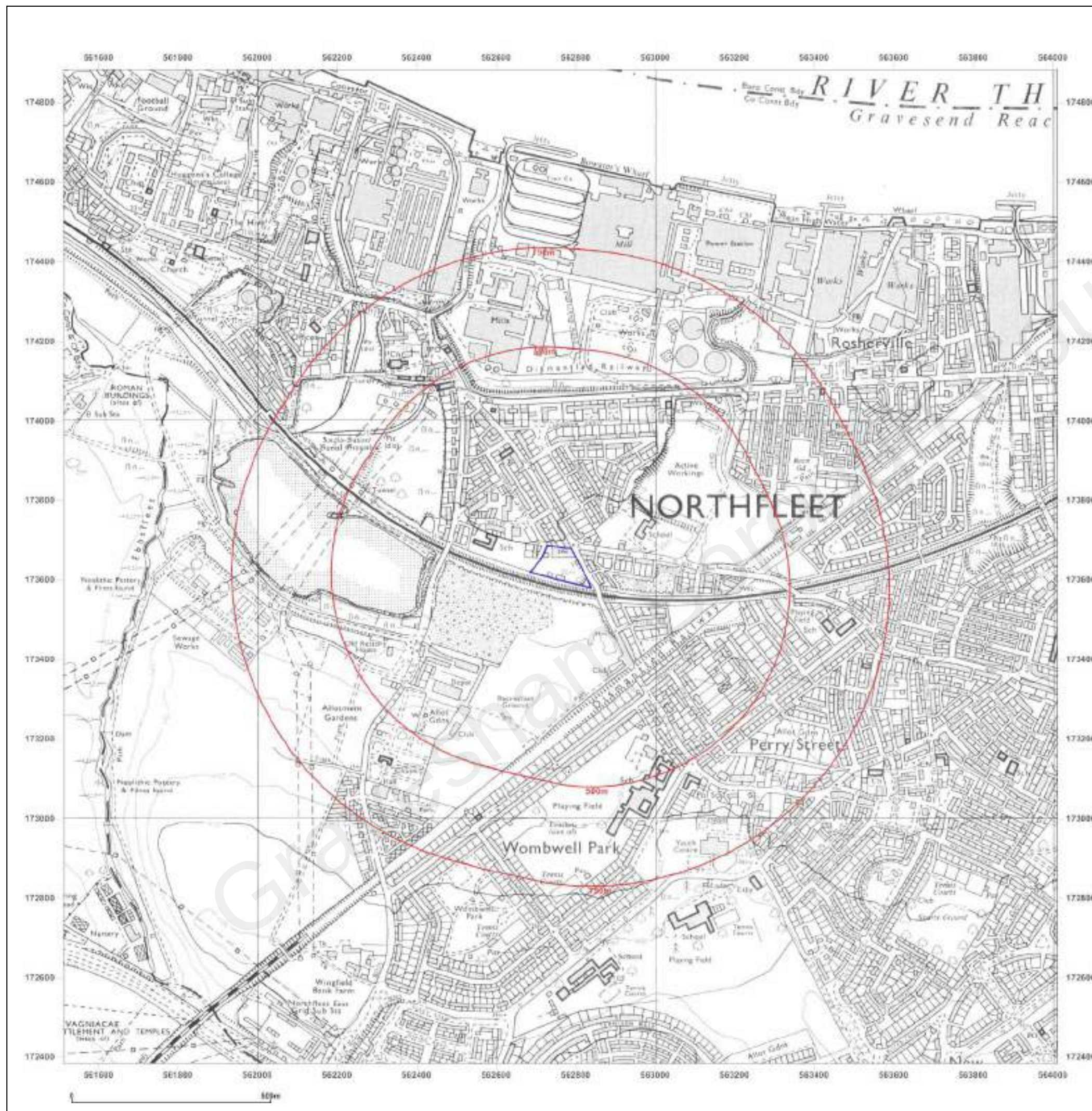


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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 1990

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1985
Revised 1990
Edition N/A
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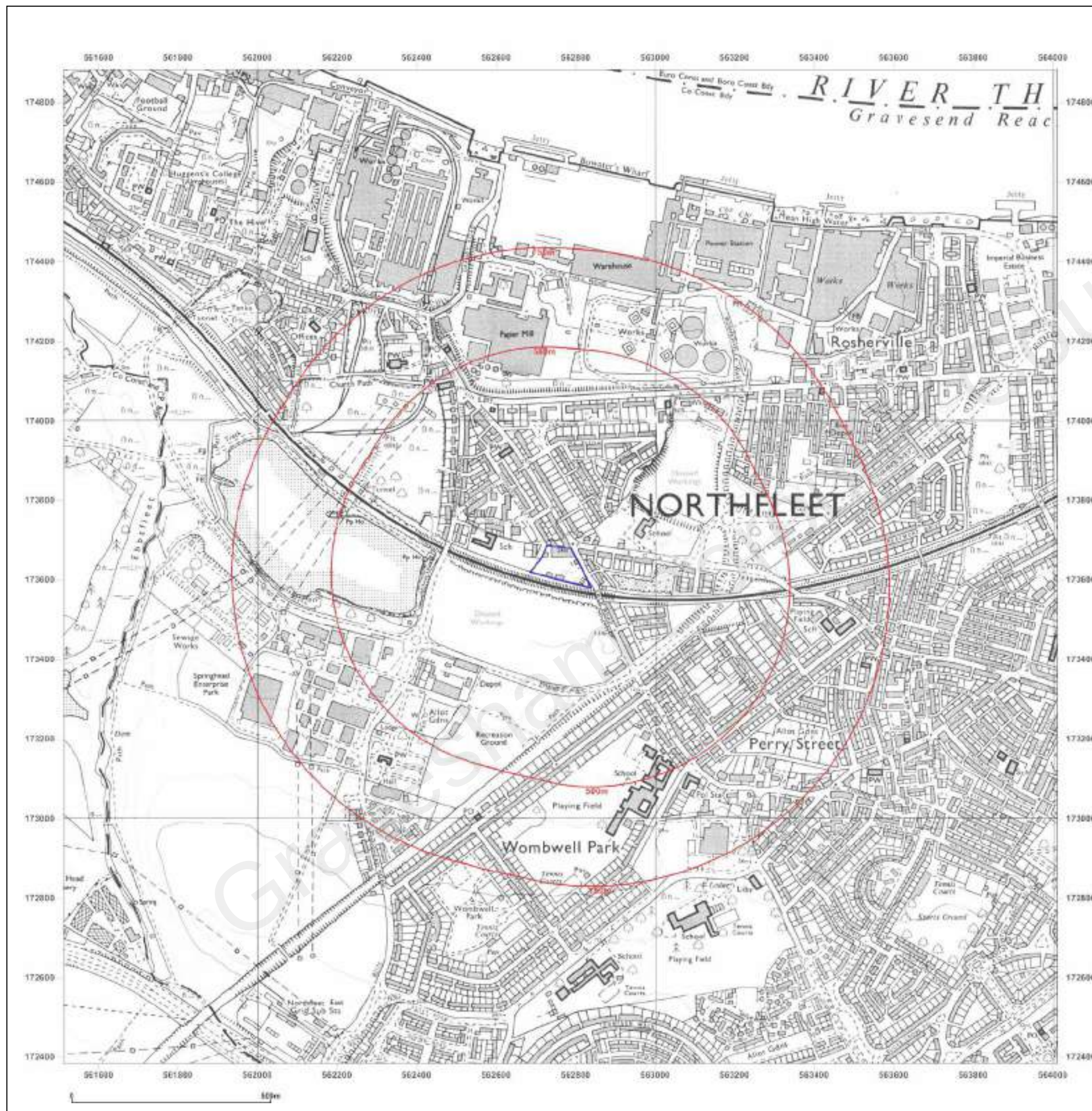


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

Gravesend, Vale Road

Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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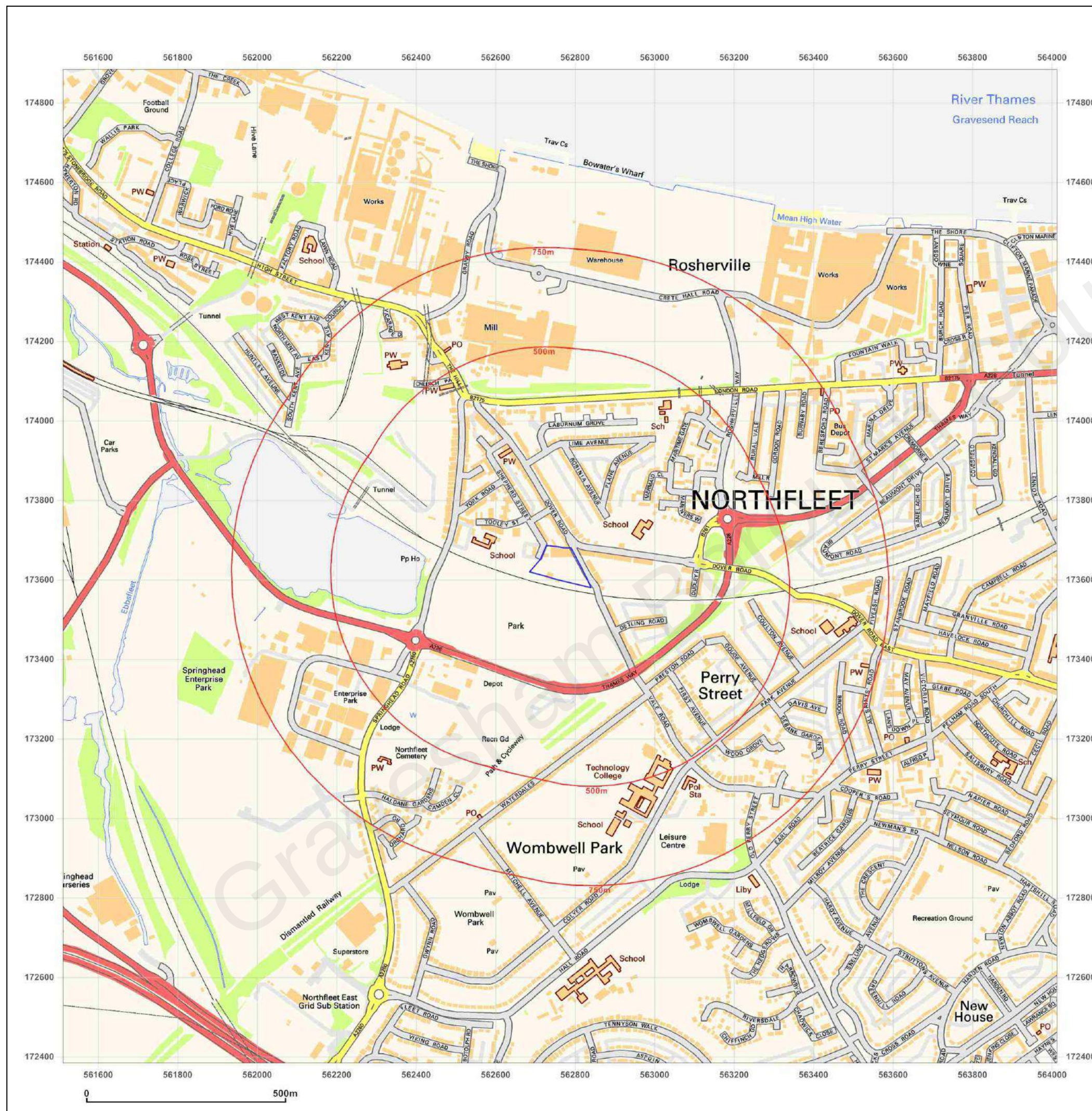


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Site Details:

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Client Ref: EMS_402946_538738
Report Ref: EMS-402946_538738
Grid Ref: 562761, 173633

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



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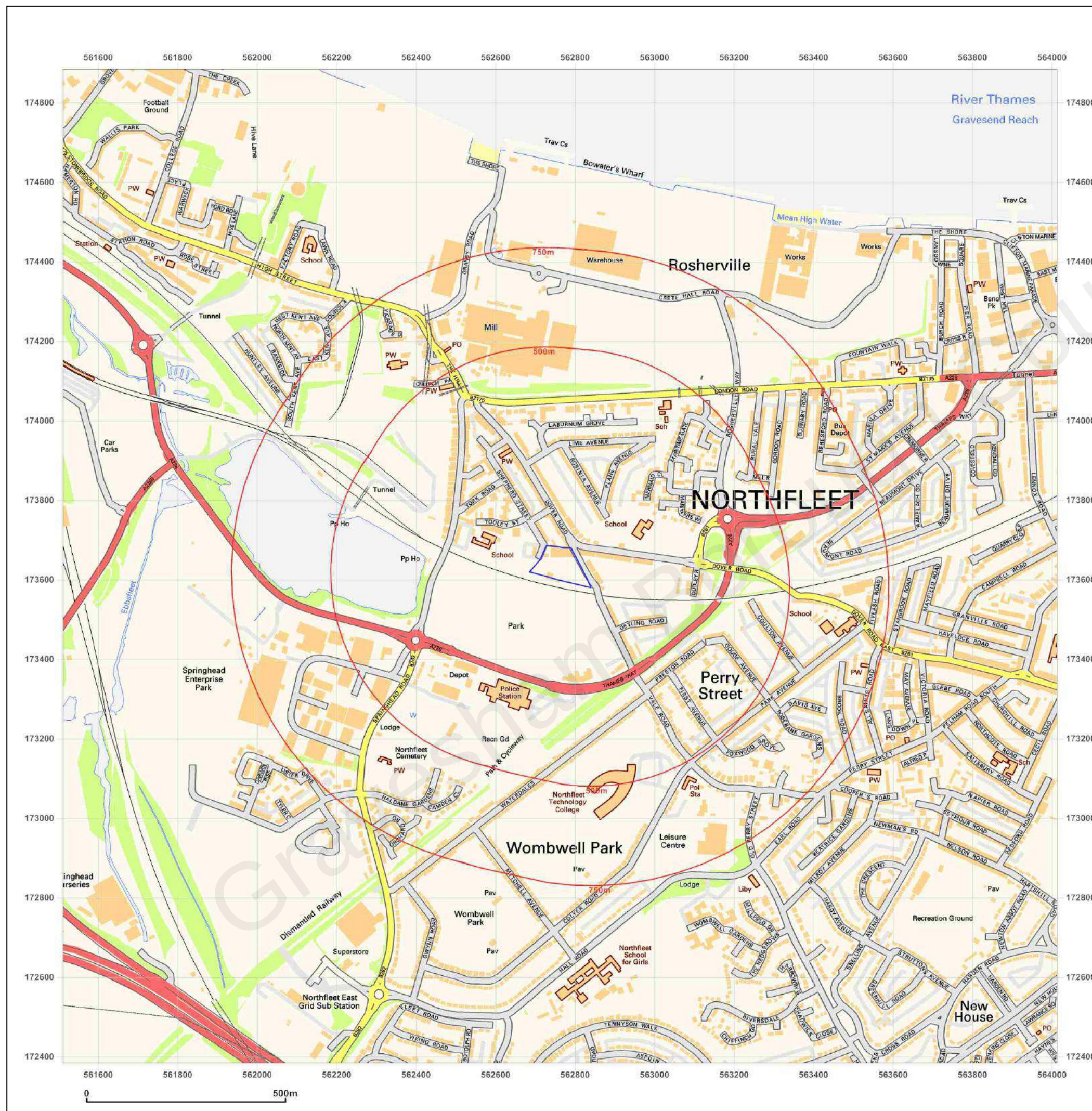


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APPENDIX B
Groundsure Report

Groundsure Enviro Insight

Address: Gravesend, Vale Road,
Date: 25 Jan 2017
Reference: EMS-402946_538739
Client: EmapSite



Aerial Photograph Capture date: 30-Jun-2015
Grid Reference: 562763,173634
Site Size: 0.88ha

Report Reference: EMS-402946_538739
Client Reference: EMS_402946_538739

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