AP GEOTECHNICS

Greggs Bakery / Twickenham

Phase I Environmental Assessment

Prepared by AP Geotechnics

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GREGGS BAKERY SITE & No. 2 GOULD ROAD TWICKENHAM TW2 6RT

Phase I
Environmental Assessment

Client
London Square Developments Limited

Report No. 4609-1 V1 Resi

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& No. 2 GOULD ROAD
TWICKENHAM TW2 6RT

Phase 1
Environmental Assessment

Synopsis

A Phase I Environmental Assessment has been carried out into the past and present usage of land currently occupied by a former Greggs Bakery and the closed Enessa Works on the instructions of London Square Developments Ltd. The purpose of the study was to conduct a visual appraisal of the site and to research available data with reference to chemical constraints that may impinge upon the proposal to redevelop the site for both residential and commercial use.

The investigation comprised a walkover survey followed by examination of historic map records. In addition, searches were carried out of various databases held by the Environment Agency and others. The information obtained from these sources is summarised herein.

It is considered that previous activities on or in the immediate vicinity of the site constitute a low to medium risk of significant or widespread contamination. An intrusive investigation has been commissioned to determine the physical characteristics of the soil with respect to foundation design and related matters and will be extended to assess environmental aspects of the development. Public Health England do not consider that Radon protection will be required.

1

Walk over survey

The area under investigation is an approximate 'L' shaped plot of land extending to some 1.12 hectares, as shown on Figure 1 at Appendix A. The site was, from 1953 until November 2016, a bakery and distribution depot for Greggs.

The site has two vehicular access points; one from Gould Road at its juncture with Crane Road in the north west and one in the south of the site, on Edwin Road. The former is for cars and vans whilst the latter is for larger vehicles and lorries. A three storey building with metal fire escapes and walkways lies adjacent to the access on Gould Road and previously housed the maintenance area on the ground floor with office space above. The north west portion of the site contains an asphalt surfaced car park and a single storey, flat roofed building previously used as offices. Anecdotal information suggests there may be a WWII bomb shelter (or the remains of) on the far western boundary.

A collection of one, two and part three storey structures line the eastern side of the car park and these were also used as offices. To the west of these offices lies the bakery proper which occupies the northern and central portions of the site. At the time of our visit the bakery was being stripped of useable machines and other equipment although a considerable amount remains, including a very large commercial oven. A number of cold storage areas, fridges and the boiler house lie at the rear (north) of the bakery. Information from Greggs operatives still present on site suggests there may be two cavities or partial voids under the northern end of the site. They were apparently caused by hot water/steam 'blow-down' from the boiler.

At the southern end of the bakery is a large canopy under which are four large freezers, a stockade and a rectangular building containing a box washer.

The south of the site contains two rectangular buildings. The one on the eastern side was used as storage whilst the one bordering the western boundary is the former Enessa Works. No entry to either building was available at the time of our visit. Two silos are located adjacent to the eastern building which also has an above ground fuel tank complete with pump on its northern side. A petrol interceptor is located to the south of the silos and was apparently regularly emptied when the bakery was in operation. The former Enessa Works building lies on the western side of the southern portion of the site. It is understood that the works were precision engineers and involved in producing pewter products and latterly a turners. Three underground fuel storage tanks (USTs) are located between the Enessa Works and the building to its north. Surplus diesel was removed from tank No. 3 and the USTs were foam filled between 27 and 29 September 2006. Full details are presented at Appendix B.

There was no visual or olfactory evidence of contamination noted during the walk over survey. All surfaces were free of staining and all hardstanding was in a generally good state of repair.

Residential properties bound the site on three sides; to the east, south and west. The River Crane and a railway line lie to the north.

2
Historic map records

Extracts from historic maps are presented at Figures 2 - 11 of Appendix A and illustrate site usage from 1865 to 2014.

1865

The earliest available mapping is given at Figure 2 and shows the site to be undeveloped. The main portion of the site has a path across it, up to the River Crane whilst the north west is

part of an orchard. The orchard continues some way to the west and one is also present immediately east of the site. A railway line runs east - west just to the north of the site and another railway line lies to the south east. Land to the north of the railway line is undeveloped save for Marsh Farm, some 200 m to the north east. The Duke of Northumberland's River is noted in the far north west of the mapped area. Land south of the site is fairly well developed and includes numerous residential properties, a School, Chapel, Post Office and Brewery.

1896

The site appears essentially unchanged although the footpath is no longer depicted. A Gravel Pit is noted immediately to the east of the site. A large Sewage Works has been constructed to the north, on the other side of the river and railway and a Fever Hospital is noted just to its west. The course of the River Crane has been altered somewhat, with some of the meanders straightened. Marsh Farm is no longer depicted although a single, square structure remains. Additional lines have been added to the railway to the east and the road layout has altered where the railway line crosses (what was) Staten Lane, now Marsh Farm Road and Lion Road. The Town of Twickenham to the south continues to develop.

1915

The site and surrounding area have undergone significant change in the nearly 20 years between Figures 3 and 4. The north west portion of the site has been developed with a number of unknown buildings including a small glazed structure on the northern boundary. A small building is also shown on the eastern boundary of the main body of the site. The gravel pit immediately east has been infilled and replaced by a Laundry in the north and Norcutt

Road to the south. New residential streets of mainly terraced housing have been constructed to the east and west of the site. An Electricity Works with large Tank is shown 100 m east

and a miniature Rifle Range is located 250 m to the north east. The Sewage Works to the north have expanded and new Filter Beds are shown. An Engineering Works has been constructed some 200 m to the west.

1934

An additional building is shown in the north west part of the site and the glazed structure is no longer present. The main body of the site is now depicted as Allotment Gardens whilst a Laundry has been constructed on the southern part. The Laundry immediately east has expanded and additional structures are shown. The Electricity Works somewhat further east is no longer labelled as such and additional buildings are shown, including two chimneys. An Engineering Works is shown some 200 m to the south west. The Sewage Works to the north have gained additional Filter Beds and the adjacent Hospital is no longer labelled as such.

World War II

Online information does not record a direct bomb strike on the site although a number of strikes are recorded in the surrounding area. The closest being to the west, close to Gould Road, as shown on Figure 6 at Appendix A. An unexploded ordnance threat assessment has been requested for the site and is in the process of being compiled.

1960

The site has undergone significant development. Buildings in the north west have been consolidated and altered somewhat and a large Bakery now occupies the northern portion of the site. Two rectangular structures have been constructed on the western boundary; the southernmost one is labelled as a Works whilst the other one is unidentified. The latter has a Tank on its northern side and the Laundry also has a Tank depicted on its western wall. The Laundry immediately east is now shown with a couple of Tanks and a Well. The former

Electricity Works further to the east is now shown as a Depot; without chimneys but with additional unknown buildings. The River Crane appears to have been canalised and its course altered significantly; it has been straightened to the west of the site and moved southwards to the north of the site. A large number of Works are noted within the mapped area; 20, 70 & 180 m south, 50, 160, 180 & 250 m to the south east and 250 m to the south west. A Works is also noted 20 m west of the NW boundary of the site. The large Engineering Works 200 m west, first noted on Figure 4 of 1915 is now shown as a Bakery.

No Filter Beds or associated infrastructure are shown on the former Sewage Works to the north although the main building remains and a number of other buildings have been constructed. The site is now a Corporation Depot.

1974 - 1979

The Bakery has expanded southwards and now includes the canopy and an Electricity substation is shown in the far north east of the site. The Tanks identified on Figure 7 of 1960 are no longer depicted on either building on site. The Laundry in the south has altered its footprint slightly and is no longer labelled as a Laundry. A Printing Works has replaced the Laundry immediately to the east and the Electricity works, latterly Depot, has reduced in size and a number of other buildings are shown, including an electricity substation. The Works just to the west have expanded and now border the site.

1993 - 1994

The majority of the site remains unchanged although the main Bakery outline has changed and a rectangular building is shown in the north west. The Printing Works immediately to the east have been demolished and replaced by Norcutt House and three square structures.

2002

No large scale maps are available from 1993 - 1994 to the present day and small scale maps have therefore been included. The map scale allows the site to be seen within its wider context. The site appears unchanged.

2014

Figure 11 at Appendix A shows the site and surrounding area much as it is today and no significant changes are evident.

3

Database searches

Database searches have revealed the following information, generally within a 250 m radius of the site.

3.1

Environmental permits, incidents and registers

3.1.1

Negative search results within 500 m of search centre

Historic IPC authorisations.

Part A(1) and IPPC authorised activities.

Red list discharge consents (potentially harmful discharges to controlled waters).

List 1 or List 2 dangerous substances inventory sites.

Licensed discharge consents.

Water industry referrals (potentially harmful discharges to the public sewer).

Hazardous substance consents and enforcements.

Records of COMAH or NIHHS sites.

Environment Agency (EA) List 1 recorded pollution incidents.

The Local Authority have not determined any sites as Contaminated Land under Part IIa of the EPA 1990.

3.1.2

Part A(2) and Part B Activities

Two current permits have been identified by the database search as detailed in Table 1.

Table 1: Part A(2) and Part B Activities and Enforcements

Distance, m	Direction	Activity	Enforcement
294	E	Dry cleaning	None
344	SW	Dry cleaning	None

3.1.3

EA List 2 recorded pollution incidents

Two National Incidents Recording System (NIRS) List 2 records have been identified within 500 m of the study site, as detailed in Table 2.

Table 2: List 2 recorded pollution incidents

Distance, m	Direction	Date	Pollutant	Impact
46	N	14/10/2003	Chemicals/products - Inorganic chemical	Water: No impact Land: Minor Air: No impact
131	NE	07/07/2003	Oils and fuel - Diesel	Water: Minor Land: No impact Air: No impact

3.2

Landfill and other waste sites

3.2.1

Landfill sites

No operational landfill sites have been identified within 1000 m of the search centre.

One historical landfill has been identified 909 m to the north at Twickenham Trading Estate. Waste was deposited between December 1946 and December 1963. The waste type is listed as inert and the landfill is recorded as having gas control measures.

3.2.2

Other waste sites

No records of operational or non-operational waste treatment, transfer or disposal sites have been found within 500 m.

A Waste Transfer Station is located 150 m north at Langhorne Drive. No other EA licensed waste sites have been identified by the database search within 1000 m.

3.3

Current land use

3.3.1

Potentially contaminative industrial sites

As befits its urban location, 43 records of potentially contaminative industrial sites have been identified, seven of which are electricity substations and are not considered significant. Older substations have the potential to contain polychlorinated biphenyls although they are generally considered to be relatively immobile.

In addition, the search is very broad in its remit and only those activities considered potentially contaminative have been listed. Full details are available at Appendix C.

3.3.2
Petrol and fuel sites

None are located within 500 m of the study site.

3.4
Geology

Published records of the British Geological Survey (BGS) indicate the site to lie on Kempton Park Gravel over London Clay.

3.5
Hydrogeology and Hydrology
3.5.1
Groundwater vulnerability

Information supplied by the EA indicates that the Kempton Park Gravel is a Principle Aquifer whilst the London Clay is classed as Unproductive.

The site is not located within 500 m of a groundwater Source Protection Zone.

3.5.2
Abstraction licences

No groundwater, surface water or potable water abstraction takes place within 1000 m of the study site.

3.5.3
Flooding

The northern boundary of the site is described by the River Crane. A Zone 3 floodplain impinges onto the very northernmost part of the site. In addition, floodplains associated with the River Crane and Duke of Northumberland's River line both banks of both rivers.

The EA RoFRaS database indicates that there is a low risk of flooding at the centre of the site.

No flood defences, areas benefiting from flood defences or areas benefiting from flood storage are located within 250 m of the site.

3.6
Environmentally sensitive sites

A Local Nature Reserve is located 900 m to the south east at Ham Lands.

3.7
Natural hazards

The British Geological Survey combine data sets for ground stability and conclude the following:

Shrink / swell clay	Moderate
Landslides	Very low
Soluble rocks	Negligible
Compressible ground	Moderate
Collapsible rocks	Very low
Running sand	Very low

3.8
Mining

No coal mining areas are located within 75 m of the study site and no non-coal mining areas are located within 50 m.

4
Development proposals

It is intended to demolish all buildings (save for a single dwelling) and redevelop the site to provide up to 116 residential units and 175 m^2 of commercial floorspace with associated hard and soft landscaping, car parking, highways works and other associated works.

The proposed general arrangement is given at Figure 12 of Appendix A.

5
Discussion
5.1
Solid and liquid phase contaminants

The development history of the site and its immediate surroundings have been summarised in the foregoing, as far as could be ascertained within the present remit.

The site was undeveloped on the first available mapping of 1865. The north west portion was developed by the time of the 1915 mapping and a Laundry was present in the south by 1934. The next available mapping of 1960 shows the Bakery and Enessa Works on site. A small scale map of 1948 (not included) shows the site in the same configuration as Figure 5 of 1934,

indicating the Bakery and Enessa Works were constructed post-war. Some further, albeit fairly small scale development continued over the years, culminating in the building layout of the present day.

The Tanks shown on the 1960 map (absent by 1973), the Enessa Works, the USTs and the interceptor are considered to be the main areas of potential contamination.

Land to the east and west was also undeveloped on the first mapping whilst land to the south comprised the beginnings of Twickenham. A number of potentially contaminative land uses have been identified within the mapped surroundings, as discussed on the various Figures. A number of electricity substations are also located within the surrounding area.

The database searches have revealed activities within the surrounding area which could potentially give rise to contamination although their likely impact on the subject site is considered to be low.

The underlying geology is mapped as Kempton Park Gravel underlain by London Clay. A mantle of Made Ground is also likely given the development history of the site and surroundings. Migration of mobile contaminants is therefore possible within the Kempton Park Gravel (a Principle Aquifer), both from on site sources and from off site sources. The underlying London Clay will severely retard any migration, both laterally and vertically due to its very low permeability.

5.2
Gas phase

No operational landfill sites have been identified by the database searches within 1000 m and the BGS does not record the site as being either Worked Ground or Made Ground. An

historic landfill has been identified 900 m to the north although the waste type is listed as inert and gas control measures are in place.

The former gravel pit immediately east was backfilled with unknown material. The gas generating potential depends on the constituents of the backfill used to restore levels. The risk of ground gas is therefore considered to be low to medium.

The database searches record the site as being in an area where less than 1 % of homes exceed the Radon Action level. The Health Protection Agency do not consider further action to be necessary and no Radon protection is required.

5.3
Risk assessment

This risk classification is designed to consider environmental risk in the context of alternative use strategies where redevelopment or a change of use may be required. This must be set in the context of the following hierarchy of risks as follows:-

High: Significant risk of contamination without remediation. Precludes all but the least sensitive of development such as car parking. Significant potential for environmental pollution. Remediation measures expensive. Site investigation required.

Medium: Risk of contamination but allowing non-sensitive development such as commercial for reasonable costs of remediation. More sensitive development such as housing may require substantial remedial measures. Potential for environmental pollution. Site investigation required.

Low: Little risk of contamination where all development options are likely to be possible with little or no remediation measures. Little potential for environmental pollution. Confirmatory site investigation required.

The information available in this assessment has revealed that there is a *low to medium* potential risk of contamination arising from the previous uses of the site.

Surrounding uses also form a *low to medium* risk of potential contamination migrating to the subject site.

5.4
Conceptual model
5.4.1
Source(s)

The historical uses of parts of the site are considered to represent a potentially contaminative use. The Tanks shown on the 1960 map, the Enessa Works, the USTs and the interceptor are all considered to be areas of potential contamination. However, the historical and current extent of building cover and hardstanding is likely to have provided a degree of protection against any potential contaminants at the surface entering the ground, although this cannot be relied upon.

The pollution incidents listed at Section 3.1.3 are not considered to represent a significant risk.

The site currently sits within a predominately residential environment which has evolved from a mix of residential and commercial land use. As such there is the potential for background contamination to exist across the surrounding area.

5.4.2
Pathways

The site is located on a Principle Aquifer. Therefore there is the potential for any contamination (if present) beneath the site to have migrated to groundwater. In addition, off site contamination has the potential to migrate to the subject site. The underlying solid geology of the London Clay is Unproductive strata. The London Clay is an effective aquiclude and significant lateral and downward migration within this stratum is considered unlikely. Although it is acknowledged that fissures exist in London Clay and could potentially act as a pathway, the degree and orientation of fissuring will partly dictate the extent of any potential migration, as will the volume of any liquid contaminants.

Currently, the site is 100 % hardstanding and building cover. The hardstanding and building cover will offer a significant degree of protection to current site users and occupiers from any contamination beneath the site if present.

Following redevelopment, the extent of building cover and hardstanding will be significantly reduced and private gardens are included within the proposals. Human contact with potentially contaminated soil is therefore possible, assuming no mitigation measures.

Buried service runs could act as both a potential source and a pathway.
A potential vapour risk also exists but its significance will depend on the degree of hydrocarbon contamination from the historical tanks, foam filled USTs, petrol interceptor and any Made Ground present.

The backfilled gravel pit immediately east is a potential source of ground gas. However, the age of backfill and the presence of houses on the former pit suggests that ground gas from this potential source is not an issue.

5.4.3
Receptors

Future site residents, users/visitors, groundworkers, flora, fauna, new services (water pipes etc.) and the underlying Aquifer all have the potential to be impacted by any contamination present beneath the site.

Off-site receptors include the adjacent residential properties and the River Crane. However, the risk of significant contamination migrating off site is considered to be low.

6
Recommendations

The Risk Assessment has indicated there to be a medium risk of significant or widespread contamination of soil or groundwater at the site.

An intrusive investigation has been commissioned to determine the ground conditions and will be extended to confirm the findings of this study and to evaluate the presence and extent of any contamination. Based upon the findings of this study, the following potential contaminants should be considered:-

Metals & metalloids:	Total arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc. Water soluble boron.
Organic:	Petroleum hydrocarbons, polyaromatic hydrocarbons and phenols.
Others:	Asbestos screen and Waste Acceptance Criteria.
	Ground gas monitoring with PID readings.

The scope of investigation should be tailored to the development proposals and the risk to construction workers and end users. Selected soil samples should be analysed for the foregoing range of contaminants. Should contamination be present to significant depth, the assessment should be extended to determine its impact upon groundwater.

The extent of all aspects of the investigation should be reassessed in the light of the conditions revealed in the early stages, and on consideration of the test results. In particular, significant levels of contamination may warrant further investigation to determine its spatial distribution and mobility. A 'watching brief' should be maintained during the construction phase and any suspect material should be brought to the attention of AP geotechnics.

R G Chapman
AP GEOTECHNICS LTD.
6th April 2022

PROCEDURAL NOTES
for
ENVIRONMENTAL ASSESSMENTS

This report reviewed and evaluated information from the client, property owner, local authority, Environment Agency and others. The opinions, conclusions and recommendations are based on this information and observations made during the site reconnaissance.

The recommendations made in this report represent our professional opinions. These opinions were arrived at in accordance with current accepted industry practises and hydrological and engineering practises at this time. As such they are not a guarantee that the site is free of hazardous or potentially hazardous material or conditions.

APPENDIX

A Figures

B UST Decommissioning Information

C Current Industrial Data

APPENDIX A

FIGURES

Greggs, Gould Road, Twickenham, TW2 6RT

Existing Site Plan

Scale: unknown

Existing site plan

Figure 1

Greggs, Gould Road,
Twickenham, TW2 6RT

Extract from Ordnance Survey Map
County Series: 1865

Scale: approx. 1/2,500 @ A3

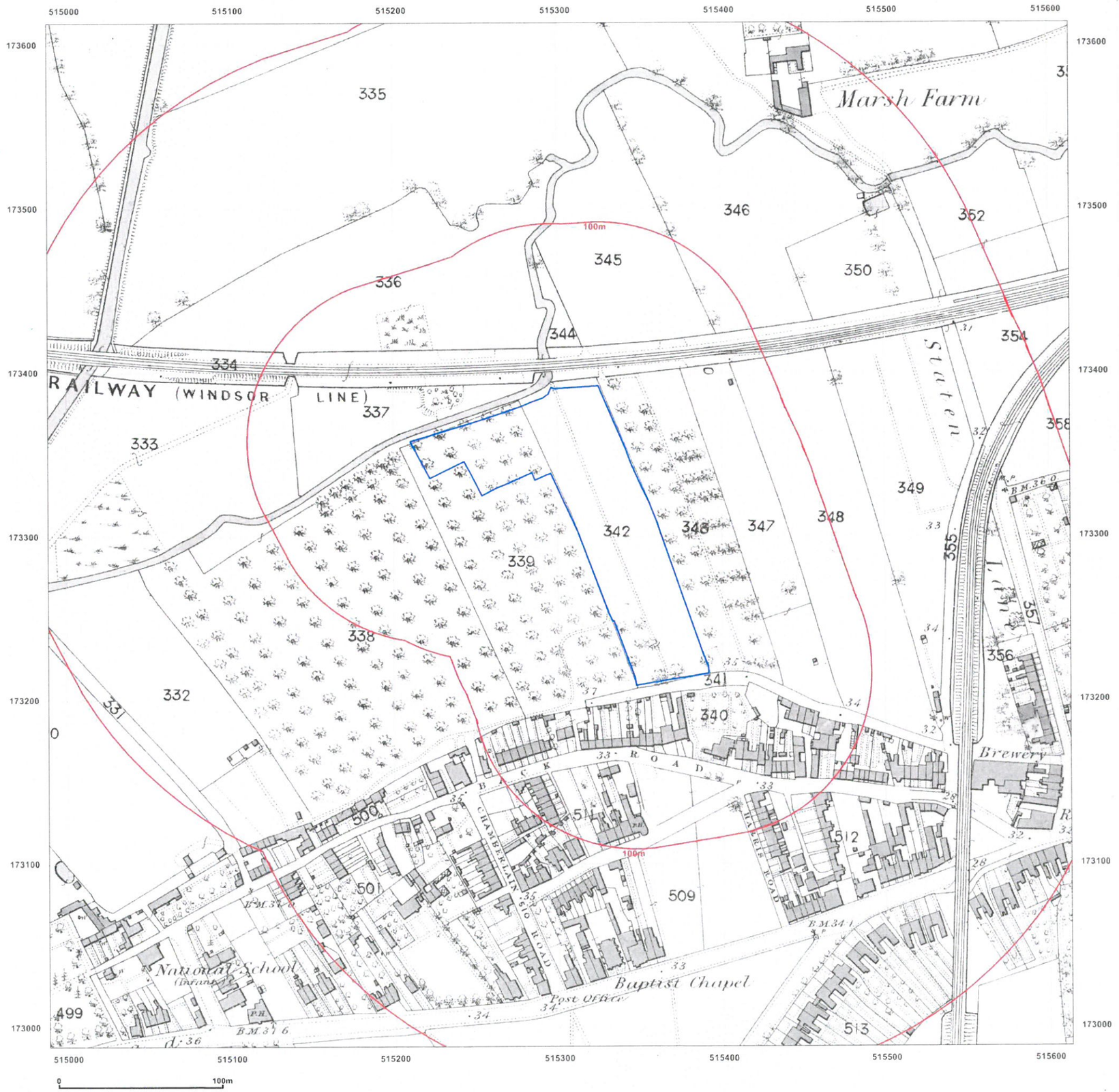

Figure 2