

**REPORT ON
GROUND INVESTIGATION
AT
IMPERIAL WHARF,
GRAVESEND**

REPORT STATUS SHEET

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1.0 INTRODUCTION

1.1 Objectives and Scope of Investigation

An area of land at Imperial Bitumen (the site) is being considered for development and redevelopment by FM Conway Ltd (the Client). The proposals for the site comprise the construction of 3 cement silos with associated mixing stations and loading areas over an existing car park, with the remainder of the site to be used as parking for cars and articulated lorries.

Applied Geology was appointed by the Client to undertake a desk study/Phase I assessment and Phase II ground investigation in order to:

- assess the potential for hazardous substances or conditions to exist at the site that might warrant mitigation or remediation appropriate to the intended end use proposed by the Client.
- establish geological conditions and geotechnical parameters to assist in the safe and economic engineering design of the proposed development.

The terms of reference/brief for the works were mutually developed between Clark Smith Partnership, (Engineer to the Client) and Applied Geology and are outlined in our proposal and estimate reference AG14-4383let001 dated 2nd July 2014.

The scope of works undertaken by Applied Geology comprised:

- A site inspection and walkover survey
- A review of the following desk study sources:
 - GroundSure – GeoInsight & EnviroInsight environmental databases.
 - GroundSure – MapInsight historical maps.
 - British Geological Survey (BGS) - published information & on-line borehole database.
 - Multi-Agency Geographical Information for the Countryside (MAGIC) on-line database.
 - Environment Agency Web Site.
 - Local Authority.
 - Review of a previous ground investigation report by Southern Testing, report reference J11793 dated 30th April 2014, provided by the Engineer.
- Ground investigation together with sampling, monitoring and a programme of laboratory testing.
- Assessment and reporting of the results of the works.

Underground service plans for the site were obtained by Applied Geology on 21st August 2014. An unreferenced topographic survey drawing, dated September 2013, was provided by the Engineer.

1.2 Report Layout

This report presents a brief description of the site, the desk study data and the factual results of the intrusive investigations carried out. An interpretation of the ground conditions and a discussion/assessment of the findings is presented in the later report text sections. The main text of the report has been produced in a

concise format, including the use of data tables to summarise key information where possible. The report should be read in conjunction with the general procedures detailed in Appendix F and General Notes given at the end of the main text, which provide details of investigation techniques, assessment methodology and standards, health & safety and limitations and exceptions of the report. Drawings and factual data including exploratory hole records, laboratory testing results and desk study records are presented in the other Appendices.

2.0 SITE DESCRIPTION AND PROPOSALS

2.1 Site Description

The site is located off Clifton Marine Parade, south of the River Thames and approximately 750m northwest of the centre of Gravesend. The Ordnance Survey grid reference for the centre of the site is TQ 640 744 as shown on the Site Location Plan in Appendix A.

The site approximately comprises two offset rectangular areas of land which are generally level.

A site inspection/walkover was undertaken by Applied Geology on 28th October 2014. The site is occupied by the Imperial Bitumen compound adjacent to the Thames in the north of the site, a parking area in the southeast and an undeveloped field in the southwest. Reference should be made to the exploratory hole location plan reference AG2119-14-01 in Appendix A for further detail.

The Imperial Bitumen compound was located adjacent to the River Thames with a jetty, which extended north out into the river. The ground surface almost entirely comprised concrete hardstanding with a small area of Type I hardstanding present in the west of the compound. A disused weighbridge was located in the south of the area along with a storage container. Several skips were present in the north and appeared to predominantly contain wood and office waste. Several pallets were stored in the west, with many containing open buckets of tarmacadam. An electricity sub station was located adjacent to the parking area to the south. The area jutted out in to the River Thames, which bounded the site to the north and west. The area was bound by Clifton Marine Parade road to the south and an office of Imperial Bitumen to the east.

The parking area was located to the southeast of the Imperial Bitumen compound on the opposite side of Clifton Marine Parade. The east of the area comprised a tarmacadam surfaced car park with no access restrictions to the general public. The west comprised a concrete hardstanding area containing rails of a former tramway and was used for tankers to park when visiting Imperial Bitumen. It has been noted on drawing no. GravOS, by CH Surveys Ltd, provided by the Engineer, that this area may contain voids or cellars/basements associated with the former use of part of the site as a public house. This drawing is presented in Appendix A. The area was bound to the northwest by Clifton Marine Parade, beyond which was Imperial Bitumen, the east by commercial units, to the south by ITAB industrial unit, and to the west by Clifton Marine Parade, beyond which was an undeveloped field.

The undeveloped field in the southwest of the site was secured with heras fencing and located within West Mill Trading Estate off Clifton Marine Parade. The area comprised overgrown grass and brambles with several semi mature trees lining the

northern and eastern boundaries. The field was bound to the north and east by Clifton Marine Parade, beyond which was the Imperial Bitumen site and the parking area as described above; to the west and south were industrial units.

The topography was relatively flat across all areas of the site.

Liaison with the Local Authority, (Gravesham Borough Council) was undertaken on Wednesday 10th December 2014 to ascertain information relating to records of underground tanks on the site. The records at Gravesham Borough Council indicated that all tanks on the site were above ground. No tanks were observed during the walkover.

2.2 Site Proposals

The proposals for the site can be divided into three areas: the existing public car park is to be developed with 3 cement silos with associated mixing stations and loading areas, as shown on the proposed layout, 'London Cement Terminal – Rev 10', by Vurmak and is presented in Appendix A. Although no proposed layouts are available for the remainder of the site, it is understood from Clarke Smith Partnership that the west of the site, (the field) is to be used as vehicle parking and the north of the site, (the Imperial Bitumen compound) as parking for articulated lorries.

3.0 DESK STUDY INFORMATION

The desk study findings are summarised below with the full Groundsure Report and selected Historical Ordnance Survey Maps included in Appendix B. The boundary on the historical maps, includes the area investigated by Southern Testing, to the east.

Site History	• 1866 - A tramway dissects the site to the west in a northwest – southeast orientation. Hit or Miss Tavern is located in the centre of the site, Bycliffes in the southwest and quays are shown in the north. Clifton Marine Parade (road) dissects the site in an east – west orientation. Limekilns are present approximately 175m southeast. The River Thames bounds the site to the north. Ponds are located 50m and 125m southwest, 100m south and 150m southeast. • 1885 –The Southeastern Railway passes the site approximately 550m south orientated east-west. • 1888 – The north of the site is occupied by wharves. Clifton Baths is located in the east of the site. The site is dissected by Clifton Marine Parade (road) in an east-west orientation. Chalk pits are located 250m south and southeast of the site. The London Chatham & Dover Railway passes the site approximately 200m south orientated northeast - southwest. Whiting Works and a school are located 300m southeast. The remaining surrounding area is predominantly residential with wharves and jetties along the River Thames. • 1923 – Electric Cable Works and Printing Works are located approximately 300m west of the site. • 1909 - Clifton Baths is now disused. The chalk pits to the south and southeast no longer appear to be present. • 1932 - IPM Jetty now extends from the north of the site into the River Thames with travelling cranes. Four additional buildings and travelling cranes are located on the site north of Clifton Marine Parade. Bycliffes is no longer present in the west. Tanks are located in the south and southwest of the site and 50m southwest of the site. A building is located adjacent the site to the southwest and overlaps on to part of the
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	site. Imperial Paper Mills bounds the site to the south. The lime kilns to the south are no longer present. • 1952 – Ruins are shown on buildings approximately 25m south of the site. • 1973 – Silo tanks are located on the site, north of Clifton Marine Parade in the east and with a hopper in the west. The building in the southwest of the site is now a paper mills. • 1986 – The silo tanks and hopper in the west of the site are no longer present. The tramway is no longer present on the site. The Imperial Paper Mills to the south is no longer present. • 1989 – Two sub stations are located adjacent Clifton Marine Parade in the west of the site. The paper mill in the southwest is no longer present. Clifton Marine Parade extends to the south where the former tramway occupied. • 2002 – The public house is no longer present on the site. The site is now bound to the south by a retail park. • 2014 – West Mill business park bounds the site to the southwest.
Anticipated Geology and Ground Conditions	• Published BGS Map 271, 'Dartford' indicates the north of the site to be underlain by superficial deposits of Alluvium and River Terrace Deposits, with the Seaford Chalk Formation anticipated below. The remainder of the site is devoid of Superficial Deposits and directly underlain by the Seaford Chalk. Given the historical development of the site, it is anticipated that there would be a varying thickness of Made Ground across the site. • A ground investigation was carried out by Southern Testing Environmental and Geotechnical between the 8th and 10th April 2014 and comprised 2 Cable Percussion boreholes in the east of the site. A copy of this report was supplied by the Engineer. Made Ground was encountered in the boreholes to a depth of 2.7m to 4.2m bgl and comprised grey and white silty gravel, with the gravel comprising bricks, clinker and chalk. The Made Ground was directly underlain by weak white chalk with bands of black coarse subangular flint gravel. A ground water strike at 6.30m bgl was recorded in both boreholes.
Mining/ Quarrying	• There are ten historical surface ground workings associated with a Quay in 1865 and unspecified wharves from 1907 to 1977. There is one current ground working on site associated with crushed rock, however this is inactive. There is one underground working within 500m of the site, a tunnel, 163m south in 1977. • There are two records of non-coal mining activity on the site, associated with chalk, the assessment of likelihood has been designated as occasional mining but restricted in extent. There are two further non-coal mining cavities within 250m of the site, the nearest being 121m southeast associated with chalk extraction.
Hydrology	• Nearest surface watercourse is the River Thames, adjacent the site to the north. • No water quality data was available. • No surface water abstractions are located within 500m of site. • There are two licensed discharges on the site both associated with miscellaneous discharges into the River Thames (revoked in 1991) and to freshwater river (no revocation date). • Although the site lies within a zone 2 and 3 floodplain, it is also shown as lying within an area benefitting from flood defences.
Hydrogeology	• The Superficial Deposits underlying the site are classified as a Secondary A Aquifer. The Seaford Chalk Formation is classified as a Principal Aquifer. • There are two groundwater abstraction licenses within 1km of the site, the closest being 857m west, associated with process water from southern region groundwater. • Site lies outside of any Source Protection Zones. • Likely groundwater flow direction is towards the River Thames, to the north of the site and is likely to be tidal. • There is a limited potential of groundwater 'clearwater' flooding.

Other Environmental data	• There are two Environment Agency historic landfill sites within 500m of the site, the closest being 189m south, which was licensed to accept inert waste. The second landfill is located 307m south at Lennox Road, Gravesend and was licensed to accept inert, commercial and liquid sludge. • There is one waste transfer or disposal site within 500m of the site, located 121m east and classified as a scrap yard. • There are 9 industrial land uses located on the site, including wharves, tanks, an electricity sub station and a gas valve compound. • There is one recorded pollution incident within 250m of the site, associated with a diesel spill 175m south. The incident was classified as minor impact to water and land. • Site is located within a zone of Lapwing (England), adjacent a Marine Conservation Zone and approximately 100m east of the nearest listed building.
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4.0 CONCEPTUAL SITE MODEL

4.1 Diagrammatical Illustration

The Conceptual Model for the site, showing the main elements of the surface and subsurface conditions and including the potential contaminant sources, pathways and receptors identified from the desk study information is presented in Appendix A as Drawing No AG2119-14-02. The potential sources, pathways and receptors are defined in the following sections:

4.2. Sources

- Made Ground Soils on site associated with the historical development of the site.
- Contaminants associated with the historic usage of the site, especially the Imperial Bitumen, (hydrocarbon leaks and spills).
- On-site ground gases associated with decomposition of organic material in Made Ground.
- Off-site ground gases from surrounding landfills, (189m south of the site) and backfilled chalk pits.
- Sulphates in Made Ground or underlying natural strata.
- The sub-station adjacent to Clifton Marine Parade is a potential source of PCBs.

4.3 Pathways

- Human dermal contact and human ingestion via soil directly – likely to be limited due to extensive hard-standing, pending detailed development proposals.
- Human inhalation of dust, gas or vapours.
- Leaching and/or migration through permeable soils (granular Made Ground and Superficial Deposits and/or Seaford Chalk Formation).
- Direct contact with buried concrete/water supply services.

4.4 Receptors

- End users, customers and workers, (Human Health).
- Neighbours (Human Health), (residential to the west).

- Superficial Deposits – Secondary A Aquifer (Controlled Waters).
- Seaford Chalk Formation – Principal Aquifer (Controlled Waters).
- River Thames, adjacent to the north (Controlled Waters).
- Buried foundation/substructure concrete (Building Materials).
- Water supply services (Building Materials).

4.5 Source/Pathway/Receptor Linkage and Assessed Risk

Source-pathway-receptor (SPR) linkages are tabulated below together with the qualitatively assessed risk. The risk to ground workers and construction workers is not included here due to the short-term exposure times that they will be subject to and the assumption that good hygiene practices will be adopted on site and the appropriate use of relevant PPE/RPE will be adhered to when exposed to potentially contaminated soils. Comments regarding contamination issues with respect to ground workers and construction workers are included in the health and safety section of the Standard Procedures included as Appendix F.

Source	Pathway	Receptor	Risk*
Potential contaminants within Made Ground, resulting from the industrial usage of the site or historical site development	Inhalation, ingestion, dermal contact.	End users, neighbours	Low
	Migration and Leaching	Secondary A and Principal Aquifers	Medium
Ground gas from Made Ground/organic soils on-site (methane, carbon dioxide)	Migration into buildings, service ducts etc.	End users, adjacent residents	Low
Ground gas from off-site landfills, (methane, carbon dioxide)	Migration into buildings, service ducts etc.	End users, adjacent residents	Low
Elevated sulphates and hydrocarbons in Made ground or natural soils	Direct contact	Buried concrete, water supply pipes	Low

* Definition of Risk Categories

Negligible - Contaminants that might have unacceptable impact on key receptors, are unlikely to be present, or, no pathway is envisaged.

Low Risk: Contaminants may be present but are unlikely to be at levels to have unacceptable impact on key receptors, or pathways are likely to be minimal.

Medium Risk: Contaminants are probably present and might have an unacceptable impact on key receptors. Pathways may also be present therefore remedial measures may be necessary to reduce the risks.

High Risk – Contaminants probably or certainly present and pathways are probably also present. Therefore, contaminants are likely to have an unacceptable impact on key receptors and remedial measures are likely to be necessary to reduce the risks to acceptable levels.

5.0 GROUND INVESTIGATION WORKS

5.1 Fieldwork

The following scope of fieldwork was undertaken:

- 7 No Cable Percussion boreholes (ref. BH3, BH4, BH4A, BH4B, BH5, BH5A and BH6) to a maximum depth of 20.45m below ground level (bgl);

- 10 No machine excavated trial pits (TP1 to TP10) to depths of between 0.3m and 3.9m bgl;
- 6 No TRL Dynamic Cone Penetrometer tests (ref. TRL1 to TRL6);
- 4 falling head permeability tests.

The locations of the exploratory holes were selected by the Client and set out on site by Applied Geology Limited and these were constrained by the presence of underground services on the site. BH3 and BH4 were drilled in the vicinity of the proposed silos in the existing car park area, BH5 in the field and BH6 in the compound. BH4 was re-drilled twice due to shallow concrete obstructions encountered at between 1.0m and 2.0m bgl and BH5 was re-drilled due to a cavity encountered below the concrete hardstanding. The trial pits were distributed across the site and TRL probes confined to the field due to the presence of underground services elsewhere (most notably a high voltage electric cable encountered in TP1), which were not shown on underground service plans.

The boreholes were drilled utilising two Dando 2000 rigs and were advanced using equipment to bore 150mm diameter boreholes for the purpose of obtaining Standard Penetration Test (SPT) 'N' Values for pile design and to install standpipes for subsequent ground gas and groundwater monitoring. Undisturbed sampling using thin walled 100mm driven open tube samples was attempted, however due to the ground and groundwater conditions, were generally unsuccessful. Soil descriptions have therefore based on small disturbed samples

Falling head permeability tests were undertaken in the standpipes of each borehole, the response zones of which were in the Seaford Chalk Formation. Clean water was poured into the boreholes and the rate of decline recorded, however, water could not be introduced into the boreholes quickly enough to raise water levels, which suggests a high permeability although an actual rate of permeability could not be calculated in accordance with BS5930:1999.

A Preliminary UXO Risk Assessment undertaken by 1st Line Defence was commissioned by Applied Geology and is presented in Appendix B. The results of this survey indicated that a more detailed assessment is recommended to confirm the risk presented by unexploded ordnance.

The positions of the exploratory holes were defined by taping from identifiable features and ground levels extrapolated from the topographical survey drawing, provided by the Engineer. The locations are presented on Drawing No. AG2119-14-01, included in Appendix A. The borehole and trial pit logs are presented in Appendix C.

5.2 Instrumentation and Monitoring

On completion of boring, 19mm diameter standpipes were installed in the Made Ground and 50mm diameter standpipes in the natural strata as follows, with further details included in the relevant borehole logs in Appendix C:

- BH3, 1.0 to 2.0m bgl, Made Ground, 3.0m to 7.0m bgl, Seaford Chalk Formation;
- BH4B, 1.0 to 2.0m bgl, Made Ground, 3.0m to 7.0m bgl, Seaford Chalk Formation;

- BH5A, 1.0 to 2.0m bgl, Made Ground, 3.0m to 7.0m bgl, Seaford Chalk Formation;
- BH6, 1.0 to 2.0m bgl, Made Ground, 3.0m to 7.0m bgl, Seaford Chalk Formation.

Washed silica gravel (6-10mm) was used as the filter medium. A bentonite seal was placed between the response zones of the 19mm and 50mm diameter standpipes. Each standpipe was fitted with a push-in bung and single gas tap and was finished with flush metal cover concreted in place.

Ground gas and groundwater monitoring visits were undertaken on 4 occasions from 21st November to 12th December 2014 including two periods of falling. Each monitoring well was monitored for concentrations of carbon dioxide, methane, oxygen, volatile organic compounds (VOC), flow rates and differential pressures and water level. The monitoring results are included in Appendix D.

5.3 Laboratory Testing

Geotechnical laboratory testing was undertaken on selected samples and comprised the following:

- 3 No particle size distribution tests;
- 11 No saturated moisture content tests, carried out on clasts of chalk recovered from disturbed samples;
- 3 No BRE SD1 – Brownfield with pyrite suite tests;
- 8 No BRE SD1 – Greenfield suite tests.

The chemical testing undertaken by specialist Laboratory Chemtest (UKAS Lab No 2183) included a general suite to determine the contamination potential of the soils encountered on site, with specific testing to target industrial usage of the site as determined from the desk study. Samples of Made Ground were tested for the following contaminants;

- 10 No. selected metals suite [arsenic, cadmium, chromium (total, trivalent and hexavalent), copper, lead, magnesium (water soluble), mercury, nickel, selenium, zinc];
- 10 No. speciated (to US 16) Polycyclic Aromatic Hydrocarbons (PAH);
- 10 No. soil Organic Matter (SOM);
- 10 No. pH;
- 10 No. asbestos containing fibres;
- 8 No. Total Petroleum Hydrocarbons (TPH) Criteria Working Group;
- 10 No. Phenols (total);
- 1 No. PCBs.

Three samples were subjected to selected metals suite leachate tests, comprising arsenic, cadmium, chromium (total, trivalent and hexavalent), copper, lead, magnesium (water soluble), mercury, nickel, selenium, zinc], speciated (to US 16) Polycyclic Aromatic Hydrocarbons (PAH), hardness, pH and TOC.

Four groundwater samples were taken from the boreholes using low flow techniques and were scheduled for the following suite of testing to indicate the groundwater quality:

- Selected metals suite (arsenic, cadmium, chromium (total), copper, mercury, nickel, lead, selenium, zinc,);
- 9 Band Speciation Total Petroleum Hydrocarbons (TPH);
- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- Speciated (to US 16) Polycyclic Aromatic Hydrocarbons (PAH);
- Phenols (total);
- pH;
- Hardness.

The number of samples tested was designed to be sufficient to form an initial assessment of the contamination potential of the site, taking into account its known history and the materials encountered in the investigation. Hence, it falls in line with the general requirements of BS10175 'Investigation of Potentially Contaminated Sites'.

Laboratory test results are included in Appendix E.

6.0 GROUND CONDITIONS

6.1 Strata Encountered

The ground conditions encountered on site, generally comprised Made Ground over strata representing the Seaford Chalk Formation. Natural Superficial Deposits were not encountered in any of the exploratory holes. Full details of the strata encountered are given on the borehole records presented in Appendix C. A generalised ground profile is presented below to summarise the information.

Stratum	Depth to Top of Strata (m bgl)	Thickness (range) (m)	Comments
Hardstanding	GL	0.3 – 0.4	Not encountered in TP's 2, 6-8 and BH4 – 4B.
Made Ground	GL	1.2m – >3.3m	Encountered in all exploratory holes. Base not proven in TP1, TP5 and TP8 to TP10. Void to 4.2m bgl in BH5. Frequent obstructions.
Seaford Chalk Formation	1.2m – 2.5m	> 18.8m	Base not proven. Not encountered where Made Ground could not be penetrated.

6.2 Hardstanding/Made Ground

Made Ground was encountered in all exploratory holes from ground level to a depth of between 1.2m and 3.3m bgl (except in BH5 where a void was recorded to 4.2m bgl). The surface Made Ground predominantly comprised concrete, with tarmacadam encountered over the public car parking area and grass over the field in the west. The underlying Made Ground generally comprised brown gravelly fine to coarse sand or sandy gravel, with the gravel comprising fine to coarse angular concrete and bricks, with occasional flint and chalk fragments recorded locally.

Concrete obstructions were recorded in BH3 (0.5m to 1.5m), BH4 (2.10m), BH4A (1.7m to 1.75m) TP3 (0.6m and 0.7m) and TP5 (0.9m). Chiselling was undertaken in BH3, BH4 and BH4A, however the concrete was only penetrated in BH3. BH4 was relocated to BH4B. The obstruction was broken out in TP3 and trial pit advanced to natural strata. The obstruction could not be penetrated in TP5 due to a groundwater seepage obscuring the base of the pit preventing the use of a breaker.

BH5 encountered a void below the surface concrete from 0.4m bgl to a depth of 4.2m bgl and was then relocated as BH5A, approximately 25m northeast, as suggested by the Client. TP1 was terminated at 1.0m bgl due to the presence of an undetected and unidentified cable running through the centre of the pit. TP8 to TP10 were excavated for shallow soil sampling purposes, to a depth of 0.3m bgl and so the depth to the base of the Made Ground was not proven.

Some strata has been designated as possible Made Ground at the base of the Made Ground in BH5A (2.05m to 2.5m), BH6 (1.9m to 2.5m) and TP6 (2.7m to 3.3m). The strata generally have the appearance of natural superficial deposits but include such as coal gravel, which may have been reworked as part of the historical development of the site. The strata comprised soft brown gravelly clay, with the gravel comprising fine to coarse subangular to angular chalk and flint with occasional fine subangular coal.

6.3 Seaford Chalk Formation

Seaford Chalk was encountered in each of the eleven exploratory holes, where the Made Ground was penetrated, from depths of between 1.3m and 2.5m bgl to the base of the exploratory holes at depths of up to 20.45m bgl.

The method of cable percussion drilling causes severe soil disturbance and, as such, only general descriptions of the Chalk 'as recovered' can be given where no 'undisturbed' samples have been recovered (generally below 5 to 6.5m bgl).

The upper parts of the Seaford Chalk were predominantly recovered as structureless Dm grade chalk typically composed of cream gravelly silt, with the gravel comprising extremely weak to very weak low density white subangular chalk, with bands of black fine to coarse subangular to angular flint. Occasional black specs were recorded in the strata at various depths.

Structureless Dc grade chalk was identified in BH6 from 2.5m to 5.0m bgl, TP2 from 1.2 to 3.5m bgl and TP3 1.45 to 2.3m bgl. The Dc grade chalk composed of white slightly sandy silty subangular gravel with the gravel typically extremely weak to very weak of low density in a brown, becoming white matrix.

SPT 'N' values of between N=1 and N=192 (extrapolated) were recorded in the Seaford Chalk Formation. An SPT 'N' Value vs depth plot is presented in Appendix A of this report and shows a general increase with depth. The SPT 'N' values to a depth of 6m bgl were significantly lower than those encountered in the Southern Testing boreholes.

Saturated moisture content (SMC) determinations on chalk samples ranged between 29% and 34%. The associated dry density measurements ranged from 1.41 to 1.52 Mg/m³ indicating the chalk to be of low density, as per CIRIA C574.

6.4 TRL Dynamic Cone Penetrometer Testing

Probing was undertaken using a Transport Research Laboratory Dynamic Cone Penetrometer (TRL DCP), in order to determine approximate in-situ CBR parameters. Six TRL DCP tests (TRL1 to TRL6) were undertaken on the 5th November 2014 from ground level to depths of between 194mm and 800mm bgl. The results are plotted as number of blows versus depth penetrated bgl with equivalent CBR values for individual layers and are presented in Appendix D.

6.5 Groundwater and Falling Head Tests

Groundwater was encountered during the drilling of each borehole, with the groundwater strikes recorded at depths of between 3.7m and 4.2m bgl within the Seaford Chalk. Groundwater seepage was recorded during the excavation of TP5 at a depth of 0.4m, although this is anticipated to be perched water.

During the subsequent monitoring visits, groundwater was recorded in all boreholes at depths of between 2.2m (3.63m AOD) and 6.2m bgl (-1.1m AOD). The difference in depths is anticipated to be due to tidal variations between the monitoring visits.

Falling head tests were carried out within the Seaford Chalk Formation in each standpipe. The water level could only be raised by 40mm in BH3 and by 30mm in BH4B and could not noticeably be raised by any amount in BH5A and BH6. This suggests very high permeability, possibly in the range 10^{-4} m/s, however, more accurate permeability rates could not be calculated.

6.6 Contamination

No visual or olfactory evidence of any gross contamination was encountered within the soils recovered from the boreholes or the foundation inspection pits.

6.7 Soil Gas

Four phases of ground gas monitoring have been undertaken as part of this investigation, the results of which are included in Appendix D. Methane concentrations of less than 0.1% by volume were recorded together with carbon dioxide concentrations of between less than 0.1% and 3.1% (by volume). Oxygen concentrations were recorded at between 13.7% and 21.3%. Flow readings were taken over a three minute period and the average result reported a maximum average flow rate of 3.2l/hour. VOC's were not detected during the monitoring visits.

Based on the worst case average gas flow and the peak methane and peak carbon dioxide readings, gas screening values have been calculated for methane of 0.0032 l/hr and for carbon dioxide of 0.0099l/hr.

7.0 GEOENVIRONMENTAL ASSESSMENT

7.1 Human Health Risk Assessment

The results of the chemical testing on soils have been assessed as described in Appendix F, with specific details as follows:

- Proposed end-use – commercial/industrial;
- Screening criteria – 2.5% SOM;
- Assuming a single dataset based on the size of the site, the site's history, current land-use and the proposed redevelopment.

The spreadsheets summarising the laboratory results and relevant screening values for each dataset are presented in Appendix E. Using screening values based on an organic matter of 2.5%, no exceedences were recorded. Therefore, any Made ground soils exposed at the surface are not considered to represent an unacceptable risk to proposed end users.

The presence of asbestos fibres/clumps was detected in two samples, amosite in TP6 at 0.2m and chrysotile in TP8 at 1.2m. Following quantification, concentrations of 0.001% were recorded in both samples.

7.2 Controlled Waters Risk Assessment

The leachate testing indicated all results below screening values for metals and below the laboratory detection limits for PAHs.

Subsequent groundwater testing indicated one slight exceedence of arsenic and one exceedence of sulphate, both from a sample obtained from groundwater in the Seaford Chalk Formation, in BH3. All hazardous determinands were below detection limits.

The arsenic of 17µg/l was only marginally above the UK Drinking Water Standards value of 10µg/l and is not considered significant. The sulphate concentration of 740mg/l also exceeded the UK Drinking Water Standards screening value of 250mg/l. This is not considered significant in terms of groundwater quality but has been taken into account for the buried concrete assessment, included in Section 8.0.

In light of the leachate and groundwater results, and the absence of any soil contamination detected, it is considered that the groundwater does not represent an unacceptable risk to controlled waters.

7.3 Conclusions and Recommendations

The above risk assessments have established a low risk to human health and controlled water receptors. It is therefore considered that further assessment or remedial actions are not warranted for the proposed development.

Issues with respect to ground gas and potential effects of contaminants on buried concrete and water supply pipework are included in Section 8.0.

8.0 GEOTECHNICAL ASSESSMENT

8.1 General

The proposals for the site are divided into three areas: the existing public car park is proposed to comprise the construction of 3 cement silos with associated mixing stations and loading areas. Although no proposed layouts are available for the remainder of the site, it is understood that the west of the site is to be used as

vehicle parking and the north of the site as parking for articulated lorries. No proposed loads were available at the time of reporting.

The ground conditions generally comprised granular Made Ground (1.2m to 3.3m thick), over Dm and Dc grade low density structureless chalk. The chalk was proven to the base of the exploratory holes, 20.45m bgl. Groundwater was measured during monitoring visits at depths of between 2.2m (3.63m AOD) and 6.2m bgl (-1.1m AOD) and is likely to be tidally influenced.

8.2 Foundation Design

It is recommended that as part of the site clearance, all foundations and associated services are removed from the site and that any subsequent voids/obstructions are infilled with a suitable clean fill material. In particular, the nature and extent of void encountered in BH5 will need to be determined and infilled with clean material as necessary. The base of the cellar will need to be broken out where the footprint and foundations of proposed structures coincide with this feature. In this respect, it is also recommended that all hardstanding is removed to expose the underlying Made Ground across the site and check be made for other such voids.

The Made Ground is not considered suitable founding strata for the proposed cement silos due to the anticipated low strength of the Made Ground and potential for unacceptable total and differential settlement and, as such, foundations should be extended into the underlying Seaford Chalk Formation.

Due to the variable strength of the chalk, a piled foundation solution is recommended for the silos. On the proposed layout drawing, provided by the Client (London Cement Terminal – Rev10' by Vurmak), it is noted that there are to be two mixing stations constructed north of the silo's. Foundations for these structures will need to extend to the Chalk in order to avoid unacceptable settlement and as such consideration may also be given to piling these structures.

Piles should be designed based on the SPT N value profiles of the relevant boreholes and specialist piling contractors should be contacted to advise on suitable pile types, sizes, depths and carrying capacities. However, as a preliminary indication the table below presents likely capacities for 450mm and 600mm diameter CFA piles for differing pile lengths. The following has been assumed in these preliminary calculations:

- CFA pile type;
- Skin friction from the Made Ground and 'low strength' structureless chalk (to c.6m) were not taken into account;
- The unit weight of the chalk has been taken as 19.1kN/m^3 , given by the average of the bulk density tests;
- SPT 'N' values have been taken from a conservative line of best fit through the data of the four boreholes drilled on the site;
- A global factor of safety of 2.5 has been applied.

Typical pile capacities were also included in the Southern Testing Report, for the boreholes carried out in the northeast of the site in April 2014 and are generally comparable to those listed below.

Pile Length (m bgl)	Applied Geology	
	Pile Capacity (450mm diameter Pile)	Pile Capacity (600mm diameter Pile)
10	285	460
12	360	575
15	480	750
18	625	950
20	740	1110

Concrete obstructions within the Made Ground are likely to need removing prior to piling.

8.3 Gas Protection

The details of any buildings to be constructed on site are not known and as such the following comments should be reviewed once this is confirmed. Based on the conceptual model, the ground conditions encountered and the calculated GSVs (discussed in section 6.8), the site can be characterised as Situation 1 (CIRIA C665), for which no gas protection measures are required for buildings on the site.

VOC's were not recorded during the ground gas monitoring visits.

8.4 Excavations

Excavations for underground services are likely to be in the Made Ground (encountered to a depth to circa 3.3m). These materials are anticipated to be unstable and so trench support is anticipated to be required. Groundwater was during monitoring visits, at depths of between 1.92m and 2.8m bgl, therefore groundwater ingress can be anticipated in any 'deeper' underground drainage/service trenches.

8.5 Pavement Design

An equilibrium CBR of <2.5% is normally recommended for the Made Ground due to its inherent variability, although this may be improved following removal of any soft/deleterious material, proof rolling and retesting. As discussed previously, it is recommended that hardstanding is removed to confirm the absence of voids under the concrete hardstanding. The results of the TRL probes indicate equivalent CBRs of between 5% and 100% in the Made Ground, which suggest better than equilibrium conditions at the time of testing. The higher values probably represent hard layers/obstructions.

8.6 Soakaways

With the likely permeability of the Seaford Chalk Formation being in the region of 10^{-4} m/s, soakaways are could in theory be considered suitable for this site. However, the depth of Made Ground and the depths to groundwater will also need to be taken into account in determining suitable locations for soakaways. Should

soakaways be proposed, it is recommended that these are located away from structures and further testing in accordance with BRE 365 be undertaken.

8.7 Buried Concrete and Services

The results of the testing in the soils on site indicate characteristic values as following:

- water soluble sulphate: 0.945g/l (Made Ground), and 0.12g/l (chalk);
- total potential sulphate: 0.87% (Made Ground);
- pH: 9.7 (Made Ground), 8.7 (chalk) and 7.4 (groundwater)
- groundwater: sulphate of 0.75g/l.

Two results suggest the Made Ground could be pyritic.

The results of the sulphate tests carried out have identified the Design Sulphate Class of the Made Ground to be DS-3 with the Aggressive Chemical Environment for Concrete (ACEC) being AC-3 and of the chalk to be DS-1 and AC-1 as defined by the BRE Special Digest 1, Concrete Aggressive Ground, 2005 for a brownfield site and mobile groundwater regime. Further reference should be made to BRE Special Digest 1 for requirements in respect of types of cement and aggregate to be used and variations in type of concrete construction.

8.8 Conclusions and Recommendations

Following the removal of Made Ground and obstructions and associated voids infilled, a piled foundation solution extended into the Seaford Chalk Formation is recommended for the cement silos and mixing stations on this site. It is essential that a piling contractor is contacted to establish the suitable piling types for the ground conditions once the proposed loads are known. The Made Ground may be suitable for the parking areas, subject to proof rolling and confirmation of the absence of voids.

Given the results of infiltration testing, conventional soakaways extended into the chalk are considered suitable on this site, subject to further testing, groundwater levels and depth of Made Ground.

It is recommended that a detail Unexploded Ordnance Survey is undertaken prior to the commencement of construction.

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January 2015

GENERAL NOTES

- A) The assessment made in this report is based on the site terrain and ground conditions revealed by the various field investigations undertaken and also any other relevant data for the site including previous site investigation reports (if available) and desk study data. There may be special conditions appertaining to the site, however, which have not been revealed by the investigation and which have not, therefore, been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available. It must be recognised that many of the Environmental Searches obtained during the course of the desk study are often lengthy. Applied Geology have, where appropriate and in the interests of simplicity, only reproduced the summary of the searches within the report. A full copy of all the search data is held at the Applied Geology office and is available for inspection if required.
- B) The services provided are defined within our proposal and are carried out in line with the terms of appointment between Applied Geology and the Client.
- C) Where any data supplied by the Client or other external source, including that from previous site investigations, has been used it has been assumed that the information is correct. No responsibility can be accepted by Applied Geology for inaccuracies within this data.
- D) Whilst the report may express an opinion on possible configurations of strata between or beyond the exploratory locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy.
- E) Comments on groundwater (and landfill gas) conditions are based on observations made during the course of the present and past investigations or with reference to published data unless otherwise stated. It should be noted, however, that groundwater (and landfill gas) levels vary due to seasonal (or atmospheric conditions) or other effects.
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- I) Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated in the light of this data by the supervising geotechnical or geo-environmental engineers.
- J) Unless specifically stated, the investigation has not taken into account the possible effects of mineral extraction.
- K) The works performed are not a comprehensive site characterisation and should not be construed as being such.
- L) The findings of the geo-environmental risk assessment are based on information obtained from a variety of sources which Applied Geology believe to be correct. Applied Geology cannot and does not guarantee the authenticity or reliability of the information it has relied upon.
- M) The report represents the findings and opinions of experienced geo-environmental consultants. Applied Geology does not provide legal advice and the advice of lawyers may be required.
- N) Conditions at the site are subject to change from the time of the site inspection.
- O) It is possible that researches carried out by Applied Geology, whilst fully appropriate for a phase 1 desk study, failed to indicate the existence of important information sources. Assuming such indicators actually exist, their information could not have been considered in the formulation of Applied Geology findings and opinions.
- P) The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, depends on very many factors in addition to geotechnical considerations and hence its evaluation is outside the scope of this report.
- Q) Applied Geology operates as a Consultancy and does not operate its own laboratory for soil testing, this work being sub contracted to known and respected, generally UKAS accredited, laboratories. Applied Geology can therefore not be held responsible for the testing carried out.

LIST OF REFERENCES COMMONLY USED BY APPLIED GEOLOGY IN REPORTS

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20/02/12

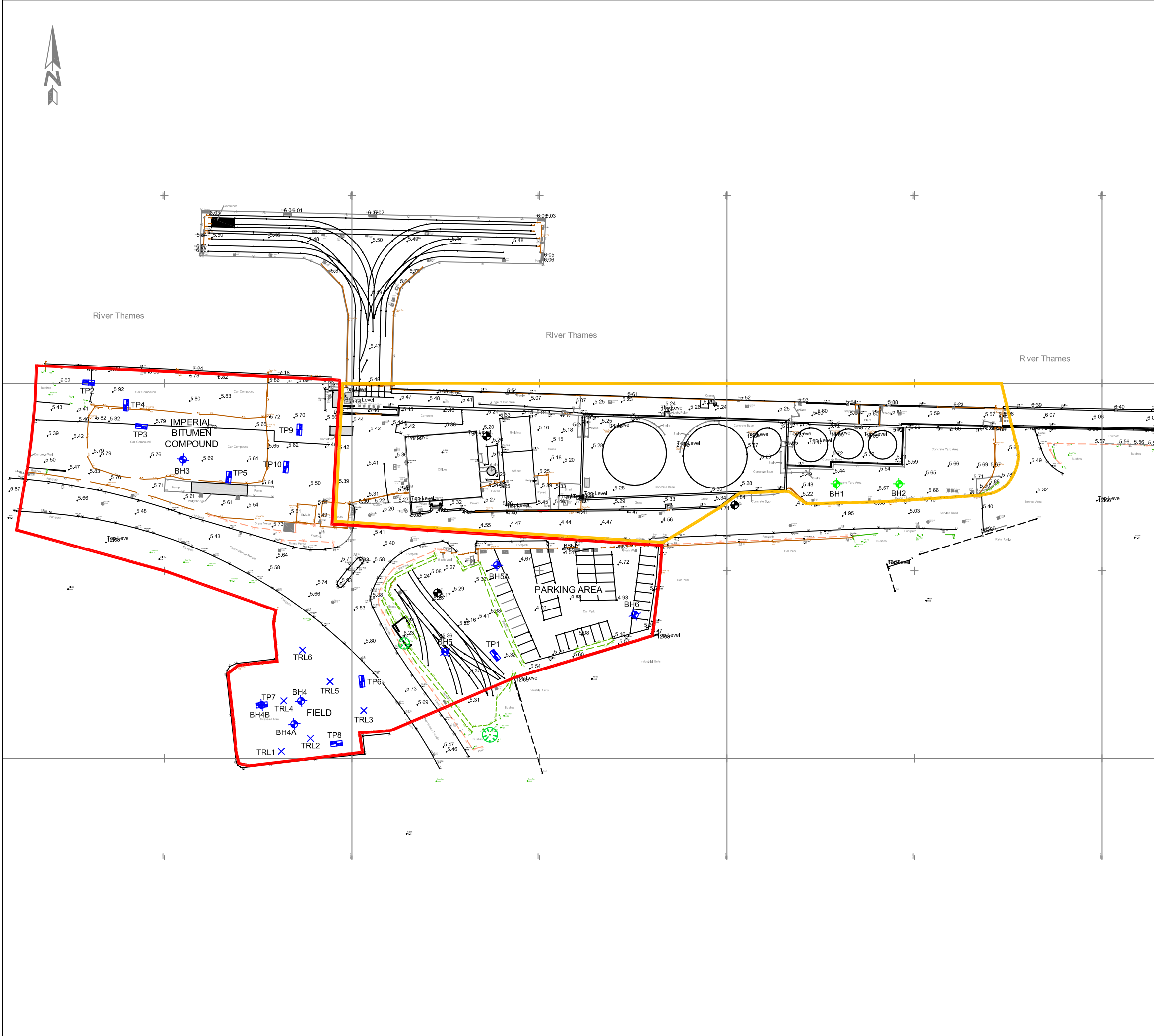
APPENDIX A

Site Location Plan

Site: **Imperial Wharf, Gravesend**
Title: **Taken from Ordnance Survey (1:50,000) Map 177,
East London, Billericay and Gravesend**

NGR: **TQ 640 744** Project No: **AG2119-14**





KEY:

- Trial Pit
- Cable Percussion Borehole
- Transport Research Laboratory Dynamic Cone Penetrometer
- Site Boundary
- Area Investigated Site Boundary
- Approximate locations of boreholes (BH1 and BH2) drilled by Southern Testing as shown on drawing No.GravOS by CH Surveys Ltd dated September 2013.

Drawing based on Gravesend Topo Survey Sept 13 Model Space, supplied by client.

1	Addition of Area Investigated and Site Boundary	18.12.2014	FHJ
Rev	Notes	Date	By

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FM CONWAY LTD

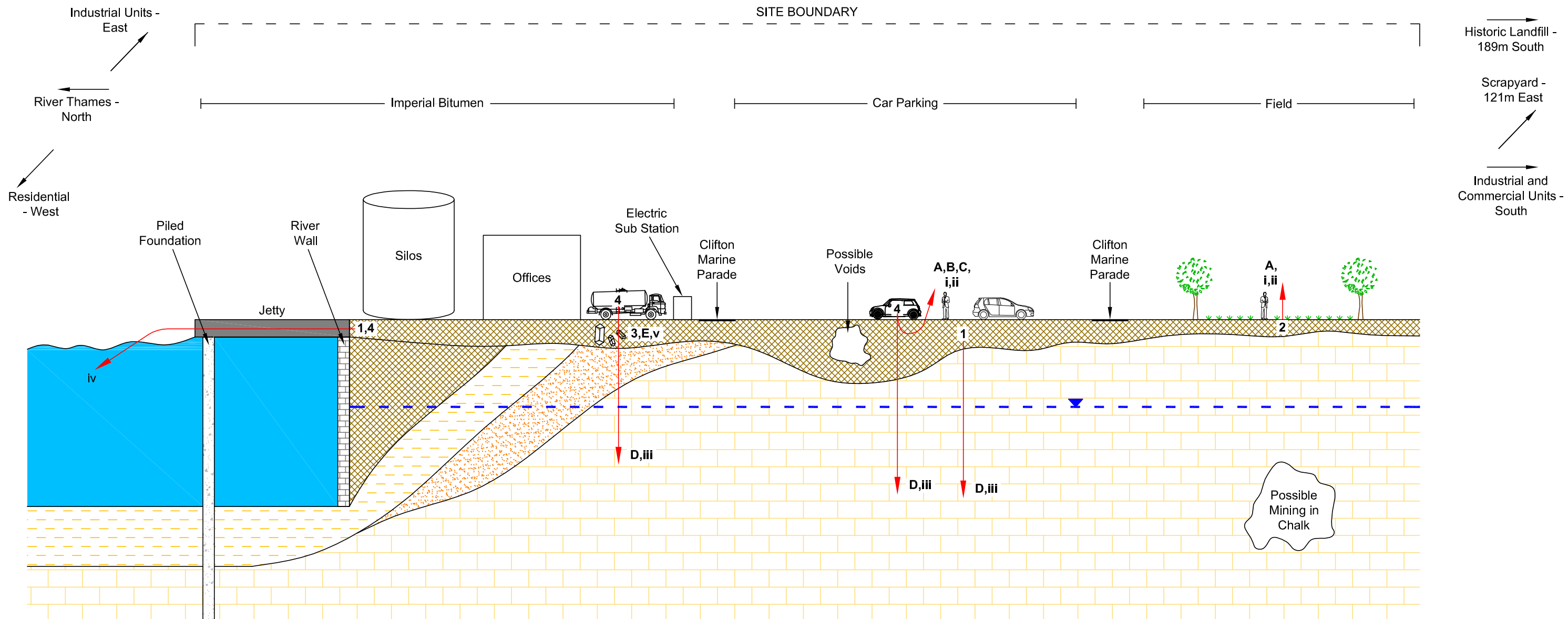
Project:

IMPERIAL WHARF, GRAVESEND -
SHOWING THE THREE AREAS OF THE SITE

Title:

EXPLORATORY HOLE LOCATION PLAN

Drawn By:	JS	Checked By:	FHJ	Paper Size:	A3
Scale:	1:1000	Date:	18.11.2014		
Drawing No:	AG2119-14-01	Revision:	1		



SOURCES

1. Made Ground
2. Soil gas
3. Elevated sulphates
4. Hydrocarbons

PATHWAYS

- A. Inhalation
- B. Ingestion
- C. Dermal contact
- D. Leaching
- E. Direct contact

RECEPTORS

- i. Construction workers
- ii. End users
- iii. Aquifer
- iv. Watercourse
- v. Buried Concrete

Key:

-  Made Ground
-  Alluvium (Secondary A Aquifer)
-  River Terrace Deposits (Secondary Undifferentiated Aquifer)
-  Seaford Chalk Formation (Principal Aquifer)
-  Groundwater

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Client:
FM CONWAY LTD

Project:
IMPERIAL WHARF, GRAVESEND

Title:

CONCEPTUAL SITE MODEL

Drawn By:
JS

Checked By:
FHJ

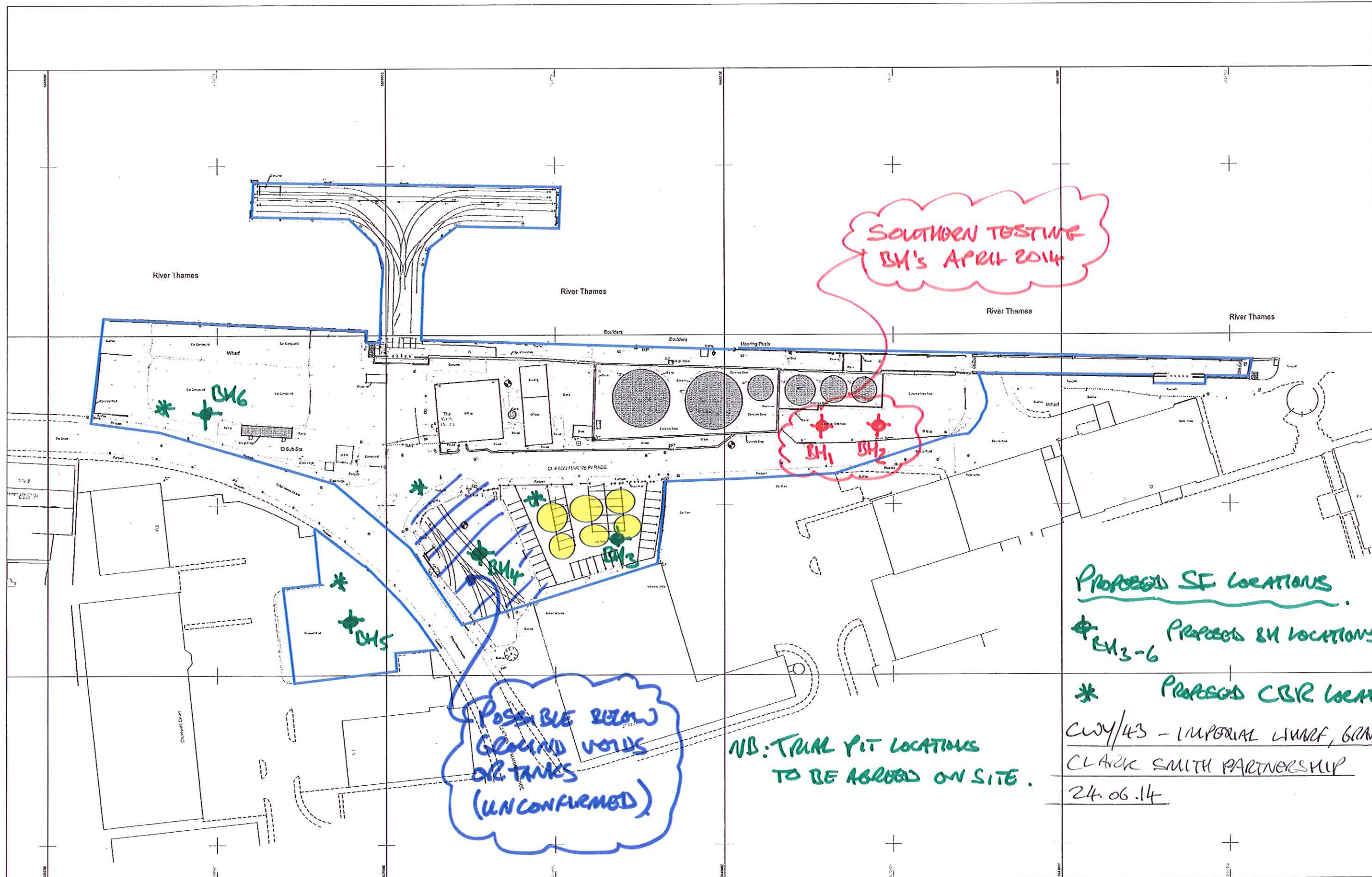
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Date:
12.12.2014

Drawing No:
AG2119-14-02

Revision:
0



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CH Surveys Ltd
Tel: 07860 293724

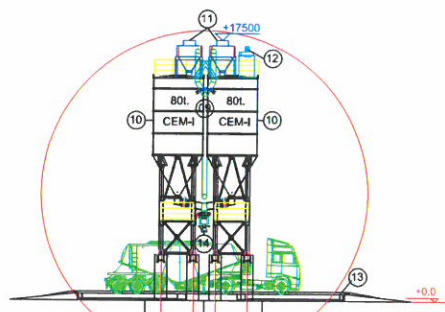
Landholding



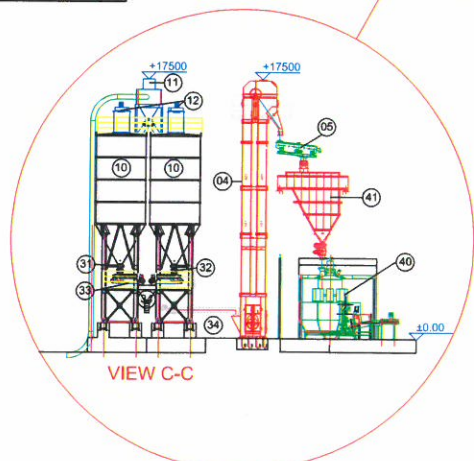
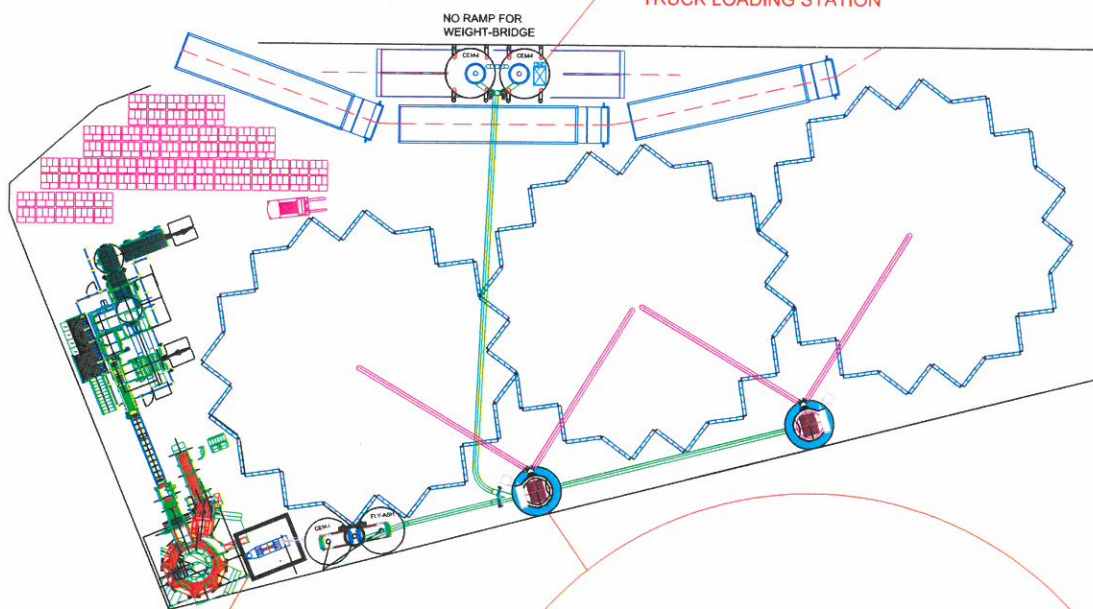
Bulk Cement Storage Silos. For details re Drw No. 535457.0.04.1

Gravesend Site Survey
Surveyed: September 2013
Scale: 1/500 (A1)
Drawing No: GravOS

01	4000T. STEEL SILO
02	FLUIDISATION BOTTOM
03	VACUUM TANK
04	BUCKET ELEVATOR
05	VIBRATING SCREEN
06	2WAY-PNEUMATIC VALVE
07	TRANSFER KETTLE
08	CONVEYING PIPELINE
09	PNEUMATIC VALVE
10	DAILY SILO 80T.
11	CYCLON
12	DUST COLLECTOR
13	WEIGHT-BRIDGE
14	LOADING SPOUT
31	SLIDING VALVE
32	ROTARY VALVE
33	DOSING BELT CONVEYOR
34	MIXER
40	PACKAGING SYSTEM
41	BUFFER BUNKER
42	FILTER
43	SCREW CONVEYOR
44	VACCUM PIPE
50	PALETISER

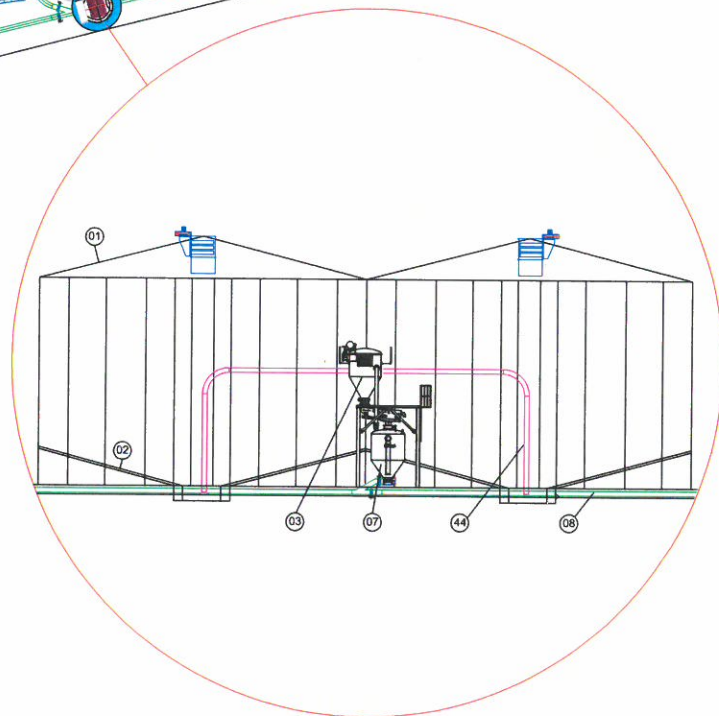


TRUCK LOADING STATION



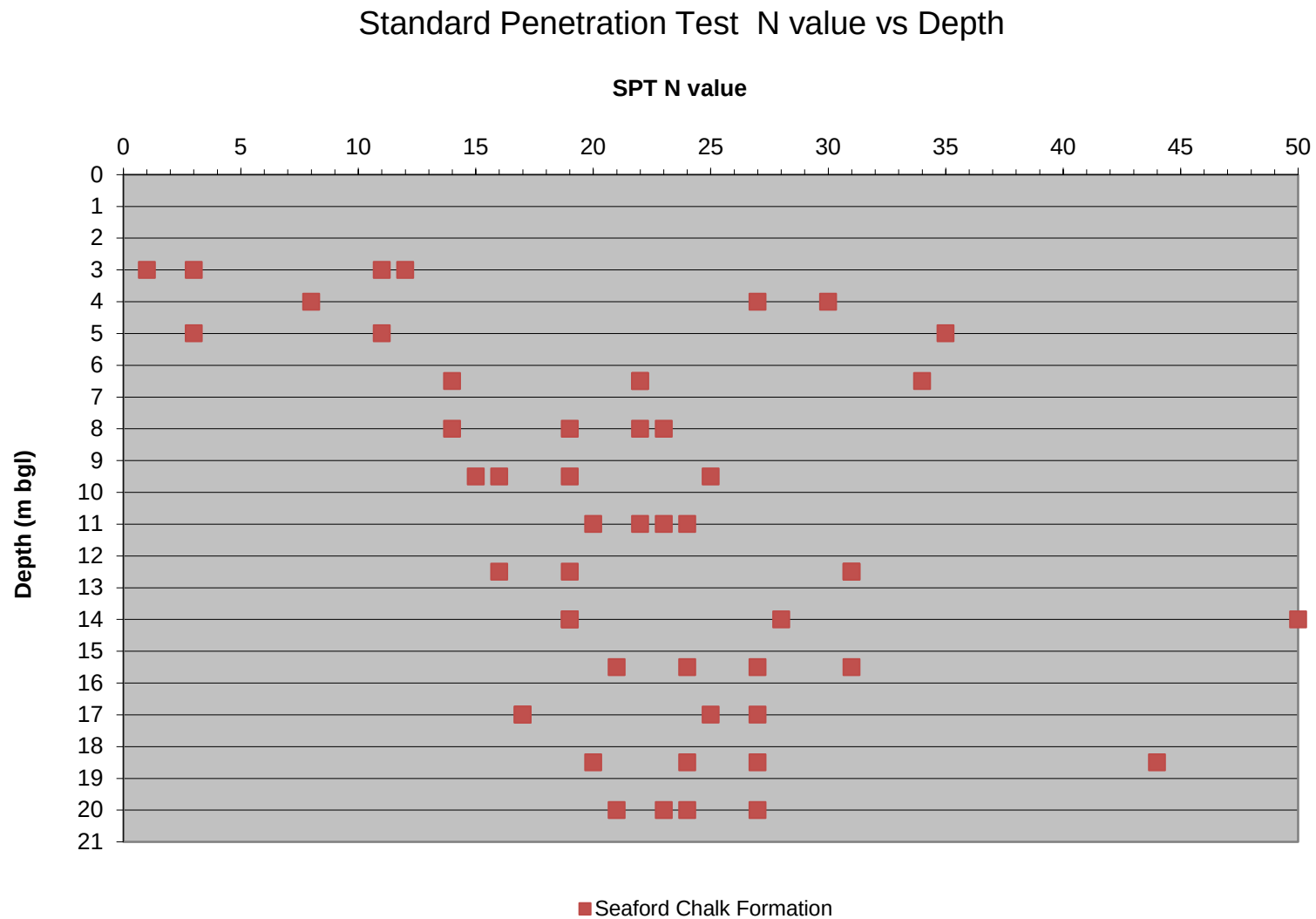
VIEW C-C

MIXING SYSTEM
AND
FEEDING OF BAGGING
MACHINE



VERTICAL SILO RECLAIM SYSTEM

NO		ANET		SİTİMLERİ AÇIKLAMA							
 www.vurmak.com.tr		LONDON CEMENT TERMINAL- REV10									
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01	01	01.01.2010	01.01.2010								



APPENDIX B



Express Preliminary UXO Risk Assessment

Client	Applied Geology
Project	Imperial Wharf Centre
Site Address	Imperial Wharf, Gravesend , DA11 0BY
Report Reference	OPN2010
Date	31/10/14
Originator	AT

Assessment Objective

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at the Imperial Wharf Centre. The assessment involves the consideration of the basic factors that affect the potential for UXO to be present at a site as outlined in Stage One of the UXO risk management process.

Background

This assessment uses the sources of information available in-house to 1st Line Defence Limited to enable the placement of a development site in context with events that may have led to the presence of German air-delivered or Allied military UXO. The report will identify any immediate necessity for risk mitigation or additional research in the form of a Detailed UXO Risk Assessment. It makes use of 1st Line Defence's extensive historical archives, library and unique geo-databases as well as internet resources, and is researched and compiled by UXO specialists and graduate researchers.

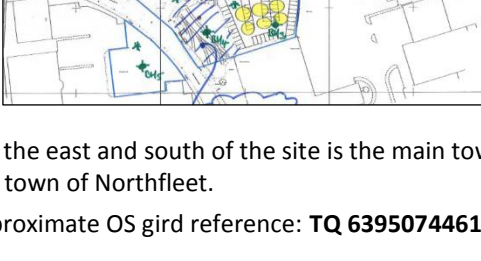
The assessment directly follows CIRIA C681 guidelines "Unexploded Ordnance, a Guide for the Construction Industry". The document will therefore assess the following factors:

- Basic Site Data
- Previous Military Use
- Indicators of potential aerial delivered UXO threat
- Consideration of any Mitigating Factors
- Extent of Proposed Intrusive Works
- Any requirement for Further Work

It should be noted that the vast majority of construction sites in the UK will have a low or negligible risk of encountering UXO and should be able to be screened out at this preliminary stage. The report is meant as a common sense 'first step' in the UXO risk management process. The content of the report and conclusions drawn are based on basic, preliminary research using the information available to 1st Line Defence at the time this report was produced.



Risk Assessment Considerations

Site location and description/current use	The site is situated within the town of Gravesend in north-west Kent. The site is occupied by car parks, buildings, storage tanks, and to the north a jetty with cranes. North of the site lies the River Thames, and further north, the town of Tilbury. To the east and south of the site is the main town centre of Gravesend. To the west is the town of Northfleet. The site is situated on the approximate OS grid reference: TQ 6395074461 
Are there any indicators of current/historical military activity on/close to the site?	While the site itself does not appear to have been used by the military, the town of Gravesend appears to have had some military presence. The Milton Barracks were located in the centre of the town, and RAF Gravesend to the east, approximately 4.75km south-east of the site. While these facilities would not have directly affected the UXO risk on site their presence within Gravesend may have resulted in additional targeting and bombing of the town.
What was the pre- and post-WWII history of the site?	The site appears to have been part of the Imperial Paper Mills during WWII. While this is unlikely to have been a specific Luftwaffe target in its own right, it may well have been bombed as part of the attacks on other infrastructure within Gravesend and the surrounding area of the Thames Estuary. The main buildings of the Paper Mills were located south of the site, and may have been easy to ignite using incendiary bombs. Some of the buildings on and adjacent to the site are labelled as Ruins on post-war mapping – often an indication of wartime bomb damage. Some time after the war, the site was redeveloped.
Was the area subject to bombing during WWII?	The site was located within the Municipal Borough of Gravesend during WWII. This borough of 4,014 acres was hit by 272 HE bombs, 14 Oil Bombs, 9 Phosphorus Bombs, 4 V1 Flying Bombs and 2 V2 Missiles, making for a total of 301 incidents, equating to a medium bomb density of 75 incidents per 1,000 acres. The site was situated on the estuary of the Thames. Luftwaffe aircraft would use the Thames on their way into London as a natural path to the capital. On the way back from bombing London, they would pass over the Gravesend area and often release any bombs they had left on these areas. There is an abandoned bomb in the Thames approximately 1.25km east of the site. Given the amount of bombing that the area received, it is likely that further UXB's fell in the Thames that have never been recovered. 1st Line Defence does not hold written bomb incident records or bomb mapping for Gravesend in-house. At this stage, it has therefore not been possible to confirm exactly where bombs in the area fell, and in what quantity.
Is there any evidence of bomb damage on/close to the site?	Significant areas of ruined buildings exist to the south of the site on OS Historical mapping, the former main structures of the Imperial Paper Mills. It has not been possible to fully assess the site for damage, due to the quality of mapping available at this stage of research. The acquisition of WWII-era aerial photography would be able to reveal a more

	detailed picture of the ground cover within the site and to what extent the site was occupied by conditions conducive to the observation of UXO.
To what degree would the site have been subject to access?	The site was part of significant dock infrastructure during the war. If the paper mills to the south were operational, and used the jetty and the cranes on site, the access level would have been high, and signs of UXO are likely to have been spotted. This would not have been the case if major damage was sustained to the buildings on site or south of the site, which does appear to have happened.
To what degree has the site been developed post-WWII?	Several buildings appear to have been built on site, as well as several storage tanks. Construction of some of the structures on site will have most likely required some deep foundations. The risk from deep-buried unexploded bombs is only considered mitigated at the locations and down to the depth of post-war foundations and excavations. The development of the car parks and pathways would have involved minimal excavation work. Where this development has taken place the risk of encountering shallow buried UXO, especially 1kg incendiaries and anti-aircraft projectiles will have been partly mitigated.
What is the nature and extent of the intrusive works proposed?	Four boreholes are proposed at locations shown on the site plan. (BH3-6, with trial pits to be carried out north and west of BH4). It is unknown what redevelopment, if any, is planned on site after these works.

Summary and Conclusions

Preliminary research for this report has identified **a risk of encountering unexploded ordnance** at the Imperial Wharf Centre.

The site was situated in an area of Kent that was frequently bombed by the Luftwaffe due to it’s location on the Thames. While the site area is unlikely to have been specifically targeted, it is likely it would have been bombed by aircraft flying to or returning from London. There are also a number of very significant targets in the area such as Tilbury Docks to the north-west and the industry along the banks of the Thames. Bombs may have fallen in the river itself unnoticed. Historical mapping shows numerous ‘ruined’ structures south of the site – possibly as a direct result of bomb damage. If the paper mill to the south of the site had been taken out of action, access across the site area may have been significantly reduced. Furthermore, the quality of mapping available at this stage is poor, and it has not been possible to fully check the site area for damage without access to original bomb records and WWII-era aerial photography.

Recommendations

Given the findings of this preliminary report, **further research** is recommended in the form of a Detailed **UXO Threat Assessment**.

Further research would be needed to obtain WWII-era aerial photography and detailed historical mapping. Visits to local and national archives may also be able to locate bomb mapping, bomb damage maps and incident reports for any bombing on site. Thus, it is recommended that more research is undertaken utilising external resources in order to fully qualify the risk and to recommend work and site-specific mitigation measures if required. It is possible given the quality and quantity of information found that the site could be ‘zoned’ into areas of different risk, or negated altogether in some section. Prior to or in lieu of a Detailed Threat Assessment, **it is recommended that any proposed site works be directly supported by a UXO Specialist**.

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1st Line Defence.

County Series 1:2,500 scale

National Grid 1:2,500 / 1:1,250 scale



Historical Map Pack Legend

GENERAL FEATURES

Wood	Marsh	Reeds
Fir	Mixed Wood	Brush Wood
Orchard	Bush	Rough Pasture
Ford	Stepping Stones	Ferry
Lock	Waterfall	Quarry
Shingle	Gravel Pit	
Trigonometrical Station	SL Sluice	
507 Altitude at Trigonometrical Station	Tr. Trough	
B.M. 325-9 Bench Mark	Sp. Spring	
342 Surface Level	M.R. Mooring Ring	
Permanent Traverse Station	M.P. Mooring Post	
Antiquities (site of)	B.S. Boundary Stone	
Arrow denotes flow of water	B.P. Boundary Post	

ROADS

Road over single stream	Road crossing railway
Road over River or Canal	

RAILWAYS

Railway crossing River or Canal	Railway crossing Road
Level Crossing	Embankment
Cutting	

ABBREVIATIONS

Trigonometrical Station	SL Sluice
507 Altitude at Trigonometrical Station	Tr. Trough
B.M. 325-9 Bench Mark	Sp. Spring
342 Surface Level	M.R. Mooring Ring
Permanent Traverse Station	M.P. Mooring Post
Antiquities (site of)	B.S. Boundary Stone
Arrow denotes flow of water	B.P. Boundary Post

GENERAL FEATURES

Non-coniferous Trees	Slopes	Antiquity (site of)
Coniferous Trees	Cliff	Culvert
Surveyed Trees	Cave Entrance	Direction of water flow
Orchard Trees	Rock	Electricity Pylon
Coppice, Osier	Boulders	Electricity Transmission Line
Scrub	Sloping Masonry	Triangulation Station
Bracken	Roofted Building	ts Traverse Station (permanent)
Heath	Glasshouse	Bench Mark
Rough Grassland	Archway	Surface Level
Marsh, Saltings	Change of boundary mering	rp Revision Point (instrumentally fixed)
Reeds	see AREAS notes	Revision Point & Bench Mark coincident

Top	Slopes	Quarry	Refuse Heap	Sloping Masonry
Flat Rock	Sand	Sand Pit	Culvert	Archway
Shingle	Boulders	Gravel Pit	Cliff Face	Glazed Roof Building

BOUNDARIES

England & Wales

County Boundary (geographical)
County & Civil Parish Boundary coterminous
Admin County or County Borough Boundary
London Borough Boundary
County District Boundaries based on civil parish

England, Wales & Scotland

Civil Parish Boundary
Boro (or Burgh) Const & Ward Bdy Parly & Ward Boundaries based on civil parish
Co Const Bdy
Boro (or Burgh) Const & Ward Bdy Parly & Ward Boundaries not based on civil parish
Co Const Bdy

Scotland

County Boundary (geographical)
Co Cnl Bdy County Council Boundary
Co of City Bdy County of the City Boundary
Burgh Bdy Burgh Boundary
Burgh Bdy
Dist Bdy District Council Boundary
Dist Bdy

* Not with parish † Coincident with parish

ABBREVIATIONS

Beer House	Fire Station	Mail Pick-up	Signal Light
Bench Mark	Guide Post	Mile Stone	Sluice
Boundary Post	Gas Valve Compound	National Trust	Signal Post
Boundary Stone	Hydrant or Hydraulic	Normal Tidal Limit	Spring
Crane	Hectares	National Trust for Scotland	Signal Station
Club House	Letter Box	Pillar, Pole or Post	Telephone Call Box
Chimney	Lifeboat Station	Public Convenience	Telephone Call Post
Capstan	Level Crossing	Police Call Box	Tank or Track
Drinking Fountain	Loading Gauge	Public House	Trough
Dock	Lighthouse	Post Office	Traverse Station
Electricity Pillar or Post	Lighting Tower	Pump	Well
Electricity Transmission Line	Metres	Police Telephone Pillar	Weighbridge
Fire Alarm	Mean High Water	Reservoir	Wind Pump
Fire Alarm Pillar	Mean High Water Springs	Road House	Works
Filter Bed, Foot Bridge	Mean Low Water	Revision Point	Water Point
Fundamental Bench Mark	Mean Low Water Springs	Stone	Water Tap
Flagstaff	Mile or Mooring Post	Signal Box	

County Series

1:1,250 scale



County Series & National Grid

1:2,500 scale

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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1866

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1866
Edition N/A
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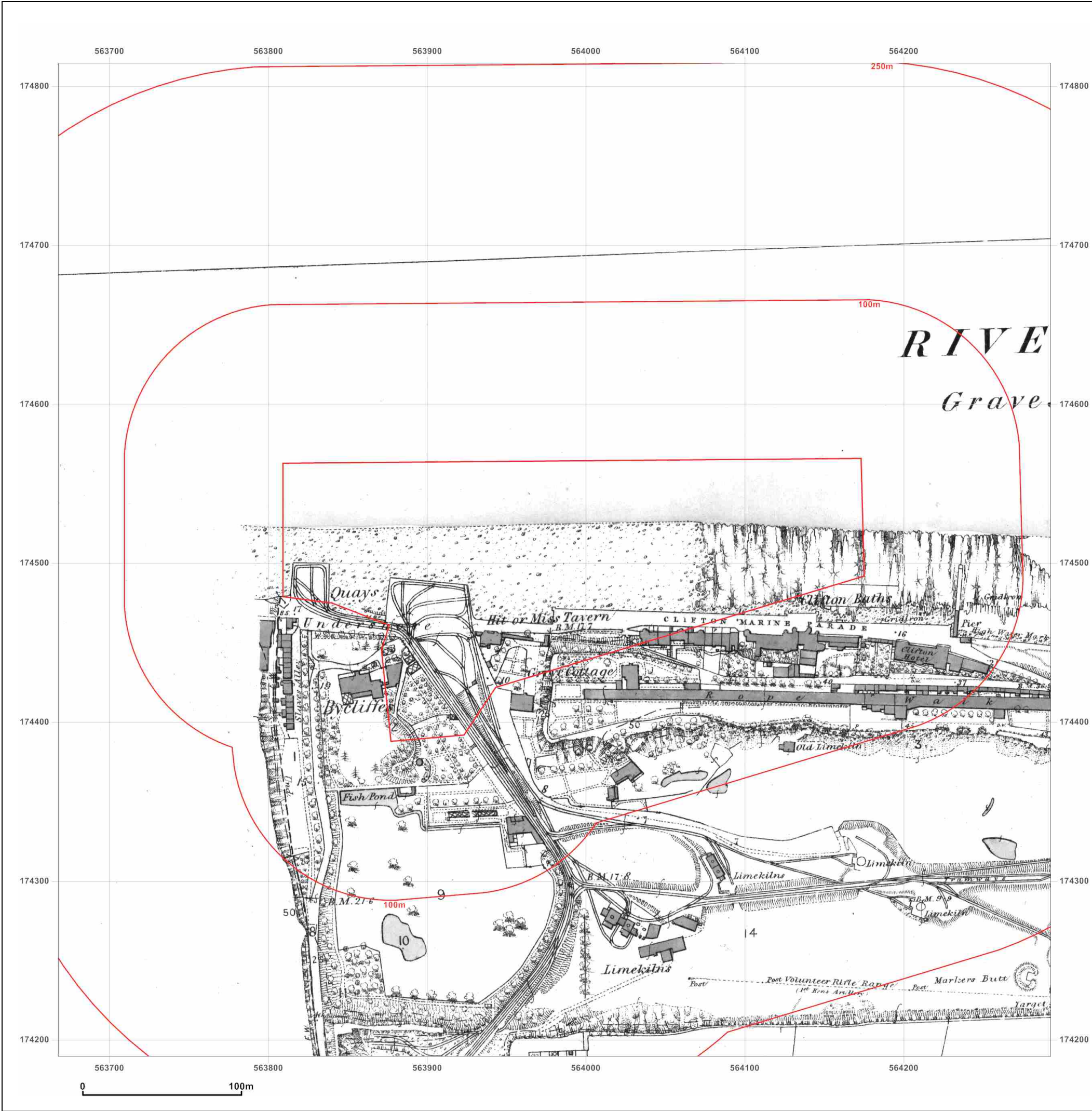


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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1897-1898

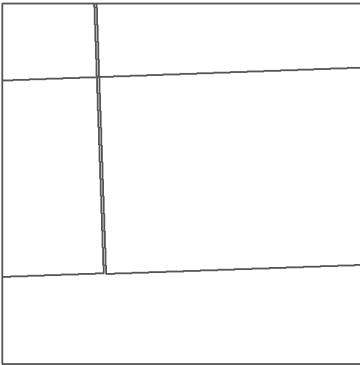
Scale: 1:2,500

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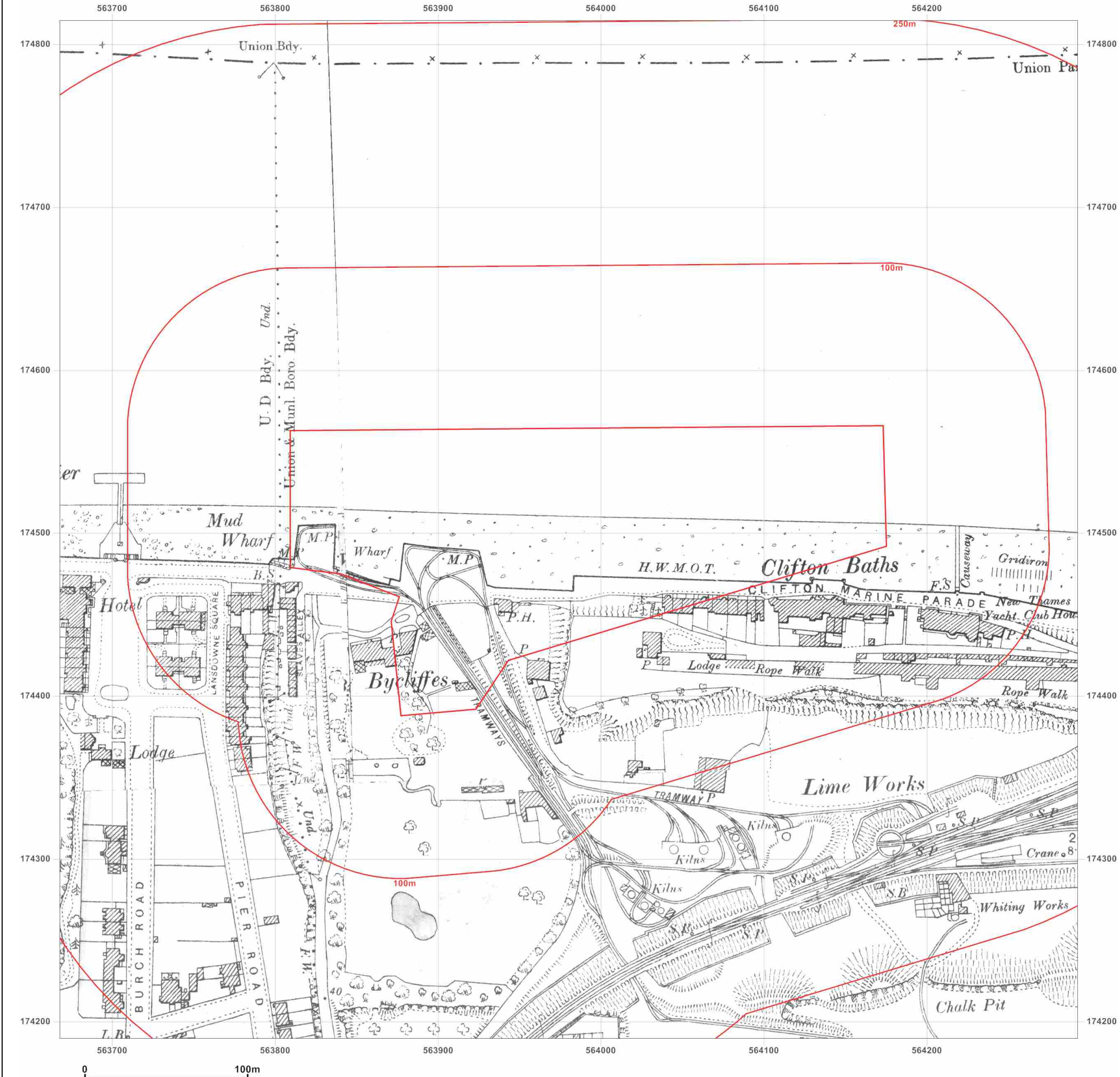


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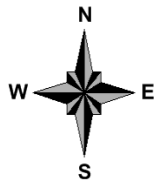
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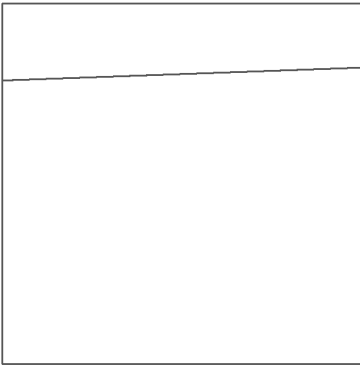
Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



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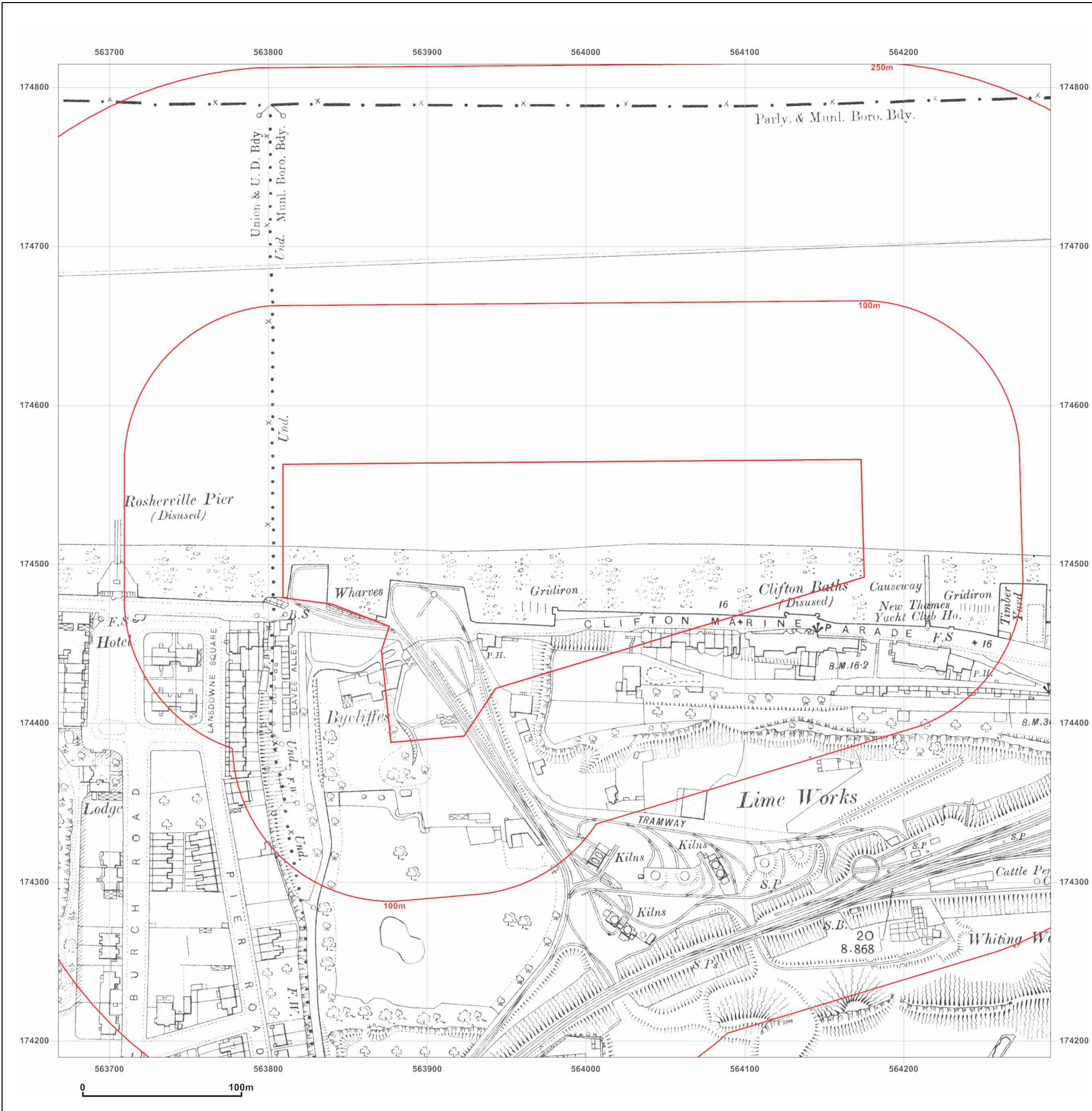


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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

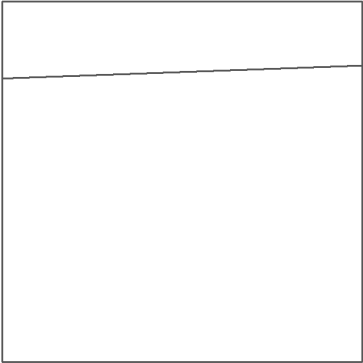
Map date: 1932-1933

Scale: 1:2,500

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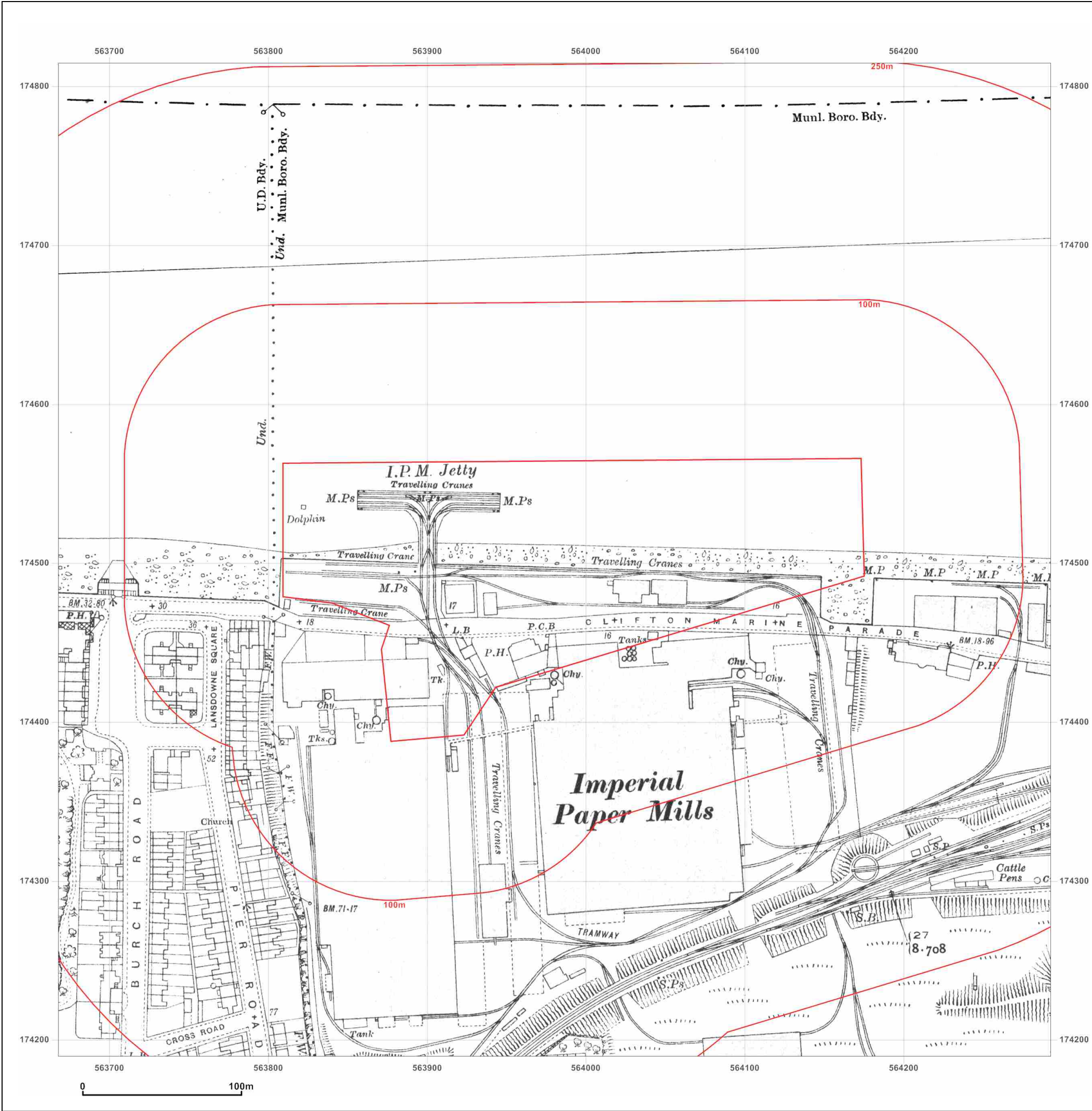


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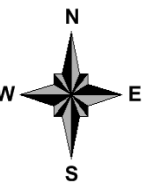
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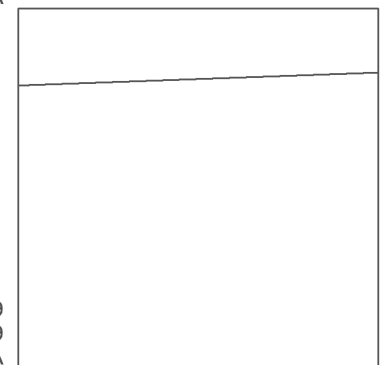
Map date: 1939

Scale: 1:2,500

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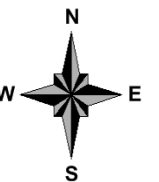
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Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1952-1953

Scale: 1:1,250

Printed at: 1:2,000



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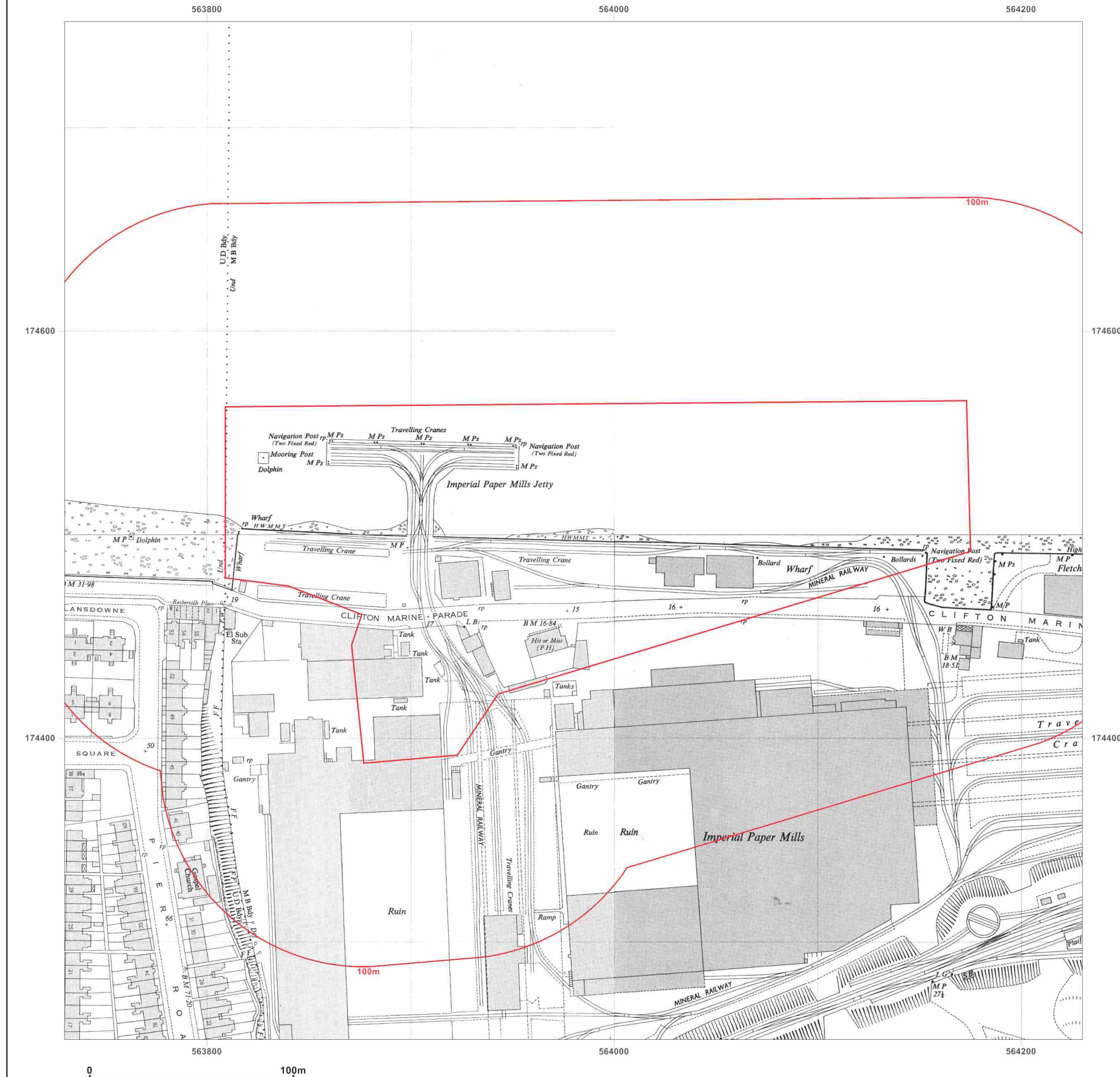


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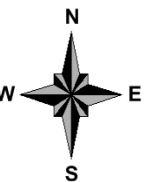
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1952-1953

Scale: 1:2,500

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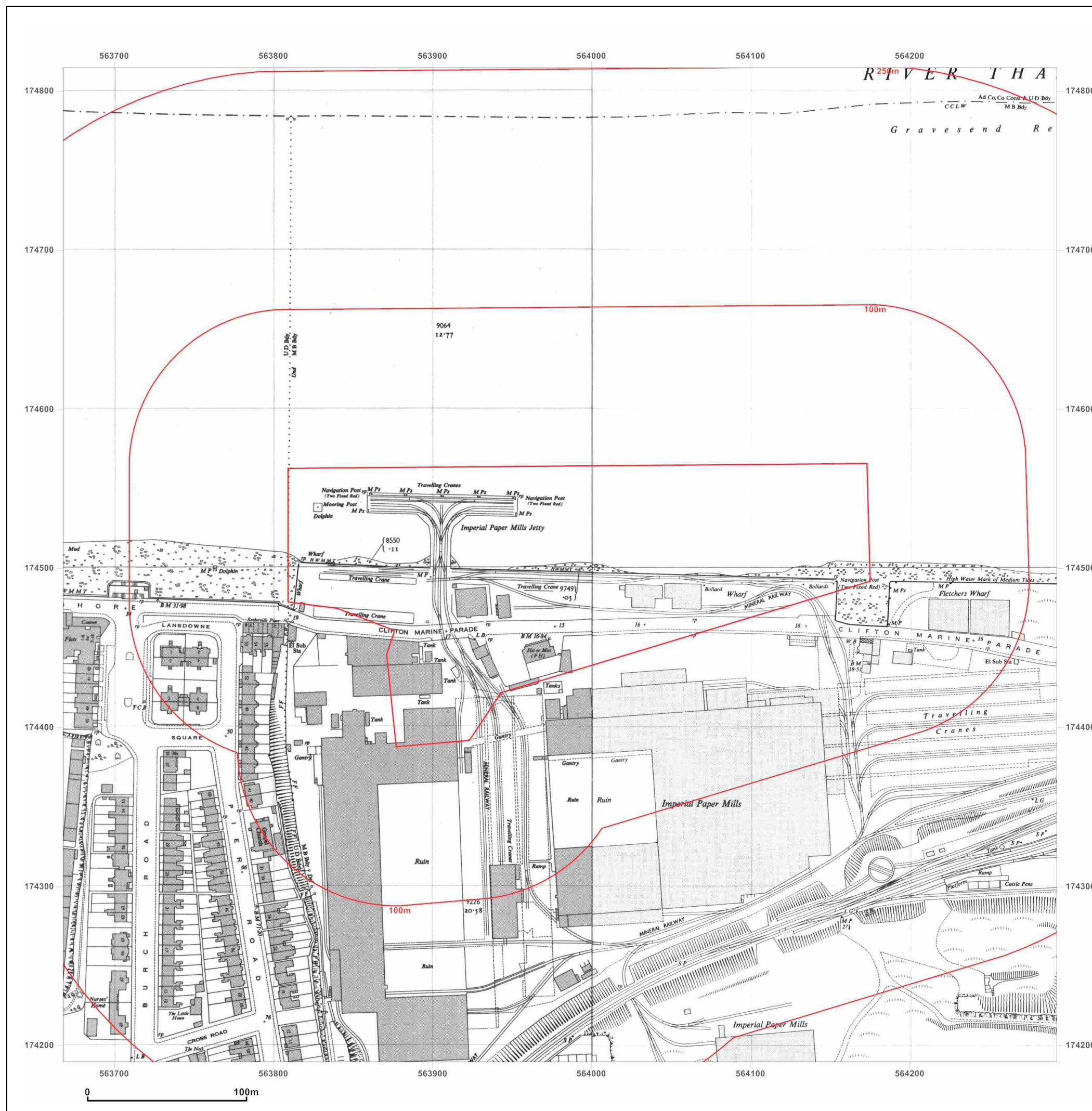


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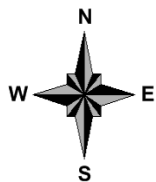
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Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1964

Scale: 1:2,500

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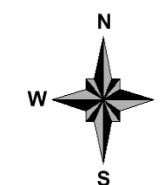
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1963-1965

Scale: 1:1,250

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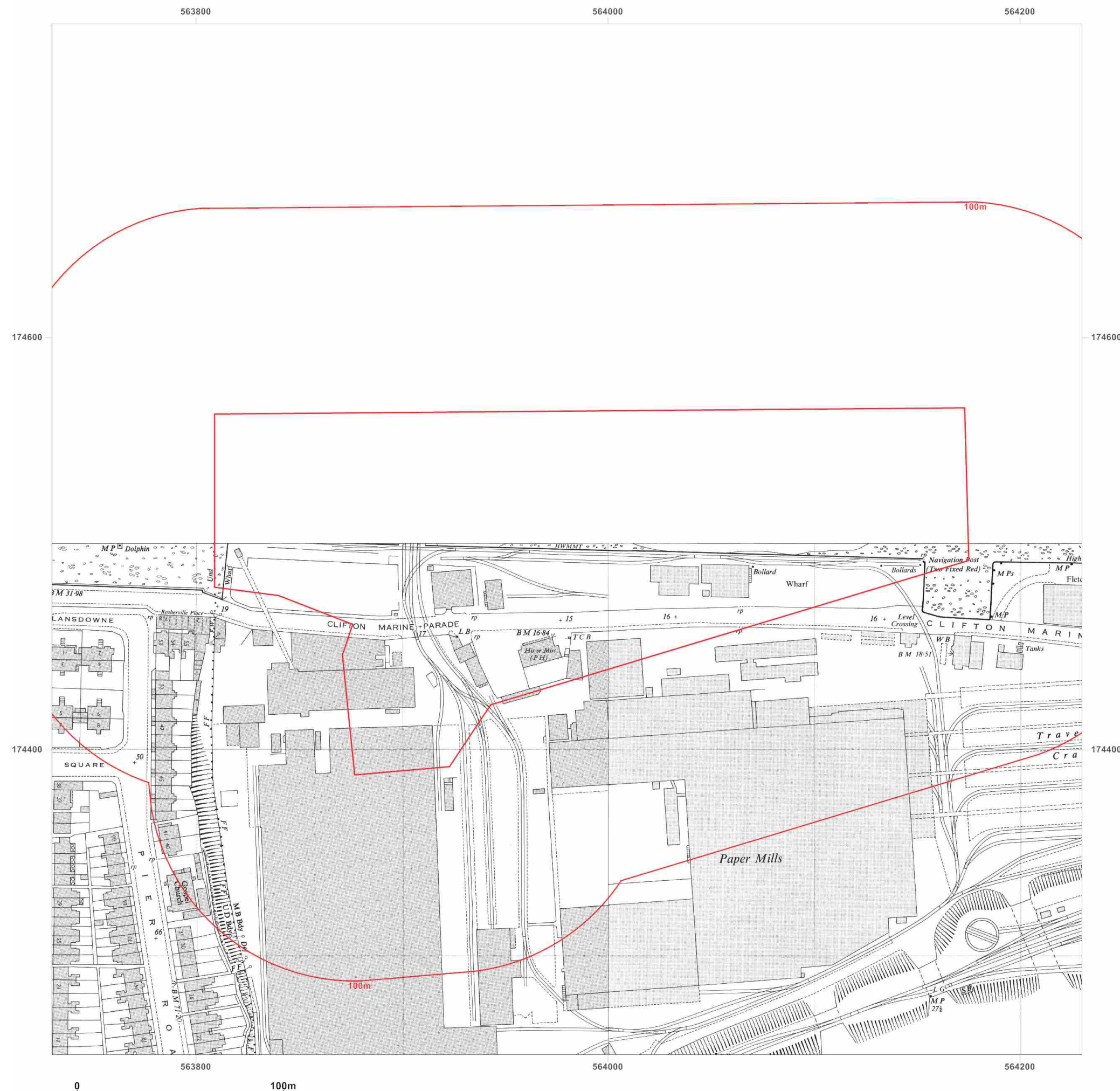


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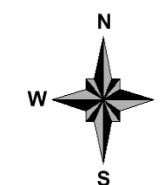
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1973-1975

Scale: 1:1,250

Printed at: 1:2,000



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 Revised N/A
 Edition N/A
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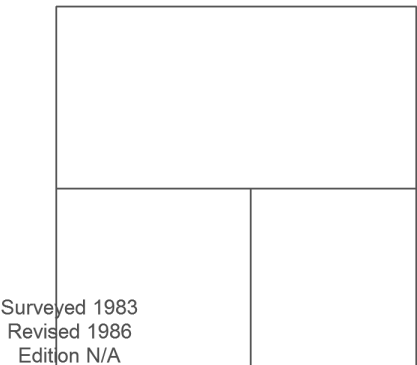
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid
Map date: 1986-1989
Scale: 1:1,250
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Surveyed 1983
Revised 1989
Edition N/A
Copyright 1989
Levelled 1983



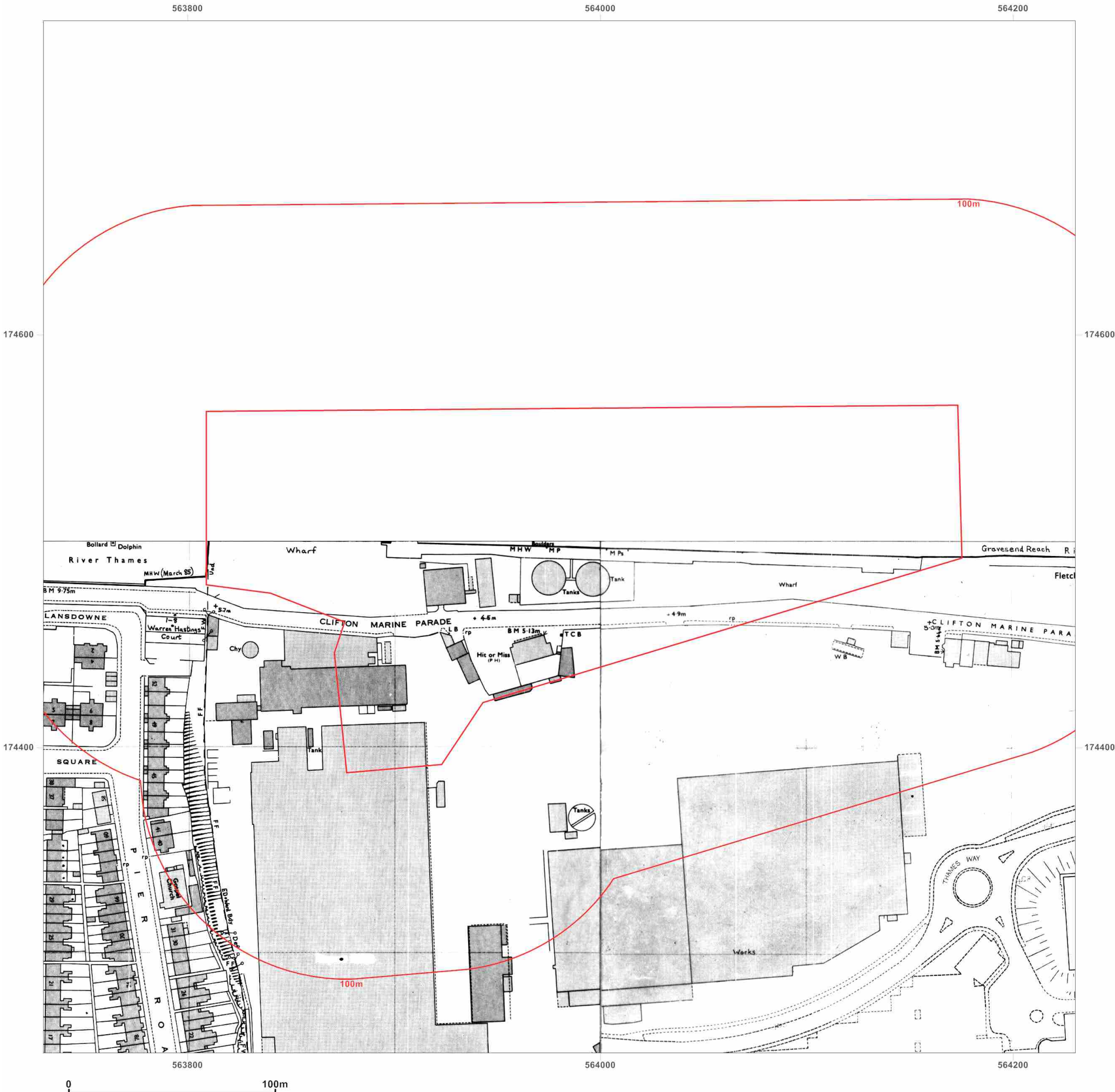
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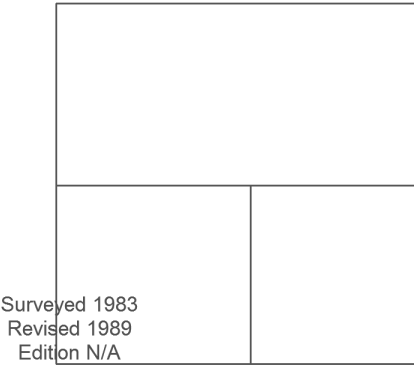
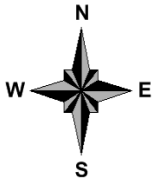
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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid
Map date: 1989-1991
Scale: 1:1,250
Printed at: 1:2,000



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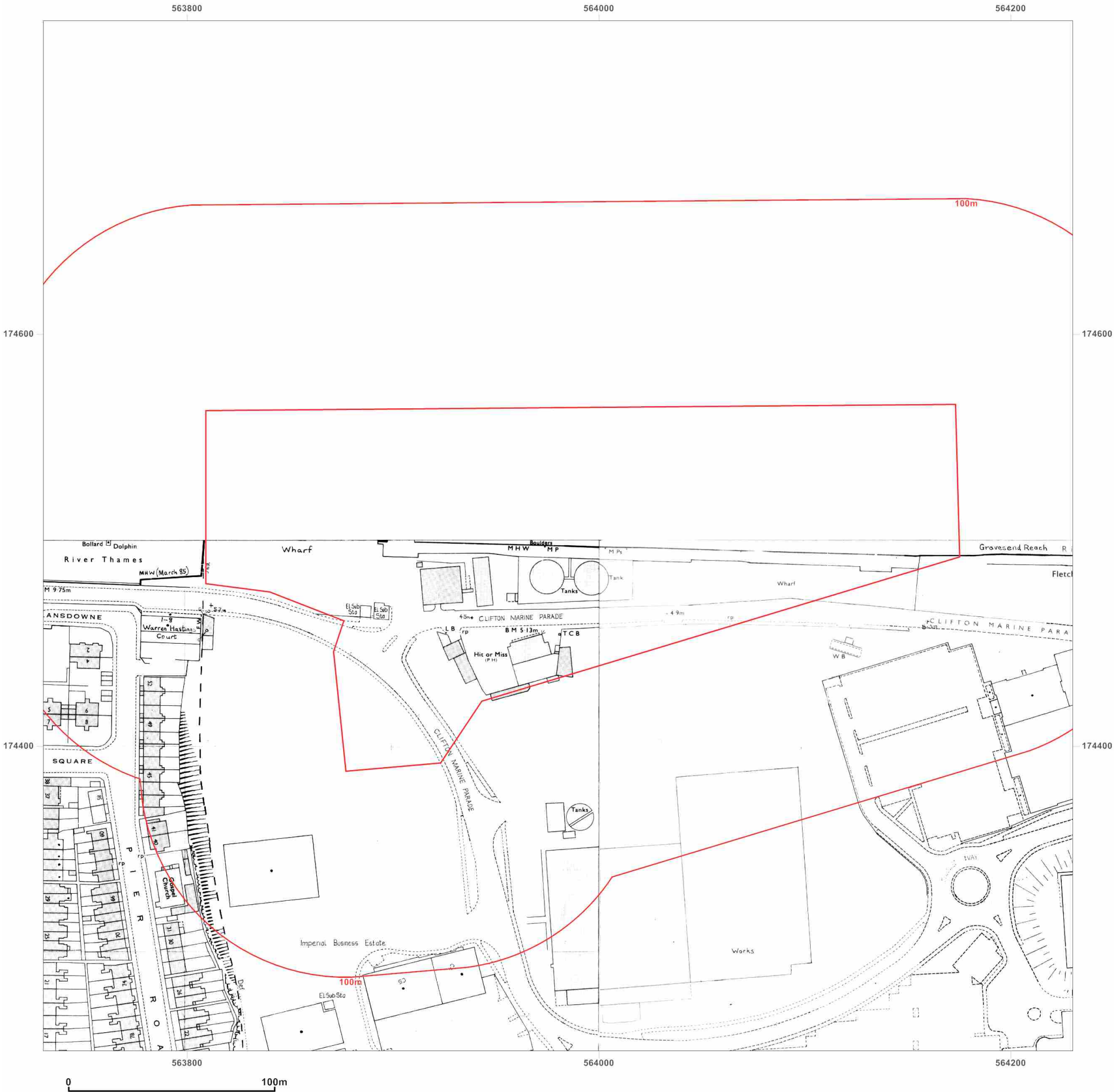
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County Series 1:10,560 scale

VEGETATION



Fir Wood



Deciduous Wood



Mixed Wood



Brushwood



Orchard



Reeds



Rough Pasture



Furze



Marsh



Osiers

ROADS



Railway over Road



Road over Railway



Road over River or Canal



Level Crossing



Railway over River



Road over Stream



Road over Stream



Sunken Road

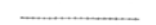


Raised Road

RAILWAYS



Double Lines of Railway



Single Lines of Railway and Tramway

GENERAL FEATURES



Gravel Pit



Sand Pit



Quarry



Shingle



Other Pits



Antiquities, Site of



Arrow, showing direction of flow of water



Trigonometrical Station

BOUNDARIES



County Boundary



Parish Boundary



Contours



Parliamentary Division Boundary



Union Boundary



Rural District Boundary

National Grid 1:10,000 scale

HEIGHTS (METRES)

Values are given in metres above mean sea level at Newlyn.

Surface heights determined by ground survey 163m
air survey 163m

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

ROCK FEATURES

Loose rock

Boulders

Outcrop

Scree



CONVERSION SCALE

Metres - Feet

2000 Metres 6500 Feet

6000

5000

4000

ABBREVIATIONS

BP,BS Boundary Post or Stone
Ch Church
CH Club House
F Sta Fire Station
FB Foot Bridge
Fn Fountain
GP Guide Post
MP,MS Mile Post or Stone
P Pole or Post
Pol Sta Police Station

PO Post Office
PC Public Convenience
PH Public House
S Stone
Spr Spring
TCB Telephone Call Box
TCP Telephone Call Post
TH Town Hall
W Well
Y Youth hostel

ROADS

Road

Track
Where unfenced shown by pecked lines.

Path

RAILWAYS

Cutting Embankment Multiple track
Single track
Siding, tramway or mineral line
Narrow gauge
Road over
Level crossing
Foot Bridge
Road under

GENERAL FEATURES

Antiquity, (site of)

Boulders

Building

Pylon

Pole

Glasshouse

Triangulation station

Lake, loch or pond

Sloping masonry

= Chalk pit, clay pit or quarry

= Gravel pit

= Sand pit

Refuse or slag heap

Direction of flow of water

Shingle

Sand

VEGETATION

Bracken, rough grassland

Scrub

Heath

Marsh

Saltings

Reeds

Coppice

Orchard

Coniferous trees

Non-coniferous trees

In some areas bracken () and rough grassland () are shown separately.



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Historical Map Pack Legend

County Series & National Grid

1:10,560 scale & 1:10,000 scale

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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1865

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1865
Edition N/A
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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1888

Scale: 1:10,560

Printed at: 1:10,560



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Site Details:

Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



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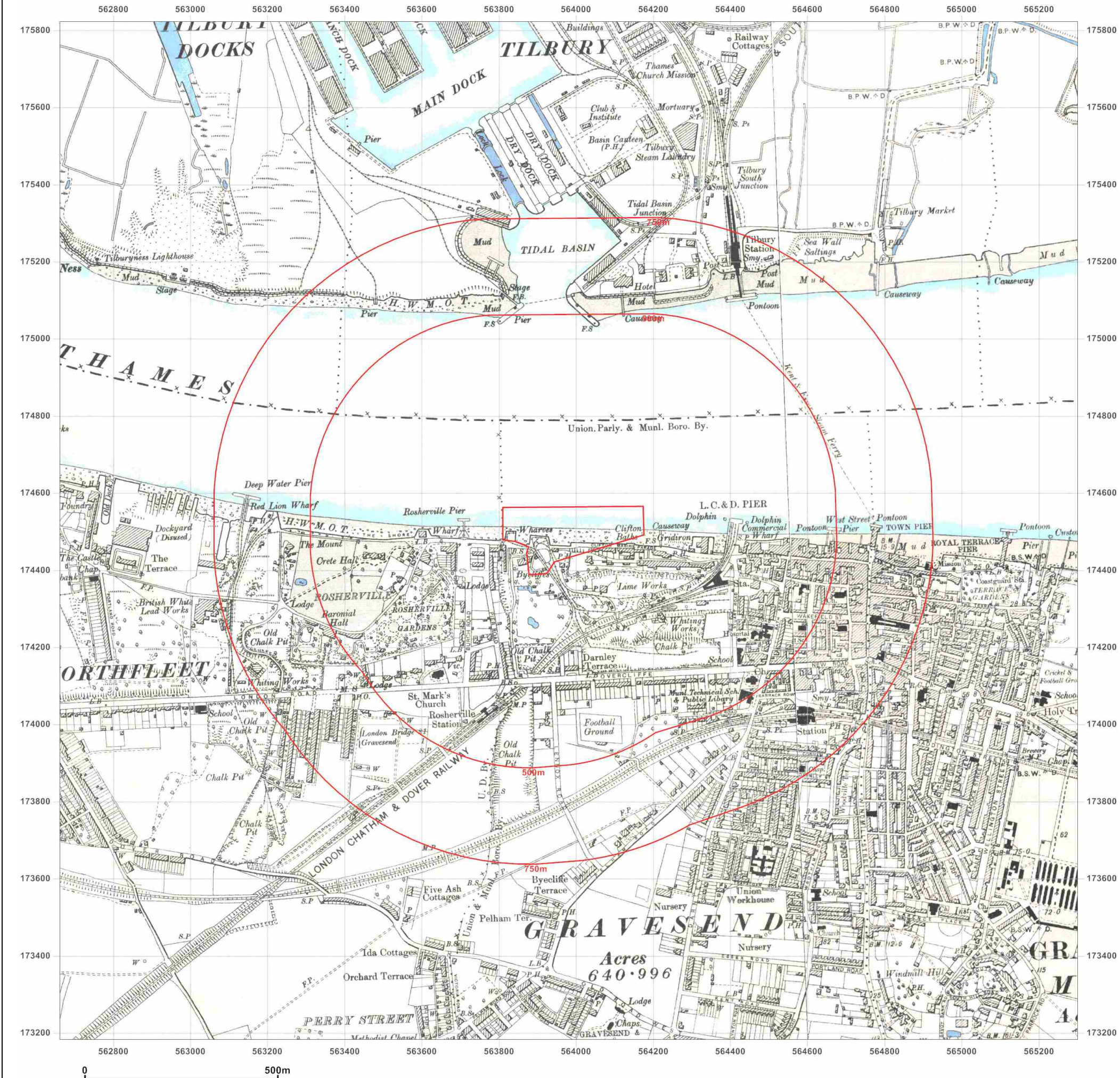


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Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1895-1898

Scale: 1:10,560

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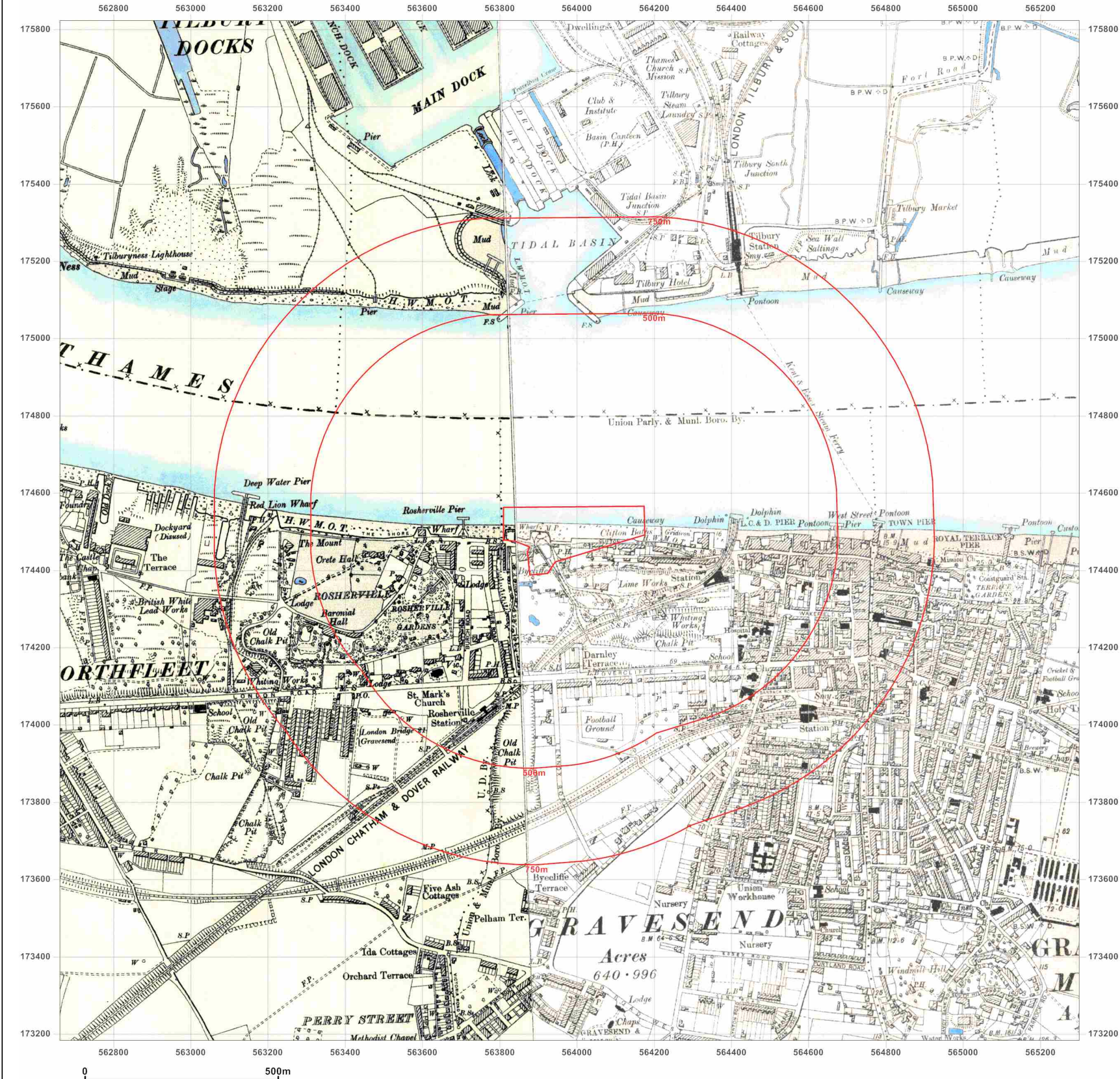


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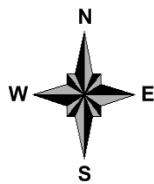
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Report Ref: EMS-273955_369318
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Map Name: County Series

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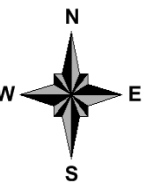
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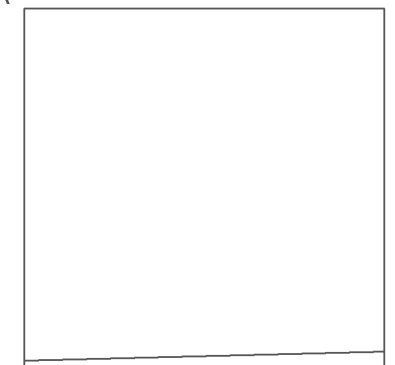
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Map Name: County Series

Map date: 1938

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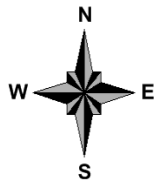
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: County Series

Map date: 1946-1948

Scale: 1:10,560

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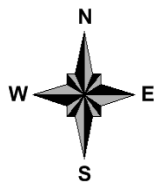
Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: Provisional

Map date: 1955

Scale: 1:10,560

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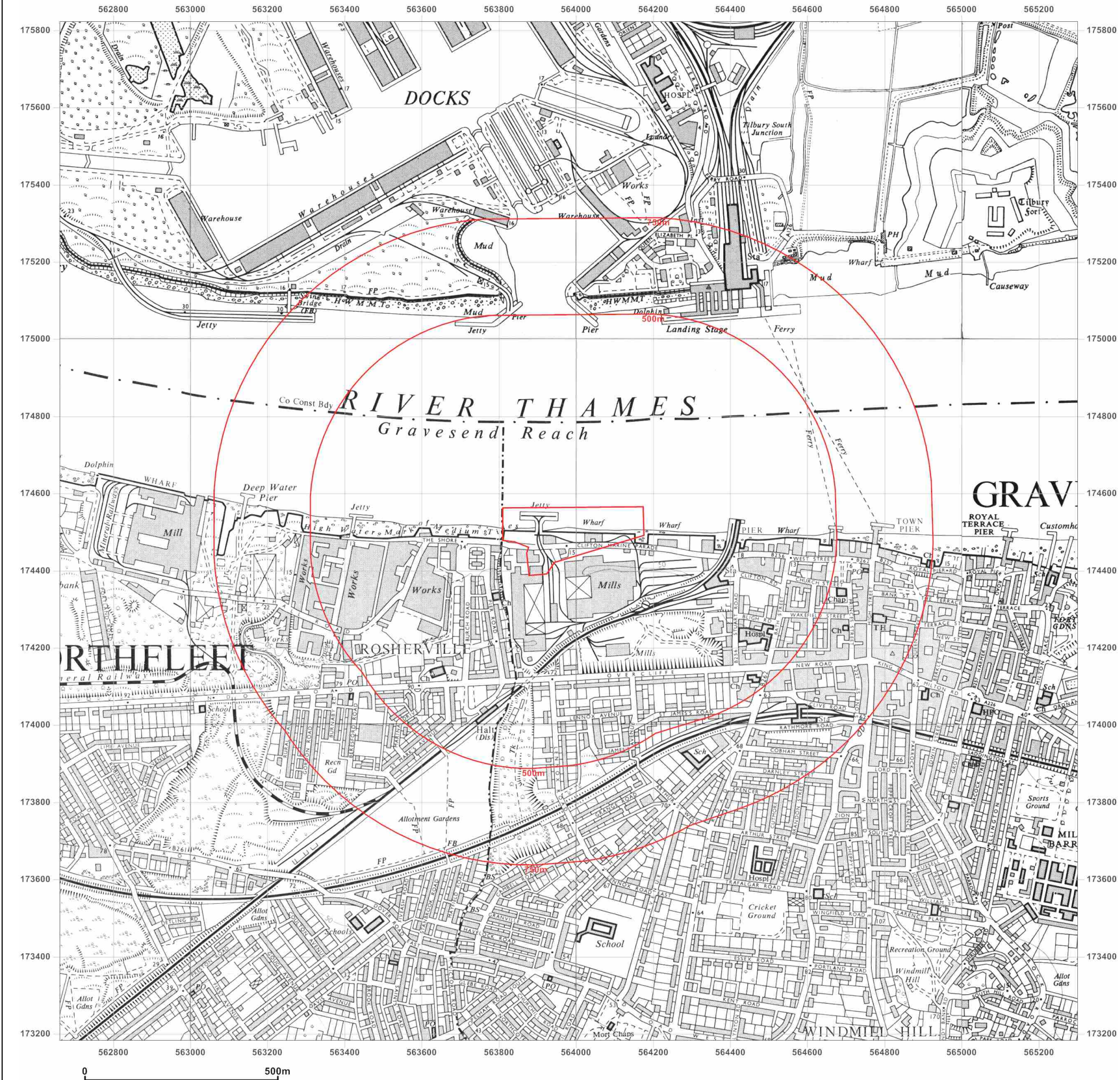


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Grid Ref: 563980, 174502

Map Name: Provisional

Map date: 1966-1967

Scale: 1:10,560

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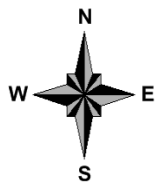
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1971-1973

Scale: 1:10,000

Printed at: 1:10,000



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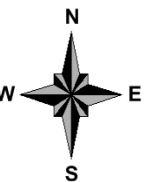
Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1977-1982

Scale: 1:10,000

Printed at: 1:10,000



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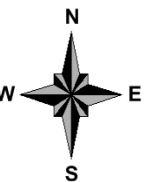
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Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 1990-1992

Scale: 1:10,000

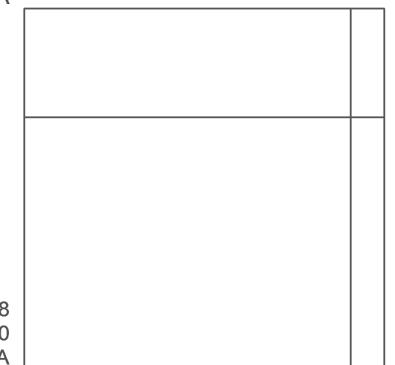
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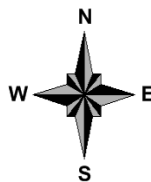
Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

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2002



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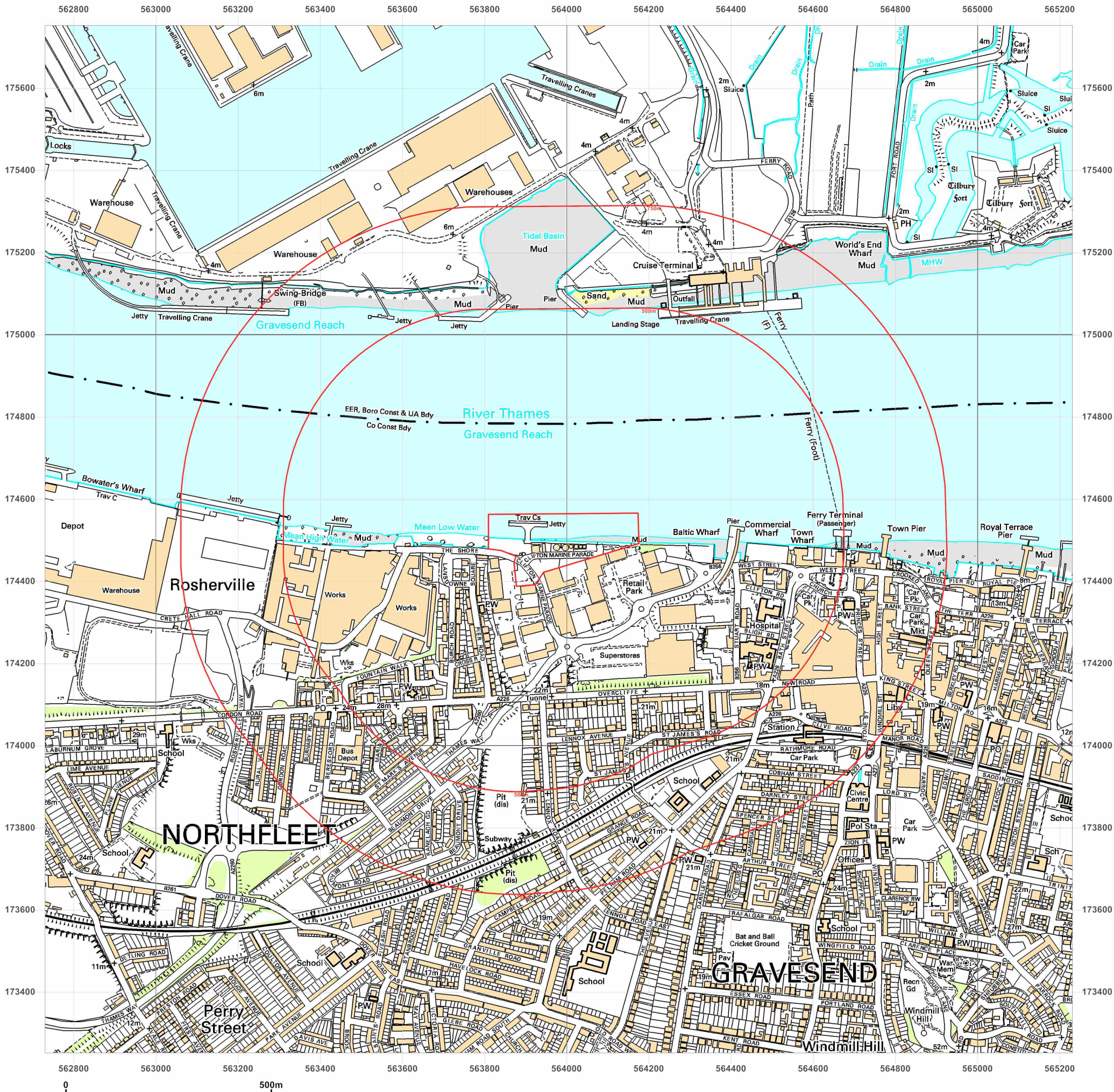


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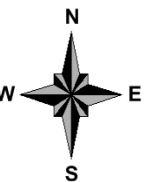
Client Ref: EMS_273955_369318
Report Ref: EMS-273955_369318
Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010



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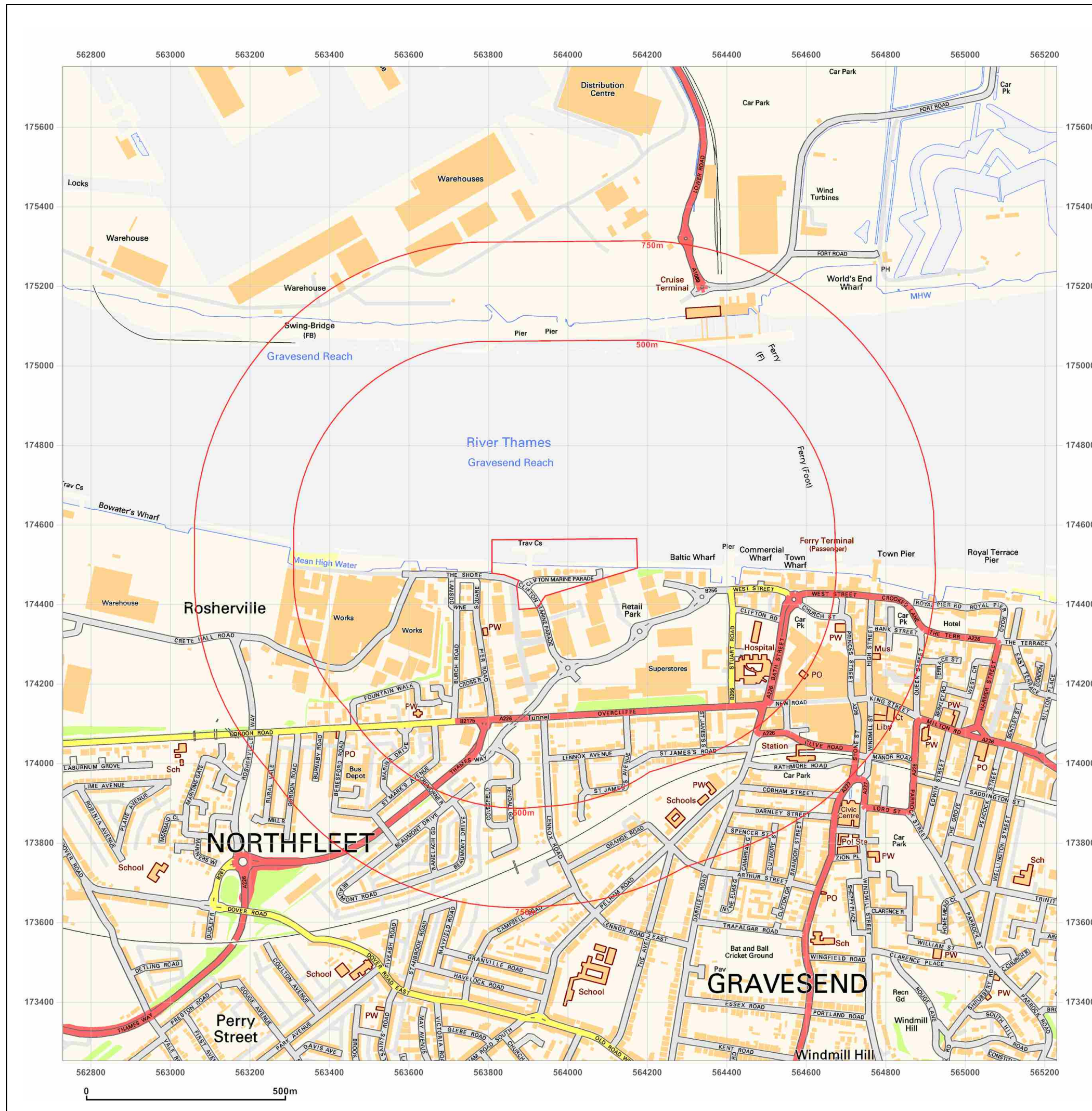


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Grid Ref: 563980, 174502

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

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2014



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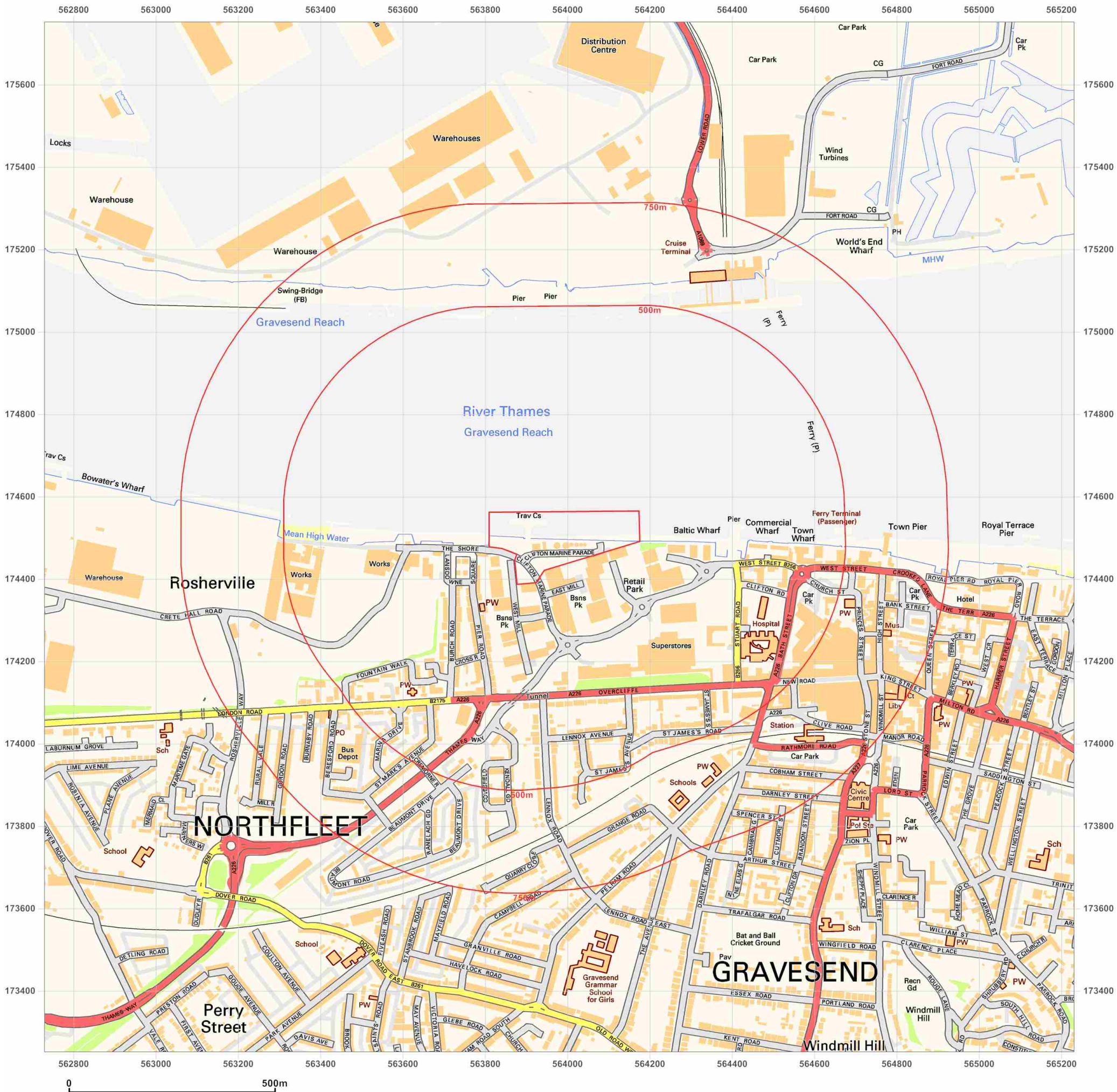


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EmapSite

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Report Date 29 Oct 2014

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Aerial Photograph Capture date: 25-May-2012
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Site Size: 4.27ha

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Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1:Geology

1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	Yes
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	Yes
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	10	4	36	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	1	0	8
2.3 Current Ground Workings	1	0	1	1	9
Section 3:Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000

3.1 Historical Mining	0	0	0	0	0
-----------------------	---	---	---	---	---

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	2	0	3	3	13
3.5 Non-Coal Mining Cavities	0	0	2	1	2
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

Section 4: Natural Ground Subsidence	On-site
4.1 Shrink Swell Clay	Low
4.2 Landslides	Very Low
4.3 Ground Dissolution of Soluble Rocks	Very Low
4.4 Compressible Deposits	Moderate
4.5 Collapsible Deposits	Very Low
4.6 Running Sand	Moderate

Section 5: Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	2	2	23

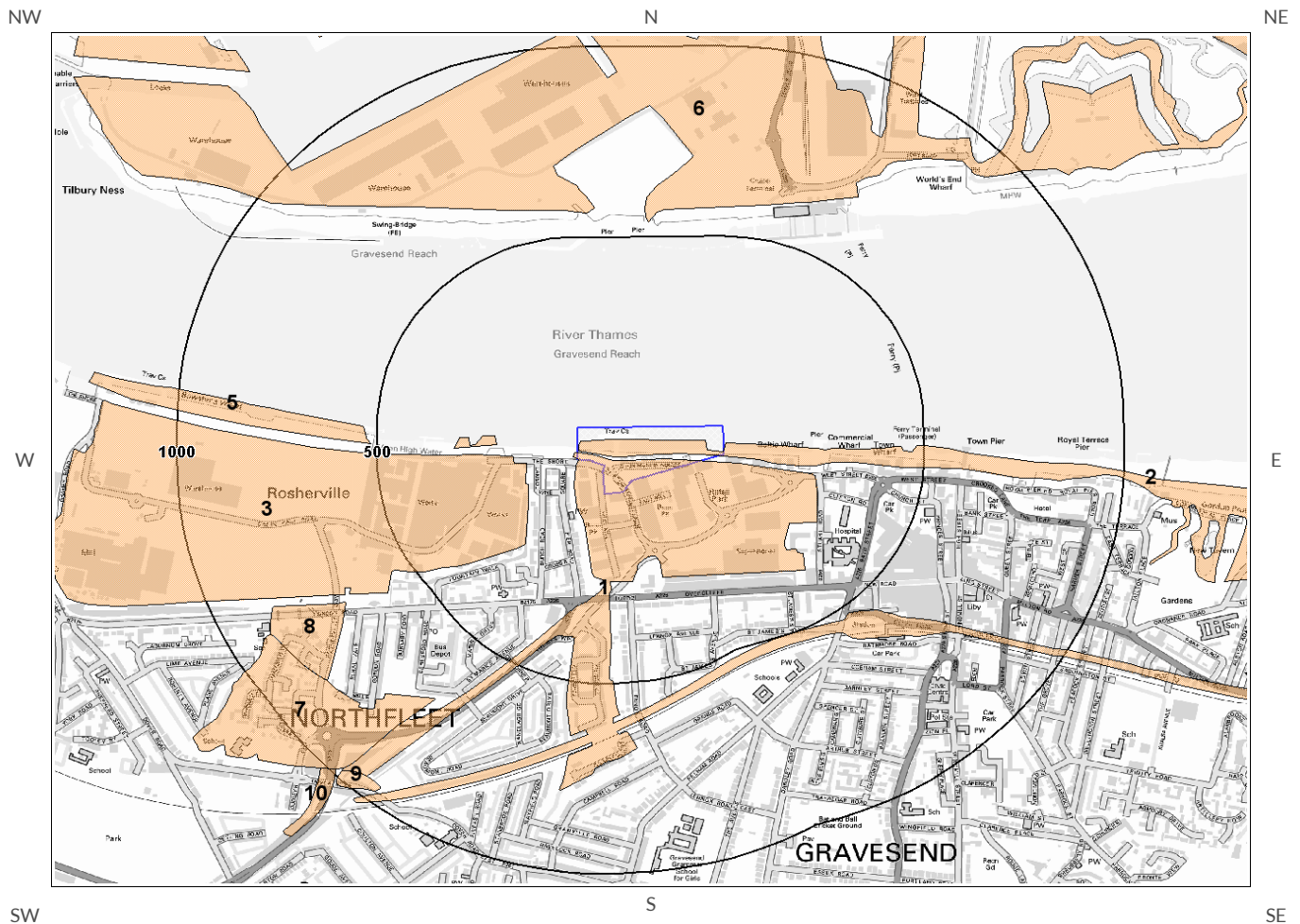
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	9	0	3

Section 7: Railways and Tunnels	On-site	0-50m	51-250	251-500
7.1 Tunnels	0	0	0	Not Searched
7.2 Historical Railway and Tunnel Features	38	1	29	Not Searched
7.3 Historical Railways	0	0	2	Not Searched
7.4 Active Railways	0	0	0	Not Searched

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

1 Geology

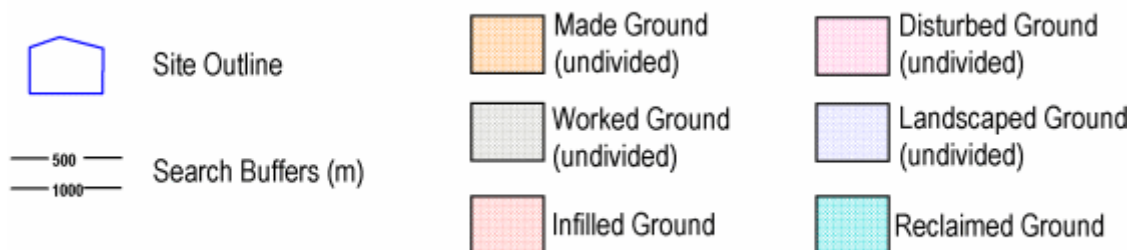
1.1 Artificial Ground Map



Artificial Ground Legend



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1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:271

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

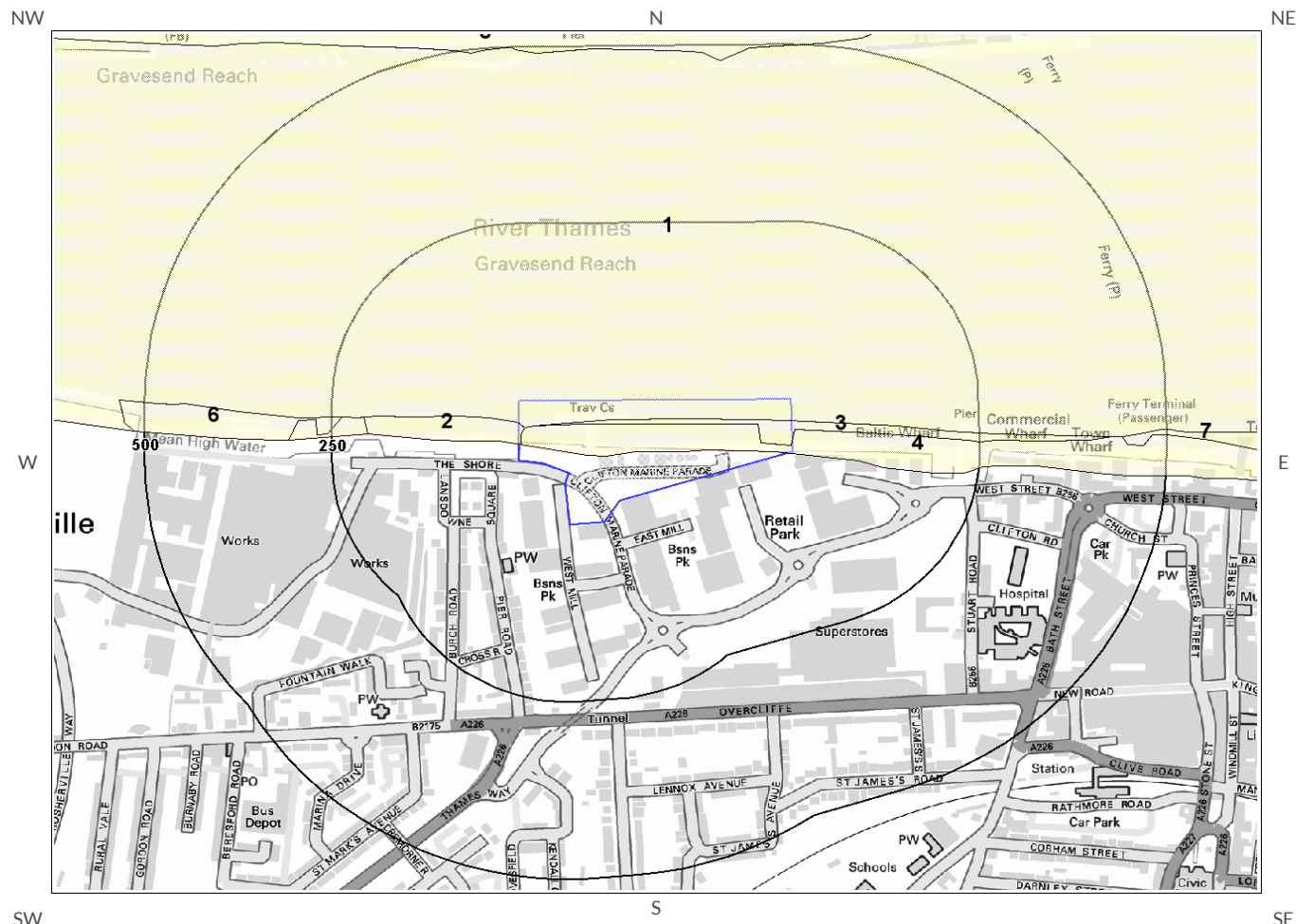
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID
2	0.0	On Site	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	128.0	W	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID
4	203.0	W	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	Very Low

1.2 Superficial Deposits and Landslips Map



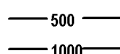
Superficial Deposits and Landslips
Legend



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Site Outline



Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	ALV-CZPS	ALLUVIUM	SILTY PEATY SANDY CLAY
2	0.0	On Site	TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
3	0.0	On Site	TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
4	0.0	On Site	ALV-CZPS	ALLUVIUM	SILTY PEATY SANDY CLAY
5	203.0	W	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
6	237.0	W	TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
7	440.0	E	TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
8	478.0	N	TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Moderate	Very Low
0.0	On Site	Intergranular	Low	Very Low
0.0	On Site	Intergranular	Low	Very Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

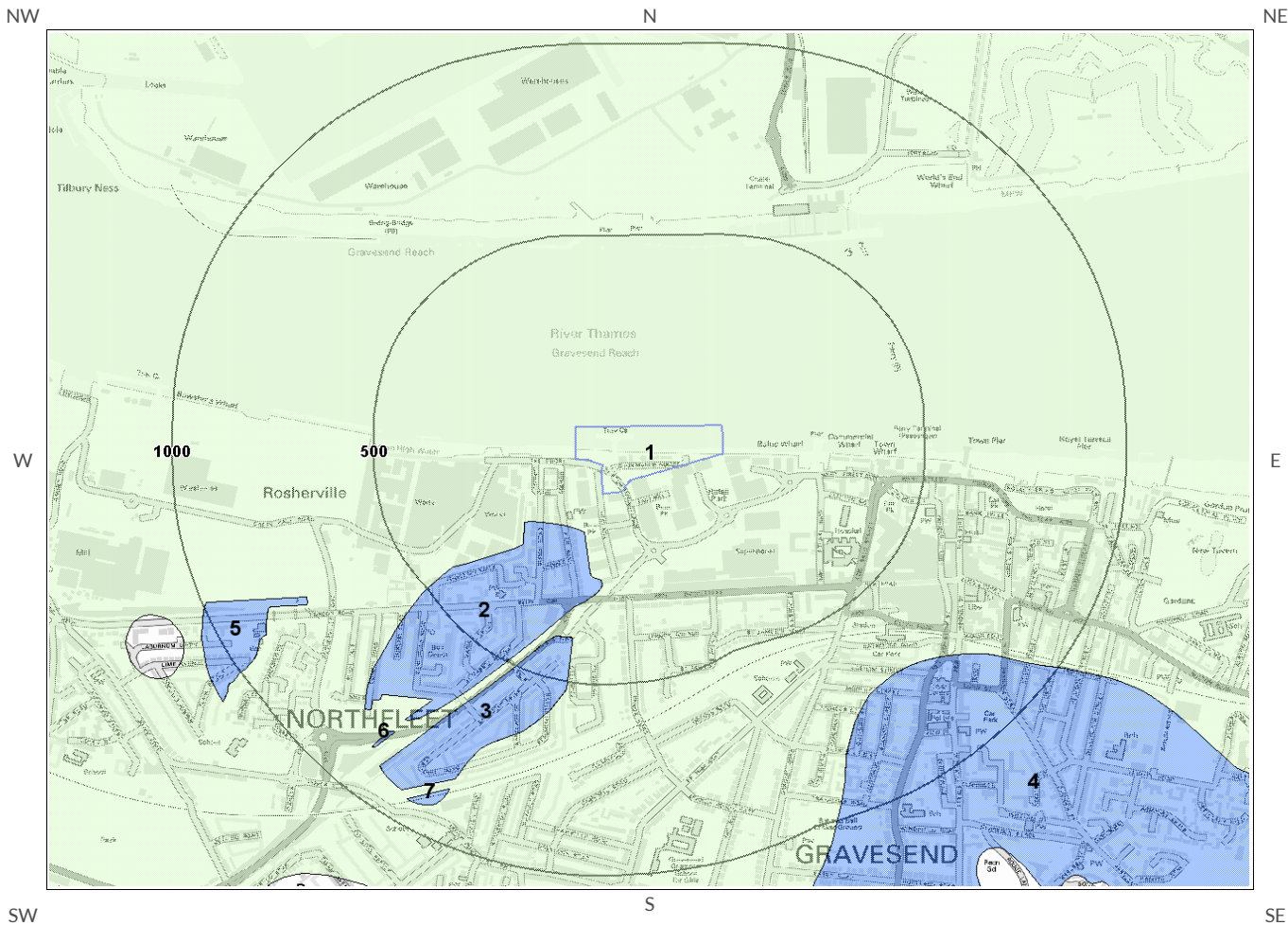
1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site** boundary? No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site

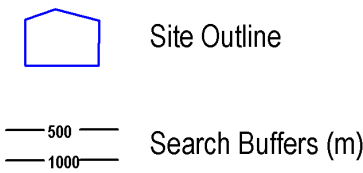
1.3 Bedrock and Faults Map



Bedrock and Faults Legend



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1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:271

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	SNCK-CHLK	Seaford Chalk Formation And Newhaven Chalk Formation (undifferentiated) - Chalk	Campanian / Coniacian
2	111.0	SW	TAB-SAND	Thanet Sand Formation - Sand	Thanetian
3	384.0	S	TAB-SAND	Thanet Sand Formation - Sand	Thanetian

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	Very High

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

* This includes an automatically generated 50m buffer zone around the site

1.4 Radon Data

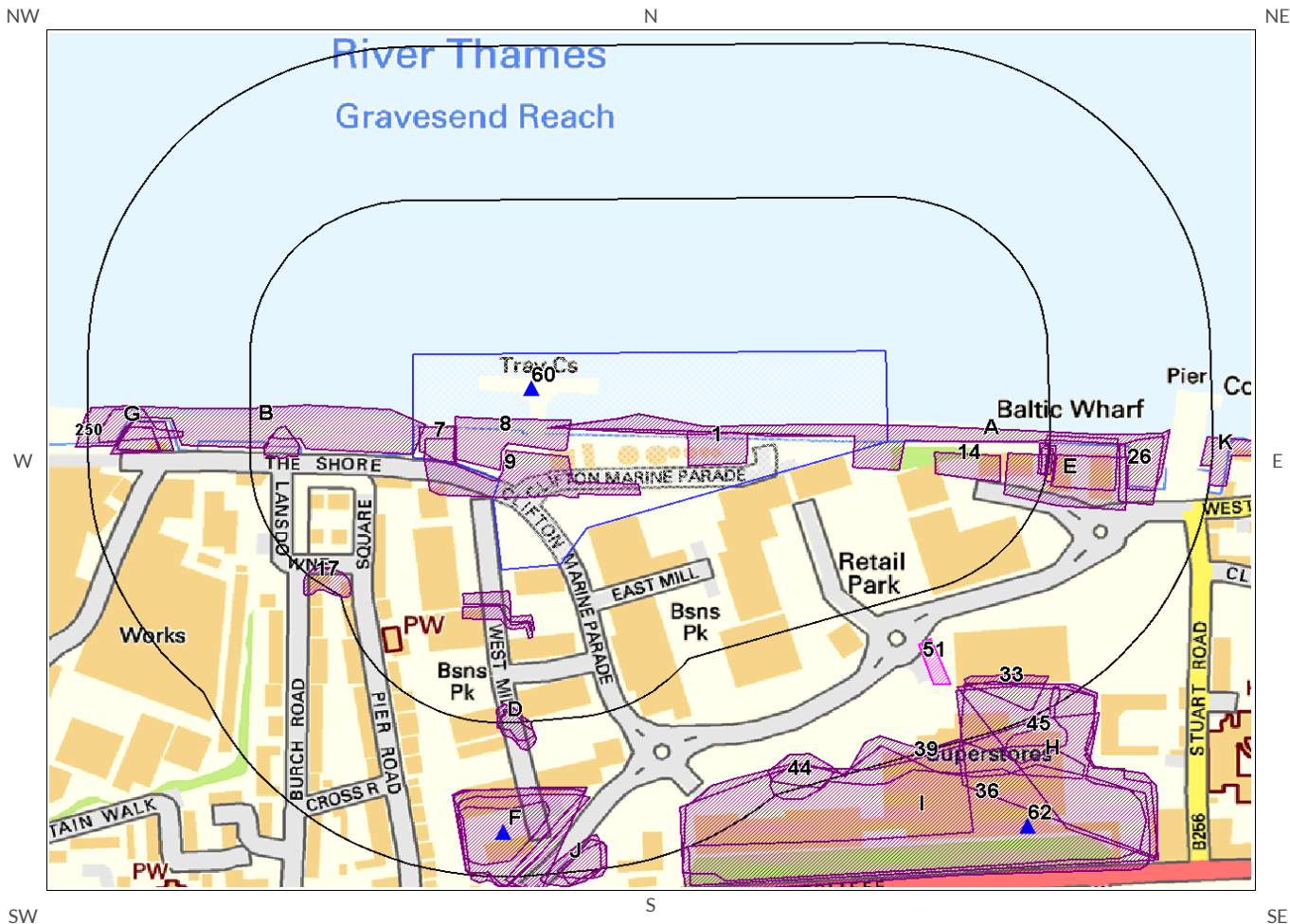
1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary

2 Ground Workings Map



Ground Workings Legend

Mapping sourced from

Ordnance Survey

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- Site Outline
- Historic Surface Ground Workings
- Historic Underground Workings
- Current Ground Workings
- Search Buffers (m)



2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? **Yes**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	0.0	On Site	564043 174486	Unspecified Wharf	1955
2A	0.0	On Site	564152 174483	Unspecified Wharf	1990
3A	0.0	On Site	564152 174483	Unspecified Wharf	1977
4A	0.0	On Site	564152 174483	Unspecified Wharf	1971
5B	0.0	On Site	563684 174502	Unspecified Wharf	1977
6B	0.0	On Site	563684 174502	Unspecified Wharf	1971
7	0.0	On Site	563828 174488	Quay	1865
8	0.0	On Site	563885 174490	Unspecified Wharves	1907
9	0.0	On Site	563901 174470	Unspecified Wharves	1923
10A	0.0	On Site	564152 174483	Unspecified Wharf	1966
11C	18.0	S	563881 174354	Pond	1895
12C	29.0	S	563881 174346	Pond	1895
13C	29.0	S	563881 174346	Pond	1907
14	37.0	E	564236 174471	Unspecified Wharf	1955
15B	88.0	W	563708 174491	Unspecified Wharf	1895
16E	92.0	E	564312 174460	Unspecified Wharf	1923
17	108.0	SW	563743 174377	Unspecified Pit	1865
18D	110.0	S	563888 174263	Pond	1895
19D	110.0	S	563888 174263	Pond	1907
20D	116.0	S	563890 174257	Pond	1923
21E	117.0	E	564295 174478	Unspecified Wharf	1932

ID	Distance (m)	Direction	NGR	Use	Date
22E	118.0	E	564297 174476	Unspecified Wharf	1907
23E	120.0	E	564324 174474	Unspecified Wharf	1938
24G	177.0	W	563587 174503	Unspecified Wharf	1895
25F	179.0	S	563891 174169	Old Chalk Pit	1895
26	179.0	E	564370 174468	Unspecified Wharf	1946
27F	179.0	S	563891 174169	Unspecified Ground Workings	1907
28G	184.0	W	563602 174497	Quays	1865
29F	185.0	S	563895 174165	Unspecified Quarry	1923
30F	191.0	S	563879 174173	Unspecified Pit	1946
31G	194.0	W	563596 174493	Unspecified Wharf	1946
32G	195.0	W	563595 174493	Unspecified Wharf	1932
33	201.0	S	564266 174288	Unspecified Pit	1865
34H	206.0	S	564306 174224	Unspecified Pit	1977
35H	207.0	S	564305 174222	Unspecified Pit	1971
36	209.0	S	564307 174212	Unspecified Pit	1966
37I	214.0	SE	564197 174199	Unspecified Ground Workings	1923
38I	217.0	SE	564243 174189	Chalk Pit	1895
39	222.0	S	564205 174231	Chalk Pit	1895
40J	222.0	S	563931 174151	Unspecified Pit	1966
41J	222.0	S	563931 174151	Unspecified Pit	1955
42J	225.0	S	563939 174152	Unspecified Pit	1977
43J	228.0	S	563941 174149	Unspecified Pit	1971
44	232.0	S	564109 174215	Unspecified Heap	1895
45	237.0	SE	564298 174261	Unspecified Ground Workings	1865
46K	241.0	E	564428 174477	Unspecified Wharf	1955
47K	241.0	E	564428 174477	Unspecified Wharf	1977
48K	241.0	E	564428 174477	Unspecified Wharf	1971
49K	241.0	E	564428 174477	Unspecified Wharf	1966
50K	241.0	E	564428 174477	Unspecified Wharf	1990

2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
51	163.0	S	564211 174313	Tunnel	1977
Not shown	565.0	S	563953 173822	Tunnel	1938
Not shown	572.0	S	563957 173814	Tunnel	1907
Not shown	579.0	S	563960 173808	Tunnel	1923
Not shown	631.0	S	563863 173740	Tunnel	1932
Not shown	637.0	S	563875 173731	Tunnel	1923
Not shown	795.0	SW	563114 174067	Tunnel	1923
Not shown	798.0	SW	563110 174075	Tunnel	1946
Not shown	799.0	SW	563108 174076	Tunnel	1932

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

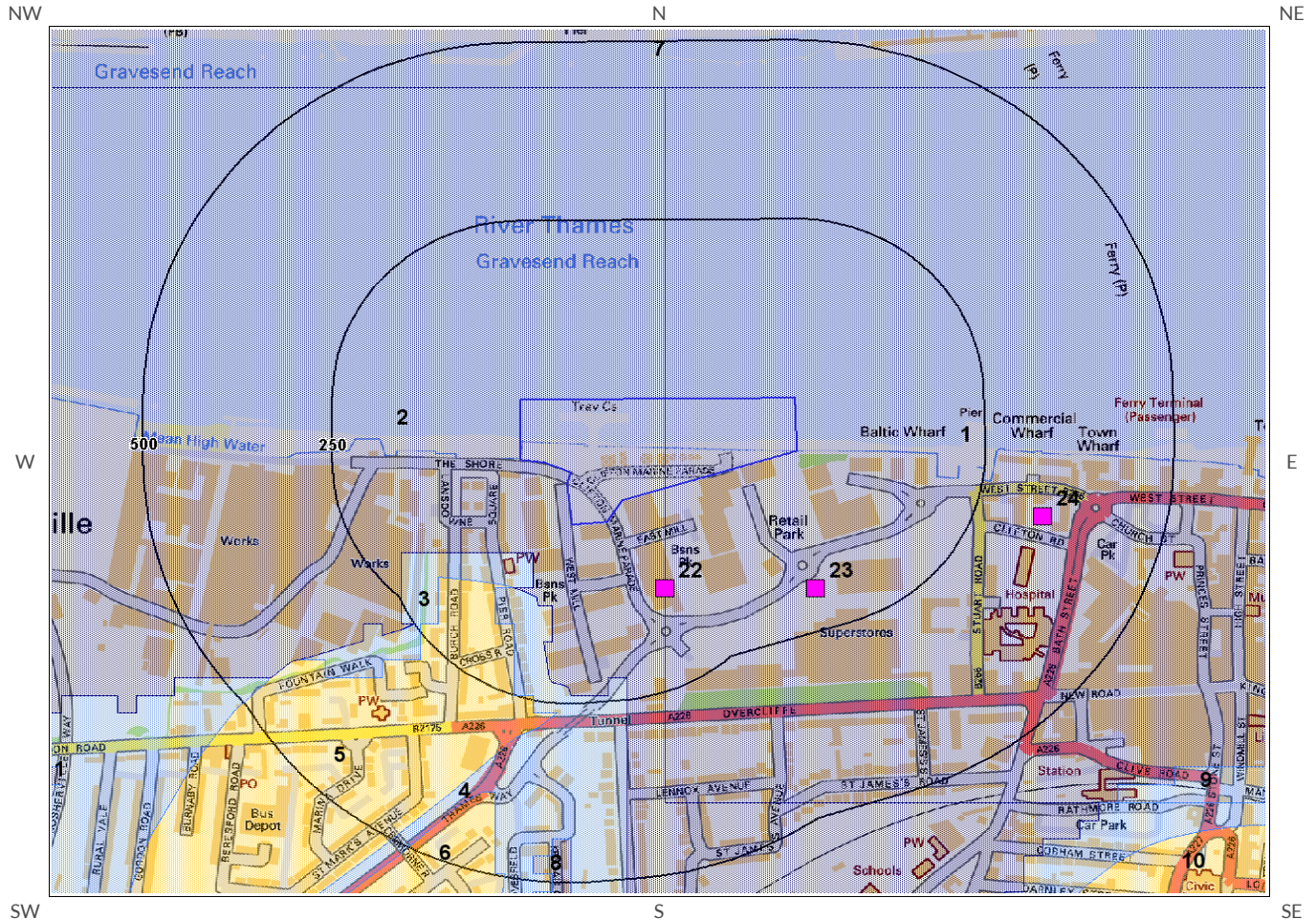
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
60	0.0	On Site	563900 174535	Crushed Rock	Imperial Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Inactive
61F	214.0	S	563878 174174	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
62	331.0	S	564282 174179	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	521.0	S	563834 173869	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	527.0	S	564035 173877	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	649.0	W	563160 174580	Marine Sand & Gravel	Red Lion Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Active
Not shown	649.0	W	563160 174580	Crushed Rock	Red Lion Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Active
Not shown	675.0	SW	563186 174219	Chalk	London Road Whiting Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	741.0	S	563809 173650	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	796.0	SW	563165 174012	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	894.0	SW	563145 173875	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	925.0	SW	563220 173737	Chalk	Northfleet Chalk Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and
Natural Cavities Legend

Mapping
sourced from
**Ordnance
Survey**

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3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary?

No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary?

Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
2	0.0	On Site	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
3	64.0	SW	Not available	Chalk	Rare and localised small scale mining may have occurred.
4	111.0	SW	Not available	Chalk	Rare and localised small scale mining may have occurred.
5	118.0	SW	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
6	387.0	S	Not available	Chalk	Small scale mining may have occurred but restricted in extent.

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
7	434.0	N	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
8	438.0	S	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
9	631.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
10	714.0	SE	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
11	745.0	SW	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
Not shown	809.0	W	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
Not shown	825.0	E	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
Not shown	861.0	SW	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
Not shown	883.0	SW	Not available	Chalk	Rare and localised small scale mining may have occurred.
Not shown	889.0	SW	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
Not shown	893.0	SW	Not available	Chalk	Rare and localised small scale mining may have occurred.
Not shown	894.0	SW	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
Not shown	934.0	NE	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
Not shown	936.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
Not shown	996.0	SE	Not available	Chalk	Small scale mining may have occurred but restricted in extent.

3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? Yes

The following Non-Coal Mining Cavities information provided by Peter Brett Associates:

ID	Distance (m)	Direction	NGR	Address	Superficial Deposits	Bedrock Deposits	Extracted Mineral
22	120.0	SE	564000 174300	Gravesend, Kent	Worked Ground	Chalk Group	Chalk
23	191.0	S	564200 174300	Gravesend, Kent	Worked Ground	Chalk Group	Chalk
24	338.0	E	564500 174400	Clifton Road Tunnel, Gravesend, Kent	-	Chalk Group	Chalk
Not shown	804.0	SW	563100 174100	Northfleet, Kent	Worked Ground	Chalk Group	Chalk
Not shown	926.0	W	562900 174300	Northfleet, Kent	Worked Ground	Chalk Group	Chalk

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.10 Clay Mining

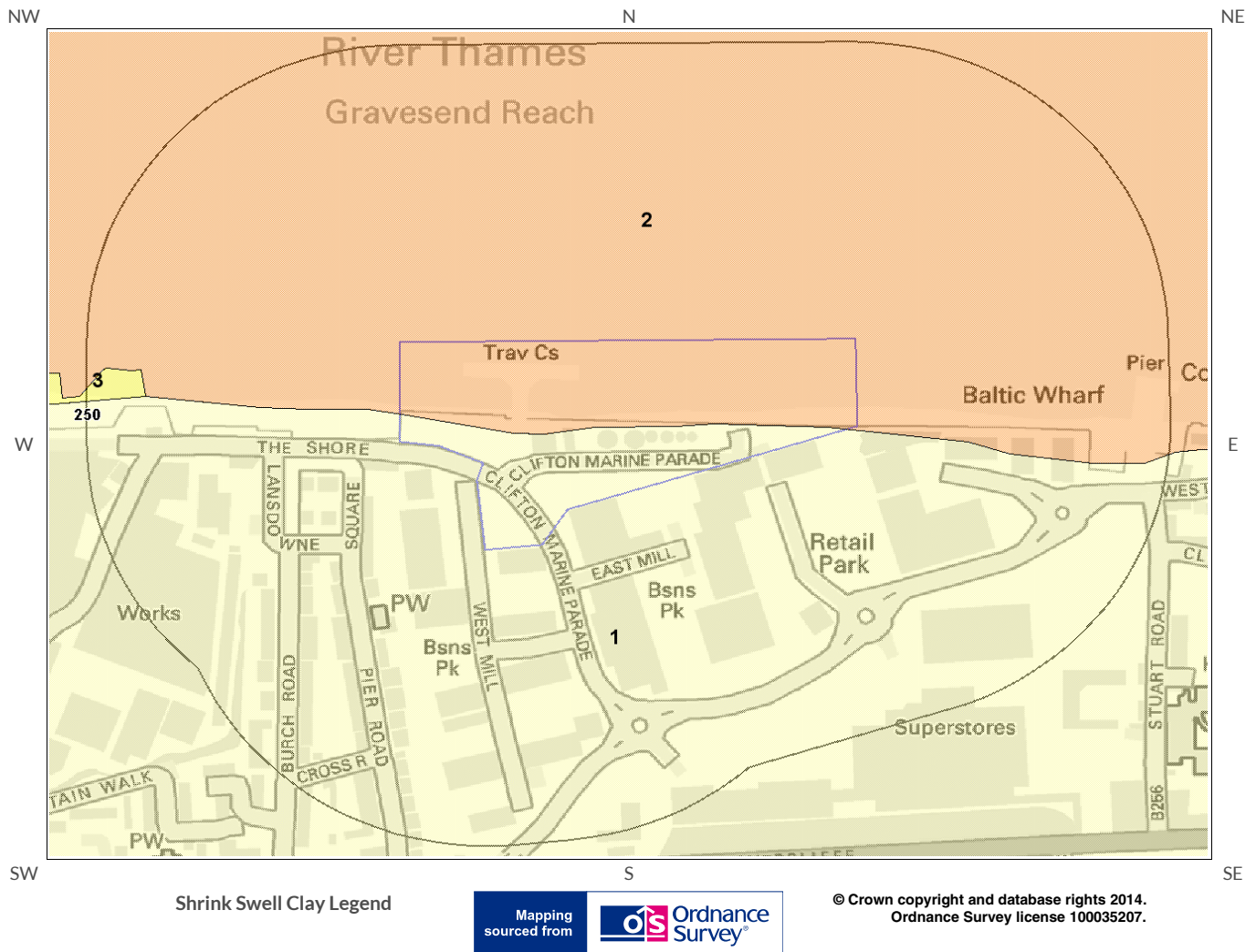
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

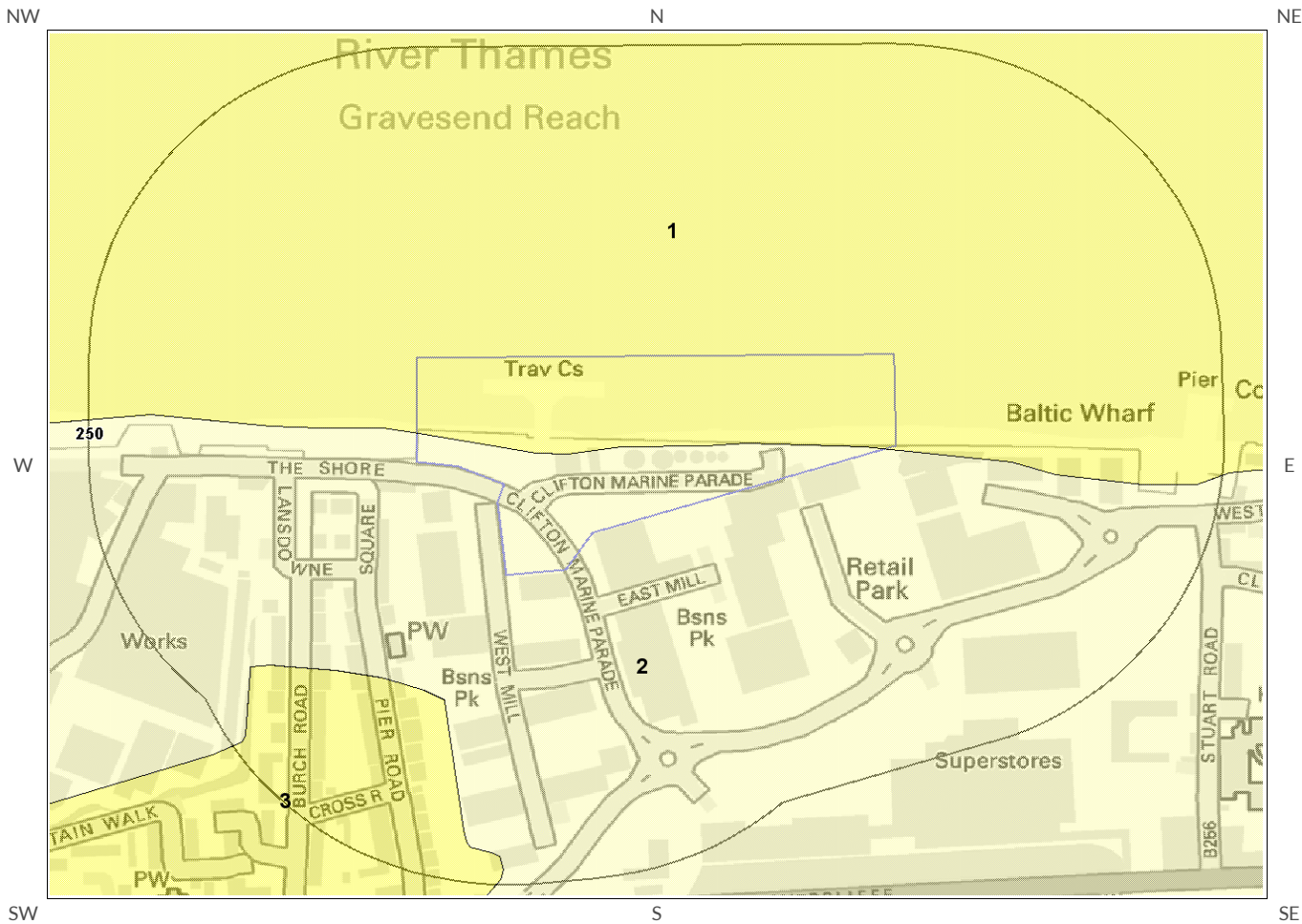
Database searched and no data found.

4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



4.2 Landslides Map



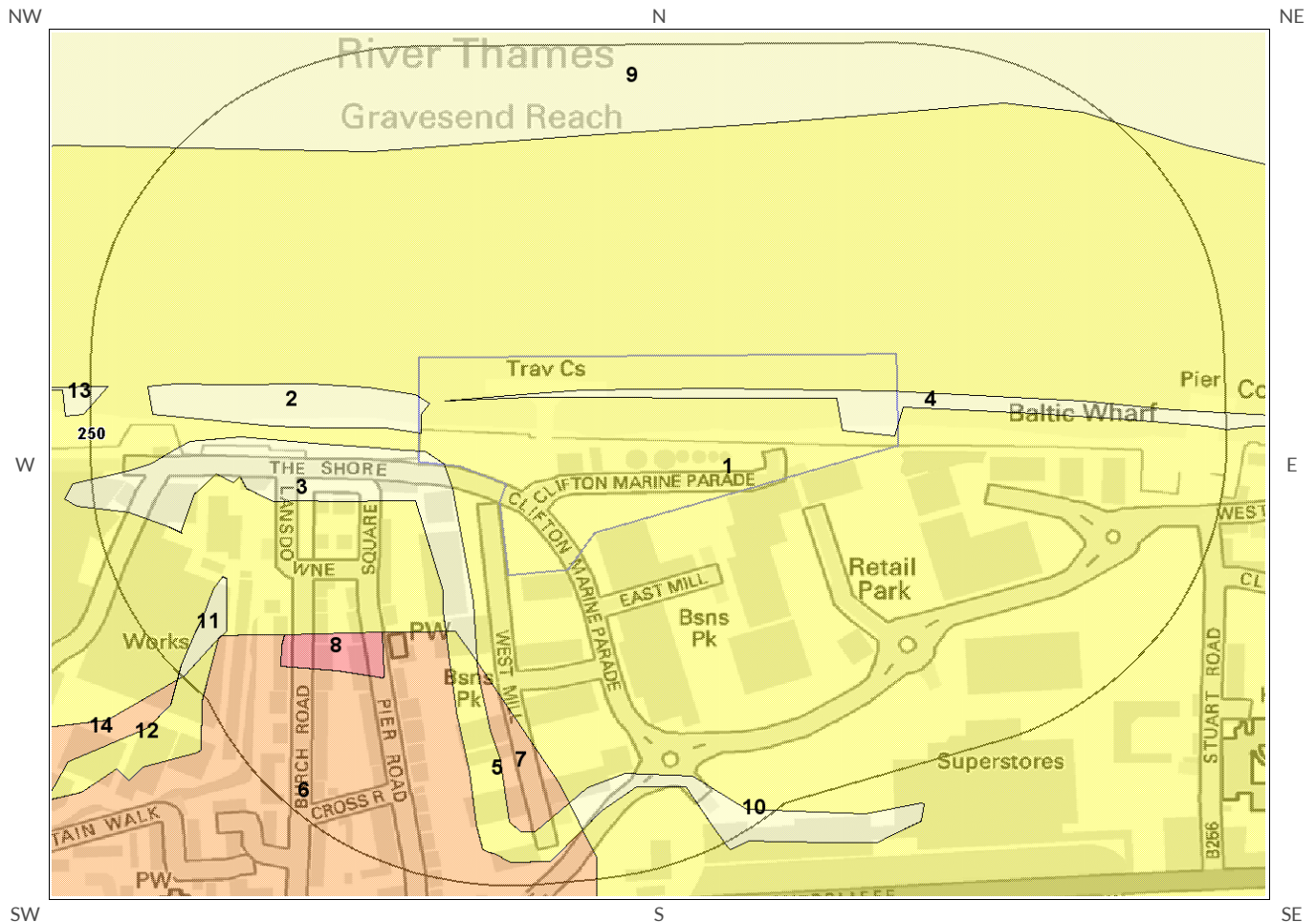
Landslides Legend



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4.3 Ground Dissolution Soluble Rocks Map



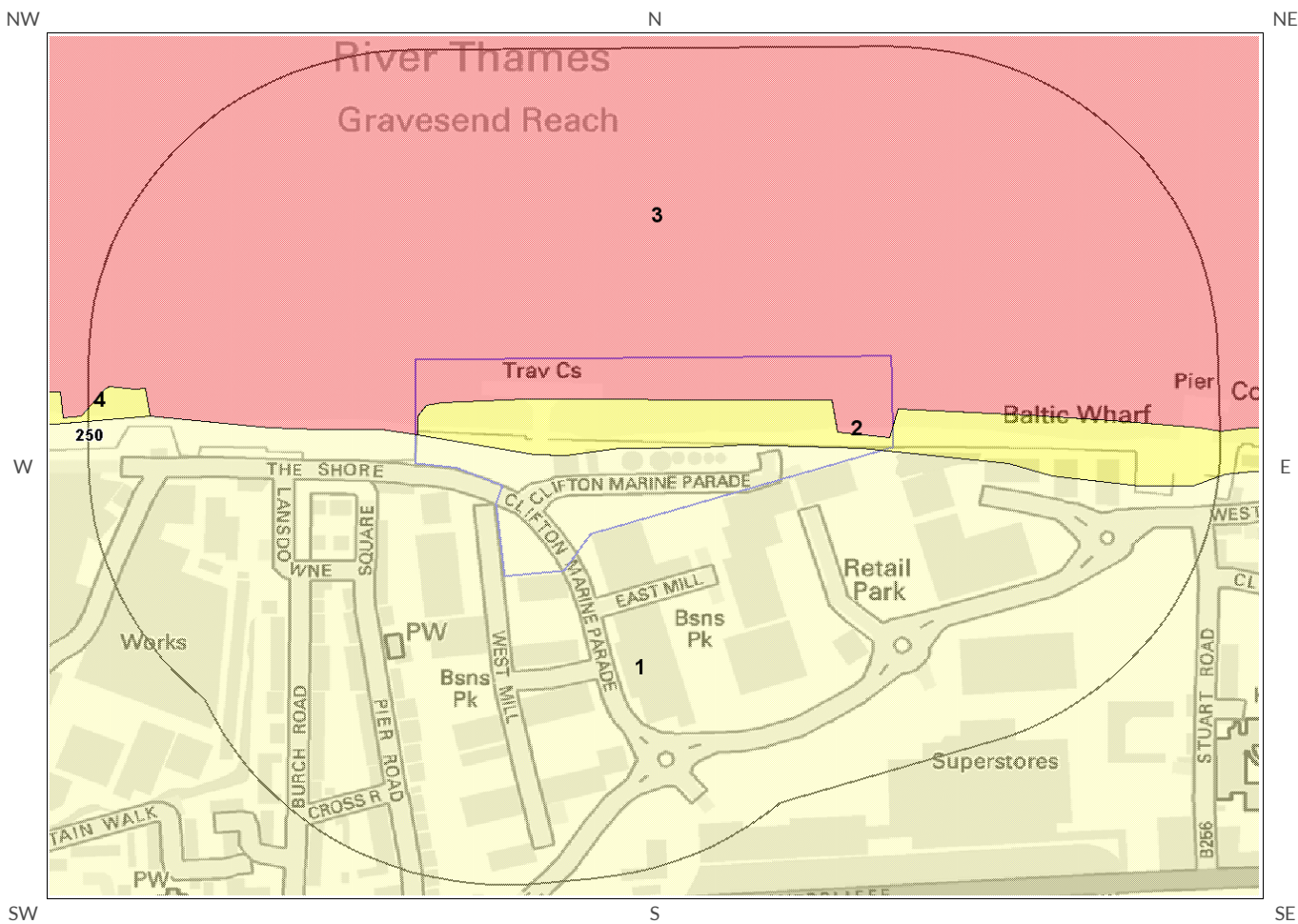
Ground Dissolution
Soluble Rocks Legend



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4.4 Compressible Deposits Map

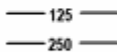


Compressible Deposits Legend



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-  Site Outline

 Search Buffers (m)
-  No Data / Null

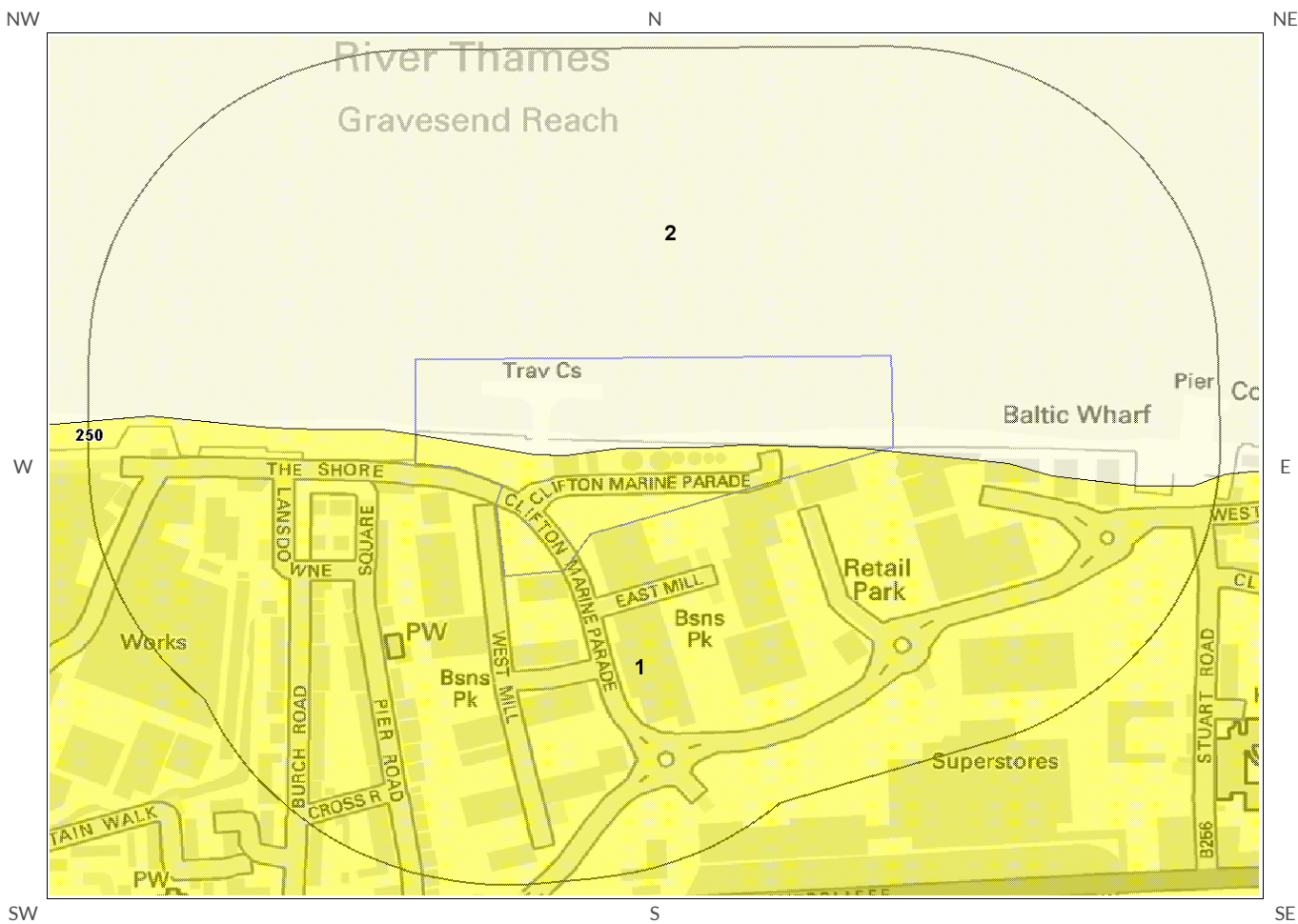
 Negligible

 Very Low
-  Low

 Moderate

 High

4.5 Collapsible Deposits Map



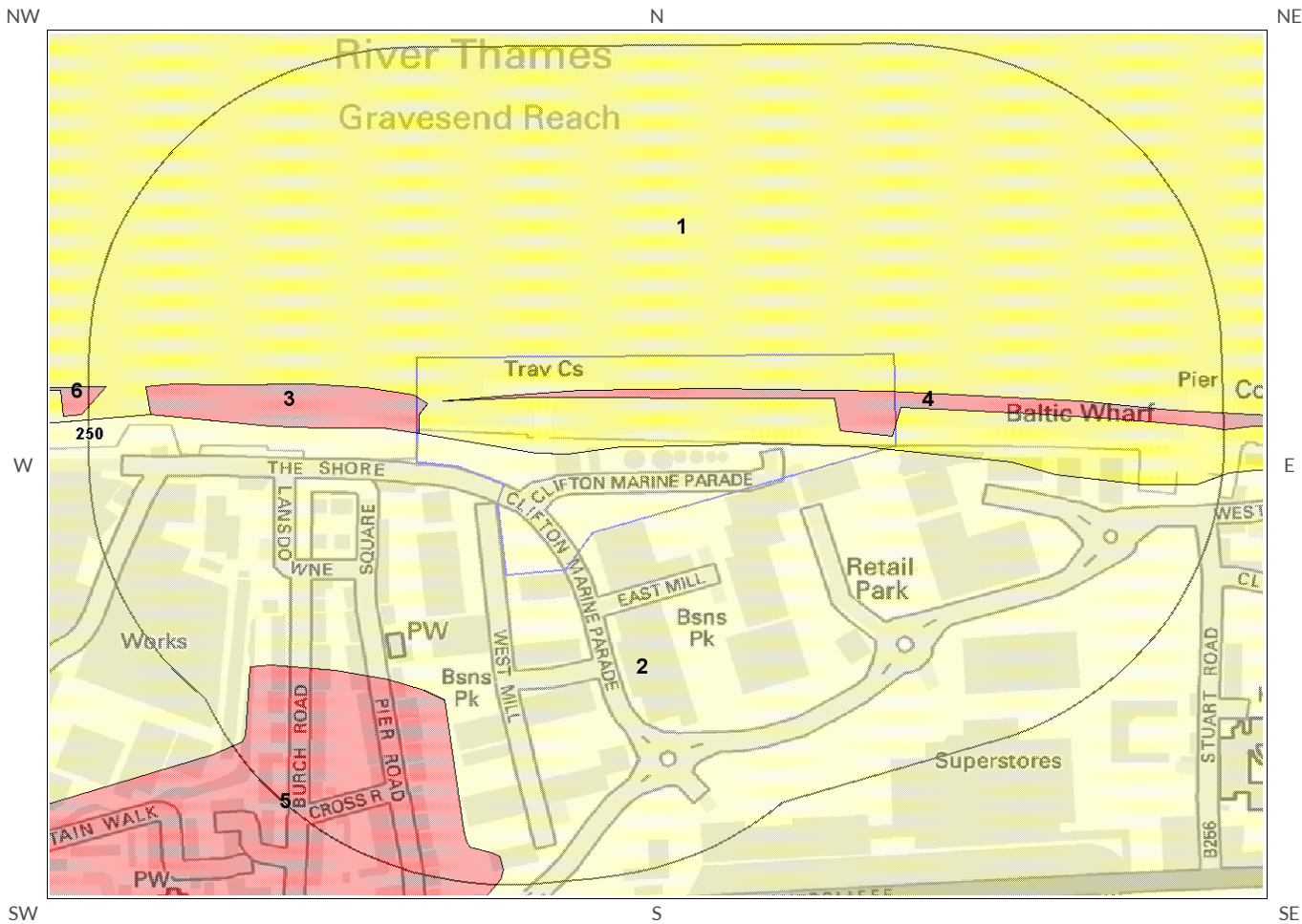
Collapsible Deposits Legend



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4.6 Running Sand Map



Running Sand Legend



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4 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? **Moderate**

4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	0.0	On Site	Negligible	No indicators for slope instability identified. No special actions required to avoid problems due to landslides. No special ground investigation required and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This includes an automatically generated 50m buffer zone around the site

4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.
2	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.
3	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.
4	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

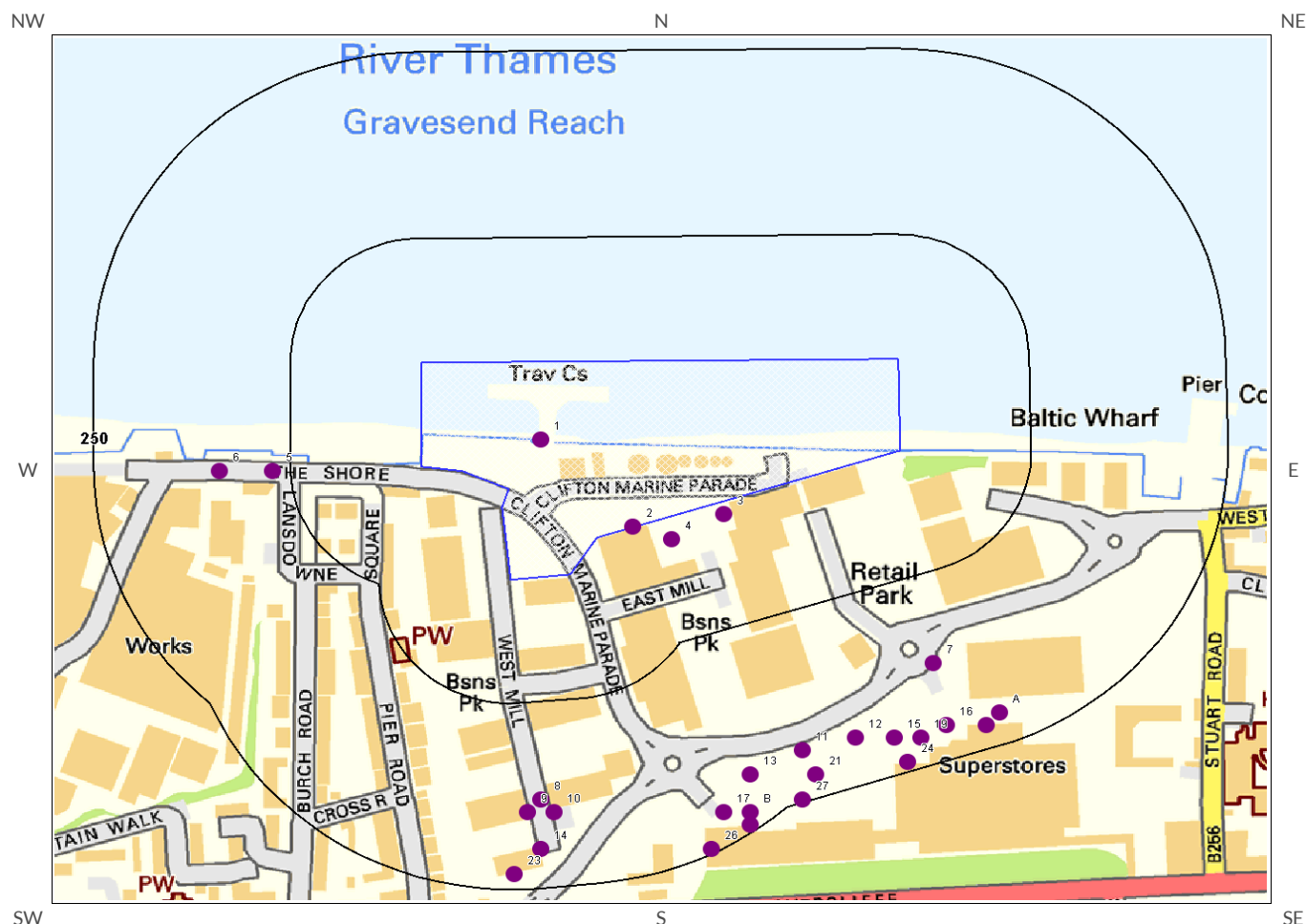
ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
3	0.0	On Site	Moderate	Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build - consider the consequences of soil and groundwater conditions during and after construction. For existing property - possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.
4	0.0	On Site	Moderate	Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build - consider the consequences of soil and groundwater conditions during and after construction. For existing property - possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

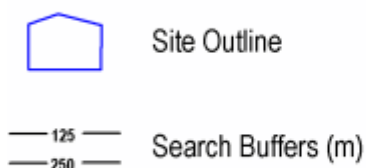
5 Borehole Records Map



Borehole Records Legend



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5 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

27

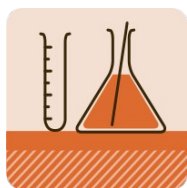
ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	0.0	On Site	563900 174500	TQ67SW65	67.97	IMPERIAL CEMENT CO NORTHFLEET
2	0.0	S	563970 174430	TQ67SW502	273.8	NUMBER NOT USED
3	11.0	S	564040 174440	TQ67SW520	279.5	NUMBER NOT USED
4	18.0	S	564000 174420	TQ67SW12	279.5	GRAVESEND 1
5	114.0	W	563695 174475	TQ67SW321	-1.0	THE SHORE GRAVESEND SG1
6	154.0	W	563655 174475	TQ67SW322	-1.0	THE SHORE GRAVESEND SG2
7	172.0	S	564200 174320	TQ67SW54	30.78	B R GRAVESEND
8	179.0	S	563900 174210	TQ67SW516	91.44	NUMBER NOT USED
9	188.0	S	563890 174200	TQ67SW13/A	87.47	IMPERIAL PAPER MILLS GRAVESEND
10	190.0	S	563910 174200	TQ67SW13/B	91.44	IMPERIAL PAPER MILLS GRAVESEND
11	210.0	S	564100 174250	TQ67SW461	2.0	ASDA GRAVESEND TP 6
12	212.0	S	564140 174260	TQ67SW464	0.0	ASDA GRAVESEND TP 9
13	212.0	SE	564060 174230	TQ67SW458	3.0	ASDA GRAVESEND TP 3
14	219.0	S	563900 174170	TQ67SW501	87.48	NUMBER NOT USED
15	221.0	S	564170 174260	TQ67SW467	3.0	ASDA GRAVESEND TP 12
16	223.0	S	564210 174270	TQ67SW471	3.0	ASDA GRAVESEND TP 16
17	225.0	SE	564040 174200	TQ67SW456	3.0	ASDA GRAVESEND TP 1
18A	225.0	S	564250 174280	TQ67SW448	15.0	ASDA GRAVESEND 2
19	226.0	S	564190 174260	TQ67SW447	15.0	ASDA GRAVESEND 1
20A	231.0	S	564240 174270	TQ67SW475	4.0	ASDA GRAVESEND TP 20
21	232.0	S	564110 174230	TQ67SW455	7.0	ASDA GRAVESEND 9
22B	236.0	SE	564060 174200	TQ67SW459	3.0	ASDA GRAVESEND TP 4
23	238.0	S	563880 174150	TQ67SW522	91.44	PAPER MILLS, GRAVESEND
24	243.0	S	564180 174240	TQ67SW468	3.0	ASDA GRAVESEND TP 13
25B	244.0	SE	564060 174190	TQ67SW454	5.0	ASDA GRAVESEND 8
26	246.0	SE	564030 174170	TQ67SW523	91.44	NUMBER NOT USED
27	248.0	S	564100 174210	TQ67SW462	2.0	ASDA GRAVESEND TP 7

Additional online information is available for the following boreholes listed above:

#1: scans.bgs.ac.uk/sobi_scans/boreholes/838362

#2: scans.bgs.ac.uk/sobi_scans/boreholes/838802

#3: scans.bgs.ac.uk/sobi_scans/boreholes/838820
#4: scans.bgs.ac.uk/sobi_scans/boreholes/838285
#7: scans.bgs.ac.uk/sobi_scans/boreholes/838336
#8: scans.bgs.ac.uk/sobi_scans/boreholes/838816
#9: scans.bgs.ac.uk/sobi_scans/boreholes/838286
#10: scans.bgs.ac.uk/sobi_scans/boreholes/838287
#11: scans.bgs.ac.uk/sobi_scans/boreholes/838761
#12: scans.bgs.ac.uk/sobi_scans/boreholes/838764
#13: scans.bgs.ac.uk/sobi_scans/boreholes/838758
#14: scans.bgs.ac.uk/sobi_scans/boreholes/838801
#15: scans.bgs.ac.uk/sobi_scans/boreholes/838767
#16: scans.bgs.ac.uk/sobi_scans/boreholes/838771
#17: scans.bgs.ac.uk/sobi_scans/boreholes/838756
#18A: scans.bgs.ac.uk/sobi_scans/boreholes/838748
#19: scans.bgs.ac.uk/sobi_scans/boreholes/838747
#20A: scans.bgs.ac.uk/sobi_scans/boreholes/838775
#21: scans.bgs.ac.uk/sobi_scans/boreholes/838755
#22B: scans.bgs.ac.uk/sobi_scans/boreholes/838759
#23: scans.bgs.ac.uk/sobi_scans/boreholes/838822
#24: scans.bgs.ac.uk/sobi_scans/boreholes/838768
#25B: scans.bgs.ac.uk/sobi_scans/boreholes/838754
#26: scans.bgs.ac.uk/sobi_scans/boreholes/838823
#27: scans.bgs.ac.uk/sobi_scans/boreholes/838762



6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

12

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
111.0	SW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
203.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg
237.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

The map shows the River Thames Gravesend Reach area. Key features include:

- River Thames Gravesend Reach**: The large body of water at the top of the map.
- Baltic Wharf**: A large industrial area on the right side of the map.
- Retail Park**: A large commercial area in the center-right of the map.
- Superstores**: A large commercial area at the bottom right of the map.
- Works**: An industrial area on the left side of the map.
- Pier**: A small structure in the river at the top right.
- Trav Co**: A small structure in the river at the top center.
- The Shore**: A small area on the left side of the map.
- Lansdown Square**: A small area on the left side of the map.
- West Mill**: A small area in the center of the map.
- West Parade**: A small area in the center of the map.
- Stuart Road**: A road on the right side of the map.
- Burch Road**: A road on the left side of the map.
- Pier Road**: A road on the left side of the map.
- Cross Road**: A road on the left side of the map.
- Tain Walk**: A path on the left side of the map.
- PW**: A small area on the left side of the map.
- B256**: A road on the right side of the map.
- West**: A road on the right side of the map.
- East**: A road on the right side of the map.
- North**: A road on the right side of the map.
- South**: A road on the right side of the map.
- NW**: A road on the left side of the map.
- NE**: A road on the right side of the map.
- SW**: A road on the left side of the map.
- SE**: A road on the right side of the map.

Mapping sourced from  Ordnance Survey®

	Underground or Partially Underground Railway / Subway System		Railway Track (OpenStreetMap)	
	Site Outline		Railway Tunnel (OS Mapping)	
	Search Buffers (m)		High Speed 2	
		Abandoned or Dismantled Railway (OpenStreetMap)		Crossrail
		Railway Track (OS Mapping)		Railway and/or Tunnel Feature from Historical Mapping



7 Railways and Tunnels

7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.2 Historical Railway and Tunnel Features

This data is derived from GroundSure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? Yes

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	0	On Site	563815 174491	Railway Sidings	1895
2	0	On Site	563956 174372	Railway Sidings	1907
3	0	On Site	564027 174344	Railway Sidings	1895
4B	0	On Site	564130 174342	Railway Sidings	1971
5K	0	On Site	563927 174410	Railway Sidings	1865
6A	0	On Site	563960 174368	Railway Sidings	1899
7A	0	On Site	563960 174368	Railway Sidings	1899
8	0	On Site	564026 174328	Railway Sidings	1916

ID	Distance (m)	Direction	NGR	Details	Date
9J	0	On Site	564036 174309	Railway Sidings	1923
10	0	On Site	564130 174342	Railway Sidings	1955
11	0	On Site	564089 174345	Railway Sidings	1977
12D	0	On Site	563817 174485	Railway Sidings	1898
13B	0	On Site	564130 174342	Railway Sidings	1966
14C	0	On Site	564110 174340	Railway Sidings	1938
15O	0	On Site	564110 174335	Tramway Sidings	1895
16C	0	On Site	564111 174340	Tramway Sidings	1932
17	0	On Site	564110 174335	Tramway Sidings	1946
18D	0	On Site	563817 174485	Railway Sidings	1898
19	0	On Site	563976 174348	Railway Sidings	1888
20D	0	On Site	563837 174490	Railway Sidings	1938
39	0	On Site	563990 174282	Tramway Sidings	1866
40J	0	On Site	563995 174340	Tramway Sidings	1897
41	0	On Site	563881 174126	Tramway Sidings	1909
42	0	On Site	564073 174345	Tramway Sidings	1939
43K	0	On Site	563912 174423	Tramway Sidings	1898
44	0	On Site	564169 174341	Railway Sidings	1975
45	0	On Site	564167 174344	Mineral Railway Sidings	1965
46	0	On Site	564170 174330	Mineral Railway Sidings	1953
47	0	On Site	564209 174342	Mineral Railway Sidings	1953
48	0	On Site	564112 174345	Railway Sidings	1933
49M	0	On Site	563945 174349	Mineral Railway Sidings	1952
50L	0	On Site	563831 174325	Railway Sidings	1963
51L	0	On Site	563830 174325	Mineral Railway Sidings	1952
52M	0	On Site	563945 174349	Mineral Railway Sidings	1964
53	0	On Site	563933 174327	Railway Sidings	1973
54N	0	On Site	563906 174523	Railway Sidings	1973
55N	0	On Site	563906 174523	Railway Sidings	1952
56	0	On Site	564209 174357	Railway Sidings	1964

ID	Distance (m)	Direction	NGR	Details	Date
57	10	E	564271 174469	Tramway Sidings	1939
58O	96	S	n/a	Railway	1867
21	131	S	564224 174303	Railway Sidings	1865
22E	133	S	564355 174393	Railway Sidings	1938
23E	140	S	564350 174389	Railway Sidings	1938
24P	153	S	564361 174403	Railway Sidings	1916
59E	153	S	n/a	Railway	1895
60E	153	S	n/a	Railway	1907
61E	153	S	n/a	Railway	1930
25	158	S	563903 174189	Railway Sidings	1865
26Q	159	S	564283 174329	Railway Sidings	1895
27	159	S	564375 174383	Railway Sidings	1923
62E	163	S	564357 174394	Railway Sidings	1939
63P	163	S	564364 174397	Railway Sidings	1909
64P	163	S	564364 174397	Railway Sidings	1897
68I	163	S	564211 174313	Tunnel	1977
28F	165	S	564369 174410	Railway Sidings	1899
29F	165	S	564369 174410	Railway Sidings	1899
37I	166	S	564208 174310	Tunnel	1975
38I	166	S	564208 174309	Tunnel	1985
65	174	S	564262 174317	Mineral Railway Sidings	1953
66Q	175	S	564294 174326	Railway Sidings	1965
67	187	SE	564393 174447	Railway Sidings	1898
30G	194	SE	564074 174194	Railway Sidings	1955
31G	194	SE	564074 174194	Railway Sidings	1966
32H	195	SE	564031 174222	Railway Sidings	1899
33H	195	SE	564031 174222	Railway Sidings	1899
34	197	SE	564053 174211	Railway Sidings	1971
35	199	SE	564393 174474	Railway Sidings	1895
36	207	S	564173 174245	Railway Sidings	1923

Any records that have been identified are represented on the Railways and Tunnels Map.

7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Status
174	SE	Abandoned
249	S	Abandoned

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail.

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a GroundSure HS2 and Crossrail Report.

Contact Details

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BGS Geological Hazards Reports and general geological enquiries



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Report Reference: EMS-273955_369319

Client Reference: EMS_273955_369319

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order

shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,
- (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
- (iv) the first purchaser or first tenant of the Site, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

- (i) full payment of all relevant Fees and
- (ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

- (i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
 - (ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
 - (iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
 - (iv) not combine the Services with or incorporate such Services into any other information data or service;
 - (v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
 - (vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
 - (vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
- 6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

- (i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
- (ii) any use made of the Reports, Services, Materials or any part of them; and
- (iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
- (xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
- (xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
- (xiii) loss or damage to a computer, software, modem, telephone or other property; and
- (xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

- (i) the Client fails to pay any sum due to GroundSure within 30

days of the Payment Date; or

- (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
- (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
- (iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

- (i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
- (ii) the Reports and/or Mapping provided under this Contract are
 - (a) supplied to the Client's specification(s) and in any event
 - (b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

- (i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
- (ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

- (i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
- (ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
- (iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

- (i) the Client or Beneficiary's failure to provide facilities, access or information;
- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;
- (vii) suspension or delay of services at public registries by Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly

given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law



EmapSite
Masdar House, ,
Eversley, RG27 ORP

GroundSure
Reference: EMS-273955_369320

Your Reference: EMS_273955_369320

Report Date 29 Oct 2014

Report Delivery Method: Email - pdf

GroundSure EnviroInsight

Address: ,

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Enviroinsight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
GroundSure EnviroInsight



GroundSure EnvirolInsight

Address: ,
Date: 29 Oct 2014
Reference: EMS-273955_369320
Client: EmapSite

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 25-May-2012
Grid Reference: 563980,174502
Site Size: 4.27ha

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Environmental Permits, Incidents and Registers		On-site	0-50m	51-250	251-500		
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations							
1.1.1	Records of historic IPC Authorisations	0	0	12	0		
1.1.2	Records of Part A(1) and IPPC Authorised Activities	0	0	6	6		
1.1.3	Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0		
1.1.4	Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	2	0		
1.1.5	Records of List 1 Dangerous Substances Inventory sites	0	0	0	0		
1.1.6	Records of List 2 Dangerous Substances Inventory sites	0	0	0	0		
1.1.7	Records of Part A(2) and Part B Activities and Enforcements	0	0	6	3		
1.1.8	Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0		
1.1.9	Records of Licensed Discharge Consents	2	1	1	11		
1.1.10	Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0		
1.2	Records of COMAH and NIHHS sites	0	0	0	0		
1.3 Environment Agency Recorded Pollution Incidents							
1.3.1	National Incidents Recording System, List 2	0	0	1	7		
1.3.2	National Incidents Recording System, List 1	0	0	0	0		
1.4	Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0		
Section 2: Landfill and Other Waste Sites		On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites							
2.1.1	Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2	Environment Agency Historic Landfill Sites	0	0	1	1	4	5
2.1.3	BGS/DoE Landfill Site Survey	0	0	0	0	0	1
2.1.4	GroundSure Local Authority Landfill Sites Data	0	0	0	0	1	4
2.2 Landfill and Other Waste Sites Findings							
2.2.1	Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	1	0	Not searched	Not searched
2.2.2	Environment Agency Licensed Waste Sites	0	0	0	0	2	6

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	9	4	29	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	1	1
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology	
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology	0-500m					
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	14
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	1
5.6 Source Protection Zones (within 500m of the study site)	1	0	1	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	1	2	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	0	1	2	Not searched	Not searched
5.11 Surface water features within 250m of the study site	Yes	No	No	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Flood Defences within 250m of the study site?	Yes
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	Yes
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	0	0
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	1

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Very Low
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Moderate

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Low
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

[illegible]

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- | | | | |
|---|-------------------------------|--|--|
|  | Site Outline |  Recorded Pollution Incident |  RAS 3 & 4 Authorisations |
|  | Dangerous Substances (List 1) |  Part A(1) Authorised Processes and Historic IPC Authorisations | |
|  | Dangerous Substances (List 2) |  Part A(2) and Part B Authorised Processes | |
|  | Water Industry Referrals |  COMAH / NIHHS Sites | |
|  | Licenced Discharge Consents |  Sites Determined as Contaminated Land | |
|  | Red List Discharge Consents |  Hazardous Substance Consents and Enforcements | |
|  | Search Buffers (m) | | |



1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

1.1.1 Records of historic IPC Authorisations within 500m of the study site:

12

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
71G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: AW3597 Original Permit Number: IPCMINVAR Date Approved: 23-8-1996 Effective Date: 23-8-1996 Status: Superseded By Variation
72G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: AJ6513 Original Permit Number: IPCMINVAR Date Approved: 20-9-1993 Effective Date: 20-9-1993 Status: Superseded By Variation
73G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: BE8954 Original Permit Number: IPCMINVAR Date Approved: 14-4-1999 Effective Date: 26-4-1999 Status: Superseded By Variation
74G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: BB6459 Original Permit Number: IPCMINVAR Date Approved: 27-7-1998 Effective Date: 10-8-1998 Status: Superseded By Variation
75G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: AH9499 Original Permit Number: IPCAIRAPP Date Approved: 18-6-1993 Effective Date: 18-6-1993 Status: Superseded By Variation
76G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: AM6579 Original Permit Number: IPCMINVAR Date Approved: 16-3-1994 Effective Date: 16-3-1994 Status: Superseded By Variation
77G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes Permit Number: BA0153 Original Permit Number: IPCMINVAR Date Approved: 19-1-1998 Effective Date: 1-2-1998 Status: Superseded By Variation

ID	Distance	Direction	NGR	Details	
78G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes	Permit Number: AW6839 Original Permit Number: IPCMINVAR Date Approved: 12-9-1996 Effective Date: 12-9-1996 Status: Superseded By Variation
79G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes	Permit Number: BE5556 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
80G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes	Permit Number: BG6472 Original Permit Number: IPCMINVAR Date Approved: 5-8-1999 Effective Date: 11-8-1999 Status: Superseded By Variation
81G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes	Permit Number: BH4726 Original Permit Number: IPCMINVAR Date Approved: 6-12-1999 Effective Date: 16-12-1999 Status: Superseded By Variation
82G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Address: Lafarge Cement Uk, Northfleet Works, The Shore, Northfleet, Gravesend, Kent, DA11 9AN Process: Cement/lime Manuf. And Assoc. Processes	Permit Number: BH8829 Original Permit Number: IPCMINVAR Date Approved: 10-3-2000 Effective Date: 17-3-2000 Status: Revoked - Now Ippc

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

12

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
59H	193.0	W	563620 174440	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Works, Blue Circle Industries Plc Process: CEMENT AND LIME; LOADING ETC CEMENT AND CLINKER, BULK IN AND OUT	Permit Number: QP3931UV Original Permit Number: BM0176IS EPR Reference: - Issue Date: 31-3-2008 Effective Date: 1-4-2008 Last date noted as effective: 2014-07-01 Status: Superceded
60H	193.0	W	563620 174440	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Works, Blue Circle Industries Plc Process: CEMENT AND LIME; PRODUCING ETC CEMENT CLINKER	Permit Number: QP3931UV Original Permit Number: BM0176IS EPR Reference: - Issue Date: 31-3-2008 Effective Date: 1-4-2008 Last date noted as effective: 2014-07-01 Status: Superceded
61H	193.0	W	563620 174440	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Works, Blue Circle Industries Plc Process: CEMENT AND LIME; LOADING ETC CEMENT AND CLINKER, BULK IN AND OUT	Permit Number: GP3433HF Original Permit Number: BM0176IS EPR Reference: - Issue Date: - Effective Date: 12-10-2010 Last date noted as effective: 2014-07-01 Status: Surrender Effective

ID	Distance	Direction	NGR	Details	
62H	193.0	W	563620 174440	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Cement Works Process: CEMENT AND LIME; PRODUCING ETC CEMENT CLINKER	Permit Number: JP3731UU Original Permit Number: BM0176IS EPR Reference: - Issue Date: 17-12-2007 Effective Date: 17-12-2007 Last date noted as effective: 2014-07-01 Status: Superseded
63H	193.0	W	563620 174440	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Works, Blue Circle Industries Plc Process: CEMENT AND LIME; PRODUCING ETC CEMENT CLINKER	Permit Number: GP3433HF Original Permit Number: BM0176IS EPR Reference: - Issue Date: - Effective Date: 12-10-2010 Last date noted as effective: 2014-07-01 Status: Surrender Effective
64G	223.0	W	563600 174400	Operator: Blue Circle Industries Plc Installation Name: - Process: CEMENT & LIME; PRODUCING ETC CEMENT CLINKER	Permit Number: BM0176 Original Permit Number: BM0176 EPR Reference: - Issue Date: 26-3-2004 Effective Date: 26-3-2004 Last date noted as effective: 2004-10-01 Status: Superseded By Pas
65I	357.0	SW	563480 174340	Operator: Aei Cables Ltd Installation Name: Crete Hall Rd, Gravesend Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T-D LEAD-CADMIUM OR 20T-D OTHERS	Permit Number: EP3431SV Original Permit Number: BM7570IU EPR Reference: - Issue Date: - Effective Date: 1-9-2006 Last date noted as effective: 2014-07-01 Status: Surrender Effective
66I	357.0	SW	563480 174340	Operator: Aei Cables Ltd Installation Name: Crete Hall Rd, Gravesend Process: NON-FERROUS METALS; MELTING WITH CAPACITY => 5T	Permit Number: EP3431SV Original Permit Number: BM7570IU EPR Reference: - Issue Date: - Effective Date: 1-9-2006 Last date noted as effective: 2014-07-01 Status: Surrender Effective
67A	404.0	W	563430 174340	Operator: Aei Cables Ltd Installation Name: Crete Hall Rd, Gravesend Process: NON-FERROUS METALS; MELTING WITH CAPACITY => 5T	Permit Number: BM7570IU Original Permit Number: BM7570IU EPR Reference: - Issue Date: 27-1-2003 Effective Date: 27-1-2003 Last date noted as effective: 2014-07-01 Status: Superseded
68A	404.0	W	563430 174340	Operator: Aei Cables Ltd Installation Name: Crete Hall Rd, Gravesend Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T-D LEAD-CADMIUM OR 20T-D OTHERS	Permit Number: BM7570IU Original Permit Number: BM7570IU EPR Reference: - Issue Date: 27-1-2003 Effective Date: 27-1-2003 Last date noted as effective: 2014-07-01 Status: Superseded
69J	417.0	W	563400 174400	Operator: Aei Cables Ltd Installation Name: - Process: NON-FERROUS METALS; MELTING WITH CAPACITY => 5T	Permit Number: BM7570 Original Permit Number: BM7570 EPR Reference: - Issue Date: 27-1-2003 Effective Date: 27-1-2003 Last date noted as effective: 2004-10-01 Status: Superseded By Pas
70J	417.0	W	563400 174400	Operator: Aei Cables Ltd Installation Name: - Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T-D LEAD-CADMIUM OR 20T-D OTHERS	Permit Number: BM7570 Original Permit Number: BM7570 EPR Reference: - Issue Date: 27-1-2003 Effective Date: 27-1-2003 Last date noted as effective: 2004-10-01 Status: Superseded By Pas

1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

2

The following Red List Discharge Consent records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
9C	199.0	NE	564270.0 174740.0	Address: Blue Circle Industries Plc., Outlet A, Blue Circle, Northfleet., Outlet A, Blue Circle, Northfleet, T, The Shore, Northfleet, Gravse, Nd, Kent, - Permit Number: CNTM.1265 Permit Version: 1.0 Status: New Consent, By Application (wra 91, Section 88) Discharge Type: Extraction of Other Minerals Effluent Type: Trade Discharges - Unspecified Catchment: - Approval Date: 24/01/1994
10C	199.0	NE	564270.0 174740.0	Address: Lafarge Aggregates Limited, Outlet A, Blue Circle, Northfleet., Outlet A, Blue Circle, Northfleet, T, The Shore, Northfleet, Gravse, Nd, Kent, - Permit Number: CNTM.1265 Permit Version: 1.0 Status: New Consent, By Application (wra 91, Section 88) Discharge Type: Extraction of Other Minerals Effluent Type: Trade Discharges - Unspecified Catchment: - Approval Date: 24/01/1994

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

9

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
50	129.0	S	563856 174261	Address: Nationwide Crash Repairs, Unit D1, Imperial Business Park, West Mill, Gravesend, Kent, DA11 0DL Process: Re-spraying Of Road Vehicles Status: Current Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
51K	179.0	S	563920 174212	Address: Coachwork Renovation, Unit C1, Imperial Business Park, West Mill, Gravesend, Kent, DA11 0DL Process: Re-spraying Of Road Vehicles Status: Current Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
52K	189.0	S	563900 174200	Address: Tbf Thompson (Properties) Ltd, Imperial Business Estate, Thamesway Park, Gravesend, Kent, DA11 0DQ Process: Reduction Of Concrete By Concrete Crusher Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
53H	191.0	W	563621 174445	Address: Deritend Electro-Mechanical Services, The Shore, Northfleet, Kent, DA11 9AN Process: Operation Of Burnout Oven, Confirmed To Be Less Than 0.2mw Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
54H	191.0	W	563621 174445	Address: Lafarge Cement Terminal, The Shore, Northfleet, DA11 9AN Process: Batching Of Ready Mixed Concrete Status: Current Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
55	196.0	W	563613 174487	Address: Fleetmix, Old Sun Wharf, Crete Hall Road, Gravesend, Kent, DA11 9AA Process: Batching Of Ready Mixed Cement Status: Current Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
56	257.0	S	564257 174248	Address: ASDA Petrol, Thames Way, Gravesend, DA11 0DQ Process: Storage of Petrol Status: Current Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
57A	394.0	W	563438 174345	Address: Aei Cables, Crete Hall Road, Gravesend, Kent, DA11 9DA Process: Timber Treatment Process Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
58	444.0	SW	563521 174123	Address: Chilton House Service Station, 128 London Road, Northfleet, Kent, DA11 9LE Process: Petrol Storage Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

15

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
11 D	0.0	On Site	563810 174540	Address: Imperial Business Estate, Imperial Business Estate, Gravesend Kent Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: T01900 Permit Version: 1	Receiving Water: Freshwater River Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 1/4/1991 Effective Date: 1/4/1991 Revocation Date: -
12 D	0.0	On Site	563810 174540	Address: Imperial Business Estate, Gravesend, Imperial Business Estate, Graves, End, Kent Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: CTWC.1596 Permit Version: 1	Receiving Water: River Thames Status: Revoked - Unspecified Issue date: 5/5/1987 Effective Date: 5/5/1987 Revocation Date: 24/6/1991
13	9.0	W	563800 174500	Address: Gravesend, Imperial Paper Mills, Gravesend, Imperial Paper Mills Effluent Type: Trade Discharges - Cooling Water Permit Number: CTMR.0325 Permit Version: 1	Receiving Water: Tidal Thames Status: Revoked - Unspecified Issue date: 9/11/1976 Effective Date: 9/11/1976 Revocation Date: 7/4/1988
14	159.0	W	563650 174490	Address: Crete Hall Road, Gravesend, Kent, Crete Hall Road, Gravesend, Kent Effluent Type: Trade Discharges - Cooling Water Permit Number: CTMR.0120 Permit Version: 1	Receiving Water: Thames Tidal Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 28/1/1980 Effective Date: 28/1/1980 Revocation Date: 29/7/2008
15	309.0	W	563500 174500	Address: Lower Discharge Aei Cables Limited, Crete Hall Road, Gravesend, Kent, DA11 9AF Effluent Type: Trade Discharges - Cooling Water Permit Number: CASM.0316 Permit Version: 1	Receiving Water: The Tidal River Thames Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 23/1/2001 Effective Date: 4/12/2000 Revocation Date: 15/1/2008
16 E	346.0	E	564520 174460	Address: Town Pier Storm Overflow, Town Pier Storm Overflow, High Street, Gravesend Kent Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: D00077 Permit Version: 1	Receiving Water: Saline Estuary Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 1/4/1991 Effective Date: 1/4/1991 Revocation Date: -
17 E	346.0	E	564520 174460	Address: Town Pier Storm Overflow, Town Pier Storm Overflow, High Street, Gravesend Kent Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: D00077 Permit Version: 1	Receiving Water: Saline Estuary Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 1/4/1991 Effective Date: 1/4/1991 Revocation Date: -
18 E	346.0	E	564520 174460	Address: High Street Storm Overflow, Town Pi, High Street Storm Overflow, Town, Pier, Gravesend, Kent Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CSSB.0116 Permit Version: 1	Receiving Water: River Thames(tidal) Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 1/1/1992

ID	Distance	Direction	NGR	Details
19 E	348.0	E	564520 174450	Address: Town Pier, High St. Pumped Overflow, Town Pier, High St. Pumped Overf, Gravesend, Kent Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: D00076 Permit Version: 1 Receiving Water: Saline Estuary Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 1/4/1991 Effective Date: 1/4/1991 Revocation Date: -
20 E	348.0	E	564520 174450	Address: Town Pier, High St. Pumped Overflow, Town Pier, High St. Pumped Overf, Gravesend, Kent Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: D00076 Permit Version: 1 Receiving Water: Saline Estuary Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 1/4/1991 Effective Date: 1/4/1991 Revocation Date: -
21 E	348.0	E	564520 174450	Address: High Street Storm Overflow, Town Pi, High Street Storm Overflow, Town, Pier, Gravesend, Kent Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CSSB.0115 Permit Version: 1 Receiving Water: River Thames(tidal) Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: - Effective Date: - Revocation Date: -
22	395.0	E	564570 174480	Address: Town Wharf Storm Overflow, Gravesen, Town Wharf Storm Overflow, Grave, Send, Kent Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CSSB.0113 Permit Version: 1 Receiving Water: River Thames(tidal) Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: - Effective Date: - Revocation Date: -
23	449.0	W	563360 174550	Address: Aggregates Wharf, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AA Effluent Type: Trade Discharges - Site Drainage Permit Number: CASM.0712 Permit Version: 1 Receiving Water: The Tidal River Thames Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: - Effective Date: 6/11/2002 Revocation Date: -
24 F	469.0	W	563340 174500	Address: Upper Discharge, Aei Cables Ltd, Gr, Upper Discharge, Aei Cables Ltd, Gravesend, Kent Effluent Type: Trade Discharges - Unspecified Permit Number: CNTM.0127 Permit Version: 1 Receiving Water: River Thames Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 10/3/1992 Effective Date: 10/3/1992 Revocation Date: 4/12/2000
25 F	469.0	W	563340 174500	Address: Upper Discharge, Aei Cables Ltd, Gr, Upper Discharge, Aei Cables Ltd, Gravesend, Kent Effluent Type: Sewage & Trade Combined - Unspecified Permit Number: CASM.0315 Permit Version: 1 Receiving Water: The Tidal River Thames Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 23/1/2001 Effective Date: 4/12/2000 Revocation Date: -

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

8

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
1	175.0	S	563984 174228	Incident Date: 16/05/2002 Incident Identification: 79193 Pollutant: Oils and Fuel Pollutant Description: Diesel Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2	289.0	NE	564310 174820	Incident Date: 26/02/2003 Incident Identification: 139427 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3A	395.0	W	563438 174344	Incident Date: 06/11/2002 Incident Identification: 119304 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
4A	395.0	W	563438 174344	Incident Date: 06/11/2002 Incident Identification: 119305 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
5B	446.0	SW	563400 174300	Incident Date: 11/05/2001 Incident Identification: 11031 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
6B	446.0	SW	563400 174300	Incident Date: 11/05/2001 Incident Identification: 11034 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
7B	446.0	SW	563400 174300	Incident Date: 11/05/2001 Incident Identification: 11031 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
8B	446.0	SW	563400 174300	Incident Date: 11/05/2001 Incident Identification: 11031 Pollutant: Atmospheric Pollutants and Effects: Contaminated Water Pollutant Description: Other Atmospheric Pollutant or Effect: Firefighting Run-Off Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

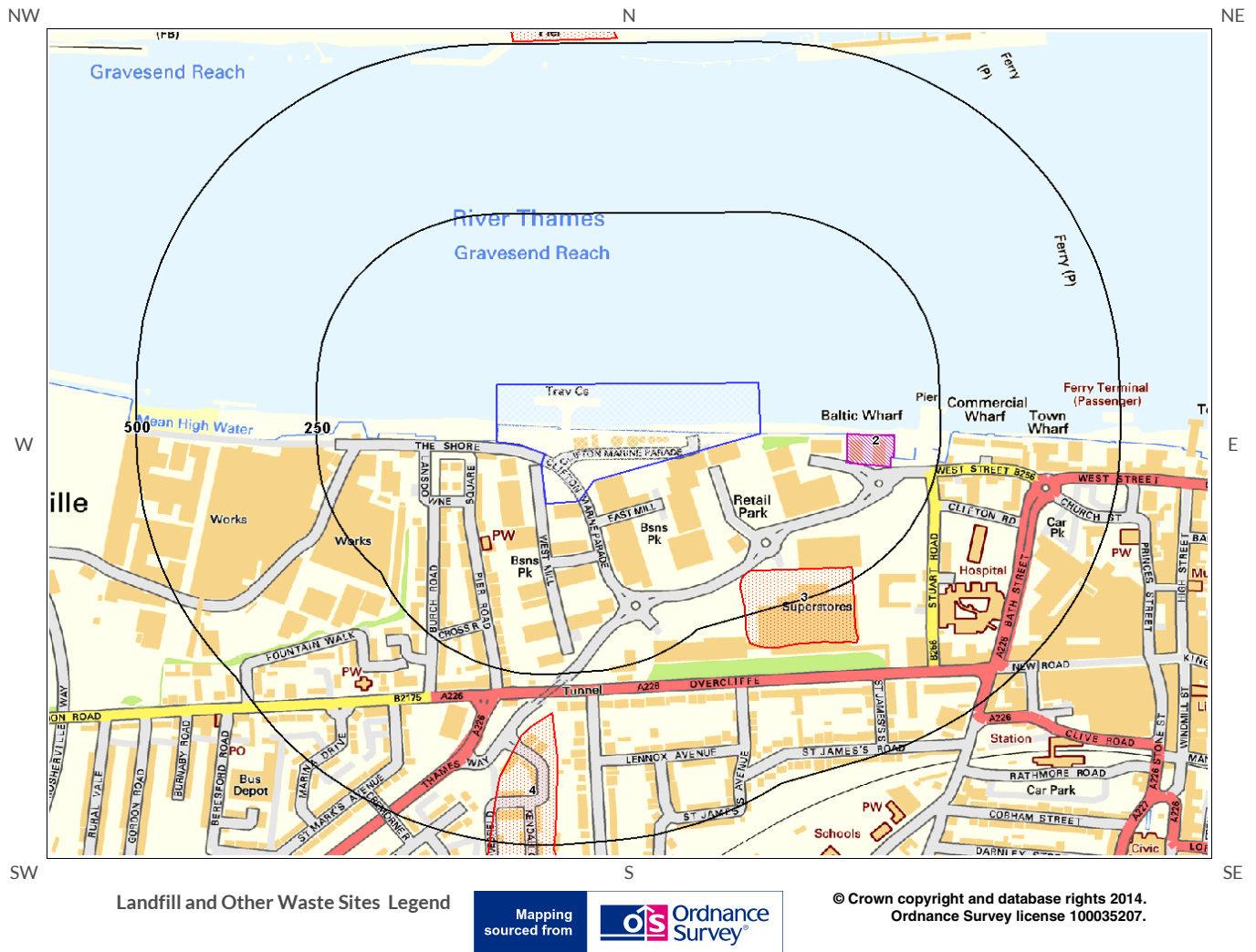
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

2. Landfill and Other Waste Sites Map





2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

11

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
3	189.0	S	564200 174200	Site Address: Asda Site, Gravesend, Kent Waste Licence: Yes Site Reference: GR15 Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 01-Jan-1976 Licence Surrendered: Licence Hold Address: - Operator: -
4	307.0	S	563800 173900	Site Address: Lennox Road, Gravesend, Kent Waste Licence: Yes Site Reference: P/02/03, 21EK Waste Type: Inert, Commercial, Liquid sludge, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 08-Mar-1977 Licence Surrendered: 29-Oct-1992 Licence Hold Address: - Operator: Reed Paper and Board
5	503.0	N	563900 175200	Site Address: Tidal Basin, Tilbury Docks, Tilbury, Essex Waste Licence: Yes Site Reference: 86/81, THU023 Waste Type: Inert, Industrial, Commercial, Household, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 10-Sep-1981 Licence Surrendered: Licence Hold Address: North Side, Royal Victoria Dock, Silvertown, London, E16 Operator: Port of Tilbury (London) Limited
Not shown	647.0	S	563800 173600	Site Address: Campbell Road Pit, Gravesend, Kent Waste Licence: Yes Site Reference: GR18, P/02/10 Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 17-Sep-1991 Licence Surrendered: 19-Sep-2000 Licence Hold Address: - Operator: T B F Thompson Properties Limited
Not shown	700.0	SW	563100 173700	Site Address: Northfleet Power Station, Northfleet, Kent Waste Licence: Yes Site Reference: 21EL, P/02/02 Waste Type: Inert, Industrial, Liquid sludge, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 14-May-1977 Licence Surrendered: 31-Dec-1992 Licence Hold Address: - Operator: Central Electricity Generating Board

ID	Distance (m)	Direction	NGR	Details
Not shown	812.0	S	564400 173600	Site Address: Nine Elms, Gravesend, Kent Waste Licence: - Site Reference: GR7 Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1034.0	SW	562900 173700	Site Address: Northfleet Power Station, Northfleet, Kent Waste Licence: Yes Site Reference: 21EL, P/02/02 Waste Type: Inert, Industrial, Liquid sludge, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 14-May-1977 Licence Surrendered: 31-Dec-1992 Licence Hold Address: - Operator: -
Not shown	1154.0	SW	562900 173500	Site Address: Dykes Pit, Swale, Kent Waste Licence: Yes Site Reference: P/02/05, 21EH Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 22-Apr-1977 Licence Surrendered: 22-Dec-1993 Licence Hold Address: - Operator: D Justice
Not shown	1323.0	SW	562600 173400	Site Address: Springhead Road, Swale, Kent Waste Licence: Yes Site Reference: REIN.2/1, 21BF Waste Type: Inert, Industrial, Commercial, Household, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 01-Jan-1976 Licence Surrendered: Licence Hold Address: - Operator: Northfleet Urban District Council
Not shown	1403.0	SE	564500 172900	Site Address: Woodfield Avenue, Gravesend, Kent Waste Licence: - Site Reference: GR8 Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1444.0	SW	562600 173200	Site Address: South Of Springhead, Gravesend, Kent Waste Licence: - Site Reference: GR14 Waste Type: Inert, Commercial, Household, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	1123.0	W	56270 0.0 17430 0.0	Address: Northfleet Power stn, Crete Hall Rd, Northfleet,Kt BGS Number: 1947.0 Risk: Risk to major aquifer Waste Type: N/A

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

5

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	699.0	SW		Refuse Tip	1971 mapping	Polygon
Not shown	1105.0	SW		Refuse Tip	1971 mapping	Polygon
Not shown	1334.0	SW		Refuse Tip	1971 mapping	Polygon
Not shown	1342.0	SW		Refuse Tip	1971 mapping	Polygon
Not shown	1413.0	SE		St. Thomas's Avenue, Gravesend	Gravesham Borough Council	Polygon

2.2 Other Waste Sites

2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
2	121.0	E	564327 174466	Type of Site: Scrap Yard Planning Application Reference: N/A Date: 1985 Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

8

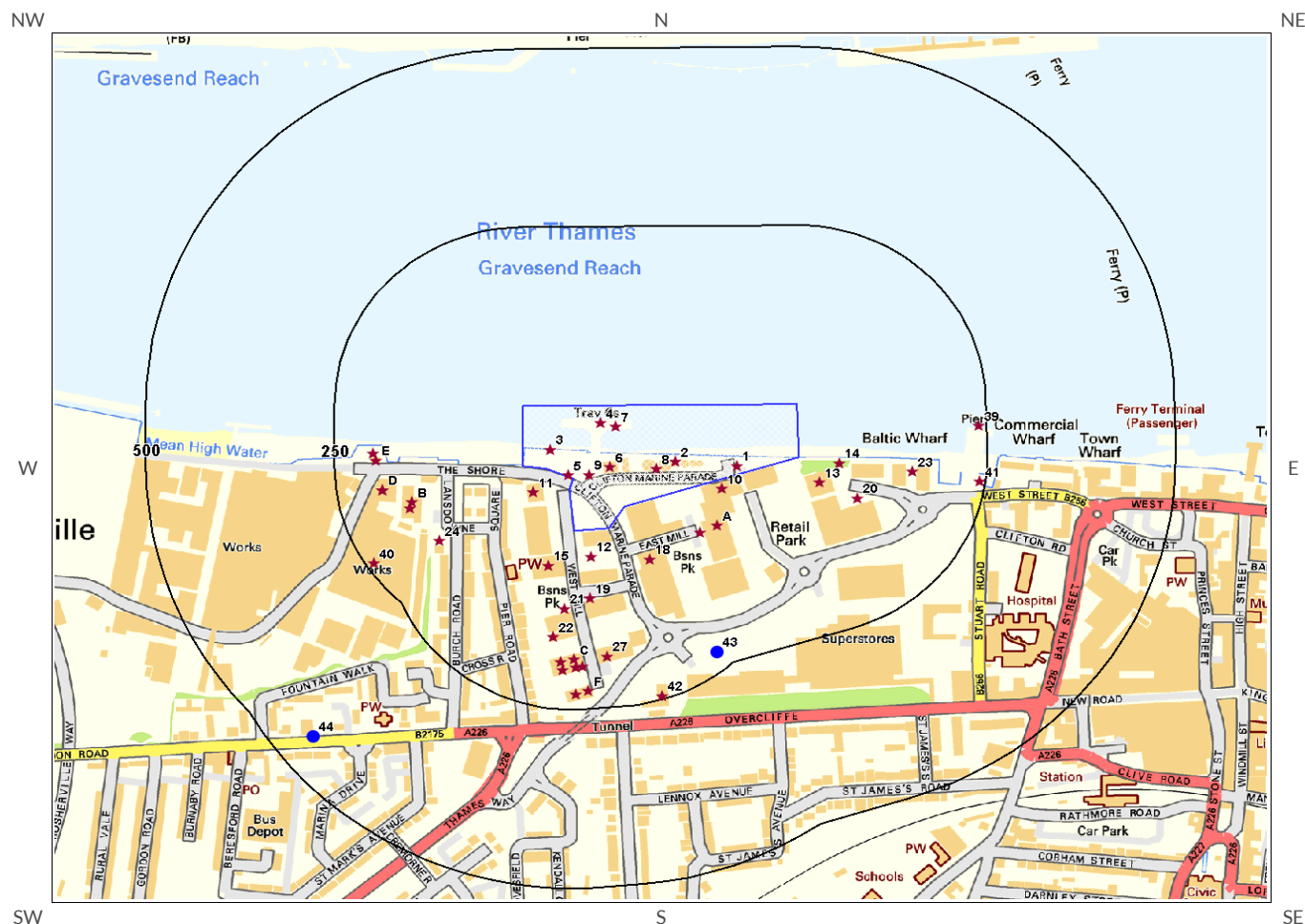
The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	655.0	W	563160 174390	Site Address: Red Lion Wharf, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AA Type: Treatment of waste wood <75000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HWR004 EPR reference: EA/EPR/GB3538AC/S002 Operator: Hadfield Wood Recyclers Limited Waste Management licence No: 104141 Annual Tonnage: 0.0 Issue Date: 23/05/2012 Effective Date: - Modified: - Surrendered Date: 28/04/2014 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Red Lion Wharf Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
Not shown	909.0	N	564013 175474	Site Address: Green Barge Site, Tilbury Docks, Tilbury, Essex, RM18 7HB Type: Treatment of waste wood <75000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HWR003 EPR reference: EA/EPR/FB3439RM/V002 Operator: Hadfield Wood Recyclers Ltd Waste Management licence No: 103962 Annual Tonnage: 74999.0	Issue Date: 21/03/2012 Effective Date: - Modified: 29/04/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Green Barge Site, Tilbury Docks Correspondence Address: -, -
Not shown	1155.0	NW	562896 175271	Site Address: 34/34 A, Tilbury Docks, Tilbury Freeport, Tilbury, Essex, RM18 7EH Type: Physical Treatment Facility Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: NOR066 EPR reference: - Operator: Nordic Recycling Ltd Waste Management licence No: 100024 Annual Tonnage: 0.0	Issue Date: 07/11/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Nordic Recyclling Limited Correspondence Address: -, Berth 6, Basin 3, Chatham Docks, Gillingham, Kent, ME4 2SR
Not shown	1155.0	NW	562896 175271	Site Address: 34/34 A, Tilbury Docks, Tilbury Freeport, Tilbury, Essex, RM18 7EH Type: Material Recycling Treatment Facility Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: NOR066 EPR reference: EA/EPR/TP3995EW/A001 Operator: Nordic Recycling Ltd Waste Management licence No: 100024 Annual Tonnage: 200000.0	Issue Date: 07/11/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Nordic Recycling Limited Correspondence Address: -, -
Not shown	1295.0	NW	563254 175733	Site Address: Tilbury Docks, Tilbury, Essex, RM18 7HB Type: Treatment of waste wood <75000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HWR001 EPR reference: EA/EPR/BB3332AE/A001 Operator: Hadfield Wood Recyclers Ltd Waste Management licence No: 103209 Annual Tonnage: 74999.0	Issue Date: 18/01/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Tilbury New Site Correspondence Address: -, -
Not shown	1415.0	N	564576 175922	Site Address: Land/ Premises At, Hume Avenue, Tilbury, Essex, RM18 8DX Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SPE001 EPR reference: EA/EPR/NP3398NN/A001 Operator: Specialist Metal Services Ltd Waste Management licence No: 71089 Annual Tonnage: 5000.0	Issue Date: 20/03/1998 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hume Works Correspondence Address: -, -
Not shown	1499.0	W	562315 174686	Site Address: Northfleet Works, Northfleet Embankment, Gravesham, Kent, DA1 9AN Type: Transfer Station taking Non-Biodegradable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/V002 Operator: Bam Ferrovial Kier Joint Venture Waste Management licence No: 102226 Annual Tonnage: 700000.0	Issue Date: 24/04/2012 Effective Date: - Modified: 11/03/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Northfleet Temporary Inert Waste Transfer Facility Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details
Not shown	1499.0	W	562315 174686	Site Address: Northfleet Works, Northfleet Embankment, Gravesham, Kent, DA11 9AN Type: Transfer Station taking Non-Biodegradable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/V003 Operator: Bam Nuttal Ltd, Ferrovia Agroman (U K) Ltd, Kier Infrastructure & Overseas Ltd Waste Management licence No: 102226 Annual Tonnage: 1200000.0 Issue Date: 24/04/2012 Effective Date: - Modified: 07/05/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Northfleet Temporary Inert Waste Transfer Facility Correspondence Address: -, -

3. Current Land Use Map



Current Land Use Legend



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Site Outline



Search Buffers (m)



Current Industrial Sites



Petrol & Fuel Sites



Underground High Pressure Oil & Fuel Pipelines



3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

42

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0.0	On Site	Wharf	564092 174479	DA11	Moorings and Unloading Facilities	Water
2	0.0	On Site	Tank	564011 174485	DA11	Tanks (Generic)	Industrial Features
3	0.0	On Site	Wharf	563845 174502	DA11	Moorings and Unloading Facilities	Water
4	0.0	On Site	Travelling Cranes	563912 174539	DA11	Travelling Cranes and Gantries	Industrial Features
5	0.0	On Site	Electricity Sub Station	563869 174466	DA11	Electrical Features	Infrastructure and Facilities
6	0.0	On Site	L G S A Marine	563924 174477	The White House, Clifton Marine Parade, Gravesend, DA11 0DY	Marine Engineers and Services	Engineering Services
7	0.0	On Site	Jetty	563931 174534	DA11	Moorings and Unloading Facilities	Water
8	0.0	On Site	Tanks	563986 174475	DA11	Tanks (Generic)	Industrial Features
9	0.0	On Site	Gas Valve Compound	563896 174467	DA11	Gas Features	Infrastructure and Facilities
10	13.0	S	Halfords	564071 174447	Unit E Imperial Retail Park, Thames Way, Gravesend, DA11 0DQ	Vehicle Parts and Accessories	Motoring
11	35.0	S	Sprint Engineering & Lubricant	563822 174442	Unit G3 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	General Purpose Machinery	Industrial Products
12	38.0	S	Imperial Business Park	563899 174352	DA11	Business Parks and Industrial Estates	Industrial Features
13	45.0	SE	Bensons Beds	564201 174456	Unit C Imperial Retail Park, Thames Way, Gravesend, DA11 0DQ	Beds and Bedding	Consumer Products
14	54.0	E	Fletchers Wharf	564228 174483	DA11	Moorings and Unloading Facilities	Water
15	59.0	SW	Howdens Joinery Co.	563842 174339	Unit E2 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	General Construction Supplies	Industrial Products
16A	61.0	S	Dreams Ltd	564065 174395	Unit G Imperial Retail Park, Thames Way, Gravesend, DA11 0DQ	Beds and Bedding	Consumer Products
17A	64.0	S	Electricity Sub Station	564044 174386	DA11	Electrical Features	Infrastructure and Facilities
18	69.0	SE	Leading Edge Labels & Packaging	563976 174348	Unit H1-H4 Imperial Business Estate, East Mill, Gravesend, DA11 0DP	Office and Shop Equipment	Industrial Products

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
19	95.0	S	Electricity Sub Station	563897 174294	DA11	Electrical Features	Infrastructure and Facilities
20	96.0	SE	Electricity Sub Station	564252 174434	DA11	Electrical Features	Infrastructure and Facilities
21	110.0	S	Electricity Sub Station	563864 174279	DA11	Electrical Features	Infrastructure and Facilities
22	151.0	S	Creative Mouldings	563848 174239	Unit B6 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Rubber, Silicones and Plastics	Industrial Products
23	151.0	E	Baltic Wharf	564325 174471	DA11	Moorings and Unloading Facilities	Water
24	153.0	SW	Tank	563698 174374	DA11	Tanks (Generic)	Industrial Features
25B	157.0	W	Janta Fashion	563660 174428	45, Burch Road, Northfleet, Gravesend, DA11 9NE	Clothing, Components and Accessories	Consumer Products
26B	161.0	W	Works	563659 174420	DA11	Unspecified Works Or Factories	Industrial Features
27	178.0	S	Coachwork Renovations	563920 174212	Unit C1-C2 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Vehicle Repair, Testing and Servicing	Repair and Servicing
28C	180.0	S	Captivair Pneumatics Ltd	563876 174208	Unit B2 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Pumps and Compressors	Industrial Products
29C	185.0	S	A2 Domestic Appliance Service Ltd	563858 174204	Unit B4 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Electrical Equipment Repair and Servicing	Repair and Servicing
30C	190.0	S	Charlton Printing Works Ltd	563887 174198	Unit A9 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Published Goods	Industrial Products
31D	190.0	W	Lafarge Cement UK	563621 174445	Blue Circle House, The Shore, Northfleet, Gravesend, DA11 9AL	Concrete Products	Industrial Products
32D	190.0	W	Wincanton	563621 174445	Blue Circle House, The Shore, Northfleet, Gravesend, DA11 9AN	Distribution and Haulage	Transport, Storage and Delivery
33C	191.0	S	Star Refrigeration Ltd	563878 174196	Unit A8 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Cooling and Refrigeration	Industrial Products
34C	195.0	S	Ava Pac UK Ltd	563861 174193	Unit A6 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Packaging	Industrial Products
35E	196.0	W	Fleetmix Ltd	563613 174487	Old Sun Wharf, Crete Hall Road, Gravesend, DA11 9AA	Concrete Products	Industrial Products
36E	199.0	W	Old Sun Wharf	563610 174496	DA11	Moorings and Unloading Facilities	Water
37F	224.0	S	Prostitch Embroidery	563895 174164	Unit A1 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Textiles, Fabrics, Silk and Machinery	Industrial Products
38F	229.0	S	Your New Floor	563878 174159	Unit A3 Imperial Business Estate, West Mill, Gravesend, DA11 0DL	Carpets, Flooring, Rugs and Soft Furnishings	Consumer Products
39	239.0	E	Travelling Crane	564413 174535	DA11	Travelling Cranes and Gantries	Industrial Features
40	240.0	SW	Works	563611 174343	DA11	Unspecified Works Or Factories	Industrial Features
41	242.0	E	Wharf	564414 174457	DA11	Moorings and Unloading Facilities	Water
42	245.0	S	W J King	563993 174157	40, Overcliffe, Gravesend, DA11 0EJ	New Vehicles	Motoring

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
43	224.0	SE	564066 174219	Asda	Asda Gravesend Automat, Thames Way, Thames Way, Gravesend, Kent, DA11 0DQ	No	Open
44	450.0	SW	563530 174101	Total	Chilton House Garage, 128, London Road, London Road, Northfleet, Gravesend, Kent, DA11 9LE	Not Applicable	Obsolete

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site:

0

Database searched and no data found.



4. Geology

4.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
ALV-CZPS	ALLUVIUM	SILTY PEATY SANDY CLAY
TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
TRD-CLSI	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
ALV-CZPS	ALLUVIUM	SILTY PEATY SANDY CLAY

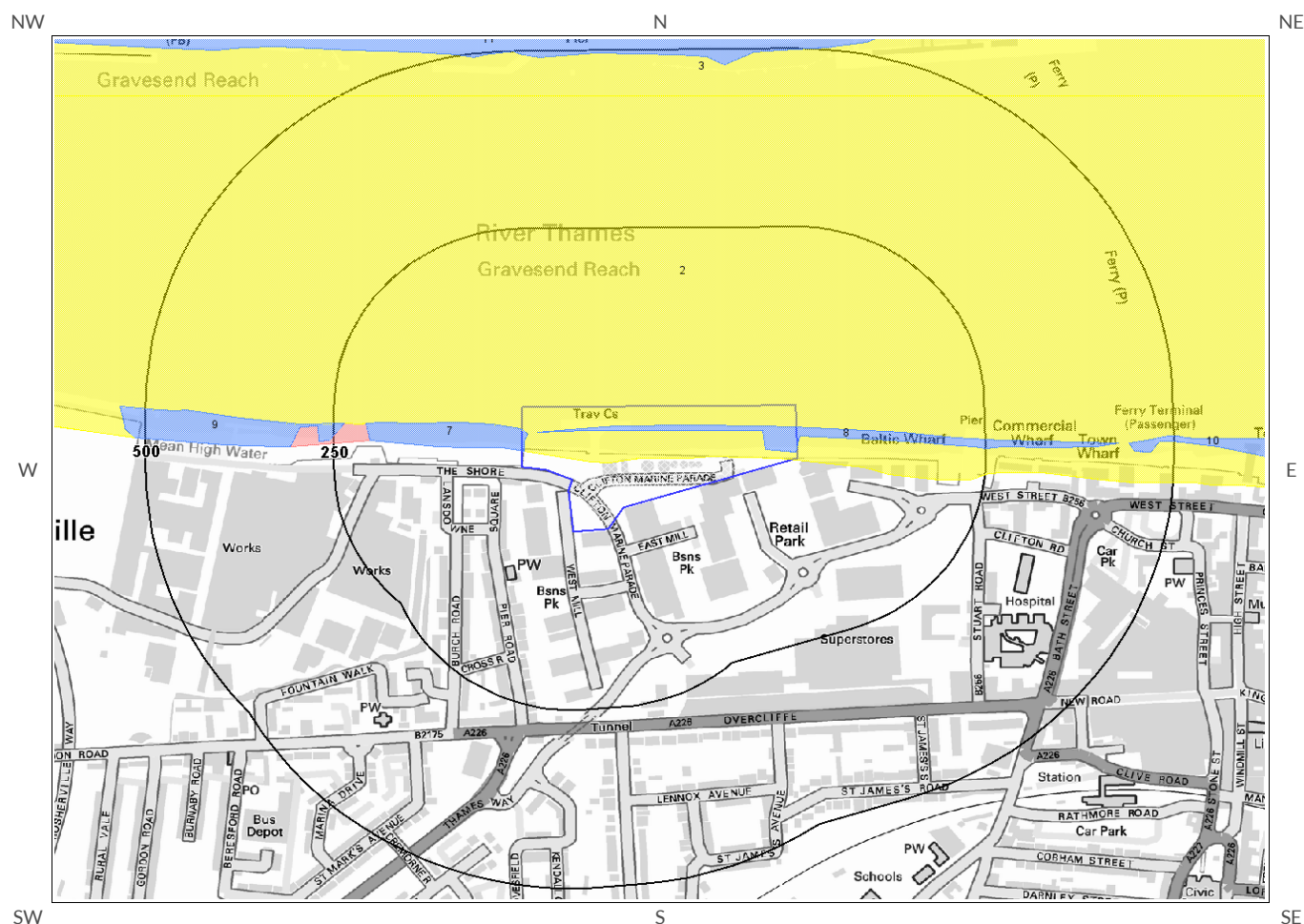
4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
SNCK-CHLK	SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION (UNDIFFERENTIATED)	CHALK

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

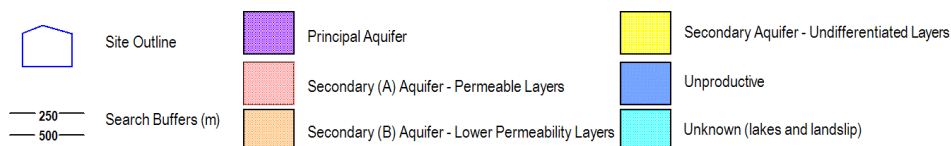
5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology

Mapping
sourced from

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The map illustrates the River Thames Gravesend Reach and the proposed tidal range reduction scheme. The scheme area is highlighted in orange, showing the proposed tidal range of 250m compared to the existing 500m. Key locations and infrastructure include:

- Waterways:** River Thames, Gravesend Reach, and the proposed tidal range reduction area.
- Landmarks and Infrastructure:** Trav Co, Baltic Wharf, Commercial Wharf, Ferry Terminal (Passenger), Town Wharf, Retail Park, Superstores, Hospital, Station, Car Park, Schools, and various roads (e.g., West Street, Clifton Rd, Bath Street, New Road, Clive Road, Rathmore Road, Cornham Street, Darnley Road).
- Other Features:** Works, PW (Public Works), Bsns Pk (Business Park), Fast Mill, Tunnel, Overcliffe, Lennox Avenue, St James's Road, St James's, Rathmore Road, Cornham Street, Darnley Road, and various other streets and landmarks.

Mapping sourced from  Ordnance Survey®

Site Outline
 Search Buffers (m)
 250
 500

Principal Aquifer
 Secondary (A) Aquifer - Permeable Layers
 Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers
 Unproductive
 Unknown (lakes and landslip)

Groundwater Abstraction Licence
 Surface Water Abstraction Licence

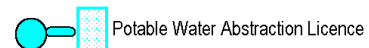
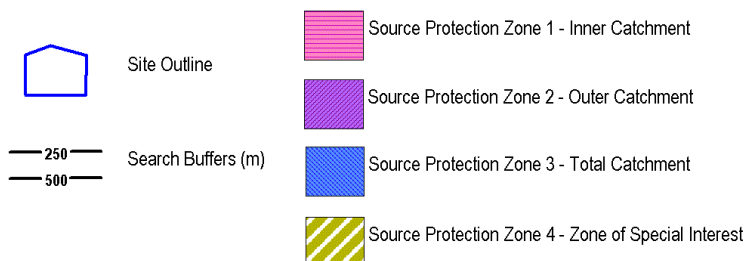
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



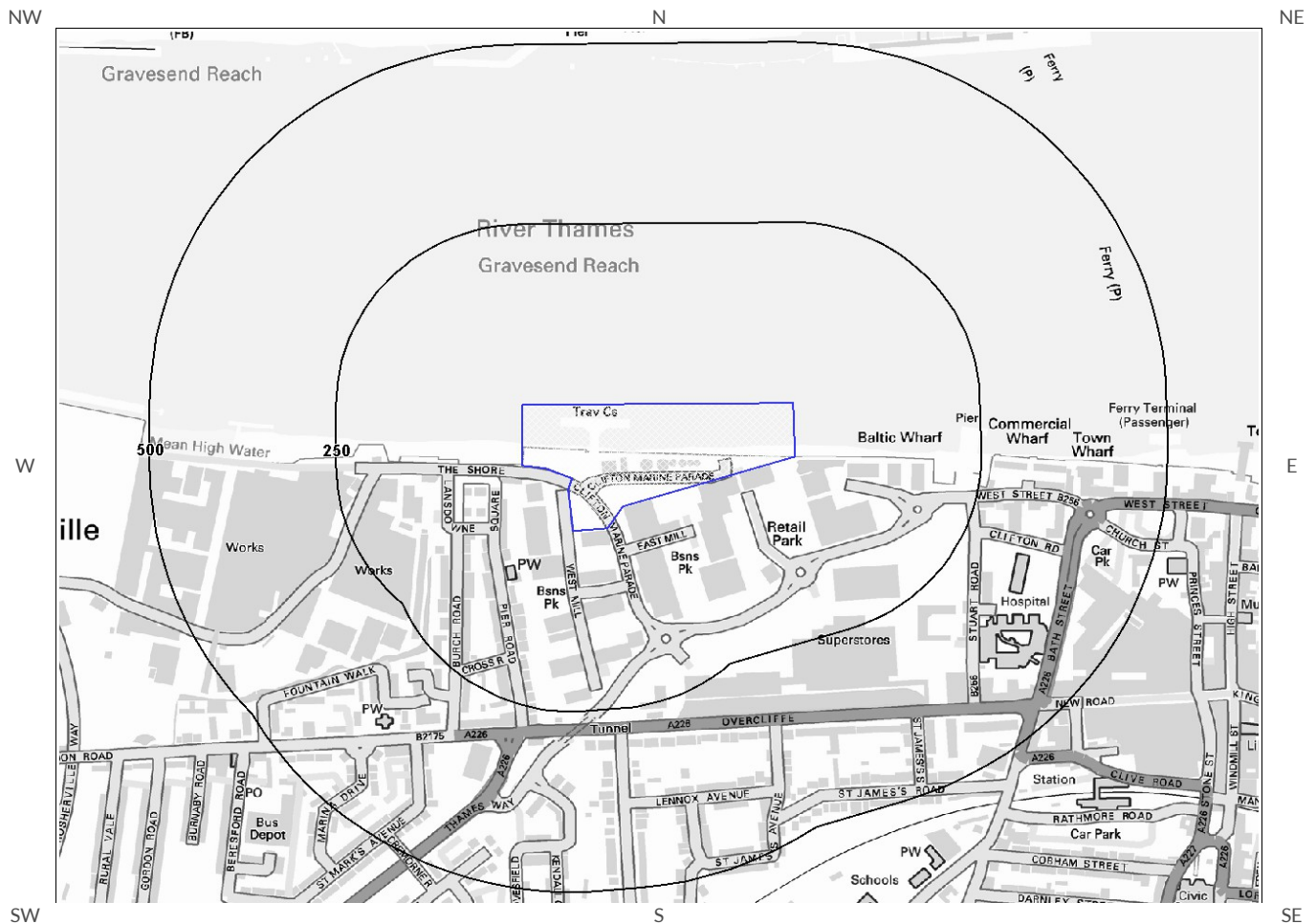
Map Legend Source Protection Zones and Potable Water Abstraction Licenses



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5d. Hydrology Source Protection Zones within confined aquifer

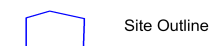


Hydrology Source Protection Zones

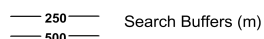
Mapping
sourced from



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Site Outline



Search Buffers (m)



Source Protection Zone 1C - Inner Catchment within Confined Aquifer



Source Protection Zone 2C - Outer Catchment within Confined Aquifer

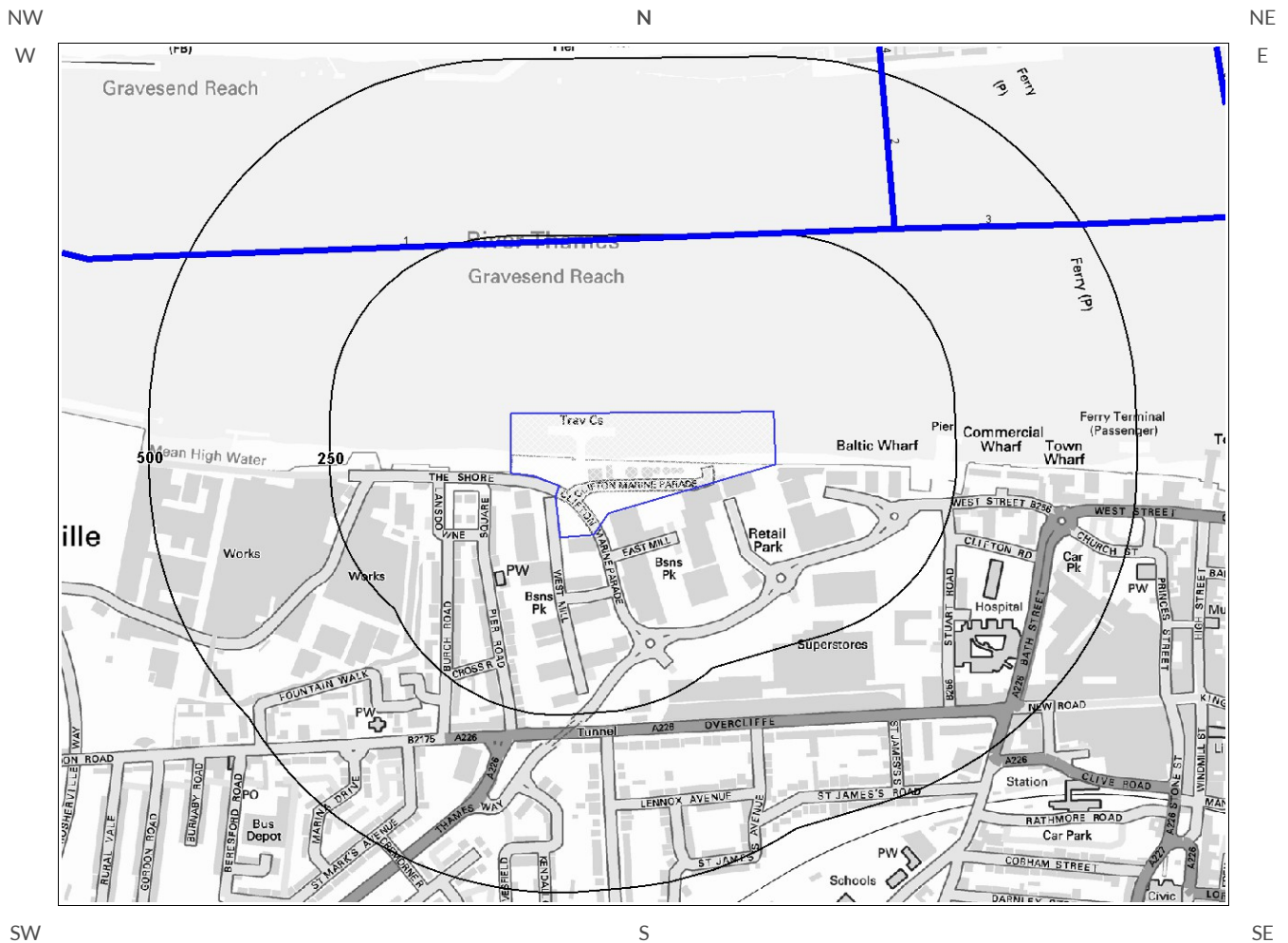


Source Protection Zone 3C - Total Catchment within Confined Aquifer



Potable Water Abstraction Licence

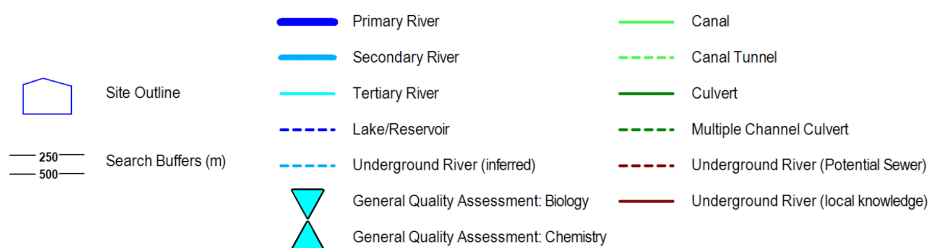
5 e. Hydrology – Detailed River Network and River Quality

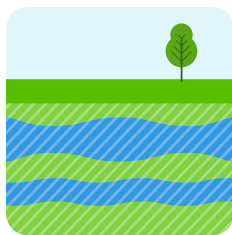


Hydrology – Detailed River Network and River Quality



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5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
2	0.0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
7	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
8	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	203.0	W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
9	237.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
3	434.0	N	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
10	440.0	E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
11	478.0	N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
5	111.0	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	384.0	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	434.0	N	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Details
Not shown	857.0	W	562980 174260	Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: Borehole 4, Crete Hall Road, Northfleet. Data Type: Point Annual Volume (m³): 4710000 Max Daily Volume (m³): 19656 Original Application No: WR.1969D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/7/1996 Version End Date:
Not shown	949.0	W	562860 174560	Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: Point 1, Greensand Borehole, Northfleet. Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR.1969C Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/5/1966 Version End Date:
Not shown	1043.0	W	562830 174120	Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: Point 2, Greensand Borehole, Northfleet. Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR.1969C Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/5/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1049.0	W	562760 174590	Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: Point A, Borehole At Kimberly Clark, Northfleet Data Type: Point Annual Volume (m³): 400000 Max Daily Volume (m³): 1309 Original Application No: WR.1969C Original Start Date: - Expiry Date: 31/3/2018 Issue No: 101 Version Start Date: 24/4/2002 Version End Date:
Not shown	1099.0	W	562770 174120	Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: Point B, Borehole At Kimberly Clark, Northfleet Data Type: Point Annual Volume (m³): 400000 Max Daily Volume (m³): 1309 Original Application No: WR.1969C Original Start Date: - Expiry Date: 31/3/2018 Issue No: 101 Version Start Date: 24/4/2002 Version End Date:
Not shown	1509.0	SE	565060 173270	Licence No: 9/40/01/0511/G Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Boreholes, Adits And Catchpits At Windmill Hill Ps Data Type: Region Annual Volume (m³): 17700000 Max Daily Volume (m³): 96000 Original Application No: 169/0639D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/11/2006 Version End Date:
Not shown	1587.0	SW	562450 173660	Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: Borehole 2, H5 Chalk, Northfleet. Data Type: Point Annual Volume (m³): 4710000 Max Daily Volume (m³): 19656 Original Application No: WR.1969D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/7/1996 Version End Date:
Not shown	1621.0	SW	562410 173660	Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: Borehole 1, H5 Chalk, Northfleet. Data Type: Point Annual Volume (m³): 4710000 Max Daily Volume (m³): 19656 Original Application No: WR.1969D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/7/1996 Version End Date:
Not shown	1712.0	SW	562260 173750	Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: Borehole 3, Springhead Lake, Northfleet. Data Type: Point Annual Volume (m³): 4710000 Max Daily Volume (m³): 19656 Original Application No: WR.1969D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/7/1996 Version End Date:
Not shown	1757.0	SW	562210 173750	Licence No: 9/40/01/0051/GR Details: Evaporative Cooling Direct Source: Southern Region Groundwater Point: Point A At Blue Lake Northfleet Cement Works Data Type: Point Annual Volume (m³): 1235375 Max Daily Volume (m³): 10060 Original Application No: WR.2221B Original Start Date: 10/4/1967 Expiry Date: - Issue No: 103 Version Start Date: 27/11/2007 Version End Date:
Not shown	1757.0	SW	562210 173750	Licence No: 9/40/01/0051/GR Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Point A At Blue Lake Northfleet Cement Works Data Type: Point Annual Volume (m³): 1186000 Max Daily Volume (m³): 6721 Original Application No: NPS/WR/001659 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 104 Version Start Date: 22/9/2009 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1757.0	SW	562210 173750	Licence No: 9/40/01/0051/GR Details: Process Water Direct Source: Southern Region Groundwater Point: Point A At Blue Lake Northfleet Cement Works Data Type: Point Annual Volume (m³): 1186000 Max Daily Volume (m³): 6721 Original Application No: NPS/WR/001659 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 104 Version Start Date: 22/9/2009 Version End Date:
Not shown	1757.0	SW	562210 173750	Licence No: 9/40/01/0051/GR Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: Point A At Blue Lake Northfleet Cement Works Data Type: Point Annual Volume (m³): 1186000 Max Daily Volume (m³): 6721 Original Application No: NPS/WR/001659 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 104 Version Start Date: 22/9/2009 Version End Date:
Not shown	1757.0	SW	562210 173750	Licence No: 9/40/01/0051/GR Details: Non-Evaporative Cooling Direct Source: Southern Region Groundwater Point: Point A At Blue Lake Northfleet Cement Works Data Type: Point Annual Volume (m³): 1186000 Max Daily Volume (m³): 6721 Original Application No: NPS/WR/001659 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 104 Version Start Date: 22/9/2009 Version End Date:
Not shown	1885.0	SW	562230 173450	Licence No: 01/144 Details: Laundry Use Direct Source: Southern Region Groundwater Point: Point A, Borehole At Springhead Enterprise Park Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 169/1720 Original Start Date: 28/7/2000 Expiry Date: 05/06/2003 Issue No: 1 Version Start Date: 28/7/2000 Version End Date:
Not shown	1885.0	SW	562230 173450	Licence No: 01/154 Details: Laundry Use Direct Source: Southern Region Groundwater Point: Point A, Borehole At Springhead Enterprise Park Data Type: Point Annual Volume (m³): 70000 Max Daily Volume (m³): 300 Original Application No: NPS/WR/013868 Original Start Date: 3/5/2004 Expiry Date: 31/3/2018 Issue No: 4 Version Start Date: 22/7/2013 Version End Date:

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (5c):

ID	Distance (m)	Direction	NGR	Details
Not shown	1509.0	SE	565060 173270	Licence No: 9/40/01/0511/G Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Boreholes, Adits And Catchpits At Windmill Hill Ps Data Type: Region Annual Volume (m³): 17700000 Max Daily Volume (m³): 96000 Original Application No: 169/0639D Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (5c):

ID	Distance (m)	Direction	Type	Description
2	0.0	On Site	3	Total Catchment
1	120.0	SW	2	Outer Catchment

5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
161	SW	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
346	S	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
468	N	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

5.9.1 Biological Quality:

Database searched and no data found.

5.9.2 Chemical Quality:

Database searched and no data found.

5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (5d):

ID	Distance (m)	Direction	Details
1	240.0	N	River Name: River Thames Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
2	307.0	NE	River Name: - Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
3	307.0	NE	River Name: River Thames Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined

5.11 Surface Water Features

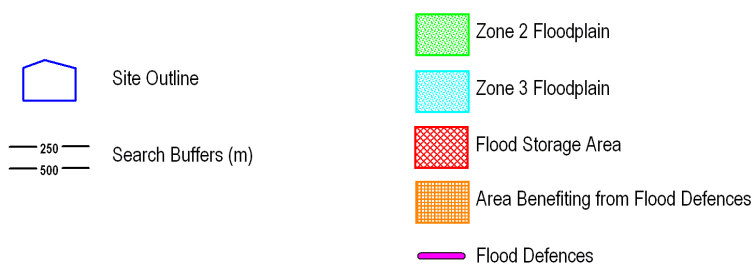
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0.0	On Site

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6. Flooding

6.1 Zone 2 Flooding

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? Yes

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
1	0.0	On Site	10-Sep-2014	Zone 2 - (Tidal Models)
2	0.0	On Site	10-Sep-2014	Zone 2 - (Tidal Models)
3A	0.0	On Site	10-Sep-2014	Zone 2 - (Tidal Models)
4B	91.0	W	10-Sep-2014	Zone 2 - (Tidal Models)
5	170.0	SW	10-Sep-2014	Zone 2 - (Tidal Models)

6.2 Zone 3 Flooding

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? Yes

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
11	0.0	On Site	11-Sep-2014	Zone 3 - (Tidal Models)
12	0.0	On Site	11-Sep-2014	Zone 3 - (Tidal Models)
13A	0.0	On Site	11-Sep-2014	Zone 3 - (Tidal Models)
14B	131.0	W	11-Sep-2014	Zone 3 - (Tidal Models)
15	211.0	W	11-Sep-2014	Zone 3 - (Tidal Models)

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site?

Yes

The following flood defence records are represented as lines on the Flood Map:

ID	Distance (m)	Direction	Update
21	6.0	SE	11-Sep-2014
22	90.0	W	11-Sep-2014

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site?

Yes

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

6.7 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

High

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

7. Designated Environmentally Sensitive Sites Map





7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 0

Database searched and no data found.

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 0

Database searched and no data found.

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site: 0

Database searched and no data found.

7.5 Records of Ramsar sites within 2000m of the study site: 0

Database searched and no data found.

7.6 Records of Ancient Woodland within 2000m of the study site: 0

Database searched and no data found.

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

1

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	1301.0	SW	NVZ Area	DEFRA





8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **GroundSure GeoInsight**, available from our [website](#). The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell** hazard rating identified on the study site?

Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
--

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This indicates an automatically generated 50m buffer and site.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

* This indicates an automatically generated 50m buffer and site.



9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

No

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*?

Low

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Guidance: No Guidance Required.

Contact Details

EmapSite
Telephone: 0118 9736883
sales@emapsite.com



British Geological Survey Enquiries

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BGS Geological Hazards Reports and general geological enquiries



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

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**Environment
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Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



**Public Health
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The Coal Authority

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DX 716176 Mansfield 5
www.coal.gov.uk



**The Coal
Authority**

Ordnance Survey

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SO16 0AS
Tel: 08456 050505



Local Authority

Authority: Gravesham Borough Council
Phone: 01474 33 70 00
Web: www.gravesham.gov.uk
Address: Civic Centre, Windmill Street, Gravesend, DA12 1AU

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

“Beneficiary” means the person or entity for whose benefit the Client has obtained the Services.

“Client” means the party or parties entering into a Contract with GroundSure.

“Commercial” means any building or property which is not Residential.

“Confidential Information” means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

“Support Services” means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

“Contract” means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

“Third Party Data Provider” means any third party providing Third Party Content to GroundSure.

“Data Reports” means reports comprising factual data with no accompanying interpretation.

“Fees” has the meaning set out in clause 5.1.

“GroundSure” means GroundSure Limited, a company registered in England and Wales under number 03421028.

“GroundSure Materials” means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

“Intellectual Property” means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

“Mapping” means a map, map data or a combination of historical maps of various ages, time periods and scales.

“Order” means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

“Ordnance Survey” means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

“Order Website” means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

“Report” means a Risk Screening Report or Data Report for Commercial or Residential property.

“Residential” means any building or property used as or intended to be used as a single dwelling.

“Risk Screening Report” means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

“Services” means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

“Site” means the area of land in respect of which the Client has requested GroundSure to provide the Services.

“Third Party Content” means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

“User Guide” means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions

implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,
- (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
- (iv) the first purchaser or first tenant of the Site, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together “Fees”).

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death

or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

- (ii) the Reports and/or Mapping provided under this Contract are
 - (a) supplied to the Client's specification(s) and in any event
 - (b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

- (i) the Client or Beneficiary's failure to provide facilities, access or information;
- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;
- (vii) suspension or delay of services at public registries by Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English

law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

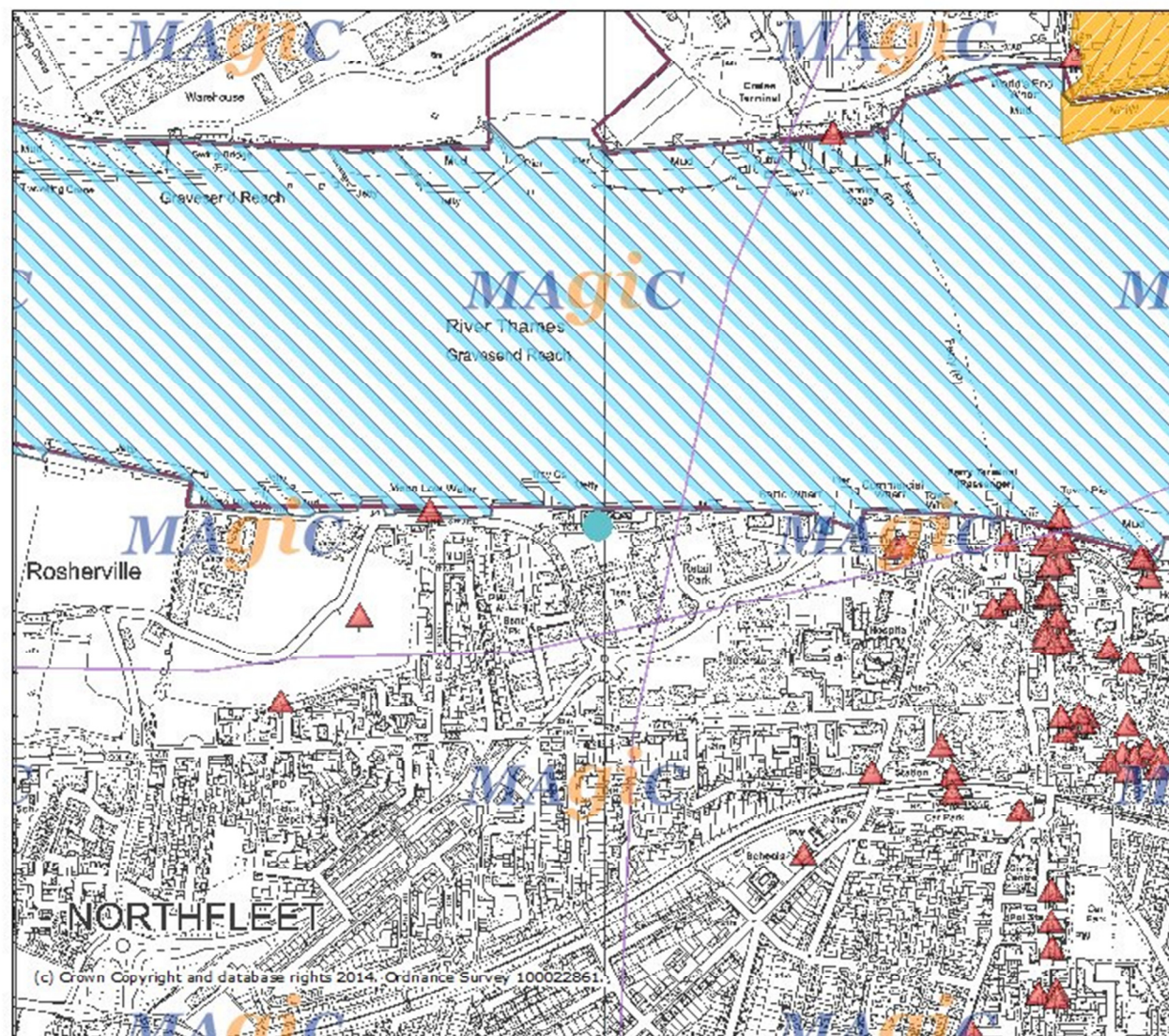
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © GroundSure Limited June 2013

MAGiC

AG2119-14 Rural Designation



Legend

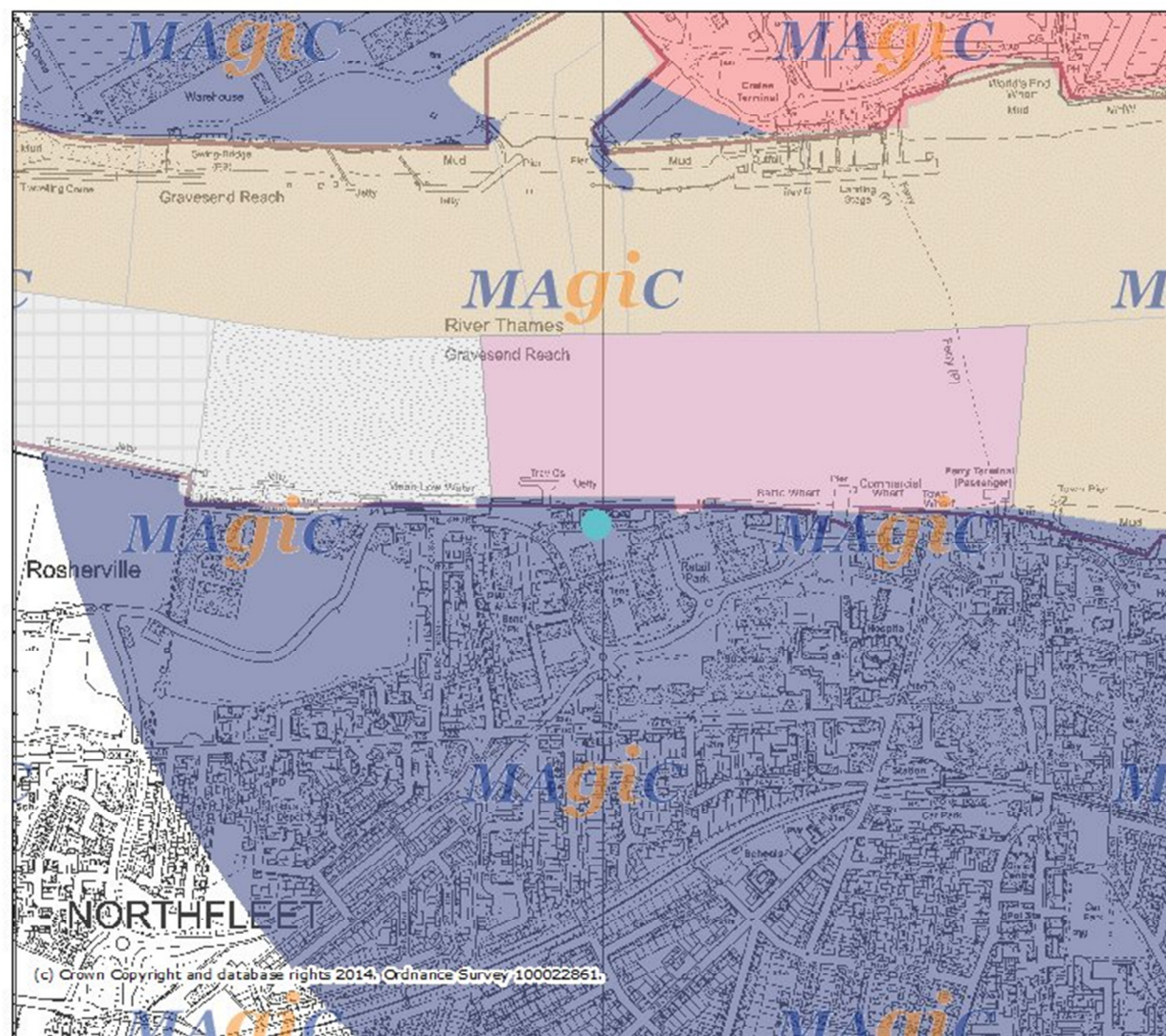
- SSSI Impact Risk Zones (England) - For use by Local Planning Authorities to assess planning applications for likely impacts on SSSIs
- Scheduled Monuments (England)
- Listed Buildings (England)
- Marine Conservation Zones (England)

Projection = OSGB36
xmin = 561500
ymin = 173300
xmax = 566500
ymax = 175600

Map produced by MAGiC on 10 December, 2014.
Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGiC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

MAGiC

AG2119-14 Habitat Inventories



Legend

- Boulders/Loose Rock
- Gravel
- Made Ground (Man Made)
- Mud
- Mud and Gravel
- Not Present
- Rock Platform
- Rock Platform with Bank of Gravel
- Rock Platform with Boulders/Loose Rock
- Sand
- Sand and Gravel
- Sand and Mud
- Unspecified
- 3
- 4
- 5
- 6
- Corn Bunting (England)
- Lapwing (England)

Projection = OSGB36

xmin = 561500

ymin = 173300

xmax = 566500

ymax = 175600

Map produced by MAGiC on 10 December, 2014.

Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGiC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

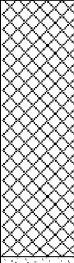
APPENDIX C

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No.		Site: Imperial Wharf, Gravesend				Borehole Log				
		AG2119-14		Client: F M Conway Ltd				BH3				
				Engineer: Clark Smith Partnership				Sheet 1 of 3				
Date 06/11/2014-07/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.72m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata	O.D Level	Depth (m)	Stand Pipe	Legend	
							Tarmacadam over roadstone. (Drillers description) (MADE GROUND)	5.32	0.40			
							CONCRETE. (MADE GROUND)					
							CONCRETE boulders. (Drillers description) (MADE GROUND)	5.02	0.70			
	1.50	D						4.22	1.50			
	2.00 2.00-2.45 2.00 2.50	D U(13) D					Brown slightly gravelly silty fine to medium SAND. Gravel is fine to medium subrounded chalk, flint and occasional limestone. (MADE GROUND)	3.92	1.80			
	3.00 3.00-3.45	SPT D		3N 3/300			Structureless CHALK composed of cream gravelly SILT. Gravel is extremely weak low density white and subangular with rare fine subangular to angular flint. (SEAFORD CHALK FORMATION) From 2.50m bgl: Brown.					
	4.00 4.00-4.45 4.00-4.50	D B										
	5.00 5.00-5.45	SPT D		3N 3/300								
	6.00	D										
	6.50 6.50-6.95 7.00	SPT D D		34N 34/300			CHALK recovered as cream slightly gravelly SILT. Gravel is extremely weak low density white and subangular with occasional fine subangular to angular flint and occasional black specs. (SEAFORD CHALK FORMATION)	-0.78	6.50			
8.00 8.00-8.45 8.50-9.00	SPT D B		19N 19/300									
9.50 9.50-9.95	SPT D		16N 16/300									
Continued next sheet												
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. Chiselling from 0.50m to 1.50m bgl and 1.00m to 3.15m bgl (2 hrs 15 mins). 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.45m bgl.							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							4.20	3.00	-	-	06/11/2014	

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log				
								BH3				
								Sheet 2 of 3				
Date 06/11/2014-07/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.72m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata		O.D Level	Depth (m)	Stand Pipe	Legend
	10.00	D					CHALK recovered as cream slightly gravelly SILT. Gravel is extremely weak low density white and subangular with occasional fine subangular to angular flint and occasioanal black specs. (SEAFORD CHALK FORMATION)					
	11.00 11.00-11.45	SPT D		23N 23/300								
	12.00	D										
	12.50 12.50-12.95	SPT D		16N 16/300								
	13.00	D										
	13.50-14.00	B										
	14.00 14.00-14.45	SPT D		19N 19/300								
	15.00	D										
	15.50 15.50-15.95	SPT D		21N 21/300								
	16.00	D										
	17.00 17.00-17.45	SPT D		17N 17/300								
	18.00	D										
	18.50 18.50-18.95	SPT D		27N 27/300								
	19.00	D										
19.50							Continued next sheet					
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. Chiselling from 0.50m to 1.50m bgl and 1.00m to 3.15m bgl (2 hrs 15 mins). 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.45m bgl.							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							4.20	3.00	-	-	06/11/2014	

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Borehole Log					
					BH3							
					Sheet 3 of 3							
Date 06/11/2014-07/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.72m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -		Ground Slope				
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata	O.D Level	Depth (m)	Stand Pipe	Legend	
	20.00 20.00-20.45	SPT D		24N 24/300			CHALK recovered as cream slightly gravelly SILT. Gravel is extremely weak low density white and subangular with occasional fine subangular to angular flint and occasioanal black specs. (SEAFORD CHALK FORMATION) End of Borehole at 20.45 m	-14.73	20.45			
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. Chiselling from 0.50m to 1.50m bgl and 1.00m to 3.15m bgl (2 hrs 15 mins). 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.45m bgl.							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							4.20	3.00	-	-	06/11/2014	

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log			
											BH4			
											Sheet 1 of 1			
Date 11/11/2014			Hole Diameter (mm) 150mm to 2.15m			Ground Level 5.83m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion						Depth (m) 2.15		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata				O.D Level	Depth (m)	Stand Pipe	Legend
	0.50	D					Rough grass over dark brown slightly clayey gravelly fine to medium SAND. Gravel is fine to coarse subangular to angular concrete, brick with occasional flint. . (MADE GROUND)							
	1.00 1.20 1.20-1.70	D SPT(C) B		18N 18/300										
	2.00	SPT(C) D		0/0			CONCRETE. (MADE GROUND)				3.73	2.10		
							End of Borehole at 2.15 m				3.68	2.15		
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. Chiselling from 2.10m to 2.15m bgl (1 hr). Unable to advance beyond concrete at 2.10m bgl, moved borehole position to BH4A. Borehole backfilled with arisings on completion.							GROUNDWATER							
							Struck	Cased	20 mins	Sealed	Date	Remarks		
							No Groundwater	Encountered						

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log						
											BH4A						
											Sheet 1 of 1						
Date 11/11/2014			Hole Diameter (mm) 150mm to 1.75m			Ground Level 5.83m AOD		Logged By FHJ		Checked By JLA		Scale 1:50					
Method Cable Percussion						Depth (m) 1.75		Co-ordinates -				Ground Slope					
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata				O.D Level	Depth (m)	Stand Pipe	Legend			
	0.50	D					Rough grass over dark brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to angular concrete, brick and occasional flint, with cobbles of concrete. (MADE GROUND)										
	1.00 1.20 1.20-1.70	D SPT(C) B		14N 14/300													
								CONCRETE. (MADE GROUND)				4.13 4.08	1.70 1.75				
							End of Borehole at 1.75 m										
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. Chiselling from 1.70m to 1.75m bgl (1 hr). Unable to advance beyond concrete at 1.70m bgl, moved borehole position to BH4B. Borehole backfilled with arisings on completion.										GROUNDWATER							
										Struck	Cased	20 mins	Sealed	Date	Remarks		
										No Groundwater Encountered							

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log				
								BH4B				
								Sheet 2 of 3				
Date 11/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.83m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata		O.D Level	Depth (m)	Stand Pipe	Legend
	10.00	D					CHALK recovered as white mottled yellow-brown SILT, occasionally silty GRAVEL. Gravel is extremely weak, low density, white and subrounded with occasional fine to medium subangular to angular flint. (SEAFORD CHALK FORMATION)					
	11.00 11.00-11.45	SPT D		22N 22/300								
	12.00	D										
	12.50 12.50-12.95	SPT D		31N 31/300								
	13.00	D										
	14.00 14.00-14.45	SPT D		28N 28/300								
	15.00	D										
	15.50 15.50-15.95	SPT D		24N 24/300								
	16.00	D										
	17.00 17.00-17.45	SPT D		27N 27/300								
	18.00	D										
	18.50 18.50-18.95	SPT D		24N 24/300								
	19.00	D										
19.50 150mm							Continued next sheet					
GENERAL REMARKS: Hand dug service inspection pit not required as set up on old trial pit. BH4B drilled over TP7 therefore testing commenced at 2.00m bgl. 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.45m bgl							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							4.20	3.00	-	-	11/11/2014	

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14			Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log			
										BH4B			
										Sheet 3 of 3			
Date 11/11/2014			Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.83m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion					Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata			O.D Level	Depth (m)	Stand Pipe	Legend
	20.00 20.00-20.45	SPT D		21N 21/300			CHALK recovered as white mottled yellow-brown SILT, occasionally silty GRAVEL. Gravel is extremely weak, low density, white and subrounded with occasional fine to medium subangular to angular flint. (SEAFORD CHALK FORMATION) End of Borehole at 20.45 m			-14.62	20.45		
GENERAL REMARKS: Hand dug service inspection pit not required as set up on old trial pit. BH4B drilled over TP7 therefore testing commenced at 2.00m bgl. 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.45m bgl							GROUNDWATER						
							Struck	Cased	20 mins	Sealed	Date	Remarks	
							4.20	3.00	-	-	11/11/2014		

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log			
										BH5			
										Sheet 1 of 1			
Date 03/11/2014		Hole Diameter (mm)				Ground Level 5.37m AOD		Logged By FHJ		Checked By JLA		Scale 1:50	
Method Cable Percussion						Depth (m) 4.20		Co-ordinates -				Ground Slope	
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata			O.D Level	Depth (m)	Stand Pipe	Legend
							CONCRETE. (MADE GROUND)			5.17	0.20		
							Grey sandy fine to coarse subangular to angular concrete gravel. (MADE GROUND)			5.07	0.30		
							CONCRETE. (MADE GROUND)			4.97	0.40		
							VOID						
							End of Borehole at 4.20 m			1.17	4.20		
GENERAL REMARKS: JCB broke out concrete and found chamber. Void encountered to 4.20m bgl. Water sitting at 1.40m bgl. Moved borehole position to BH5A. Borehole backfilled with arisings on completion.							GROUNDWATER						
							Struck	Cased	20 mins	Sealed	Date	Remarks	
							No Groundwater	Encountered					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14			Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Borehole Log				
									BH5A				
									Sheet 1 of 3				
Date 03/11/2014-04/11/2014			Hole Diameter (mm) 150mm to 20.00m		Ground Level 4.67m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion					Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata			O.D Level	Depth (m)	Stand Pipe	Legend
	0.50	D					TARMACADAM over brick ash fill. (Drillers description) (MADE GROUND)						
	1.00 1.20	D SPT(C)		2N 2/300			Dark grey-brown slightly silty gravelly fine to medium SAND. Gravel is fine to medium subangular to angular chalk. (staurated) (MADE GROUND)			3.87	0.80		
	2.00	SPT(C) D		50/10			Soft dark grey slightly gravelly sandy SILT. Gravel is fine to coarse subangular to angular concrete and occasional fine to medium subangular chalk. (saturated) (POSSIBLE MADE GROUND)			2.62	2.05		
	2.50	D								2.17	2.50		
	3.00 3.00-3.45	SPT D		12N 12/300			Strutureless CHALK composed of cream slightly gravelly SILT. Gravel is fine to medium subangular to angular flint and with black specs. (SEAFORD CHALK FORMATION)						
	4.00 4.00-4.45	SPT D		27N 27/300									
	5.00 5.00-5.45	SPT D		11N 11/300			From 5.00m bgl: Without black speckles and with fine to coarse flint.						
	6.00	D					CHALK recovered as cream gravelly SILT, occasionally silty GRAVEL. Gravel is very weak medium density white and subangular, with occasional fine to medium subangular to angular flint and black specs. (SEAFORD CHALK FORMATION)			-1.33	6.00		
	6.50 6.50-6.95	SPT D		22N 22/300									
	7.00	D					From 7.00m bgl: With fine to medium subangular to angular flint.						
	8.00 8.00-8.45	SPT D		22N 22/300			From 8.00m bgl: Extremely weak and low density.						
	9.00	D											
	9.50 9.50-9.95	SPT D		19N 19/300									
							Continued next sheet						
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.00m bgl.							GROUNDWATER						
							Struck	Cased	20 mins	Sealed	Date	Remarks	
							No Groundwater Encountered						

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log				
								BH5A				
								Sheet 2 of 3				
Date 03/11/2014-04/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 4.67m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata		O.D Level	Depth (m)	Stand Pipe	Legend
	10.00	D					CHALK recovered as cream gravelly SILT, occasionally silty GRAVEL. Gravel is very weak medium density white and subangular, with occasional fine to medium subangular to angular flint and black specs. (SEAFORD CHALK FORMATION)					
	11.00 11.00-11.45	SPT D		20N 20/300			From 11.00m bgl: With coarse subangular to angular flint.					
	12.00	D										
	12.50 12.50-12.95	SPT D		31N 31/300								
	13.00	D										
	14.00 14.00-14.45	SPT D		50N 50/300								
	15.00	D					From 15.00m bgl: Clasts are extremely weak, low density.					
	15.50 15.50-15.95	SPT D		27N 27/300								
	16.00	D										
	17.00 17.00-17.45	SPT D		17N 17/300			From 17.00m bgl: Fine flint.					
	18.00	D										
	18.50 18.50-18.95	SPT D		20N 20/300								
	19.00	D										
							Continued next sheet					
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.00m bgl.							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							No Groundwater Encountered					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log				
								BH5A				
								Sheet 3 of 3				
Date 03/11/2014-04/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 4.67m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -				Ground Slope		
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata		O.D Level	Depth (m)	Stand Pipe	Legend
20.00 150mm	20.00 20.00-20.45	SPT D		23N 23/300			CHALK recovered as cream gravelly SILT, occasionally silty GRAVEL. Gravel is very weak medium density white and subangular, with occasional fine to medium subangular to angular flint and black specs. (SEAFORD CHALK FORMATION) End of Borehole at 20.45 m		-15.78	20.45		
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed 7.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 4.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.00m bgl.							GROUNDWATER					
							Struck	Cased	20 mins	Sealed	Date	Remarks
							No Groundwater	Encountered				

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log					
											BH6					
											Sheet 2 of 3					
Date 05/11/2014-06/11/2014			Hole Diameter (mm) 150mm to 20.00m			Ground Level 5.20m AOD		Logged By FHJ		Checked By JLA		Scale 1:50				
Method Cable Percussion						Depth (m) 20.45		Co-ordinates -				Ground Slope				
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata				O.D Level	Depth (m)	Stand Pipe	Legend		
	10.00	D					CHALK recovered as cream gravelly SILT. Gravel is fine to coarse subangular to angular flint. (SEAFORD CHALK FORMATION)									
	11.00 11.00-11.45	SPT D		24N 24/300												
	12.00	D														
	12.50 12.50-12.95	SPT D		19N 19/300												
	13.00	D														
	14.00 14.00-14.45	SPT D		19N 19/300												
	15.00	D														
	15.50 15.50-15.95	SPT D		31N 31/300												
	16.00	D														
	17.00 17.00-17.45	SPT D		25N 25/300												
	18.00	D														
	18.50 18.50-18.95	SPT D		44N 44/300												
	19.00	D														
19.50							Continued next sheet									
GENERAL REMARKS: Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed 11.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 11.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.00m bgl.							GROUNDWATER									
							Struck	Cased	20 mins	Sealed	Date	Remarks				
							3.70	2.50	-	-	05/11/2014					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682		Job No. AG2119-14		Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership				Borehole Log				
								BH6				
								Sheet 3 of 3				
Date 05/11/2014-06/11/2014		Hole Diameter (mm) 150mm to 20.00m		Ground Level 5.20m AOD		Logged By FHJ		Checked By JLA		Scale 1:50		
Method Cable Percussion				Depth (m) 20.45		Co-ordinates -		Ground Slope				
Casing Date Depth & Diameter	Depth (m)	Sample Type	PID (ppm)	SPT N or Cu	PL/ LL	NMC	Description of Strata	O.D Level	Depth (m)	Stand Pipe	Legend	
	20.00 20.00-20.45	SPT D		27N 27/300			CHALK recovered as cream gravelly SILT. Gravel is fine to coarse subangular to angular flint. (SEAFORD CHALK FORMATION) End of Borehole at 20.45 m	-15.25	20.45			
GENERAL REMARKS:							GROUNDWATER					
Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed 11.00m bgl, plain pipe ground level to 3.00m and slotted pipe 3.00m to 11.00m. 19mm diameter standpipe installed to 2.00m bgl, plain pipe ground level to 1.00m and slotted pipe 1.00m to 2.00m. Borehole backfilled with bentonite ground level to 1.00m bgl, gravel to 2.00m bgl, bentonite to 3.00m bgl and gravel to 20.00m bgl.							Struck	Cased	20 mins	Sealed	Date	Remarks
							3.70	2.50	-	-	05/11/2014	

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log		
										TP1		
										Sheet 1 of 1		
Method Backhoe excavator			Date 03/11/2014			Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 2.10	Breadth (m) 0.90	Orientation -	Depth (m) 1.00		Ground Level 5.32m AOD	Co-ordinates -			Ground Slope			
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend		
	Type	Strength										
0.50	ES B		0.00			VH	CONCRETE hardstanding. (MADE GROUND)	4.92	0.40			
							Yellow-brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to angular concrete and chalk with frequent cobbles of concrete and occasional fine to coarse subangular to angular brick. (MADE GROUND)					
	0.90						B		M	Yellow-brown gravelly fine to medium SAND. Gravel is fine to medium subangular to angular flint and chalk. (MADE GROUND)	4.52	0.80
							End of Trial Pit at 1.00 m	4.32	1.00			
GROUNDWATER DETAILS: Groundwater not encountered.						KEY						
STABILITY OF PIT WALLS: Stable.						SAMPLES B = Bulk ES = Amber Glass Jar D = Tub CBR = CBR Test W = Water SPT = Insitu Penetration Test						
GENERAL REMARKS: Electric cable encountered at 0.90m bgl no signal with CAT, not disturbed. Trial pit backfilled with arisings on completion.						SHEAR STRENGTH (kN/m2) V=Hand Vane P=Hand Penetrometer						
						GROUNDWATER ▽ Entry ▼ Standing Level						
						Ease of Dig E = Easy M = Moderate H = Hard VH = Very Hard						

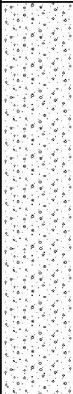
APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership		Trial Pit Log		
									TP2		
									Sheet 1 of 1		
Method Backhoe excavator			Date 03/11/2014		Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 2.80	Breadth (m) 0.70	Orientation 90	Depth (m) 3.90		Ground Level 6.00m AOD	Co-ordinates -			Ground Slope		
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend	
	Type	Strength									
0.50	ES		0.00			M	Loose type one GRAVEL. (MADE GROUND)	5.80	0.20		
							Dark grey slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse subangular to angular concrete. (MADE GROUND)				
	1.00	D					M	From 0.60m bgl: With timber fragments.			
	1.40	D					M	Structureless CHALK composed of silty subangular to angular fine to coarse GRAVEL. Gravel is weak, low density, white. Matrix is white-brown. (SEAFORD CHALK FORMATION)			
2.30	D		M		From 2.60m bgl: With occasional fine to coarse subangular to angular flint.	2.50	3.50				
	3.80	D			E	Structureless CHALK composed of cream slightly gravelly SILT. Gravel is weak, low density white subangular to angular. Locally light brown with a trace of brown clay. (SEAFORD CHALK FORMATION)					
						End of Trial Pit at 3.90 m	2.10	3.90			
GROUNDWATER DETAILS: Groundwater not encountered.						KEY					
STABILITY OF PIT WALLS: Collapsing from 0.40m to 0.90m and 1.60m to 3.80m bgl.						SAMPLES B = Bulk D = Tub W = Water ES = Amber Glass Jar CBR = CBR Test SPT = Insitu Penetration Test					
GENERAL REMARKS: Trial pit backfilled with arisings on completion.						SHEAR STRENGTH (kN/m2) V=Hand Vane P=Hand Penetrometer					
						GROUNDWATER ∇ Entry ▼ Standing Level					
						Ease of Dig E = Easy H = Hard M = Moderate VH = Very Hard					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend		Trial Pit Log		
									TP3		
									Sheet 1 of 1		
Method Backhoe excavator			Date 03/11/2014		Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 3.10	Breadth (m) 0.70	Orientation 90	Depth (m) 3.20		Ground Level 5.79m AOD	Co-ordinates -			Ground Slope		
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend	
	Type	Strength									
0.50	ES		0.00			VH	Tarmacadam hardstanding. (MADE GROUND)	5.69	0.10		
							Pinkish-brown sandy GRAVEL. Gravel is fine to coarse subangular to angular concrete. (MADE GROUND-ROADSTONE)				
1.00	B					VH	Reinforced CONCRETE hardstanding. (MADE GROUND)	5.19	0.60		
							Brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse subangular to angular flint and occasional concrete. (MADE GROUND)	5.09	0.70		
1.90	B					H					
2.40	D					M	Structureless CHALK composed of silty subangular to angular GRAVEL. Gravel is weak, low density white with flint. Matrix is compacted, light grey and white. (SEAFORD CHALK FORMATION)	4.34	1.45		
3.10	D					E	Structureless CHALK composed of cream, slightly gravelly SILT. Gravel is weak, low density, subangular to angular. (SEAFORD CHALK FORMATION)	3.49	2.30		
							End of Trial Pit at 3.20 m	2.59	3.20		
GROUNDWATER DETAILS: Groundwater not encountered.							KEY SAMPLES B = Bulk D = Tub W = Water SHEAR STRENGTH (kN/m2) V=Hand Vane GROUNDWATER ∇ Entry ▼ Standing Level Ease of Dig E = Easy H = Hard M = Moderate VH = Very Hard ES = Amber Glass Jar CBR = CBR Test SPT = Insitu Penetration Test P=Hand Penetrometer				
STABILITY OF PIT WALLS: Stable.											
GENERAL REMARKS: Tarmacadam and concrete broken out with the aid of an hydraulic breaker. Trial pit backfilled with arisings on completion.											

[illegible]

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log		
										TP5		
										Sheet 1 of 1		
Method Backhoe excavator			Date 04/11/2014			Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 2.20	Breadth (m) 0.80	Orientation 90	Depth (m) 0.90		Ground Level 5.65m AOD		Co-ordinates -			Ground Slope		
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend		
	Type	Strength										
0.30	ES		0.00			VH	Tarmacadam hardstanding. (MADE GROUND)	5.60	0.05			
0.50	B					H	Yellow-brown sandy GRAVEL. Gravel is concrete and brick. (MADE GROUND) At 0.30m bgl: Redundant pipe and cable fragment. From 0.40m bgl: With frequent whole bricks.					
							End of Trial Pit at 0.90 m	4.75	0.90			
GROUNDWATER DETAILS: Groundwater encountered at 0.40m bgl. STABILITY OF PIT WALLS: Collapsing from 0.40m bgl. GENERAL REMARKS: Unable to visualise bottom of pit due to water, cannot break through, pit abandoned. Trial pit backfilled with arisings on completion.							KEY SAMPLES B = BulkES = Amber Glass JarD = TubCBR = CBR TestW = WaterSPT = Insitu Penetration Test SHEAR STRENGTH (kN/m2) V=Hand VaneP=Hand Penetrometer GROUNDWATER ∇ Entry ▼ Standing Level Ease of Dig E = EasyM = ModerateH = HardVH = Very Hard					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log		
										TP6		
										Sheet 1 of 1		
Method Backhoe excavator			Date 04/11/2014				Logged By FHJ		Checked By JLA		Scale 1:25	
Length (m) 4.00	Breadth (m) 0.80	Orientation 0	Depth (m) 3.30		Ground Level 5.67m AOD		Co-ordinates -				Ground Slope	
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend		
	Type	Strength										
0.20	ES		0.00			VH	Rough grass and brambles over dark brown slightly clayey gravelly fine to medium SAND. Gravel is fine to coarse subangular to angular flint and occasional chalk, concrete and brick. With rootlets. (MADE GROUND)					
1.00	D							4.07	1.60			
2.00	B				H	Dark brown sandy GRAVEL. Gravel is fine to coarse subangular to angular brick, concrete with occasional fragments of tiles and cobbles of concrete. (MADE GROUND)						
3.00	D				E	Soft brown slightly silty gravelly CLAY. Gravel is fine to coarse subangular to angular chalk and flint with occasional fine to medium subangular to angular coal. (POSSIBLE MADE GROUND)	2.97	2.70				
							End of Trial Pit at 3.30 m	2.37	3.30			
GROUNDWATER DETAILS: Groundwater not encountered.							KEY					
STABILITY OF PIT WALLS: Collapsing from 1.10m to 2.70m bgl.							SAMPLES B = Bulk ES = Amber Glass Jar D = Tub CBR = CBR Test W = Water SPT = Insitu Penetration Test					
GENERAL REMARKS: Trial pit backfilled with arisings on completion.							SHEAR STRENGTH (kN/m2) V=Hand Vane P=Hand Penetrometer					
							GROUNDWATER ∇ Entry ▼ Standing Level					
							Ease of Dig E = Easy M = Moderate H = Hard VH = Very Hard					

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log		
										TP7		
										Sheet 1 of 1		
Method Backhoe excavator			Date 04/11/2014				Logged By FHJ		Checked By JLA		Scale 1:25	
Length (m) 2.60	Breadth (m) 0.70	Orientation 90	Depth (m) 2.60		Ground Level 5.83m AOD		Co-ordinates -				Ground Slope	
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend		
	Type	Strength										
0.40	ES		0.00			M	Rough grass over dark brown sandy GRAVEL. Gravel is fine to coarse subangular to angular brick, concrete, with rootlets and occasional fragments of plastic.					
1.40	D				E	Structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white, subangular to angular. (SEAFORD CHALK FORMATION)	4.53	1.30				
2.10	D					From 2.10m bgl: With occasional fine to medium subangular to angular flint.						
						End of Trial Pit at 2.60 m	3.23	2.60				
GROUNDWATER DETAILS: Groundwater not encountered.							KEY SAMPLES B = BulkES = Amber Glass JarD = TubCBR = CBR TestW = WaterSPT = Insitu Penetration Test SHEAR STRENGTH (kN/m2) V=Hand VaneP=Hand Penetrometer GROUNDWATER ▽ Entry ▼ Standing Level Ease of Dig E = EasyM = ModerateH = HardVH = Very Hard					
STABILITY OF PIT WALLS: Stable.												
GENERAL REMARKS: Trial pit backfilled with arisings on completion.												

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14				Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership		Trial Pit Log		
									TP8		
									Sheet 1 of 1		
Method Backhoe excavator			Date 04/11/2014		Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 3.00	Breadth (m) 0.80	Orientation -	Depth (m) 2.60		Ground Level 5.78m AOD		Co-ordinates -			Ground Slope	
Depth (m)	SOIL SAMPLES/TESTS		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata	O.D Level	Depth (m)	Legend	
	Type	Strength									
1.20	ES		0.00			M	Rough grass over dark brown sandy GRAVEL. Gravel is fine to coarse subangular to angular concrete with occasional fine to medium subangular to angular flint, fine to coarse brick and rootlets. (MADE GROUND)	3.18	2.60		
							From 1.40m bgl: No flint.				
End of Trial Pit at 2.60 m											
GROUNDWATER DETAILS: Groundwater not encountered.							KEY SAMPLES B = BulkD = TubW = Water SHEAR STRENGTH (kN/m2) V=Hand Vane GROUNDWATER ∇ Entry Ease of Dig E = EasyH = Hard ES = Amber Glass JarCBR = CBR TestSPT = Insitu Penetration TestP=Hand Penetrometer				
STABILITY OF PIT WALLS: Collapsing from 1.30m to 2.60m bgl.											
GENERAL REMARKS: Unable to advance beyond 2.60m bgl due to unstable ground. Trial pit backfilled with arisings on completion.											

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14			Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log TP9 Sheet 1 of 1					
Method Backhoe excavator			Date 04/11/2014			Logged By FHJ		Checked By JLA		Scale 1:25				
Length (m) 0.30	Breadth (m) 0.30	Orientation 0	Depth (m) 0.30		Ground Level 5.67m AOD	Co-ordinates -				Ground Slope				
Depth (m)	SOIL SAMPLES/TESTS TypeStrength		PID (ppm)	PL/LL %	M/C %	Ease of Dig	Description of Strata			O.D Level	Depth (m)	Legend		
0.20	ES		0.00			VH H	Tarmacadam hardstanding. (MADE GROUND) Pink-brown sandy GRAVEL. Gravel is fine to coarse subangular to angular concrete. (ROADSTONE-MADE GROUND) End of Trial Pit at 0.30 m			5.62 5.37	0.05 0.30			
GROUNDWATER DETAILS: Groundwater not encountered. STABILITY OF PIT WALLS: Stable. GENERAL REMARKS: Trial pit carried out for shallow soil sampling. Trial pit backfilled with arisings on completion.												KEY SAMPLES B = Bulk D = Tub W = Water SHEAR STRENGTH (kN/m2) GROUNDWATER Ease of Dig B = Bulk D = Tub W = Water V=Hand Vane ES = Amber Glass Jar CBR = CBR Test SPT = Insitu Penetration Test P=Hand Penetrometer Entry Standing Level E = Easy H = Hard M = Moderate VH = Verv Hard		

APPLIED GEOLOGY Tel: 02476511822 Fax: 02476697682			Job No. AG2119-14			Site: Imperial Wharf, Gravesend Client: F M Conway Ltd Engineer: Clark Smith Partnership			Trial Pit Log TP10 Sheet 1 of 1			
Method Backhoe excavator			Date 04/11/2014			Logged By FHJ		Checked By JLA		Scale 1:25		
Length (m) 0.30	Breadth (m) 0.30	Orientation 0	Depth (m) 0.30		Ground Level 5.61m AOD	Co-ordinates -			Ground Slope			
Depth (m) 0.20	SOIL SAMPLES/TESTS TypeStrength ES		PID (ppm) 0.00	PL/LL %	M/C %	Ease of Dig VH H	Description of Strata Tarmacadam hardstanding. (MADE GROUND) Pink-brown sandy GRAVEL. Gravel is fine to coarse subangular to angular concrete. (ROADSTONE-MADE GROUND) End of Trial Pit at 0.30 m			O.D Level 5.56 5.31	Depth (m) 0.05 0.30	Legend
GROUNDWATER DETAILS: Groundwater not encountered. STABILITY OF PIT WALLS: Stable. GENERAL REMARKS: Trial pit carried out for shallow soil sampling. Trial pit backfilled with arisings on completion.						KEY SAMPLES B = BulkD = TubW = Water SHEAR STRENGTH (kN/m2) GROUNDWATER ▽ Entry ▼ Standing Level Ease of Dig E = EasyH = Hard M = ModerateVH = Verv Hard ES = Amber Glass JarCBR = CBR TestSPT = Insitu Penetration TestP=Hand Penetrometer						

APPENDIX D

TEST CERTIFICATE

Unit 23, Abbey Park, Stareton,
Kenilworth, Warwickshire, CV8 2LY
t: 02476 511822 f: 02476 697682

Determination of TRL Dynamic Cone Penetrometer

Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Client: F M Conway Ltd
Client Address: Conway House, Rochester Way
Dartford
Kent
Postcode: DA1 3QY
Contact: Andrew Hack
Test Technician: F Hadley-Jones
Site Name: Imperial Wharf
Site Address: Gravesend

Certificate Number: TRL DCP 1

Client Reference:
Job Number: AG2119-14
Grid Co-ordinate:
Date Tested: 05/11/2014

Test Results:

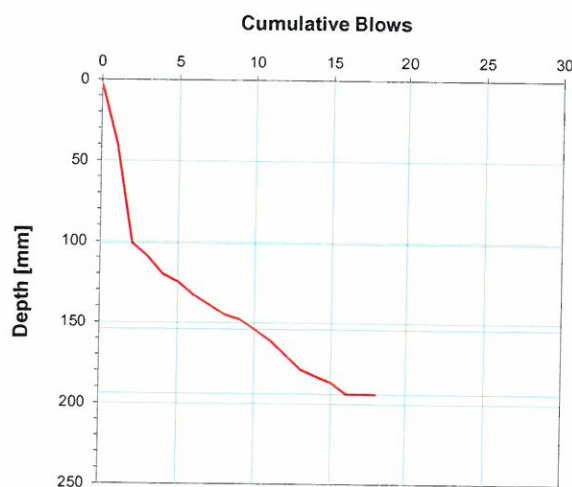
Sample Description: TRRL DCP

Sample Number:

Start Depth [mm]: Ground Level

Test Location: TRL DCP 1

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	2	2	5	101	101
Layer 2	8	10	41	53	154
Layer 3	8	18	55	40	194



Comments: TRL Equation : $\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{Strength})$

Approved Signatory: S Day
T Collins

Name: S Day

Signed:

for and behalf of

Date Reported: 12 November 2014
Form Number: AG-S-08

Position: Director

Page 1 of 1

APPLIED GEOLOGY LIMITED
Registered in England & Wales
Registration No. 6882453.
Registered Office: Unit 23, Abbey
Park, Stareton, Kenilworth,
Warwickshire CV8 2LY

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Geology

TEST CERTIFICATE

Unit 23, Abbey Park, Stareton,
Kenilworth, Warwickshire, CV8 2LY
t: 02476 511822 f: 02476 697682

Determination of TRL Dynamic Cone Penetrometer

Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Client: F M Conway Ltd
Client Address: Conway House, Rochester Way
Dartford
Kent
Postcode: DA1 3QY
Contact: Andrew Hack
Test Technician: F Hadley-Jones
Site Name: Imperial Wharf
Site Address: Gravesend

Certificate Number: TRL DCP 4

Client Reference:
Job Number: AG2119-14
Grid Co-ordinate:
Date Tested: 05/11/2014

Test Results:

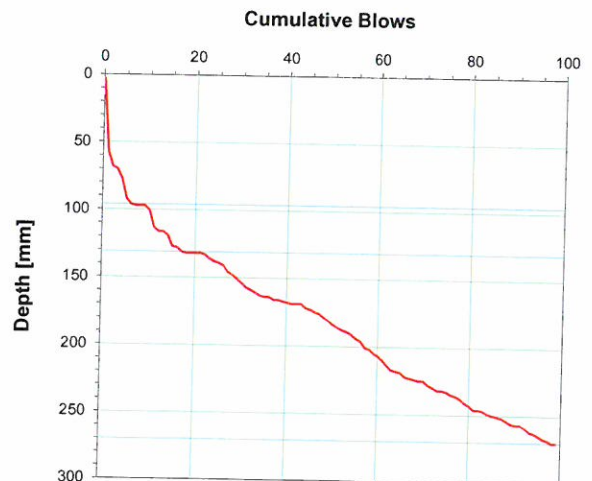
Sample Description: TRRL DCP

Sample Number:

Start Depth [mm]:

Test Location: TRL DCP 4

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	6	6	16	96	96
Layer 2	11	17	89	35	131
Layer 3	82	99	>100	139	270



Comments: TRL Equation : $\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{Strength})$

Approved Signatory: S Day
T Collins

Name: S Day

Signed:

for and behalf of

APPLIED GEOLOGY LIMITED
Registered in England & Wales
Registration No. 6882453
Registered Office: Unit 23, Abbey
Park, Stareton, Kenilworth,
Warwickshire CV8 2LY

Date Reported: 12 November 2014
Form Number: AG-S-08

Position: Director
Page 1 of 1

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TEST CERTIFICATE

Unit 23, Abbey Park, Stareton,
Kenilworth, Warwickshire, CV8 2LY
t: 02476 511822 f: 02476 697682

Determination of TRL Dynamic Cone Penetrometer

Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Client: F M Conway Ltd
Client Address: Conway House, Rochester Way
Dartford
Kent
Postcode: DA1 3QY
Contact: Andrew Hack
Test Technician: F Hadley-Jones
Site Name: Imperial Wharf
Site Address: Gravesend

Certificate Number: TRL DCP 5

Client Reference:
Job Number: AG2119-14
Grid Co-ordinate:
Date Tested: 05/11/2014

Test Results:

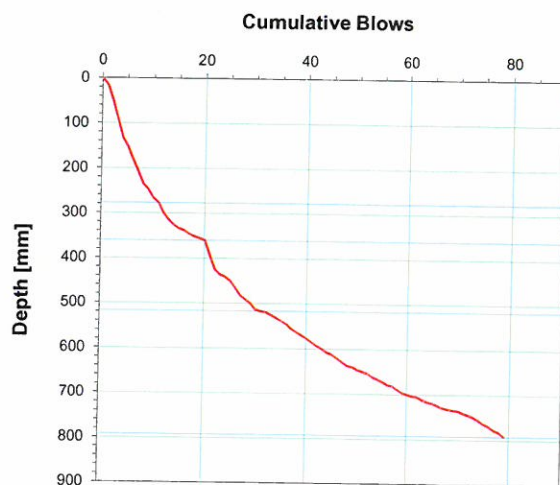
Sample Description: TRRL DCP

Sample Number:

Start Depth [mm]: Ground Level

Test Location: TRL DCP 5

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	11	11	10	277	277
Layer 2	9	20	29	83	360
Layer 3	11	31	18	157	517
Layer 4	48	79	48	275	792



Comments: TRL Equation : $\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{Strength})$

Approved Signatory: S Day
T Collins

Name: S Day

Signed:

S. Day

Position: Director

Date Reported: 12 November 2014
Form Number: AG-S-08

Page 1 of 1

for and behalf of

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Warwickshire CV8 2LY

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TEST CERTIFICATE

Unit 23, Abbey Park, Stareton,
Kenilworth, Warwickshire, CV8 2LY
t: 02476 511822 f: 02476 697682

Determination of TRL Dynamic Cone Penetrometer

Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Client: F M Conway Ltd
Client Address: Conway House, Rochester Way
Dartford
Kent
Postcode: DA1 3QY
Contact: Andrew Hack
Test Technician: F Hadley-Jones
Site Name: Imperial Wharf
Site Address: Gravesend

Certificate Number: TRL DCP 6

Client Reference:
Job Number: AG2119-14
Grid Co-ordinate:
Date Tested: 05/11/2014

Test Results:

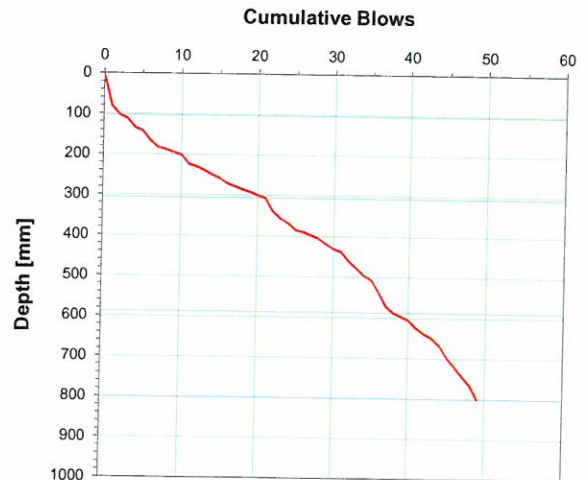
Sample Description: TRRL DCP

Sample Number:

Start Depth [mm]: Ground Level

Test Location: TRL DCP 6

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	2	2	5	103	103
Layer 2	19	21	25	203	306
Layer 3	17	38	16	282	588
Layer 4	11	49	13	212	800



Comments: TRL Equation : $\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{Strength})$

Approved Signatory: S Day
T Collins

Name: S Day

Signed:

for and behalf of

Date Reported: 12 November 2014
Form Number: AG-S-08

Position: Director

Page 1 of 1

APPLIED GEOLOGY LIMITED
Registered in England & Wales
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Park, Stareton, Kenilworth,
Warwickshire CV8 2LY

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Gas Monitoring Equipment Specification and Accuracy Details

Instrument Specifications

Instrument	Atmospheric Pressure Range	Temperature Range	Flow Range	Flow Resolution	Borehole Pressure Range	Test Time	Flow Volume
GFM 430	800 to 1200 mbar+/- 1m bar	-10°C to + 40°C	-30 to +30 l/hr	0.1l/hr	+1000 to - 1000 Pa	N/A	-
Mini Rae 2000	-	0 - 45°C	-	-	-	-	-
Pro Check Tiger	-	-20 to + 60°C (Certified to -15 to + 45°C)	-	-	-	-	-

Instrument Accuracy

Instrument		Methane	Lower Explosive Limit	Carbon Dioxide	Oxygen	Volatile Organic Compounds	Hydrogen Sulphide	Carbon Monoxide
GFM430	Detection Range	0-100%	0-100%	0 -100%	0-25%	NA	1500ppm response 30 secs	1000ppm response 30 Secs
	Detection Accuracy	+/- 0.2% @ 5% 1.0% @30% 3.0% @ 100% Response 20 secs	+/-4% of LEL Response 40 secs	Accuracy 0.1% @10% 3.0% @40% 3% @ 100% Response 20 Secs	+/- 0.5% Response 20 secs	NA	5% of fs	5% of fs
Mini Rae 2000	Detection Range	N/A	N/A	N/A	N/A	0-99ppm - 0.1ppm 2 sec 100-1999ppm 1.0ppm 2 sec 2000-10000 ppm 1.0 ppm 2 sec	N/A	N/A
	Detection Accuracy	N/A	N/A	N/A	N/A	0-2000 ppm +/- 2ppm or 10% >2000ppm +/- 20% reading (For Isobutylene 100ppm)	N/A	N/A
Pro Check Tiger	Detection Range	N/A	N/A	N/A	N/A	1 ppb - 10,000 ppm	N/A	N/A
	Detection Accuracy	N/A	N/A	N/A	N/A	+/- 1ppb +/- 5% of actual displayed accuracy +/- One digit Response < 2sec	N/A	N/A

Calibration Frequency

Equipment Serial Numbers

Instruments are calibrated annually. Details of the instrument calibration certificates and service records are available if required.	GFM430 - (10071, 10072, 10347) Mini Rae 2000 - (110-901200, 110-901321) Pro Check Tiger - (108308)	
--	---	---

Ground Gas Monitoring and Flow Results

Project/Site Name Imperial Wharf, Gravesend
Project Number AG2119-14

Date and Time of Monitoring 21st November 2014 (12:30-16.30)
Phase of Monitoring 1 of 4

BH No.	Ground Level (m AOD)	Flow Range (litres/hr over 3 mins)			Differential Pressure (pa)	Methane % v/v		Methane % LEL		Carbon dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	VOC (ppm)	Installed Depth (m bgl)	Diameter of installation (mm)	Water level (m bgl)	Water Level (m AOD)	Base of installation check (m bgl)
		Max	Min	Avg		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
BH3 (deep)	5.72	3.0	1.8	2.4	7-12	<0.1	<0.1	<0.1	<0.1	0.5	0.5	15.7	15.7	<0.1	1.0	NR	7.00	50.00	4.05	1.67	7.00
BH3 (shallow)	5.72	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	3.00	19.00	DRY	DRY	2.00
BH4B (deep)	5.83	3.3	3.0	3.0	10-16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.6	20.6	<0.1	1.0	NR	7.00	50.00	2.20	3.63	7.00
BH4B (shallow)	5.83	0.5	-0.6	0.2	-3 to 1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.6	21.3	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00
BH5A (deep)	4.67	<0.1	-1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.7	20.9	<0.1	<0.1	NR	7.00	50.00	3.15	1.52	7.00
BH5A (shallow)	4.67	2.6	2.4	2.5	9-12	<0.1	<0.1	<0.1	<0.1	0.3	0.3	20.0	20.0	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00
BH6 (deep)	5.2	3.0	2.4	2.5	8-12	<0.1	<0.1	<0.1	<0.1	2.9	2.9	13.7	13.7	<0.1	<0.1	NR	7.00	50.00	3.45	1.75	7.00
BH6 (shallow)	5.2	-0.1	-0.3	-0.3	-2 to 1	<0.1	<0.1	<0.1	<0.1	2.8	2.8	13.7	13.7	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00

Meteorological Data

Atmospheric Pressure (mb)	1016
Pressure Rising or Falling	Falling
Weather Conditions	Overcast/Rain
Atmospheric Oxygen (% vol)	21.1
Wind Speed & Direction	7 E
Ambient Air Tempertaure (°C)	10

Site Data

Monitoring Personnel	Jack Townsend		
GPS Instrument			
Equipment Used	GFM	PID	Flowmeter
Equipment Serial Number	10347		10347
Ground Conditions (vegetation stress, visual contamination)			

General Notes

Instrument specification data and calibration information is provided on a separate data sheet. Gas tap missing on 19mm standpipe of BH3. NR = Not recorded
APPLIED GEOLOGY

Ground Gas Monitoring and Flow Results

Project/Site Name Imperial Wharf, Gravesend
Project Number AG2119-14

Date and Time of Monitoring 27th November 2014 (13:00-14:00)
Phase of Monitoring 2 of 4

BH No.	Ground Level (m AOD)	Flow Range (litres/hr over 3 mins)			Differential Pressure (pa)	Methane % v/v		Methane % LEL		Carbon dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	VOC (ppm)	Installed Depth (m bgl)	Diameter of installation (mm)	Water level (m bgl)	Water Level (m AOD)	Base of installation check (m bgl)
		Max	Min	Avg		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
BH3 (deep)	5.72	2.8	1.9	2.1	4-8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	16.2	16.2	<0.1	<0.1	NR	7.00	50.00	6.01	-0.29	7.00
BH3 (shallow)	5.72	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	3.00	19.00	DRY	DRY	2.00
BH4B (deep)	5.83	2.0	<0.1	1.8	1-10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.7	20.7	<0.1	<0.1	NR	7.00	50.00	3.97	1.86	7.00
BH4B (shallow)	5.83	2.1	1.3	1.4	3-10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.9	20.9	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00
BH5A (deep)	4.67	<0.1	-1.0	<0.1	-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.7	20.9	<0.1	<0.1	NR	7.00	50.00	4.80	-0.13	7.00
BH5A (shallow)	4.67	3.0	2.2	2.5	6-18	<0.1	<0.1	<0.1	<0.1	0.2	0.2	20.0	20.0	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00
BH6 (deep)	5.2	3.2	2.2	2.5	6-18	<0.1	<0.1	<0.1	<0.1	2.8	2.8	13.9	13.9	<0.1	<0.1	NR	7.00	50.00	6.20	-1.00	7.00
BH6 (shallow)	5.2	-0.1	-0.2	-0.2	-1	<0.1	<0.1	<0.1	<0.1	3.1	3.1	13.8	13.8	<0.1	<0.1	NR	3.00	19.00	DRY	DRY	2.00

Meteorological Data

Atmospheric Pressure (mb)	1000
Pressure Rising or Falling	Falling
Weather Conditions	Overcast
Atmospheric Oxygen (% vol)	21.3
Wind Speed & Direction	7 E
Ambient Air Tempertaure (°C)	8

Site Data

Monitoring Personnel	Jack Townsend		
GPS Instrument			
Equipment Used	GFM	PID	Flowmeter
Equipment Serial Number	10347		10347
Ground Conditions (vegetation stress, visual contamination)			

General Notes

Instrument specification data and calibration information is provided on a separate data sheet. Gas tap missing on 19mm standpipe of BH3. NR = Not recorded)
APPLIED GEOLOGY

Ground Gas Monitoring and Flow Results

Project/Site Name Imperial Wharf, Gravesend
Project Number AG2119-14

Date and Time of Monitoring 4th December 2014 (14:00-15:00)
Phase of Monitoring 3 of 4

BH No.	Ground Level (m AOD)	Flow Range (litres/hr over 3 mins)			Differential Pressure (pa)	Methane % v/v		Methane % LEL		Carbon dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	VOC (ppm)	Installed Depth (m bgl)	Diameter of installation (mm)	Water level (m bgl)	Water Level (m AOD)	Base of installation check (m bgl)
		Max	Min	Avg		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
BH3 (deep)	5.72	3.0	2.8	2.8	10-12	<0.1	<0.1	<0.1	<0.1	0.8	0.8	16.2	16.2	<0.1	<0.1	<0.1	7.00	50.00	3.97	1.75	7.00
BH3 (shallow)	5.72	2.8	2.7	2.8	9-11	<0.1	<0.1	<0.1	<0.1	0.6	0.6	16.4	16.4	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH4B (deep)	5.83	2.9	2.6	2.8	10-12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.8	20.8	<0.1	<0.1	<0.1	7.00	50.00	4.13	1.70	7.00
BH4B (shallow)	5.83	2.1	<0.1	1.8	9-12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.8	20.8	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH5A (deep)	4.67	2.8	2.5	2.5	10-12	<0.1	<0.1	<0.1	<0.1	2.1	2.1	17.3	18.3	<0.1	<0.1	<0.1	7.00	50.00	3.36	1.31	7.00
BH5A (shallow)	4.67	3.1	2.5	2.8	10-13	<0.1	<0.1	<0.1	<0.1	1.2	1.2	20.1	20.2	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH6 (deep)	5.2	3.4	3.1	3.2	10-13	<0.1	<0.1	<0.1	<0.1	0.5	0.5	19.9	20.0	<0.1	<0.1	<0.1	7.00	50.00	3.06	2.14	7.00
BH6 (shallow)	5.2	3.2	2.8	3.1	9-12	<0.1	<0.1	<0.1	<0.1	0.5	0.5	20.0	20.0	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00

Meteorological Data

Atmospheric Pressure (mb)	1013
Pressure Rising or Falling	Steady
Weather Conditions	Rain
Atmospheric Oxygen (% vol)	20.9
Wind Speed & Direction	7 E
Ambient Air Tempertaure (°C)	4

Site Data

Monitoring Personnel	Jack Townsend		
GPS Instrument			
Equipment Used	GFM	PID	Flowmeter
Equipment Serial Number	10347	110-901321	10347
Ground Conditions (vegetation stress, visual contamination)			

General Notes

Instrument specification data and calibration information is provided on a separate data sheet.
APPLIED GEOLOGY

Ground Gas Monitoring and Flow Results

Project/Site Name Imperial Wharf, Gravesend
Project Number AG2119-14

Date and Time of Monitoring 12th December 2014 (11:00-12:00)
Phase of Monitoring 4 of 4

BH No.	Ground Level (m AOD)	Flow Range (litres/hr over 3 mins)			Differential Pressure (pa)	Methane % v/v		Methane % LEL		Carbon dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	VOC (ppm)	Installed Depth (m bgl)	Diameter of installation (mm)	Water level (m bgl)	Water Level (m AOD)	Base of installation check (m bgl)
		Max	Min	Avg		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
BH3 (deep)	5.72	0.6	0.1	0.4	3	<0.1	<0.1	<0.1	<0.1	1.0	1.0	17.1	17.1	<0.1	<0.1	<0.1	7.00	50.00	4.04	1.68	7.00
BH3 (shallow)	5.72	0.1	<0.1	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	17.2	17.2	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH4B (deep)	5.83	0.3	-0.1	<0.1	3	<0.1	<0.1	<0.1	<0.1	0.5	0.3	18.7	19.5	<0.1	<0.1	<0.1	7.00	50.00	4.20	1.63	7.00
BH4B (shallow)	5.83	0.3	0.2	0.2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.2	20.2	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH5A (deep)	4.67	1.0	0.1	0.9	4	<0.1	<0.1	<0.1	<0.1	1.8	1.8	17.5	17.5	<0.1	<0.1	<0.1	7.00	50.00	3.50	1.17	7.00
BH5A (shallow)	4.67	0.1	<0.1	0.1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00
BH6 (deep)	5.2	1.8	0.1	1.2	6	<0.1	<0.1	<0.1	<0.1	0.7	0.7	19.8	19.8	<0.1	<0.1	<0.1	7.00	50.00	3.00	2.20	7.00
BH6 (shallow)	5.2	1.0	0.1	0.1	1	<0.1	<0.1	<0.1	<0.1	0.7	0.7	19.8	19.8	<0.1	<0.1	<0.1	3.00	19.00	DRY	DRY	2.00

Meteorological Data

Atmospheric Pressure (mb)	991
Pressure Rising or Falling	Rising
Weather Conditions	Overcast
Atmospheric Oxygen (% vol)	20.5
Wind Speed & Direction	Light E
Ambient Air Tempertaure (°C)	6

Site Data

Monitoring Personnel	Jack Townsend		
GPS Instrument			
Equipment Used	GFM	PID	Flowmeter
Equipment Serial Number	10347	110-901200	10347
Ground Conditions (vegetation stress, visual contamination)			

General Notes

Instrument specification data and calibration information is provided on a separate data sheet.
APPLIED GEOLOGY

APPENDIX E

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: Imperial Wharf, Gravesend
Job No: AG2119-14

Land Use: Commercial / Industrial
Dataset: Made Ground
Soil Organic Matter (%): 2.5

Exploratory Hole Reference Depth (m) Strata		TP1 0.50	TP2 0.50	TP3 0.50	TP4 0.20	TP5 0.30	TP6 0.20	TP7 0.40	TP8 1.20	TP9 0.20	TP10 0.20	No. of samples (n)	Soil Screening Value (2.5% SOM)	Source/Justification
	Units													
Organic Matter (%)	%	2.1	19	6.4	4.7	1.4	1.7	2.2	2.6	11	10	10		
pH		11.1	9.6	9.4	9	9.9	10.6	11.7	10.6	12	9.8			
Arsenic	mg kg-1	14	7.1	25	1	14	16	25	17	14	13	10	640	C4SL (2014) (Taken from 6% soil organic matter)
Cadmium	mg kg-1	0.24	0.15	0.27	0.14	0.46	0.5	0.51	0.62	0.26	0.27	10	410	C4SL (2014) (Taken from 6% soil organic matter)
Chromium	mg kg-1	1	80	1	23	28	14	15	20	1	1	10	627	AG derived using published data & CLEA v1.06
Chromium (Trivalent)	mg kg-1	5	80	5	23	28	14	15	20	5	5	10	8840	AG derived using published data & CLEA v1.06
Chromium (Hexavalent)	mg kg-1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10	49	C4SL (2014) (Taken from 6% soil organic matter)
Copper	mg kg-1	30	32	13	27	93	31	26	66	1	1	10	71700	AG derived using published data & CLEA v1.06
Lead	mg kg-1	110	480	500	34	1400	180	130	210	22	6.9	10	2330	C4SL (2014)
Mercury	mg kg-1	0.16	0.1	0.1	0.1	0.18	0.9	0.55	2.2	0.1	0.1	10	3600	AG derived using published data & CLEA v1.06
Nickel	mg kg-1	18	48	8.6	58	30	35	34	45	1	1	10	1800	AG derived using published data & CLEA v1.06
Selenium	mg kg-1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	10	13000	AG derived using published data & CLEA v1.06
Zinc	mg kg-1	53	110	24	89	490	120	77	180	6.2	1	10	665000	AG derived using published data & CLEA v1.06
Naphthalene	mg kg-1	0.19	0.1	0.1	0.1	0.1	0.1	0.14	0.1	0.1	0.1	10	480	LQM GAC (December 2009)
Acenaphthylene	mg kg-1	0.1	0.1	0.1	0.1	0.1	0.14	0.25	0.1	0.1	0.1	10	97000	LQM GAC (December 2009)
Acenaphthene	mg kg-1	0.1	0.1	0.1	0.1	0.1	0.1	0.41	0.1	0.1	0.1	10	98000	LQM GAC (December 2009)
Fluorene	mg kg-1	0.1	0.1	0.1	0.1	0.1	0.1	0.46	0.1	0.1	0.1	10	69000	LQM GAC (December 2009)
Phenanthrene	mg kg-1	0.33	0.63	0.1	0.1	0.1	0.3	1.8	0.63	0.1	0.1	10	22000	LQM GAC (December 2009)
Anthracene	mg kg-1	0.11	0.12	0.1	0.1	0.1	0.1	0.37	0.17	0.1	0.1	10	540000	LQM GAC (December 2009)
Fluoranthene	mg kg-1	0.68	0.47	0.1	0.1	0.1	0.67	2	0.61	0.1	0.1	10	23000	LQM GAC (December 2009)
Pyrene	mg kg-1	0.63	0.57	0.1	0.1	0.1	0.67	2.2	0.55	0.1	0.1	10	54000	LQM GAC (December 2009)
Benzo[a]anthracene	mg kg-1	0.47	0.45	0.1	0.1	0.1	0.42	0.88	0.37	0.1	0.1	10	*	
Chrysene	mg kg-1	0.82	0.87	0.1	0.1	0.1	0.82	2.2	1	0.1	0.1	10	*	
Benzo[b]fluoranthene	mg kg-1	0.96	0.51	0.1	0.1	0.1	0.76	1.4	0.62	0.1	0.1	10	*	
Benzo[k]fluoranthene	mg kg-1	0.47	0.41	0.1	0.1	0.1	0.3	0.72	0.36	0.1	0.1	10	*	
Benzo[a]pyrene	mg kg-1	0.66	0.64	0.1	0.1	0.1	0.44	0.87	0.44	0.1	0.1	10	10	C4SL (2014) (Taken from 6% soil organic matter)
Dibenzo[a,h]anthracene	mg kg-1	0.22	0.1	0.1	0.1	0.1	0.24	0.37	0.23	0.1	0.1	10	*	
Indeno[1,2,3-cd]pyrene	mg kg-1	0.69	0.1	0.1	0.1	0.1	0.38	0.67	0.28	0.1	0.1	10	*	
Benzo[g,h,i]perylene	mg kg-1	0.74	0.1	0.1	0.1	0.1	1.1	0.85	0.94	0.1	0.1	10	*	
Phenols	mg kg-1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	10	3200	AG derived using published data & CLEA v1.06
Aliphatic TPH >C5-C6	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	6200	LQM GAC (December 2009)
Aliphatic TPH >C6-C8	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	18000	LQM GAC (December 2009)
Aliphatic TPH >C8-C10	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	5100	LQM GAC (December 2009)
Aliphatic TPH >C10-C12	mg kg-1	1	1	1			1	10	1	1	1	8	24000	LQM GAC (December 2009)
Aliphatic TPH >C12-C16	mg kg-1	1	1	8.5			1	63	7.5	1	1	8	83000	LQM GAC (December 2009)
Aliphatic TPH >C16-C21	mg kg-1	1	1	6.6			1	140	34	4.6	1	8	83000	LQM GAC (December 2009)
Aliphatic TPH >C21-C35	mg kg-1	1	1	38			1	120	140	20	1	8	≤1kg/kg	LQM GAC (December 2009)
Aliphatic TPH >C35-C44	mg kg-1	1	1	21			1	11	7.7	1	1	8	≤1kg/kg	LQM GAC (December 2009)
Total Aliphatic Hydrocarbons	mg kg-1	5	5	74			5	340	190	25	5	8		
Aromatic TPH >C5-C7	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	6200	LQM GAC (December 2009)
Aromatic TPH >C7-C8	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	18000	LQM GAC (December 2009)
Aromatic TPH >C8-C10	mg kg-1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	8	8600	LQM GAC (December 2009)
Aromatic TPH >C10-C12	mg kg-1	1	1	1			1	1	1	1	1	8	29000	LQM GAC (December 2009)
Aromatic TPH >C12-C16	mg kg-1	1	1	1.5			1	34	6.5	1	1	8	37000	LQM GAC (December 2009)
Aromatic TPH >C16-C21	mg kg-1	4.6	3.4	4.5			7	76	5.1	2.5	1	8	28000	LQM GAC (December 2009)
Aromatic TPH >C21-C35	mg kg-1	9	2.5	21			2.9	70	21	6.9	1	8	28000	LQM GAC (December 2009)
Aromatic TPH >C35-C44	mg kg-1	1	1	4.3			1	1	3.4	1	1	8	28000	LQM GAC (December 2009)
Total Aromatic Hydrocarbons	mg kg-1	14	5.9	32			9.9	180	36	9.4	5	8		
Total Petroleum Hydrocarbons	mg kg-1	14	10	110			10	520	230	34	10	8		
PCB 28	mg kg-1										0.01	1		
PCB 52	mg kg-1										0.01	1		
PCB 101	mg kg-1										0.01	1		
PCB 118	mg kg-1										0.01	1		
PCB 153	mg kg-1										0.01	1		
PCB 138	mg kg-1										0.01	1		
PCB 180	mg kg-1										0.01	1		
Total PCBs (7 Congeners)	mg kg-1										0.1	1		
Asbestos Identification		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	Amosite	No Asbestos Detected	Chrysotile	No Asbestos Detected	No Asbestos Detected	10		

Key -

Value within sample set exceeds screening value

Values in **bold** are reported at the laboratory limit of detection

Benzo(a)pyrene has been used as a 'surrogate marker for genotoxic PAH' as discussed in Appendix E of CL:AIRE SP1010 'Development of C4SL for Assessment of Land Affected by Contamination', December 2013.

This allows assessment of the combined carcinogenic risk associated with genotoxic PAH using only b(a)p. Genotoxic PAHs include Benz(a)pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Indeno(123cd)pyrene, Benzo(ghi)perylene and have been r

SUMMARY OF SOIL LEACHATE TEST RESULTS

Site Imperial Wharf, Gravesend
Job Number AG2119-14

Determinand	Limit of Detection	Hazardous or Non-Hazardous	Sample Identity Depth Sampled Date	TP1 0.50 04-Nov-14	TP2 0.50 03-Nov-14	TP7 0.40 04-Nov-14	No. of samples (n)	Waters Screening Value	Source & Justification
Hardness	15	-	mg l ⁻¹	430	410	350	3	-	-
pH		-	-	10	9.9	11	3	-	-
TOC	1	-	mg l ⁻¹	6.2	53	24	3	-	-
Arsenic (Dissolved)	1	Non Haz	µg l ⁻¹	1	1	1	3	10	UK Drinking Water Standards (2010)
Cadmium (Dissolved)	0.08	Haz	µg l ⁻¹	0.08	0.08	0.08	3	0.08	Detection limit
Chromium (Dissolved)	1	Non Haz	µg l ⁻¹	1	2	3.2	3	50	UK Drinking Water Standards (2010)
Chromium (Hexavalent)	20	Non Haz	µg l ⁻¹	20	20	20	3	3.4	WFD Environmental Standard, 2010
Copper (Dissolved)	1	Non Haz	µg l ⁻¹	9.8	11	12	3	28	WFD Environmental Standard, 2010
Lead (Dissolved)	1	Non Haz	µg l ⁻¹	1	250	2.4	3	10	UK Drinking Water Standards (2010)
Mercury (Dissolved)	0.5	Haz	µg l ⁻¹	0.5	0.5	0.5	3	0.5	Detection limit
Nickel (Dissolved)	1	Non Haz	µg l ⁻¹	1	2.7	1	3	20	UK Drinking Water Standards (2010)
Selenium (Dissolved)	1	Non Haz	µg l ⁻¹	1	1	1	3	10	UK Drinking Water Standards (2010)
Zinc (Dissolved)	1	Non Haz	µg l ⁻¹	1	9.3	1	3	125	WFD Environmental Standard, 2010
Sulphate	1	Non Haz	mg l ⁻¹	9.8	16	34	3	250	UK Drinking Water Standards (2010)
Phenol	0.03	Non Haz	mg l ⁻¹	0.03	0.03	0.03	3	7.7	WFD Environmental Standard, 2010
Magnesium	15		mg l ⁻¹	0.5	2.5	0.5			
Naphthalene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Acenaphthylene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Acenaphthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Fluorene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Phenanthrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[a]anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Chrysene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[b]fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[k]fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[a]pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Dibenz(a,h)Anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Indeno(1,2,3-c,d)Pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[g,h,i]perylene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit

Key-

Result exceeds the Detection Limit

Result exceeds the Screening Value

Values in bold at the limit of detection

SUMMARY OF GROUNDWATER TEST RESULTS

Site Imperial Wharf, Gravesend
Job Number AG2119-14
Type of Water Groundwater

Determinand	Limit of Detection	Hazardous or Non-Hazardous	Sample Identity Depth Sampled Date	BH3 21-Nov-14	BH4B 21-Nov-14	BH5A 21-Nov-14	BH6 21-Nov-14	No. of samples (n)	Waters Screening Value	Source & Justification
Hardness		-	mg l ⁻¹	1700	430	380	590	4	-	-
pH		-	-	7.4	8	7.8	7.8	4	-	-
TOC		-	mg l ⁻¹	8.5	12	6.5	9.6	4	-	-
Arsenic	1	Non Haz	µg l ⁻¹	17	2.1	2.6	5	4	10	UK Drinking Water Standards (2010)
Cadmium	0.08	Haz	µg l ⁻¹	0.08	0.08	0.08	0.08	4	0.08	Detection limit
Chromium	1	Non Haz	µg l ⁻¹	28	4	4.3	4.5	4	50	UK Drinking Water Standards (2010)
Chromium (hexavalent)	20	Non Haz	µg l ⁻¹	20	20	20	20	4	3.4	WFD Environmental Standard, 2010
Copper	1	Non Haz	µg l ⁻¹	19	2	4	4.2	4	28	WFD Environmental Standard, 2010
Lead	1	Non Haz	µg l ⁻¹	1	1	1	1	4	10	UK Drinking Water Standards (2010)
Mercury	0.5	Haz	µg l ⁻¹	0.5	0.5	0.5	0.5	4	0.5	Detection limit
Nickel	1	Non Haz	µg l ⁻¹	12	2	5.6	5.5	4	20	UK Drinking Water Standards (2010)
Selenium	1	Non Haz	µg l ⁻¹	1	3.1	3.5	3.7	4	10	UK Drinking Water Standards (2010)
Zinc	1	Non Haz	µg l ⁻¹	23	6.5	10	7.7	4	125	WFD Environmental Standard, 2010
Sulphate	1	Non Haz	mg l ⁻¹	740	140	170	190	4	250	UK Drinking Water Standards (2010)
Phenol	0.5	Non Haz	µg l ⁻¹	0.5	0.5	0.5	0.5	4	7.7	WFD Environmental Standard, 2010
Naphthalene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Acenaphthylene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Acenaphthene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Fluorene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Phenanthrene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Anthracene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Fluoranthene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Pyrene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzo[a]anthracene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Chrysene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzo[b]fluoranthene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzo[k]fluoranthene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzo[a]pyrene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Dibenz(a,h)Anthracene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Indeno(1,2,3-c,d)Pyrene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzo[g,h,i]perylene	0.1	Haz	µg l ⁻¹	0.1	0.1	0.1	0.1	4	0.5	Detection limit
Benzene	1	Haz	µg l ⁻¹	1	1	1	1	4	1	Detection limit
Toluene	1	Haz	µg l ⁻¹	1	1	1	1	4	1	Detection limit
Ethylbenzene	1	Haz	µg l ⁻¹	1	1	1	1	4	1	Detection limit
m & p-Xylene	1	Haz	µg l ⁻¹	1	1	1	1	4	1	Detection limit
o-Xylene	1	Haz	µg l ⁻¹	1	1	1	1	4	1	Detection limit

Key-
Result exceeds the Detection Limit
Result exceeds the Screening Value
 Values in bold at the limit of detection



Amended Report

Report Number: 14-13881 Issue-2

Initial Date of Issue: 12-Nov-14 **Date of Re-Issue:** 27-Nov-14

Client: Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Lab Results
Frankie Hadley Jones

Project: AG2119-14 Imperial Wharf, Gravesend

Quotation No.: **Date Received:** 10-Nov-14

Order No.: 7094 **Date Instructed:** 10-Nov-14

No. of Samples: 10 **Results Due:** 27-Nov-14

Turnaround: 3
(Weekdays)

Date Approved: 27-Nov-14

Approved By:

Details: Darrell Hall, Laboratory Director
Phil Hellier, Project Director

Results Summary - Soil

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67392	67393	67394	67395	67396	67397	67398	67399
Order No.: 7094	Client Sample Ref.:											
	Client Sample ID.:				TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Bottom Depth(m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Date Sampled:				04-Nov-14	03-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD								
Organic Matter	U	2625	%	0.4	2.1	19	6.4	4.7	1.4	1.7	2.2	2.6
Arsenic	U	2450	mg/kg	1	14	7.1	25	< 1.0	14	16	25	17
Cadmium	U	2450	mg/kg	0.1	0.24	0.15	0.27	0.14	0.46	0.50	0.51	0.62
Chromium	U	2450	mg/kg	1	< 1.0	80	< 1.0	23	28	14	15	20
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chromium (Trivalent)	N	2490	mg/kg	5	< 5.0	80	< 5.0	23	28	14	15	20
Copper	U	2450	mg/kg	0.5	30	32	13	27	93	31	26	66
Lead	U	2450	mg/kg	0.5	110	480	500	34	1400	180	130	210
Magnesium (Water Soluble)	N	2120	g/l	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Mercury	U	2450	mg/kg	0.1	0.16	< 0.10	< 0.10	< 0.10	0.18	0.90	0.55	2.2
Nickel	U	2450	mg/kg	0.5	18	48	8.6	58	30	35	34	45
Selenium	U	2450	mg/kg	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.5	53	110	24	89	490	120	77	180
Naphthalene	U	2700	mg/kg	0.1	0.19	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.14	< 0.10
Acenaphthylene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.14	0.25	< 0.10
Acenaphthene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.41	< 0.10
Fluorene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.46	< 0.10
Phenanthrene	U	2700	mg/kg	0.1	0.33	0.63	< 0.10	< 0.10	< 0.10	0.30	1.8	0.63
Anthracene	U	2700	mg/kg	0.1	0.11	0.12	< 0.10	< 0.10	< 0.10	0.10	0.37	0.17
Fluoranthene	U	2700	mg/kg	0.1	0.68	0.47	< 0.10	< 0.10	< 0.10	0.67	2.0	0.61
Pyrene	U	2700	mg/kg	0.1	0.63	0.57	< 0.10	< 0.10	< 0.10	0.67	2.2	0.55
Benzo[a]anthracene	U	2700	mg/kg	0.1	0.47	0.45	< 0.10	< 0.10	< 0.10	0.42	0.88	0.37
Chrysene	U	2700	mg/kg	0.1	0.82	0.87	< 0.10	< 0.10	< 0.10	0.82	2.2	1.0
Benzo[b]fluoranthene	U	2700	mg/kg	0.1	0.96	0.51	< 0.10	< 0.10	< 0.10	0.76	1.4	0.62
Benzo[k]fluoranthene	U	2700	mg/kg	0.1	0.47	0.41	< 0.10	< 0.10	< 0.10	0.30	0.72	0.36
Benzo[a]pyrene	U	2700	mg/kg	0.1	0.66	0.64	< 0.10	< 0.10	< 0.10	0.44	0.87	0.44
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1	0.22	< 0.10	< 0.10	< 0.10	< 0.10	0.24	0.37	0.23
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1	0.69	< 0.10	< 0.10	< 0.10	< 0.10	0.38	0.67	0.28
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1	0.74	< 0.10	< 0.10	< 0.10	< 0.10	1.1	0.85	0.94
Total Of 16 PAH's	U	2700	mg/kg	2	7.0	4.7	< 2.0	< 2.0	< 2.0	6.3	16	6.2
Total Phenols	U	2920	mg/kg	0.3	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Aliphatic TPH >C5-C6	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10

Results Summary - Soil

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67392	67393	67394	67395	67396	67397	67398	67399
Order No.: 7094	Client Sample Ref.:											
	Client Sample ID.:				TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Bottom Depth(m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Date Sampled:				04-Nov-14	03-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD								
Aliphatic TPH >C8-C10	U	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	U	2675	mg/kg	1	< 1.0	< 1.0	< 1.0			< 1.0	10	< 1.0
Aliphatic TPH >C12-C16	U	2675	mg/kg	1	< 1.0	< 1.0	8.5			< 1.0	63	7.5
Aliphatic TPH >C16-C21	U	2675	mg/kg	1	< 1.0	< 1.0	6.6			< 1.0	140	34
Aliphatic TPH >C21-C35	U	2675	mg/kg	1	< 1.0	< 1.0	38			< 1.0	120	140
Aliphatic TPH >C35-C44	U	2675	mg/kg	1	< 1.0	< 1.0	21			< 1.0	11	7.7
Total Aliphatic Hydrocarbons	U	2675	mg/kg	5	< 5.0	< 5.0	74			< 5.0	340	190
Aromatic TPH >C5-C7	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	U	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10			< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2675	mg/kg	1	< 1.0	< 1.0	< 1.0			< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2675	mg/kg	1	< 1.0	< 1.0	1.5			< 1.0	34	6.5
Aromatic TPH >C16-C21	U	2675	mg/kg	1	4.6	3.4	4.5			7.0	76	5.1
Aromatic TPH >C21-C35	N	2675	mg/kg	1	9.0	2.5	21			2.9	70	21
Aromatic TPH >C35-C44	N	2675	mg/kg	1	< 1.0	< 1.0	4.3			< 1.0	< 1.0	3.4
Total Aromatic Hydrocarbons	U	2675	mg/kg	5	14	5.9	32			9.9	180	36
Total Petroleum Hydrocarbons	U	2675	mg/kg	10	14	< 10	110			< 10	520	230
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.01	0.15	0.074	0.091	< 0.010	0.93	0.31	0.96	1.1
ACM Type	U	2192			-	-	-	-	-	Fibres/Clumps	-	Fibres/Clumps
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	Amosite	No Asbestos Detected	Chrysotile
Asbestos by Gravimetry	U	2192	%	0.001						0.001		0.001
Total Asbestos	N	2192	%	0.001						0.001		0.001
Moisture	N	2030	%	0.02	15	8.3	4.3	4.6	12	11	11	12
Stones	N	2030	%	0.02	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
pH	U	2010			11.1	9.6	9.4	9.0	9.9	10.6	11.7	10.6
PCB 28	U	2810	mg/kg	0.01								
PCB 52	U	2815	mg/kg	0.01								
PCB 101	U	2815	mg/kg	0.01								
PCB 118	U	2815	mg/kg	0.01								
PCB 153	U	2815	mg/kg	0.01								
PCB 138	U	2815	mg/kg	0.01								
PCB 180	U	2810	mg/kg	0.01								

Results Summary - Soil

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67392	67393	67394	67395	67396	67397	67398	67399
Order No.: 7094	Client Sample Ref.:											
	Client Sample ID.:				TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Bottom Depth(m):				0.50	0.50	0.50	0.20	0.30	0.20	0.40	1.20
	Date Sampled:				04-Nov-14	03-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD								
Total PCBs (7 Congeners)	N	2815	mg/kg	0.1								

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67400	67401
Order No.: 7094	Client Sample Ref.:					
	Client Sample ID.:				TP9	TP10
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.20	0.20
	Bottom Depth(m):				0.20	0.20
	Date Sampled:				04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD		
Organic Matter	U	2625	%	0.4	11	10
Arsenic	U	2450	mg/kg	1	14	13
Cadmium	U	2450	mg/kg	0.1	0.26	0.27
Chromium	U	2450	mg/kg	1	< 1.0	< 1.0
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50	< 0.50
Chromium (Trivalent)	N	2490	mg/kg	5	< 5.0	< 5.0
Copper	U	2450	mg/kg	0.5	< 1.0	< 1.0
Lead	U	2450	mg/kg	0.5	22	6.9
Magnesium (Water Soluble)	N	2120	g/l	0.01	< 0.010	< 0.010
Mercury	U	2450	mg/kg	0.1	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.5	< 1.0	< 1.0
Selenium	U	2450	mg/kg	0.2	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.5	6.2	< 1.0
Naphthalene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.3	< 0.30	< 0.30
Aliphatic TPH >C5-C6	N	2675	mg/kg	0.1	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67400	67401
Order No.: 7094	Client Sample Ref.:					
	Client Sample ID.:				TP9	TP10
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.20	0.20
	Bottom Depth(m):				0.20	0.20
	Date Sampled:				04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD		
Aliphatic TPH >C8-C10	U	2675	mg/kg	0.1	< 0.10	< 0.10
Aliphatic TPH >C10-C12	U	2675	mg/kg	1	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2675	mg/kg	1	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2675	mg/kg	1	4.6	< 1.0
Aliphatic TPH >C21-C35	U	2675	mg/kg	1	20	< 1.0
Aliphatic TPH >C35-C44	U	2675	mg/kg	1	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	U	2675	mg/kg	5	25	< 5.0
Aromatic TPH >C5-C7	N	2675	mg/kg	0.1	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10
Aromatic TPH >C8-C10	U	2675	mg/kg	0.1	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2675	mg/kg	1	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2675	mg/kg	1	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2675	mg/kg	1	2.5	< 1.0
Aromatic TPH >C21-C35	N	2675	mg/kg	1	6.9	< 1.0
Aromatic TPH >C35-C44	N	2675	mg/kg	1	< 1.0	< 1.0
Total Aromatic Hydrocarbons	U	2675	mg/kg	5	9.4	< 5.0
Total Petroleum Hydrocarbons	U	2675	mg/kg	10	34	< 10
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.01	0.047	< 0.010
ACM Type	U	2192			-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
Asbestos by Gravimetry	U	2192	%	0.001		
Total Asbestos	N	2192	%	0.001		
Moisture	N	2030	%	0.02	2.0	1.2
Stones	N	2030	%	0.02	< 0.020	< 0.020
pH	U	2010			12.0	9.8
PCB 28	U	2810	mg/kg	0.01		< 0.010
PCB 52	U	2815	mg/kg	0.01		< 0.010
PCB 101	U	2815	mg/kg	0.01		< 0.010
PCB 118	U	2815	mg/kg	0.01		< 0.010
PCB 153	U	2815	mg/kg	0.01		< 0.010
PCB 138	U	2815	mg/kg	0.01		< 0.010
PCB 180	U	2810	mg/kg	0.01		< 0.010

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:		14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:		67400	67401
Order No.: 7094	Client Sample Ref.:			
	Client Sample ID.:		TP9	TP10
	Sample Type:		SOIL	SOIL
	Top Depth (m):		0.20	0.20
	Bottom Depth(m):		0.20	0.20
	Date Sampled:		04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD
Total PCBs (7 Congeners)	N	2815	mg/kg	0.1
				< 0.10

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-13881	14-13881	14-13881
Quotation No.:	Chemtest Sample ID.:				67392	67393	67398
Order No.: 7094	Client Sample Ref.:						
	Client Sample ID.:				TP1	TP2	TP7
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.40
	Bottom Depth(m):				0.50	0.50	0.40
	Date Sampled:				04-Nov-14	03-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD			
Arsenic (Dissolved)	U	1450	µg/l	1	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.08	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1	< 1.0	2.0	3.2
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Copper (Dissolved)	U	1450	µg/l	1	9.8	11	12
Lead (Dissolved)	U	1450	µg/l	1	< 1.0	250	2.4
Mercury (Dissolved)	U	1450	µg/l	0.5	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1	< 1.0	2.7	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1	< 1.0	9.3	< 1.0
Naphthalene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Fluorene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Anthracene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Pyrene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Chrysene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1700	µg/l	0.01	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1700	µg/l	0.2	< 0.20	< 0.20	< 0.20
Total Phenols	U	1920	mg/l	0.03	< 0.030	< 0.030	< 0.030
Sulphate	U	1220	mg/l	1	9.8	16	34
pH	U	1010			10.0	9.9	11.0
Magnesium	U	1415	mg/l	0.5	< 0.50	2.5	< 0.50
Hardness	U	1415	mg/l	15	430	410	350
Total Organic Carbon	N	1610	mg/l	1	6.2	53	24

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at our Coventry laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk



Final Report

Report Number: 14-15127 Issue-1

Initial Date of Issue: 28-Nov-14

Client: Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Frankie Hadley Jones

Project: AG2119-14 Imperial Wharf, Gravesend

Quotation No.: **Date Received:** 25-Nov-14

Order No.: 7180 **Date Instructed:** 25-Nov-14

No. of Samples: 4 **Results Due:** 27-Nov-14

Turnaround:
(Weekdays) 3

Date Approved: 28-Nov-14

Approved By:

Details: Phil Hellier, Project Director

The results reported herein relate only to the material supplied to the laboratory.
This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Results Summary - Water

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15127	14-15127	14-15127	14-15127
Quotation No.:	Chemtest Sample ID.:				73927	73928	73929	73930
Order No.: 7180	Client Sample Ref.:							
	Client Sample ID.:				BH3	BH4B	BH5A	BH6
	Sample Type:				WATER	WATER	WATER	WATER
	Top Depth (m):							
	Bottom Depth(m):							
	Date Sampled:				21-Nov-14	21-Nov-14	21-Nov-14	21-Nov-14
Determinand	Accred.	SOP	Units	LOD				
Arsenic (Dissolved)	U	1450	µg/l	1	17	2.1	2.6	5.0
Cadmium (Dissolved)	U	1450	µg/l	0.08	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1	28	4.0	4.3	4.5
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20	< 20
Copper (Dissolved)	U	1450	µg/l	1	19	2.0	4.0	4.2
Lead (Dissolved)	U	1450	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Mercury (Dissolved)	U	1450	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1	12	2.0	5.6	5.5
Selenium (Dissolved)	U	1450	µg/l	1	< 1.0	3.1	3.5	3.7
Zinc (Dissolved)	U	1450	µg/l	1	23	6.5	10	7.7
Naphthalene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Fluorene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Phenanthrene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Anthracene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Fluoranthene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Pyrene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50

Results Summary - Water

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15127	14-15127	14-15127	14-15127
Quotation No.:	Chemtest Sample ID.:				73927	73928	73929	73930
Order No.: 7180	Client Sample Ref.:							
	Client Sample ID.:				BH3	BH4B	BH5A	BH6
	Sample Type:				WATER	WATER	WATER	WATER
	Top Depth (m):							
	Bottom Depth(m):							
	Date Sampled:				21-Nov-14	21-Nov-14	21-Nov-14	21-Nov-14
Determinand	Accred.	SOP	Units	LOD				
Benzo[k]fluoranthene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	U	1700	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1700	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Phenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	U	1920	mg/l	0.03	< 0.030	< 0.030	< 0.030	< 0.030
Benzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C5-C6	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C6-C7	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C7-C8	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C8-C10	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C10-C12	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C12-C16	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C16-C21	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C21-C35	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
TPH >C35-C44	N	1670	µg/l	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Total TPH >C5-C44	N	1670	µg/l	10	< 10	< 10	< 10	< 10
Sulphate	U	1220	mg/l	1	740	140	170	190
pH	U	1010			7.4	8.0	7.8	7.8
Magnesium	U	1415	mg/l	0.5	110	19	20	30
Hardness	U	1415	mg/l	15	1700	430	380	590
Total Organic Carbon	N	1610	mg/l	1	8.5	12	6.5	9.6
Dichlorodifluoromethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15127	14-15127	14-15127	14-15127
Quotation No.:	Chemtest Sample ID.:				73927	73928	73929	73930
Order No.: 7180	Client Sample Ref.:							
	Client Sample ID.:				BH3	BH4B	BH5A	BH6
	Sample Type:				WATER	WATER	WATER	WATER
	Top Depth (m):							
	Bottom Depth(m):							
	Date Sampled:				21-Nov-14	21-Nov-14	21-Nov-14	21-Nov-14
Determinand	Accred.	SOP	Units	LOD				
Chloromethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5	< 5	< 5
Chloroethane	U	1760	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50	< 50

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15127	14-15127	14-15127	14-15127
Quotation No.:	Chemtest Sample ID.:				73927	73928	73929	73930
Order No.: 7180	Client Sample Ref.:							
	Client Sample ID.:				BH3	BH4B	BH5A	BH6
	Sample Type:				WATER	WATER	WATER	WATER
	Top Depth (m):							
	Bottom Depth(m):							
	Date Sampled:				21-Nov-14	21-Nov-14	21-Nov-14	21-Nov-14
Determinand	Accred.	SOP	Units	LOD				
N-Propylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Isophorone	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50

Results Summary - Water

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15127	14-15127	14-15127	14-15127
Quotation No.:	Chemtest Sample ID.:				73927	73928	73929	73930
Order No.: 7180	Client Sample Ref.:							
	Client Sample ID.:				BH3	BH4B	BH5A	BH6
	Sample Type:				WATER	WATER	WATER	WATER
	Top Depth (m):							
	Bottom Depth(m):							
	Date Sampled:				21-Nov-14	21-Nov-14	21-Nov-14	21-Nov-14
Determinand	Accred.	SOP	Units	LOD				
2,4-Dichlorophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Azobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Pentachlorophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Carbazole	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol	N	1790	µg/l	0.5	< 0.50	< 0.50	< 0.50	< 0.50

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at our Coventry laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk



Final Report

Report Number: 14-15522 Issue-1

Initial Date of Issue: 04-Dec-14

Client: Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Lab Results
Frankie Hadley Jones

Project: AG2119-14 Imperial Wharf, Gravesend

Quotation No.: **Date Received:** 01-Dec-14

Order No.: 7200 **Date Instructed:** 01-Dec-14

No. of Samples: 11 **Results Due:** 03-Dec-14

Turnaround:
(Weekdays) 3

Date Approved: 04-Dec-14

Approved By:

Details: Keith Jones, Technical Manager

Results Summary - Soil

Project: AG2119-14 Imperial Wharf, Gravesend

Client: Applied Geology	Chemtest Job No.:				14-15522	14-15522	14-15522	14-15522	14-15522	14-15522	14-15522	14-15522	14-15522	14-15522	
Quotation No.:	Chemtest Sample ID.:				75790	75791	75792	75793	75794	75795	75796	75797	75798	75799	75800
Order No.: 7200	Client Sample Ref.:														
	Client Sample ID.:				TP2	TP6	BH5A	BH4B	BH4B	BH3	BH3	BH6	BH6	BH5A	BH5A
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				1.00	1.00	0.50	14.00	8.00	4.00	17.00	6.00	11.00	15.50	19.00
	Bottom Depth(m):				1.00	1.00	0.50	14.45	8.45	4.00	17.45	6.00	11.45	15.50	19.00
	Date Sampled:				03-Nov-14	04-Nov-14	03-Nov-14	11-Nov-14	11-Nov-14	06-Nov-14	06-Nov-14	05-Nov-14	05-Nov-14	04-Nov-14	04-Nov-14
Determinand	Accred.	SOP	Units	LOD											
Magnesium (Water Soluble)	N	2120	g/l	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.011	< 0.010	0.010	0.017	0.010
Sulphate (Acid Soluble)	U	2430	%	0.01	0.040	0.18	0.15								
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.01	0.069	0.51	0.29	0.027	0.022	0.078	0.079	0.044	0.10	0.070	0.079
Moisture	N	2030	%	0.02	8.2	10	12	23	24	19	22	25	23	24	24
Stones	N	2030	%	0.02	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
pH	U	2010			9.2	9.7	9.7	8.7	8.8	9.8	8.9	8.8	8.8	8.9	8.9
Total Sulphur	U	2175	%	0.01	0.29	0.13	0.24								
Chloride (Extractable)	U	2220	g/l	0.01	0.077	0.015	1.8								
Nitrate (Extractable)	N	2220	g/l	0.01	< 0.010	< 0.010	0.016								

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at our Coventry laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Applied Geology Ltd

Unit 23 Abbey Park

Stareton

Kenilworth

Warwickshire

CV8 2LY

For the attention of Frankie Hadley-Jones

Report No: B18775

Issue No 01

LABORATORY TEST REPORT

Project Name	IMPERIAL WHARF, GRAVESEND		
Project Number	B18775	Date samples received	01/12/2014
Your Ref	AG2119-14	Date written instructions received	01/12/2014
Purchase Order	7119	Date testing commenced	01/12/2014
Please find enclosed the results as summarised below			
Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	11	Saturation Moisture Content of Chalk	No
2-4	3	Particle Size Distribution	Yes
Remarks :			
Issued by : Stephen Langman		Date of Issue : 15/12/2014	Key to symbols used in this report S/C : Testing was sub-contracted
Approved Signatories : <i>S. Langman</i> 15/12/2014			
G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)			
Unless we are notified to the contrary, samples will be disposed after a period of one month from this date. The results reported relate to samples received in the laboratory only. All results contained in this report are provisional unless signed by an approved signatory This report should not be reproduced except in full without the written approval of the laboratory. Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory. The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw our report if we have not received cleared funds in accordance with our standard terms and conditions Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation. Feedback on the this report may be left via our website www.terratek.co.uk/contact-us			



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Terra Tek Ltd is registered in Scotland No. 121594
Offices in Airdrie, Birmingham, Belfast and Chesham

Head Office : 62 Rochsolloch Road, Airdrie, ML6 9BG

Originator	Checked & Approved	SATURATION MOISTURE CONTENT OF CHALK BS1377:Part2:1990:Clause 3.3	Tk Figure 1
PM	S. Langren 15/12/2014		

TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site IMPERIAL WHARF, GRAVESEND

Client Applied Geology Ltd

Engineer

Contract No **AG2119-14**

Hole TP5

Sample Ref

Depth (m) 0.50-0.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	96
37.5 mm	93
28.0 mm	84
20.0 mm	72
14.0 mm	66
10.0 mm	54
6.30 mm	44
5.00 mm	39
3.35 mm	31
2.00 mm	26
1.18 mm	22
600 µm	17
425 µm	14
300 µm	10
212 µm	8
150 µm	7
63 µm	5

Non Engineering Description

Brown/ grey fine to coarse GRAVEL with some sand.

Sample Proportions - %

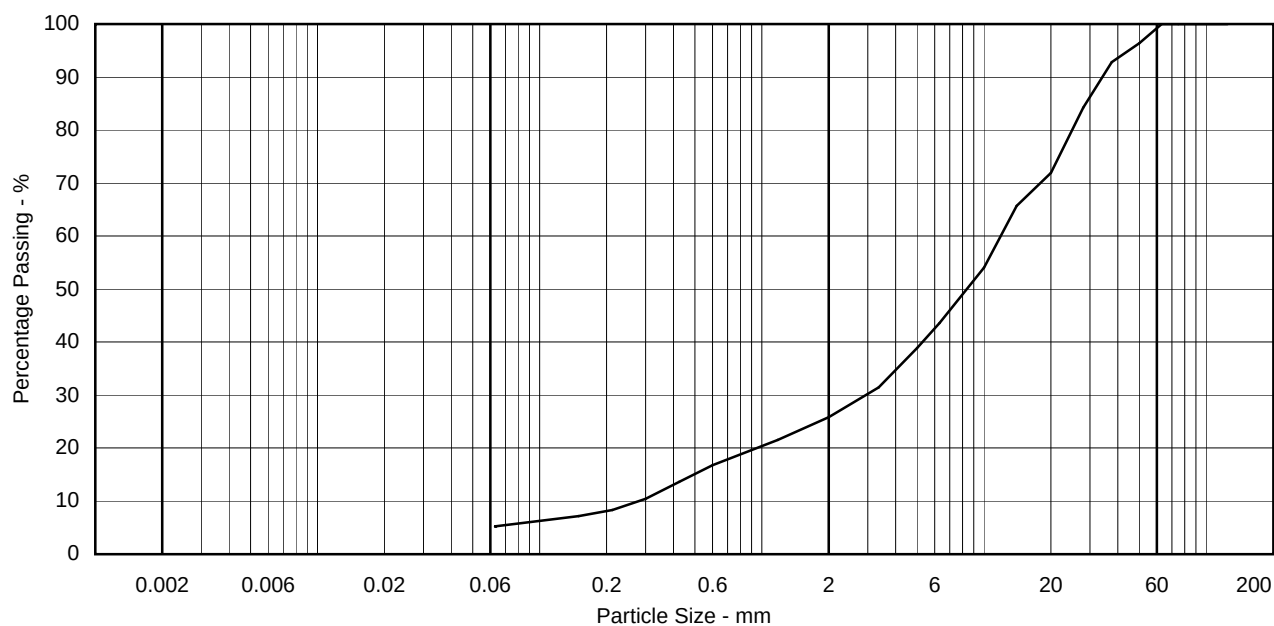
Cobbles	0.8
Gravel	73.4
Sand	20.6
Silt & Clay	5.2

Particle Diameter - mm

D100	63
D60	12
D10	0.28
Uniformity Coefficient	42.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator

Checked & Approved

CR/PM

S. Langston
15/12/2014

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



Figure 3

Sheet 1 of 1

APPENDIX F

APPENDIX F

STANDARD FIELDWORK AND ASSESSMENT PROCEDURES

Scope of Work

The scope of work undertaken is defined in Section 1.1 of the Report. It should be noted that Applied Geology Limited does not provide arboricultural surveys or specialist surveys for the detection of invasive plant species (such as Japanese Knotweed) or protected species of wildlife. Information from environmental and ecological datasets is included from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website, however, if a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted. Similarly, information on flood risk is included obtained from the Environment Agency Web site and the GroundSure report but this is not intended to be a full hydrological study and if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development.

Fieldwork

Fieldwork is generally carried out, in accordance with BS5930 (1999) "Code of Practice for Site Investigations", BS10175 Investigation of Potentially Contaminated Sites, and the Association of Geotechnical and Geo-environmental Specialist Guidelines for Good Practice in Site Investigations (August 1998)

Prior to commencement on site, statutory services plans are generally obtained and verbal enquiries are also made regarding the positions of private or statutory services on site. Prior to excavation or drilling, locations are scanned with a cable avoidance tool (CAT) and service pits are generally excavated at borehole positions, where possible.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in the report appendices, together with sample depths, the results of in-situ testing, comments on groundwater inflows, and any other pertinent information. The strata descriptions are in accordance with BS5930:1999 incorporating Amendment No 2 (2010). Disturbed plastic pot and glass amber jar samples are recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future laboratory testing.

Light cable percussion boreholes are generally drilled using a Pilcon Wayfarer or Dando rig and are advanced using equipment to bore 200/150mm diameter boreholes. Disturbed plastic pot samples are recovered from all deposits encountered to allow examination and laboratory testing. Certain strata are cased off due to their tendency to collapse, particularly in the presence of groundwater inflows and/or to reduce the risk of cross contamination. In situ Standard Penetration Tests, using Split Spoon (SPT) and Cone (CPT) are undertaken in the boreholes to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Within the fine grained (cohesive) deposits, "undisturbed" 100mm driven open tube samples were recovered from the various deposits to provide samples for examination and laboratory testing. On encountering groundwater, boring is usually suspended for 20 minutes while any rise in water level is recorded. Full details of the groundwater observations and monitoring results during boring operations are included on the borehole records. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion, unless otherwise stated on the individual logs.

Unless otherwise stated on the relevant logs, trial pits are excavated using a wheeled backhoe excavator, usually with a 0.6m wide bucket. The excavations are logged from the ground surface by an Engineering Geologist / Geo-environmental Engineer and relevant field testing, appropriate to the soils encountered, is carried out on samples brought to the surface. Disturbed soil samples are collected from selected horizons for subsequent laboratory testing. The trial pits are usually unshored and where reasonable, left open for a period of time to allow observations of pit stability

and depth and inflow rate of any groundwater ingress. The excavations are backfilled with arisings prior to moving on to the next position. Any trial pits carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable.

Driven Continuous Sampling (DCS) boreholes are drilled using a track mounted Global mini-rig or similar using sampling tubes of varying diameter (decreasing with depth). Samples of the deposits encountered are recovered in 1m long clear plastic liners, which are logged and sub-sampled on site by an Engineering Geologist. Generally for geotechnical investigations, during the drilling process in-situ Standard Penetration Tests (SPTs) are undertaken at selected depths to determine the relative density of coarse grained deposits encountered or the in-situ strength of fine grained deposits by comparing the SPT "N" value results with published empirical data. Groundwater seepages are noted during drilling if encountered. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion.

Unless specifically stated in the report, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of the exploratory holes where it is considered they may impact on proposed development.

Laboratory Testing

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by a UKAS accredited specialist laboratory. Chemical testing was undertaken by a UKAS accredited specialist chemical testing laboratory and MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

Contamination Assessment – Human Health

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and appropriate screening values.

Risk to human health has been initially assessed by comparing soil results against various published statutory and non-statutory screening criteria. These have been sourced from the following, in order of preference:

- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009 and 2014 using the new CLEA model and DEFRA Category 4 Screening Levels (C4SL);
- LQM/CIEH Generic Assessment Criteria (LQM GAC V2) Version 2, 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria, 2010.

Reference has also been made to the Soil Screening Values (SSV) derived by Atkins (ATRISKsoil) and updated and published on their website in March 2011.

However, due to the difference in soil type used by Atkins to derive their screening values, Applied Geology has also generated their own screening criteria for various end-uses/SOM combinations but only using published toxicological data (from the above sources) to generate GAC using CLEA v1.06. Applied Geology GAC has therefore generally been used in preference to Atkins SSV as they are more comparable with the EA, LQM/CIEH and EIC/AGS screening values.

In March 2014, DEFRA published a new series of soil screening values, termed Category 4 Screening Levels (C4SL), which are intended to allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial

action. The C4SL are considered to represent a contamination level that is 'low' from a toxicological view point, and is therefore considered to be 'acceptable'.

Historically, the level of contamination has been assessed with reference to SGV/GAC values which were derived to represent a 'minimal' level of contamination. The SGV/GAC values are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination, and where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/GAC/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

The latest guidance from the HPA advises that for the assessment of speciated Polyaromatic Hydrocarbons (PAH) contamination benzo(a)pyrene (b(a)p) can be used as a surrogate marker for 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker (b(a)p for C4SL) is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only b(a)p.

Contamination Assessment – Controlled Waters

Risks to Controlled Waters have been assessed by following the guidance given in the CLR11 Model Procedures Report (EA 2004) and EA publication "Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination (EA 2006)".

This guidance presents a recommended methodology comprising several levels of assessment for deriving site-specific remedial objectives (Target Values) for contaminated soils and/ or groundwater in order to protect the aquatic environment. The different levels of assessment are summarised below.

Level	Soil Source	Groundwater Source
1	Partition into leachate	Not applicable
2	As above, plus attenuation in the unsaturated zone and dilution in the aquifer	Direct comparison to appropriate quality standards
3	As above, plus lateral attenuation in the saturated zone to off-site compliance point	Lateral attenuation in the saturated zone to off-site compliance point

*soil leachate extraction test results used if available and appropriate.

Effectively the Level 1 soil and Level 2 groundwater assessments are preliminary. The other level is a detailed assessment requiring the use of suitable software, which is outside the scope of this investigation.

From the available soil, leachate and groundwater results, chemicals of concern are selected which are then directly compared to appropriate published standards. The principal standards used to assess the potential risks to controlled waters are the UK drinking water standards (UK DWS) and the Environment Agency's Environmental Quality Standards (EQS), which are derived for the protection of aquatic life.

Waste Soil Disposal

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous for off-site disposal prior to removal from site as required by the "Duty of Care" (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC ("Landfill Directive").

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included).

This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description "Soil and Stones", EWC code 17 05 04 with restrictions excluding topsoil and peat. Waste Acceptance Criteria (WAC) testing is required for all other Inert wastes and Hazardous Waste where relevant but not for non-hazardous waste.

Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

Health & Safety Aspects

As outlined within the HSE publication 'Successful Health and Safety Management - HSG65', this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations.

Trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions.

Care should be taken when digging excavations to prevent undermining or causing loss of support to the foundations of the nearby adjoining structures. Surcharging such as from spoil or vehicle movements close to excavation sides should be avoided

Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.