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Phase 1 Desk Study Site Investigation Report

LOCATION	Hough End Leisure Centre, 480 Princess Road, Manchester M20 1NA
ISSUE DATE	25 October 2021
FOR	Ameresco c/o Rik Aindow
CLIENT REF.	
OUR REF.	G21424

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Executive Summary

The major conclusions of this desk-based Phase one study are summarised in the table below:

Site Suitability	Desk Study Finding	Preliminary Assessment
Normal Foundations	Bedrock expected to be present at shallow depth with drift deposits of sand and gravel underlain by boulder clay anticipated, based upon the previous ground investigation.	Not required for the development planned
Soakaways	Sand/gravel soils likely to be present which might offer good permeability, underlain by Clay soils unlikely to offer sufficient permeability.	Not required for the development planned
Radon Gas	Less than 1% of properties effected	Negligible

Potential Risks	Desk Study Finding	Preliminary Risk Assessment
Chemical Contamination	Historical nearby and on-site land uses potentially giving rise to a range of inorganic and organic contaminants including asbestos, metals/metalloids, PAHs and petroleum hydrocarbons.	Low
Hazardous Gas	Possible chance for significant potential source of hazardous gas. Development will not involve any enclosed spaces/buildings.	Very low
Ground Instability/ subsidence	Potential for vegetation influence on shrink-swell clays which may be present, including risk of soil heave.	Low
	Potential for significant deposits of compressible made/infilled ground.	Low

NB. Arbitrary potential hazard assessment: High (Red), Moderate (Amber), Low (Yellow), Very Low (Green), Negligible (uncoloured)

1. Introduction

In accordance with your instruction, Geoinvestigate Ltd. has carried out a Phase 1 Desk Study Investigation of Hough End Leisure Centre, 480 Princess Road, Manchester M20 1NA. The location of the site is shown on the Groundsure Enviro+Geo Insight report presented in Appendix 2.

The site currently comprises an area of land some 0.93ha in size with access from A5103 from the southeast and Framley Road to the north. Recent satellite imagery shows that the study area forms part of a larger site occupied by the leisure centre, car park and the soft landscaping/playing field to the north-western and southwestern parts of the site. The site itself bounded by playing fields to the west and residential dwellings to the east. Given that the study site is part of the wider leisure centre site there are no clear site boundaries, save from the A5103 and the large trees/wooded area to the north of the site.

It is understood that it is proposed to install a closed loop ground source heat pump (GSHP) system as part of building works at Hough End Leisure Centre.

The purpose of the Phase 1 Desk Study investigation was to review the historical land use and geological information for the site in order to provide an assessment of the potential geotechnical/foundation problems together with a qualitative contamination and ground gas risk assessment.

The client has also provided a previous site investigation report which was carried out by Coffey Geotechnics Ltd (2013) within the existing site area. This ground investigation was carried out prior to the construction of the leisure centre currently present at the site, and comprised of a desk study, intrusive ground investigation and remediation strategy. These have been provided in appendix 3.

2. Scope of Works

The investigation comprised a review of the following information:

- An extract from the 1:50,000 BGS geological mapping (Sheet 98 – Stockport).
- Historical OS maps of various scales dating back to 1876 (presented in Appendix 1).
- Observations from a walkover study carried out by Tristan Campbell-Reynolds of Geoinvestigate
- A GroundSure Enviro+Geo Insight Report. This is included in Appendix 2.
- Coffey Geotechnics Ltd previous ground investigation reports are provided in Appendix 3.

3. Findings of Phase 1 Investigation

3.1 Anticipated Geology

The extract of the 1: 50,000 BGS geological map (Sheet 98 – Stockport) indicates the site is expected to be underlain by superficial deposits comprising Glaciofluvial Sheet Deposits (Devensian) with underlying bedrock geology of the Wilmslow Sandstone Formation (Sandstone). The map also states that the Shridley Hill Sand Formation lies close to the northeast of the site, possibly encroaching onto the site.

BGS borehole records some 600m to the southwest, generally show topsoil to 0.60m depth followed by natural fluvio-glacial gravel to 3.97m, underlain by boulder clay to 12.19m. No bedrock is recorded within the boreholes.

The previous ground investigation carried out by Coffey Geotechnics at the site, encountered topsoil to between 0.10m and 0.40m, followed by made ground to 0.40m to 1.00m depth, underlain by natural drift of loose and medium, dense sandy gravel (glaciofluvial sheet deposits) to between 1.10m to 2.40m, firm to stiff sandy gravelly clay (glacial till) to 1.30m to 2.70m, then natural bedrock of the Wilmslow Sandstone Formation to borehole termination.

3.2 Historical OS Maps and Historical Land Use

Copies of historical OS maps were obtained for the site covering the period 1881 to 2021. Historical land uses and major features located within the site boundary and externally but potentially within influencing distance are summarised in Table 1. The earliest OS map of 1881 shows the site as undeveloped agricultural land. The map also shows the Red Lion Brook to the north of the site, with Old Marl Pits approximately 100m from the site.

Table 1: Summary of Historical OS Map Land Use & Potential Hazard Identification

Map Feature	Location	Appears	Absent	Notes
Leisure Centre	On site	2021	Present	Construction of building on site, potential source of made ground, source of hazardous has and contamination.
Residential development	On site	1933	Present	Construction of residential estate potential source of made ground, if substantial enough, this could be a source of hazardous gas.
Framley Road	On site	1950	2010	Construction of roadway. Potential source of made ground nearby or on site.
Car Park	On site	1992	Present	Construction of car park (Asphalt hardstanding) potential source of deep made ground, source of hazardous gas and contamination.
Table 1 continued following page				

NB. Arbitrary potential hazard assessment: High (Red), Moderate (Amber), Low (Yellow), Very Low (Green), Negligible (uncoloured)

Table 1 (ctd): Summary of Historical OS Map Land Use & Potential Hazard Identification

Map Feature	Location	Appears	Absent	Notes
Princess Road	5m east	1933	Present	Construction of road. Potential source of made ground nearby or on site. Potential contamination from emissions
Red Lion Brook + Cuttings	10m northeast	1881	Present	Potential receptor and pathway for contamination.
Pavilion	70m southwest	1973-76	Present	Too distant to be considered source of contamination to the site.
Old Marl Pits	80m west	1881	1894	Pits are noted as marsh/bog and occupied by ponds. Infill of pits by 1894. Considered too distant to be source of contamination or hazardous gas.
Ponds	90m west	1881	1933	1907 – Eastern (closest) pond infilled/removed. 1933 – Southern ponds (two) infilled/removed. Considered too distant to be source of contamination or hazardous gas.

NB. Arbitrary potential hazard assessment: High (Red), Moderate (Amber), Low (Yellow), Very Low (Green), Negligible (uncoloured)

A review of the historical OS maps has highlighted the land uses most likely to present (or have presented) a hazard or source of potentially harmful contamination to the study area. The primary feature of interest is the adjacent infilled ponds (marl pits) and the multiple development that has occurred on site (Commercial and Residential). Additionally, the presence and construction of the roads on and nearby to the site, may have led to contamination from the placement of made ground and emissions, the former also possibly being a source of hazardous gas.

3.3 GroundSure Enviro + Geo Insight Report

The GroundSure Enviro+Geo Insight Report presented in Appendix 2 provides listings of potentially contaminative current and past land uses together with possible pathway and receptor information. It also covers other potential risks to the site including ground hazards associated with the area's natural geological setting and man-made hazards such as those arising from development activities. A summary of the relevant EnviroInsight Report findings (environmental issues) is presented in Table 2 below and on the following pages with GeoInsight findings discussed in the following section (geotechnical issues).

Table 2: GroundSure EnviroInsight Summary: Potential Contaminative Uses/Pathways/Receptors

Details	Feature	Location relative to site
Past land use		
Historical industrial land uses	Cuttings (15)	4m northeast (Closest)
	Nursery (2) Unspecified Pit (2) Railway Station (8) Unspecified Ground Workings Railway Building (5)	214m north (Closest) 407m northwest (Closest) 442m northwest (Closest) 453m northwest 467m northwest
Historical Tanks	No (0) records within 500m	N/A
Historical Energy Features	Electricity Substation (7)	240m southeast
Historical garages	Garage	424m northwest
Landfill and Other Waste Sites		
Historical landfill (LA/mapping records)	No (0) records within 500m	N/A
Historical landfill (EA/NRW records)	No (0) records within 500m	N/A
Table 2 is continued on the following page		

NB Arbitrary potential hazard assessment: potentially significant (yellow), or unlikely to be significant (uncoloured). Potential receptors for contamination are highlighted blue.

Table 2 (ctd.): GroundSure EnviroInsight Summary: Potential Contaminative Uses/Pathways/Receptors

Details	Feature	Location relative to site
Landfill and Other Waste Sites (continued)		
Historical waste sites	No (0) records within 500m	N/A
Licensed waste sites	No (0) records within 500m	N/A
Waste exemptions	Using waste exemption Treating waste exemption	
Current Land uses		
Recent industrial land uses	Electricity Sub Station	On site
Current or recent petrol stations	Status – Open	450m northwest
Control of Major Accident Hazards (COMAH)	No (0) records within 500m	N/A
Licensed pollutant release (Part A(2)/B)	Unloading of Petrol into Storage at Service Stations	447m northwest
Licensed Discharges to controlled waters	Sewage discharges – sewer storm overflow – water company (2)	425m northwest (Closest)
Pollution Incidents (EA/NRW)	No (0) records within 500m	N/A
Hydrogeology - Superficial aquifer		
Superficial aquifer	Secondary A	On site
Bedrock aquifer	Principal	On site
Groundwater vulnerability	Soil / surface leaching class: High Superficial geology vulnerability: High Bedrock geology vulnerability: Low	
Groundwater abstractions	Active	1895m southwest
Surface Water Abstractions	No (0) records within 2000m	N/A
Potable abstractions	No (0) records within 2000m	N/A
Hydrology		
Water Network (OS MasterMap)	Water year round (3)	12m Northeast (closest)
WFD Surface water body catchments	River WB catchment	On Site
WFD Surface water bodies	River (1)	434m north
WFD Groundwater bodies	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	Onsite
River and coastal flooding		
Risk of Flooding from Rivers and Sea (RoFRaS)	No (0) records within 50m	N/A
Historical Flood Events	No (0) records within 250m	N/A
Flood Zone 2	No (0) records within 50m	N/A
Flood Zone 3	No (0) records within 50m	N/A
Surface water flooding		
Surface water flooding	Highest risk on site Highest risk within 50m	1 in 1000 year, 0.3m - 1.0m 1 in 30 year, 0.3m - 1.0m
Groundwater flooding		
Groundwater flooding	Highest risk on site Highest risk within 50m	Moderate – High High
Environmental designations		
Local Nature Reserves (LNR)	Chorlton Water Park	1828m North
Green Belt	Merseyside and Greater Manchester	1523m south

NB Arbitrary potential hazard assessment: potentially significant (yellow), or unlikely to be significant (uncoloured). Potential receptors for contamination are highlighted blue.

The EnviroInsight report, has shown a potential source of contamination from the electricity substation, otherwise no new potentially contaminative land uses or natural risks have been listed in the EnviroInsight section beyond those already discussed in the review of the historical map record. Other identified features are considered to be too distant or historical to pose significant risk to the study site. Potential geotechnical hazards are discussed in the review of the GeoInsight section of the Groundsure Report (see Section 3.4 below). The report also identified the (bedrock) aquifer beneath the site as a Principal Aquifer.

3.3.2 Groundsure GeoInsight Report

The GroundSure Enviro+Geo Insight Report (Appendix 2) provides additional detailed information on potential geological hazards. A summary of the relevant GeoInsight Report findings (geotechnical issues) is presented in Table 3 below and on the following page:

Table 3: Groundsure GeoInsight Summary: Potential Geological Hazards

Geology 1:10,000 scale		
Artificial and made ground (10k)	Infilled Ground (2) Made Ground (Undivided) (3) Worked Ground (Undivided)	77m northwest (Closest) 234m southwest (Closest) 385m southwest
Superficial geology (10k)	Glaciofluvial Sheet Deposits, Devensian – Sand and Gravel	On Site
Bedrock geology (10k)	Wilmslow Sandstone Formation - Sandstone	On Site
Bedrock faults and other linear features (10k)	Normal fault, inferred; crossmarks on downthrow side (2)	301m northeast (Closest)
Geology 1:50,000 scale		
Artificial and made ground (50k)	No (0) records within 500m	N/A
Superficial geology (50k)	Glaciofluvial Sheet Deposits, Devensian – Sand and Gravel	On Site
Superficial permeability (50k)	Very High to High	On Site
Bedrock geology (50k)	Wilmslow Sandstone Formation - Sandstone	On Site
Bedrock permeability (50k)	High	On Site
Bedrock faults and other linear features (50k)	Fault, inferred (2)	296m northeast (Closest)
Natural ground subsidence		
Shrink swell clays	Negligible	Onsite
Running sands	Very Low Low	Onsite 16m northeast
Compressible deposits	Negligible	Onsite
Collapsible deposits	Very low	Onsite
Landslides	Very Low	Onsite
Ground dissolution of soluble rocks	Negligible	Onsite
Mining, ground workings and natural cavities		
BritPits	No (0) records within 500m	N/A
Surface ground workings	Cuttings (2) Ponds (3)	4m northeast (Closest) 130m southwest (Closest)
Underground workings	No (0) records within 1000m	N/A
Non-coal mining	No (0) records within 1000m	N/A
JPB mining areas	In addition to being located inside an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property which may supplement this information. Further details and a quote for services can be obtained by emailing this report to enquiries.gs@jpb.co.uk. Onsite	
Coal mining	No (0) records on site	N/A
Radon Risk		
Radon Risk	Less than 1% of properties effected, no protection required	Onsite
Soil chemistry		
Mostly near normal levels recorded though slightly elevated arsenic might be expected.		

NB Arbitrary potential hazard assessment: potentially significant (yellow), or unlikely to be significant (uncoloured). Potential receptors for contamination are highlighted blue.

The GeoInsight section has highlighted no additional potential risks to the site or the intended development arising due to the geological setting beyond those already discussed. As the strata beneath the leisure centre is already known, the geotechnical hazards can be considered elevated within the shrink-swell clays and compressible deposits (weak made ground).

However, as no geotechnical design will be required for the GSHP installation, any geotechnical hazards will have a reduced risk. The JPB mining areas is not considered to be of risk to the site.

3.5 Previous Ground Investigation Conclusion

As stated in section 1, a previous ground investigation has been carried out by Coffey Geotechnics, prior to the construction of the leisure centre currently on site. This investigation found:

- Ground conditions encountered during the ground investigation comprised Made Ground over (sequentially): Glaciofluvial Sheet Deposits (GSD), Glacial Till and (weathered strata of the) Wilmslow Sandstone Formation.

- Ground water was recorded at depths of between 0.70m and 5.00m during the borehole exercise. During subsequent monitoring, groundwater levels were recorded at depths of between 1.92m and 2.83m BGL (28.36 – 28.87m AOD).

- Asbestos (Chrysotile) was positively identified in one sample of Made Ground. Near-surface soils in landscaped/soft-standing parts of the development need to be devoid of asbestos.

- The results of a screen against the GQRA criteria in soils indicated concentrations of all tested determinands in samples of Made Ground to be below their respective screening values. No values exceeding the GQRA were found in natural ground in the samples tested.

- Testing of leachate prepared from several Made Ground samples indicated marginal exceedances for chromium and lead with reference to UK drinking water standards.

- A Tier 1 risk assessment based on the results of the screen against GQRA criteria indicated that the risks to site users and groundwater are very low to low, based on the information available, Coffey considered that further risk assessment is not necessary for this development.

- Specific remediation to protect controlled waters is not indicated to be necessary.

- The ground gas monitoring the site is indicated to classify as CS 2, in accordance with BS8485:2007.

As the remediation strategy for the site has also been carried out, this is thought to have satisfied the conditions which would have presented from the asbestos identified near to the pedestrian entrance on the eastern side of the site. The validation report has not been provided collected for this study.

Additionally, the asbestos (Chrysotile), which was previously identified with the ground investigation, is believed to be sourced from the previous residential estate present on the site. This could also be present with other artificial deposits on the site.

3.6 Walkover Survey Observations

A site reconnaissance visit was undertaken on the 21st October 2021 by Anthony Montgomery of Geoinvestigate.

The site was as described in Section 1 of this report comprising an area of land some 0.93 ha in size with access from A5103 from the southeast and Framley Road to the north. Recent satellite imagery shows that the study area forms part of a larger site occupied by the leisure centre, car park and the soft landscaping/playing field to the north-western and southwestern parts of the site. The study site itself bounded by playing fields to the west and residential dwellings to the east. There are no clear site boundary features to the study area, save from the boundary with A5103 and the large trees/wooded area to the north of the site.

The walkover found the site to be relative flat, with the soft landscaping and the hardstanding to both be level with one another. There are no clear site boundary features, aside from the boundary with A5103 and the large trees/wooded area to the north of the site.

The existing pavilion to the south of the site, was surrounded by asphalt hardstanding.

The electricity substation (Photograph 4) which was identified in the Groundsure report was found to be in good condition and had no damage to the outer casing. Its apparent recent age would preclude the presence of PCBs as a contamination risk.

Access to the site is via Princess Road to the southeast corner of the site.

Large trees are present within the soft landscaping around the site, and some have been left in place within and around the northern perimeter of the site. Considering the clay soils, this could indicate a potential for vegetation influence on shrink-swell clays, and potentially soil heave following any removal that may take place. However, given the upper granular strata and the nature of the proposed development, there is currently considered to be of low risk attributable to this geotechnical hazard.

The inspection of the surface of the site found no obvious evidence of physical hazards or odours, staining, or residues that might be indicative of the presence of chemical (including hydrocarbon) contamination. On the basis of the walkover inspection only, the risk of a serious contamination hazard occurring at this site would be assessed to be very low given the current condition of the site and use. The hazardous gas risk at the site, based solely on the findings of the walkover survey, would also be assessed to be very low given it is unlikely any substantial gas source exists beneath the site. The limited evidence of minor groundworks does not indicate that significant made ground might be present.

It is noted however that despite the apparent lack of evidence of any contamination encountered during the visual inspection described above, any planning application is likely to require confirmation that no contamination is likely to be present Photographs taken during the walkover survey are presented below and on the following page:

Photograph 1: Taken in the northern car park looking towards the northern part of the site.



Photograph 2: Looking to the southwest, from the northern corner of the site.



Photograph 3: Stood to the southern end of the leisure centre, with the hard standing path.



Photograph 4: Northern side of the site, showing the electricity substation present.



4. Qualitative Risk Assessment

4.1 Method

In order to assess the potential risks to the site, information obtained on the potential sources of hazard identified in Section 3 have been reviewed and applied to a model of the site. This allows an assessment of the potential sources of contamination to be made by examining the potential pollutant linkages between these and the receptors at the site. The risk assessment presented comprises a source-pathway-receptor model developed in the context of the intended end use of the site (Commercial use).

It is noted that an alternative land use would present different pollutant linkages with more or less vulnerable receptors and differing pathways for exposure. Were the intended land use to be changed at the site, a revised risk assessment would be required.

Identified potential sources of hazard or contamination, vulnerable receptors, and possible pathways by which they may be exposed are presented in the Conceptual Ground Hazard Model (CGHM) presented in Figure 1, see Section 4.2.

In addition to risks to human health and controlled waters and aquifers posed by contamination and ground gas, the CGHM examines the potential risks to the construction of the development including its buildings from geological or geotechnical hazards.

It allows an overall assessment to be made of the potential hazards and risks to the site and the proposed development with respect to “fitness for purpose”. Superficial and bedrock geology which is recorded to be beneath the site by the Groundsure report and confirmed by the previous groundworks, is shown to have very high to high and high permeability, respectively.

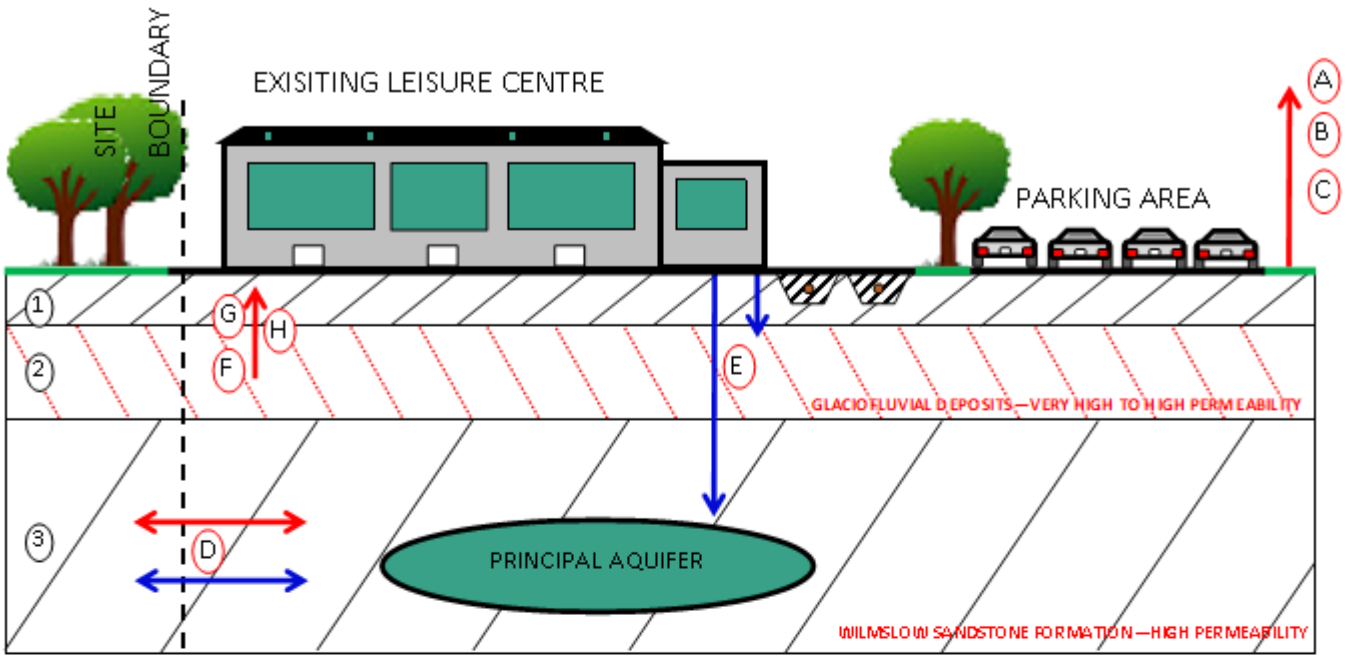
4.2 Risk Assessment

The desk study has highlighted the presence of possible sources of contamination potentially affecting the site, the initial primary features of interest were the adjacent infilled ponds (marl pits) and the multiple development that has occurred on site (Commercial and Residential). However, after reviewing the previous ground investigation and remediation to the site, it is considering that the hazardous gas and contamination conditions have already been evaluated and assessed to be of very low risk or hazards have been identified and mitigated. Following from the GroundSure report, the construction of the leisure centre and presence of the electricity substation post the remediation of the site, could have led to further contamination, although this should be unlikely given the relatively recent date of construction.

Contamination from there external sources would require a favourable pathway for migration into the site and the majority of external sources of contamination are likely to be too distant, minor or mitigated to pose any significant risk, however, considering the presence of the principal aquifer, contamination testing would be prudent. The BGS mapping and previous ground workings both suggest that the superficial deposits include sand and clay deposits which could exhibit reasonably high and then low permeability. As such, it is currently considered possible that a pathway for contamination migration into or out of the site could exist.

Potential receptors at the site would include the end users of the site (customers/employees), workers employed in the construction of the new development, the buildings themselves and their services, plants and vegetation, neighbouring sites (and their users/occupants), nearby surface water and ground water at depth. A representation of the potential hazards and pollutant linkages is shown in Figure 1 overleaf.

Figure 1 – Conceptual Ground Hazard Model of site including a Source, Pathway and Receptor Model



(1) SURFACE—TOPSOIL AND MADE GROUND. HARDSTANDING IN AREAS OF CAR PARK

(2) SUPERFICIAL GEOLOGY— GLACIOFLUVIAL DEPOSITS (SAND AND GRAVEL)

(3) BEDROCK GEOLOGY—WILMSLOW SANDSTONE FORMATION (SANDSTONE)

IDENTIFIED HAZARDS Including Potential CONTAMINATION SOURCES

- **Previous developments on site, comprising of the construction and removal of residential and commercial features on and near to the site.**
- **Construction and presence of electrical substation on site.**
- **Ground instability from geotechnical hazards.**

IDENTIFIED RECEPTORS and ASSOCIATED PATHWAY

A— End Users through Direct Contact / Inhalation / Ingestion. Buildings and hard standing will encompass most of the site, removing any pathway to end users through direct contact in these areas.

B— Plants and Trees through uptake.

C— End Users through cultivation and consumption of vegetables / fruit. Impossible given the intended end use of the site

D— Neighbouring Sites through lateral migration (in soil and water, including surface water run off)

E— Ground water through leaching of sub-soil

F— Buildings and services through direct contact.

G— End users and buildings through ground gas migration.

H— Structures through vegetation induced shrinkage-swelling of clay soils, and heave risk following vegetation removal.

The CGHM and the summary table below (Table 4) present the most likely potential sources of contamination, gas or geotechnical risk that are considered to be possible either within or near to the study site.

The identified potential contamination sources could feasibly have given rise to harmful and potentially mobile contamination of made ground and/or natural deposits which might underlie the site. Superficial deposits may include higher permeability sand/ gravel deposits, underlain by lower permeability clay deposits and so it is currently considered possible that contamination migration into or out of the site could occur / have occurred. As the site is underlain by a principal aquifer, notwithstanding the forgoing, it is considered appropriate to carry out further contamination testing. These testing areas should be located away from the previous remediation.

As previously mentioned, the sources of contamination and hazardous gas that have been identified within this Phase 1, such as the infilled ponds, marl pits, construction, and presence of roads nearby to the site, due to the previous ground investigation that occurred on the site, it is considered that risks have been mitigated. Therefore, this phase 1 has only considered any risks post the 2013 assessment, such as the electricity substation.

Note that, due to the potentially contaminative historical land uses / features that have been identified within the study site boundary (Development of the leisure centre and electricity substation on site) the risk *to* external sites or ground/surface waters through contamination migration *from* the study site is currently expected to be more significant/likely than any risks posed *to* the study site from external sources.

Therefore, assuming the worst-case scenario, the potential for harmful contamination to exist at the site from historical sources is assessed to be low (as opposed to very low or negligible) owing to the potentially contaminative activities located near to and/or within the study area.

The hazardous gas risk is currently assessed to be low as it is unlikely that any significant potential hazardous gas source exists at or the site or within influencing distance. As the proposed site development will not include any enclosed spaces, the gas risk could be reassessed to very low, perhaps negligible.

The actual current level of risk to the development and its users can only be ascertained for certain through confirmation of the ground conditions by a Phase 2 intrusive investigation, involving a contamination survey, which will be carried out to assess if any contamination has occurred post the remediation and if there any other areas of contamination that were not recognised in the initial ground investigation.

Table 4: Summary of Conceptual Ground Hazard Model

Potential Source	Nature of Hazard	Associated Contaminants	Pathway	Receptor	Preliminary Risk Rating
Historical land use and development. Made ground. Electricity substation.	Inorganic and organic chemical contaminants within soil.	-Trace metals -PAHs -Petroleum hydrocarbons -Asbestos -Pesticides -Pathogens (microbiology)	-Direct human contact -Ingestion of soil -Ingestion of dust -Inhalation of vapour -Leaching into ground or surface waters -Overground migration to external sites (soil and water)	-Site Operatives -End Users -Vegetation -Controlled waters -Structures and services -Neighbouring sites/users	Low
Possible made ground	Hazardous ground gas migration.	Landfill-type gases (CO_2, CH_4 etc.)	-Inhalation -Explosion risk	-Site Operatives -End Users -Structures	Very low
Local Geology	Radon gas migration	Radon gas	-Inhalation	-End Users	Negligible
Shrink-swell clays	Ground instability vegetation influence / heave	N/A	Direct	-End Users -Structures	Low
Infilled/made ground	Ground instability via risk of settlement	N/A	Direct	-End Users -Structures	Low

NB. Arbitrary potential hazard assessment: High (Red), Moderate (Amber), Low (Yellow), Very Low (Green), Negligible (uncoloured)

5. Conclusions

A summary of the anticipated ground conditions, risks and implications based on the findings of Sections 3 and 4 of this report is presented in Table 5 below:

Table 5: Summary of Phase 1 Desk Study Findings

Concern	Desk Study Finding	Initial Risk Assessment	Potentially Useful Action in a Phase 2 Site Investigation
Normal Foundations	Bedrock expected to be present at shallow depth with drift deposits of competent boulder clay anticipated, based upon the previous ground investigation.	Likely to be suitable	Currently not considered necessary for the proposed development
Soakaways	Sand and gravel soils likely to be present which might offer good permeability, underlain by Clay soils unlikely to offer low permeability.	Unlikely to be suitable	Currently not considered necessary for the development.
Radon Gas	Less than 1% of properties effected	Negligible	None. No radon protection required.
Chemical Contamination	Historical nearby and on-site land uses potentially giving rise to a range of inorganic and organic contaminants including asbestos, metals/metalloids, PAHs and petroleum hydrocarbons.	Low	Chemical analysis for potential contaminants in soil samples (and potentially leachate). Samples should be recovered from made ground (if found) and topsoil, and also potentially underlying natural sub soils to check for potential leaching and/or migration into the site from possible external sources.
Hazardous Gas	Possible chance for significant potential source of hazardous gas. Development will not involve any enclosed spaces/buildings.	Very low	Ground gas monitoring unlikely to be required unless significant (>1m deep) made ground deposits are encountered. Alternative means of assessment may be useful such as those described in CL:AIRE RB17. As the development will not include any enclosed spaces/buildings, hazardous gas risk is further assessed to be of negligible risk.
Ground Instability/ subsidence	Potential for vegetation influence on shrink-swell clays which may be present, including risk of soil heave.	Low	Currently not considered necessary for the development.
	Potential for significant deposits of compressible made/infilled ground.	Low	

NB. Arbitrary potential hazard assessment: High (Red), Moderate (Amber), Low (Yellow), Very Low (Green), Negligible (uncoloured)

The initial risk assessment provided above is tentative as it is based only on the Phase 1 desk study. The risks will need to be reassessed and may perhaps change significantly becoming higher or lower depending on the results of the Phase 2 intrusive investigation and contamination/gas survey, should these be undertaken.

6. Recommendations

In light of the Phase 1 desk study findings, it is recommended that a Phase 2 investigation be undertaken at the site to better explore the possible risks that have been identified. This should include contamination analyses of the site to establish any further or remaining contamination that may be on the site. As there are relative uncertainties, this work is recommended in order to establish the actual site conditions and to properly assess both geotechnical and environmental risks.

The Phase 2 investigation should be designed to focus on the potential contaminants highlighted in the CGHM (Figure 1 and Table 4). As there is a potential hazardous gas risk, a gas survey is recommended.

Table 6: Proposed Phase 2 Site Investigation Specification

Action	Quantities	Justification/Details
Hand excavated trial pits	Up to 6 (up to 1m in depth – if achievable)	Further inspect condition and composition of soils and recover additional samples for contamination analyses, including in locations which may be difficult for plant to access.
Chemical Contamination Analysis of Soils and Leachate (and possibly ground water if pertinent)	Up to 6 No. samples from topsoil and/or made ground at shallow depth (<1m) and potentially also deeper natural strata or made ground (if encountered).	Quantify risk posed to receptors identified in CGHM (see Figure 1) for revised risk assessment. Determinands should include a range of metals/metalloids, speciated PAH content, petroleum hydrocarbon content, BTEX, **asbestos** presence, and soil organic matter content (to aid in revised risk assessment).
Gas monitoring	Up to 6 No. visits over 3 months. Preferably including occasions of <1000mb and after sharp drop (may only be required in made ground encountered at site).	Quantify risk posed by potential hazardous gas from made/in-filled ground. Possible analysis of Total Organic Carbon (TOC) to support gas measure recommendations (or in the absence of gas monitoring data) using guidance published in CL:AIRE research bulletin RB17. If no evidence of shallow mining or significant (>1m deep) made ground deposits are encountered, then monitoring may not be necessary or may be cut short (i.e. if there is no feasible significant gas sources). **Considered unlikely to be necessary**
Provision of Factual and Interpretive Report	N/A	Presentation of findings and implications including: • Site plan • Trial pit logs • Results of geotechnical testing • Contamination analysis results • Results of water infiltration testing • Ground gas measurements (if appropriate) • Revised CGHM and chemical contamination risk assessment including appropriate soil assessment criteria. • Advice regarding any necessary remediation/validation • Advice regarding foundation design etc.

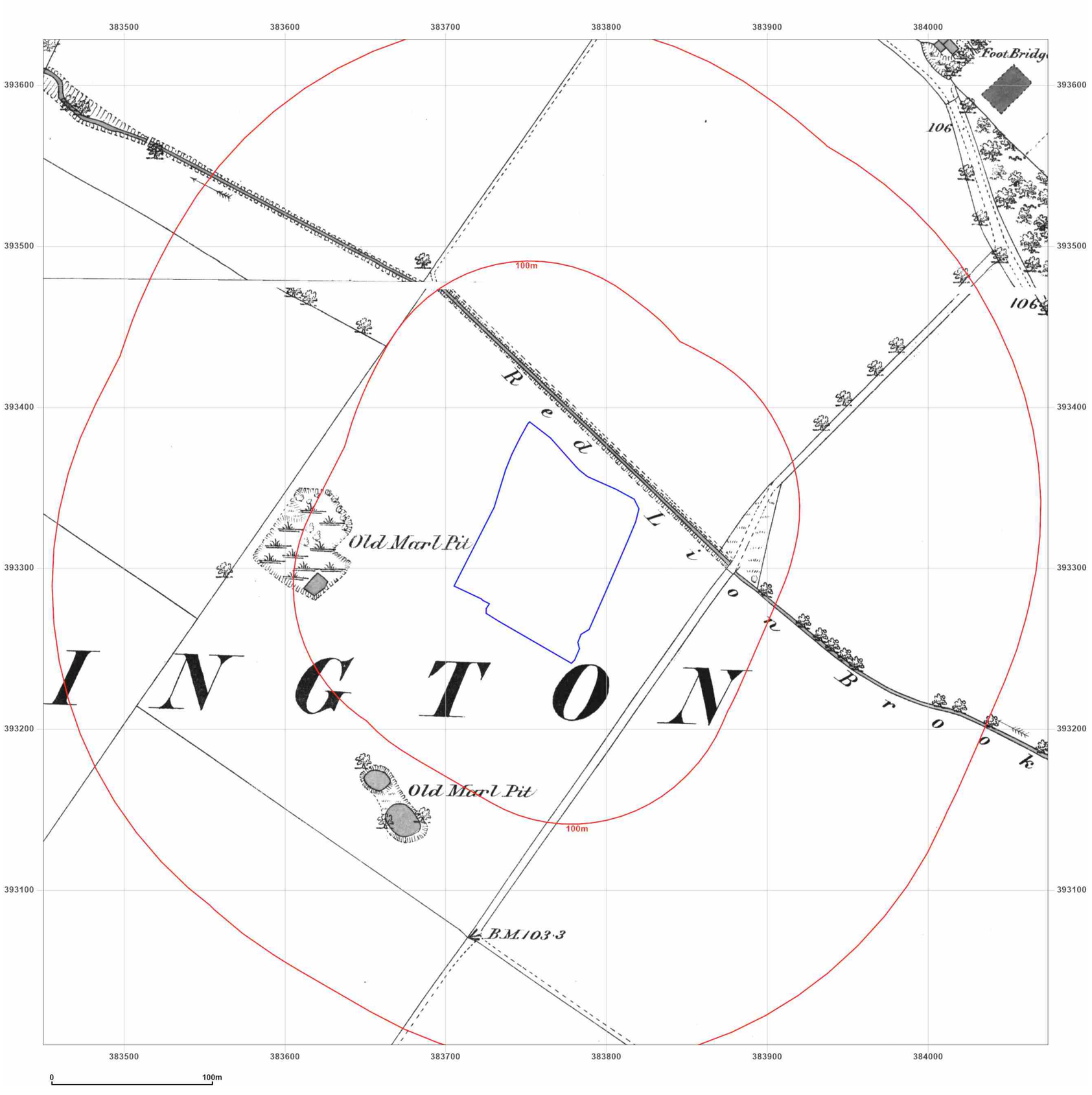
It should be noted that the scope, extent and cost of the Phase 2 work may increase if extensive ground contamination, or extensive amounts of made ground or drift deposits were found to exist at the site and/or the Local Authority or the Environment Agency require additional information.

END OF REPORT

Units 3a and 4 Terry Dicken Industrial Estate
Ellerbeck Way
Stokesley
North Yorkshire
TS9 7AE

Tel. 01642 713779
Fax 01642713923
Email enquiries@geoinvestigate.co.uk

APPENDIX 1
HISTORICAL MAP RECORD



Groundsure INSIGHTS

Site Details:

HOUGH END LEISURE CENTRE,
480 HOUGH END LEISURE CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

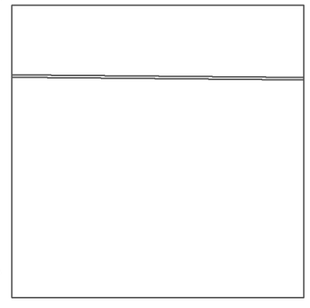
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Revised N/A
Edition 1881
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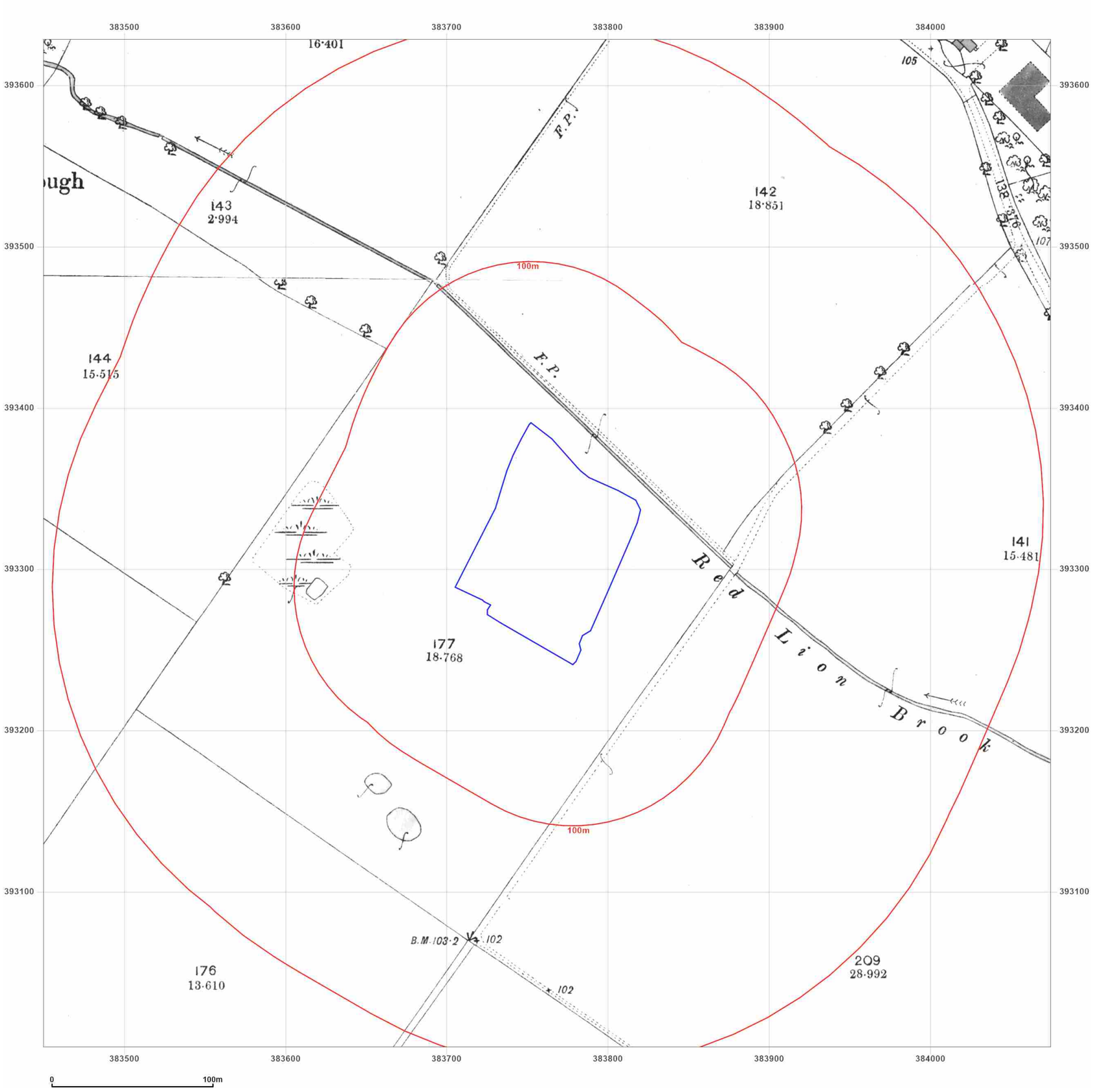
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Groundsure INSIGHTS

Site Details:

HOUGH END LEISURE CENTRE,
480 HOUGH END LEISURE
CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

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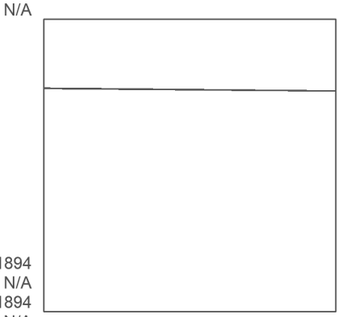
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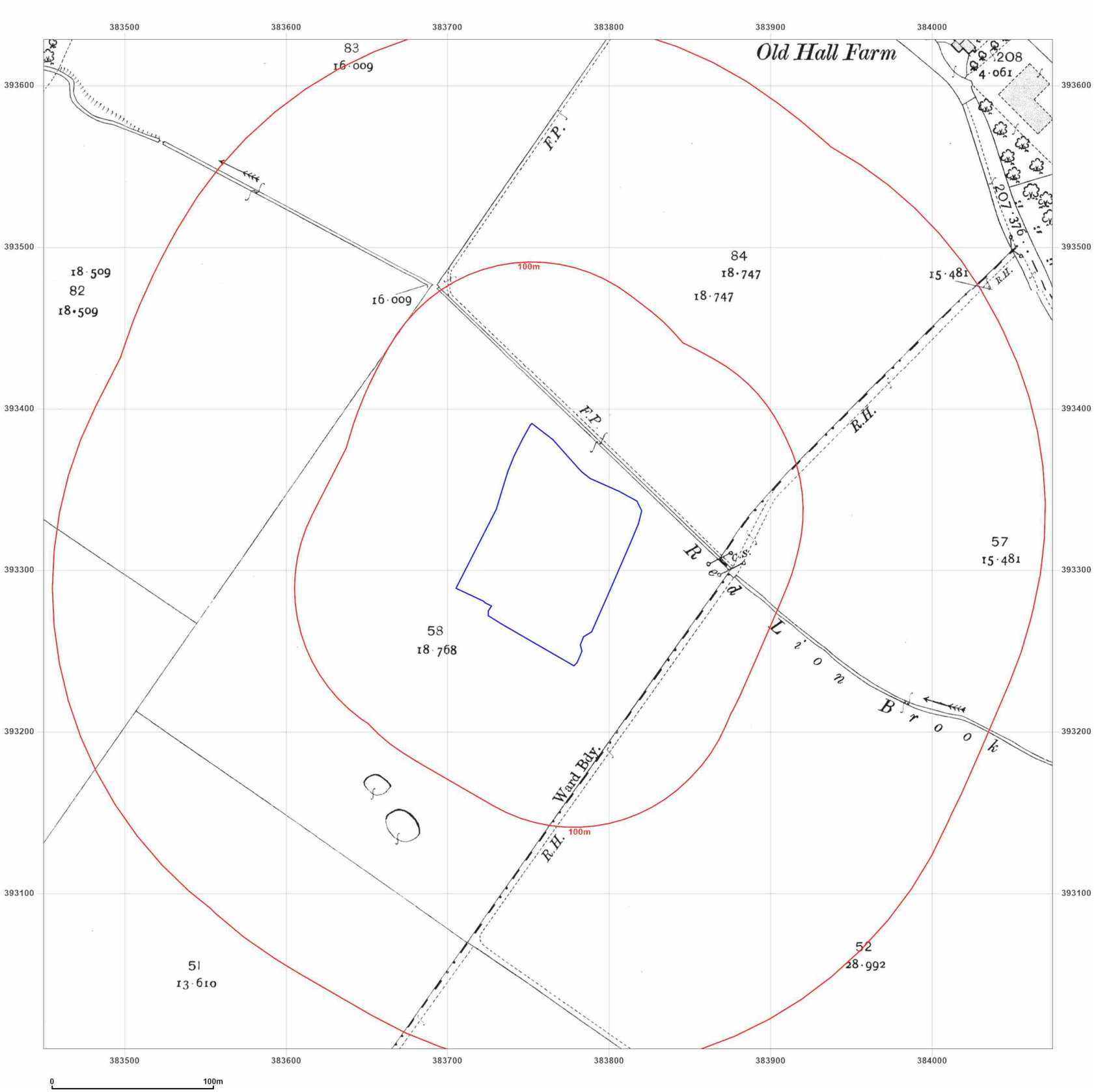
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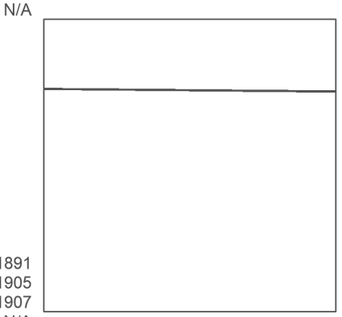
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MANCHESTER, M20 1NA

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Map Name: County Series
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Printed at: 1:2,500

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Edition 1907
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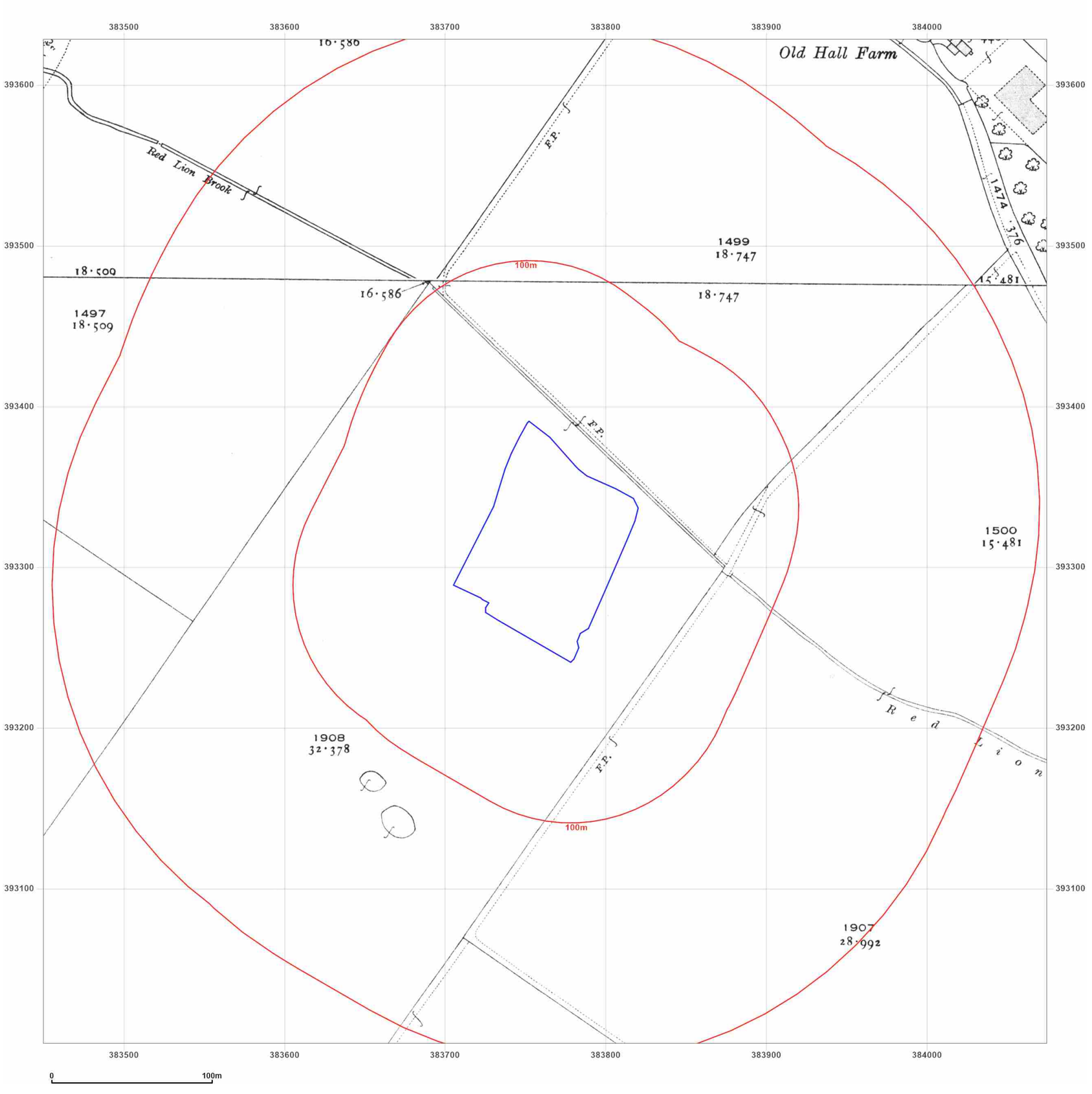
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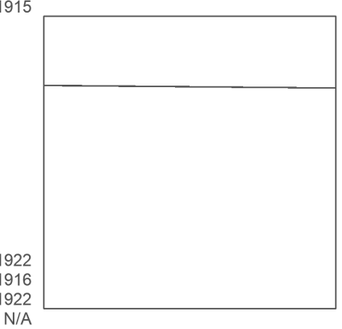
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480 HOUGH END LEISURE
CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series
Map date: **1922**
Scale: 1:2,500
Printed at: 1:2,500

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Revised 1916
Edition 1922
Copyright N/A
Levelled 1915



Surveyed 1922
Revised 1916
Edition 1922
Copyright N/A
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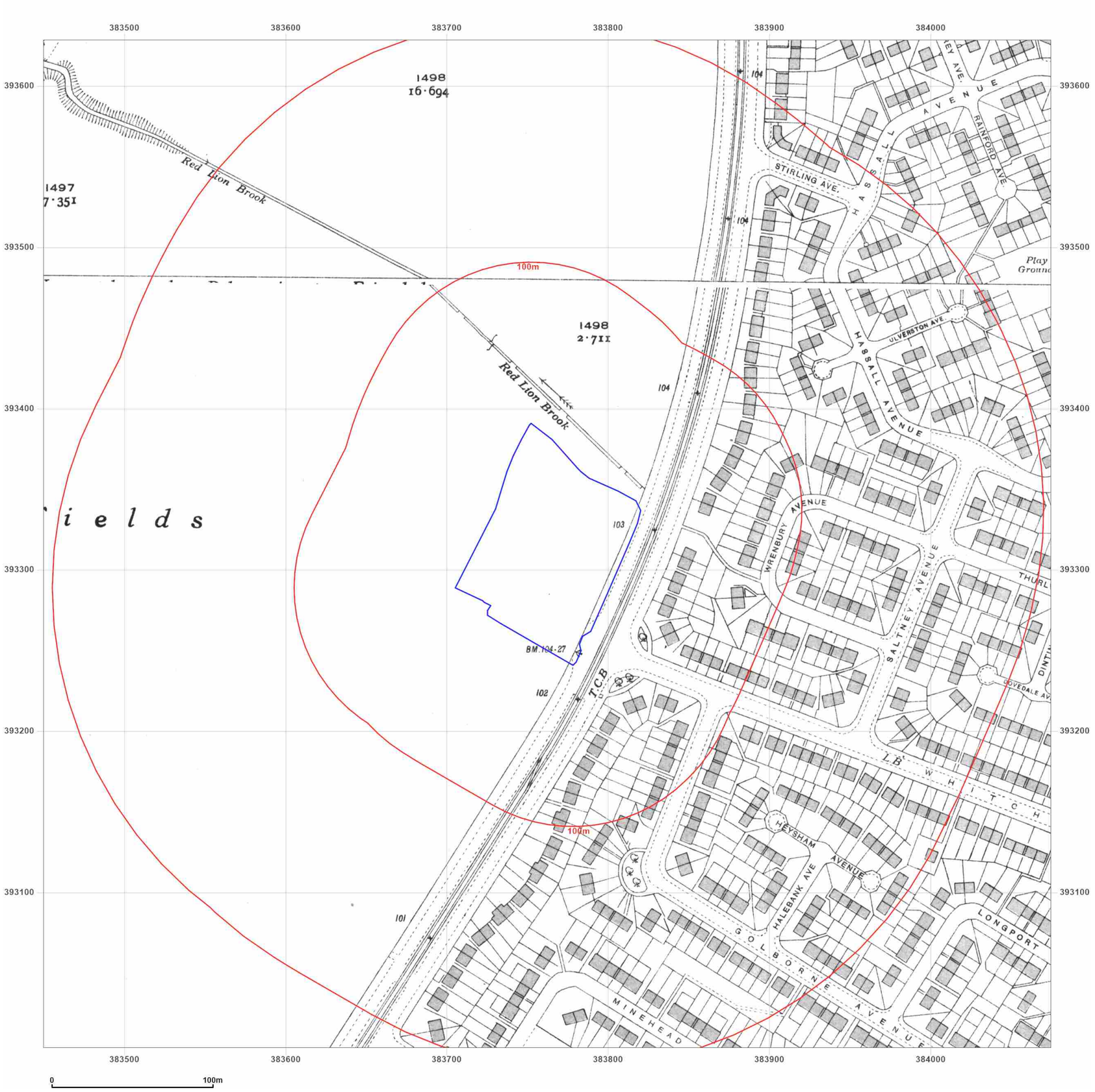
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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

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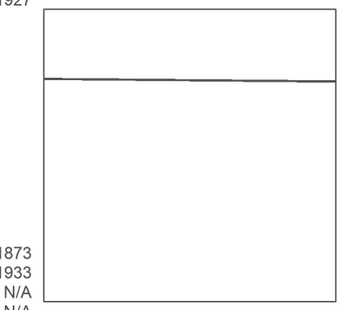
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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1950**

Scale: 1:1,250

Printed at: 1:2,000

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1950**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

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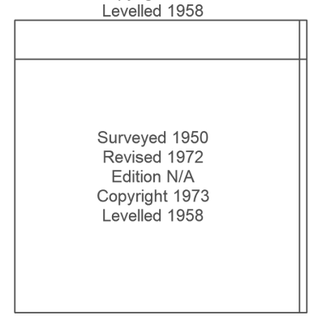
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Edition N/A
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Surveyed N/A
Revised N/A
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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1983**

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Surveyed 1958
Revised 1983
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Copyright 1983
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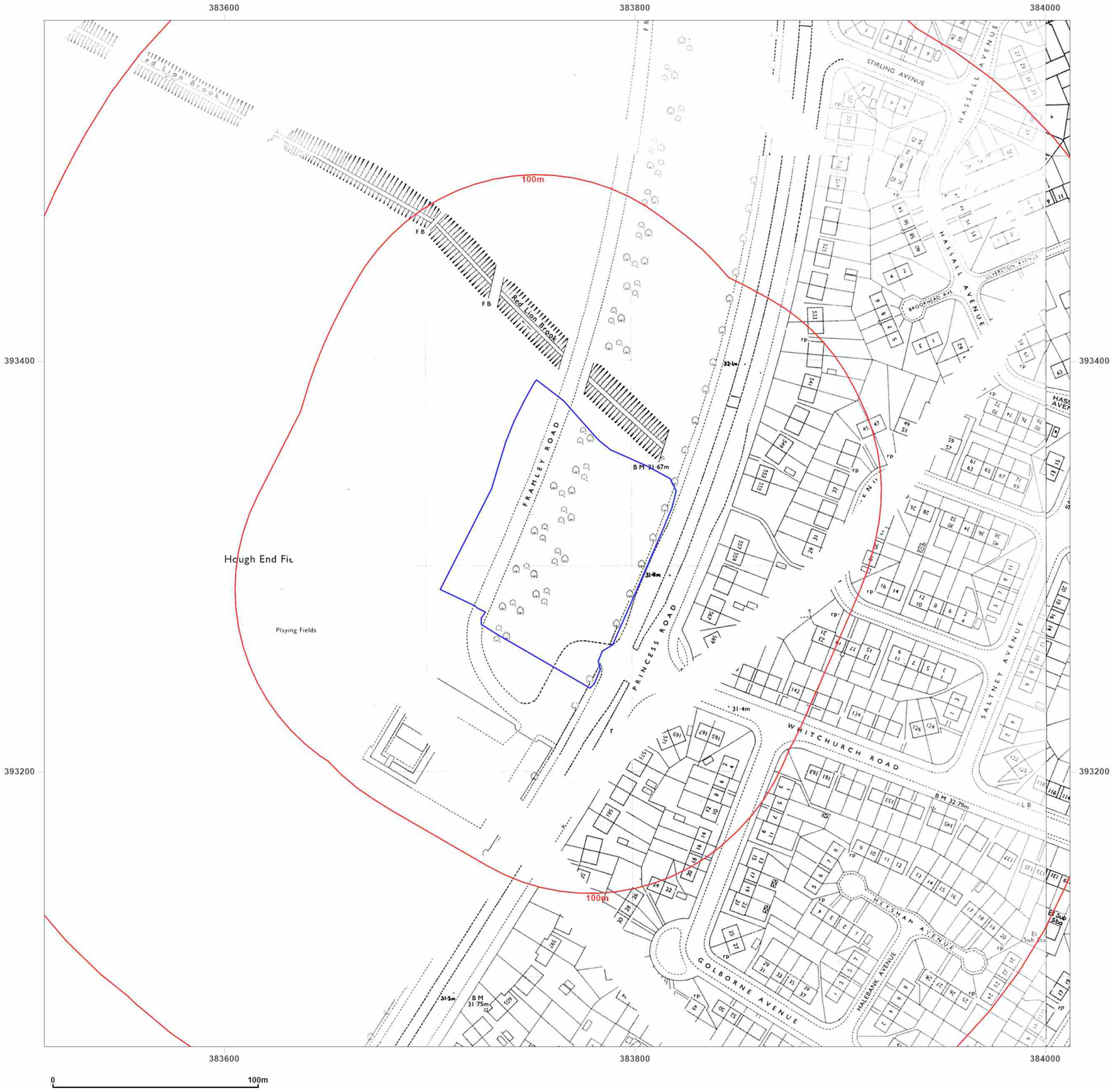
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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1983-1986**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1983 Levelled 1958	Surveyed 1958 Revised 1983 Edition N/A Copyright 1983 Levelled 1958
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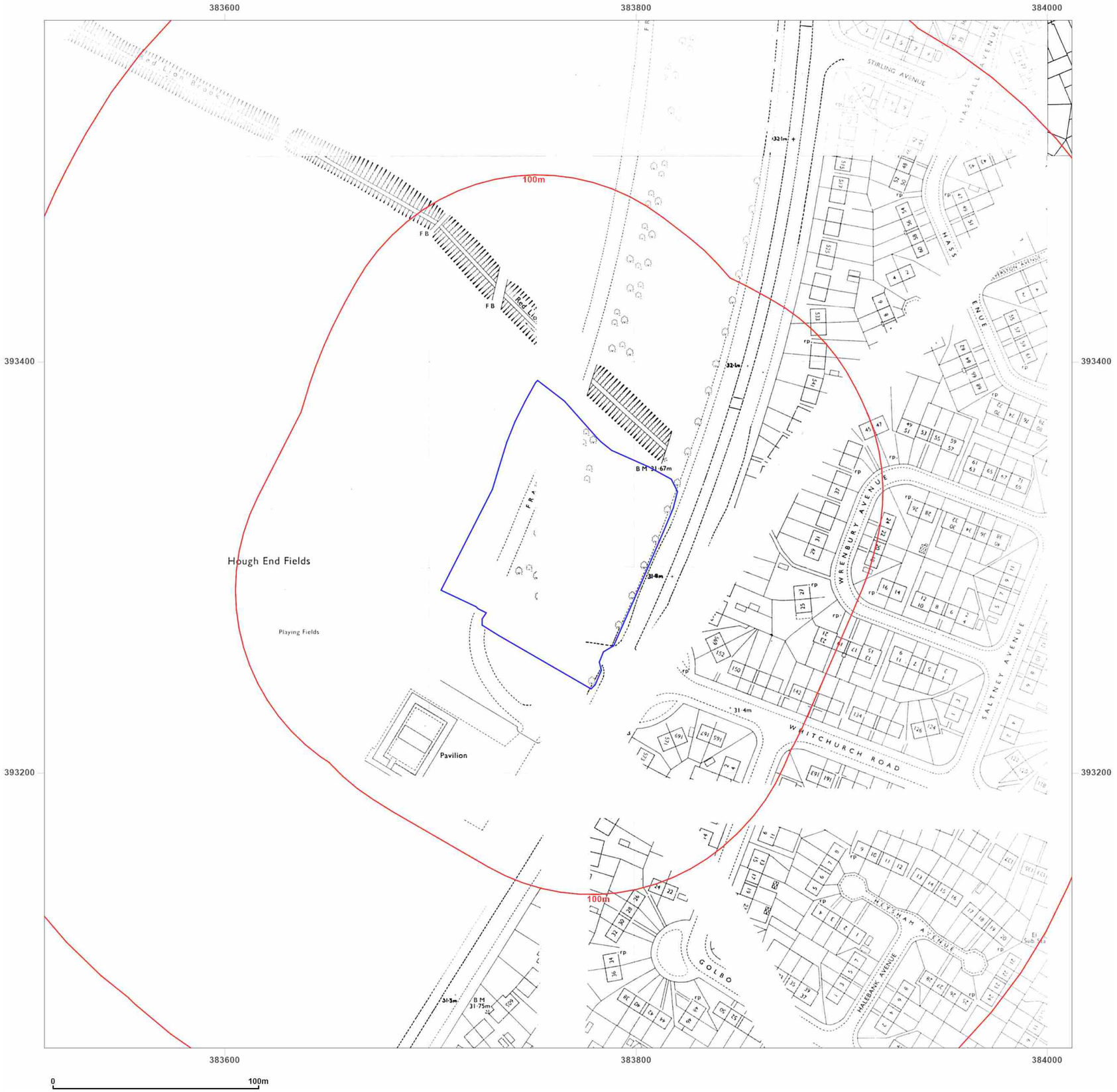
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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1983-1986**

Scale: 1:1,250

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Edition N/A
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Surveyed 1958
Revised 1986
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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1992**

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

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Map date: **1992**

Scale: 1:1,250

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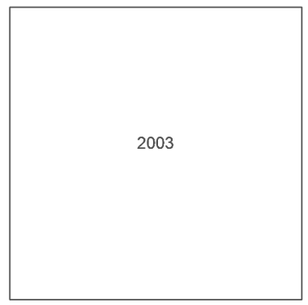
Site Details:

HOUGH END LEISURE CENTRE,
480 HOUGH END LEISURE CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: LandLine
Map date: **2003**
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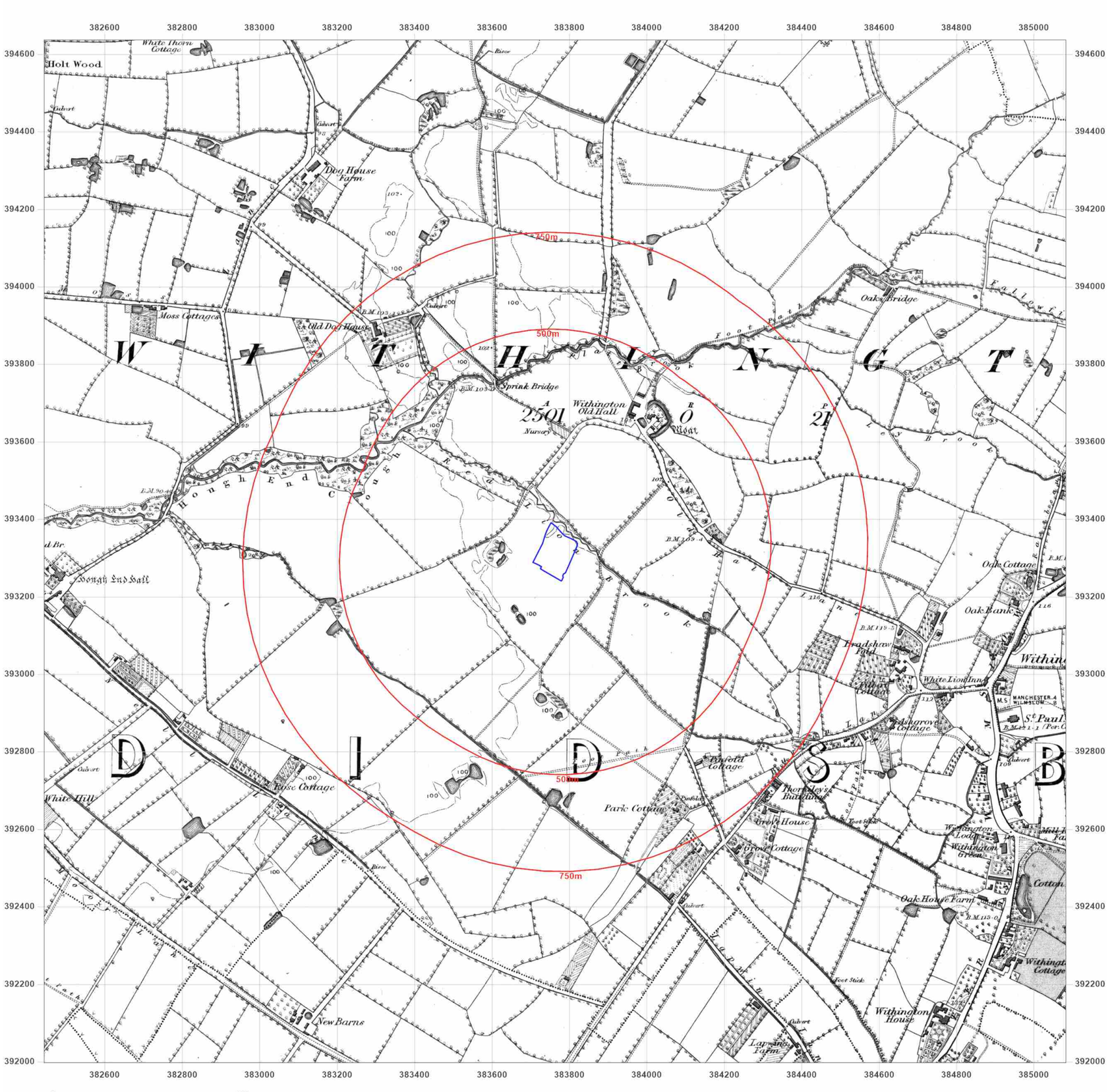
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Site Details:

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CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1849**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1845
Revised 1849
Edition 1849
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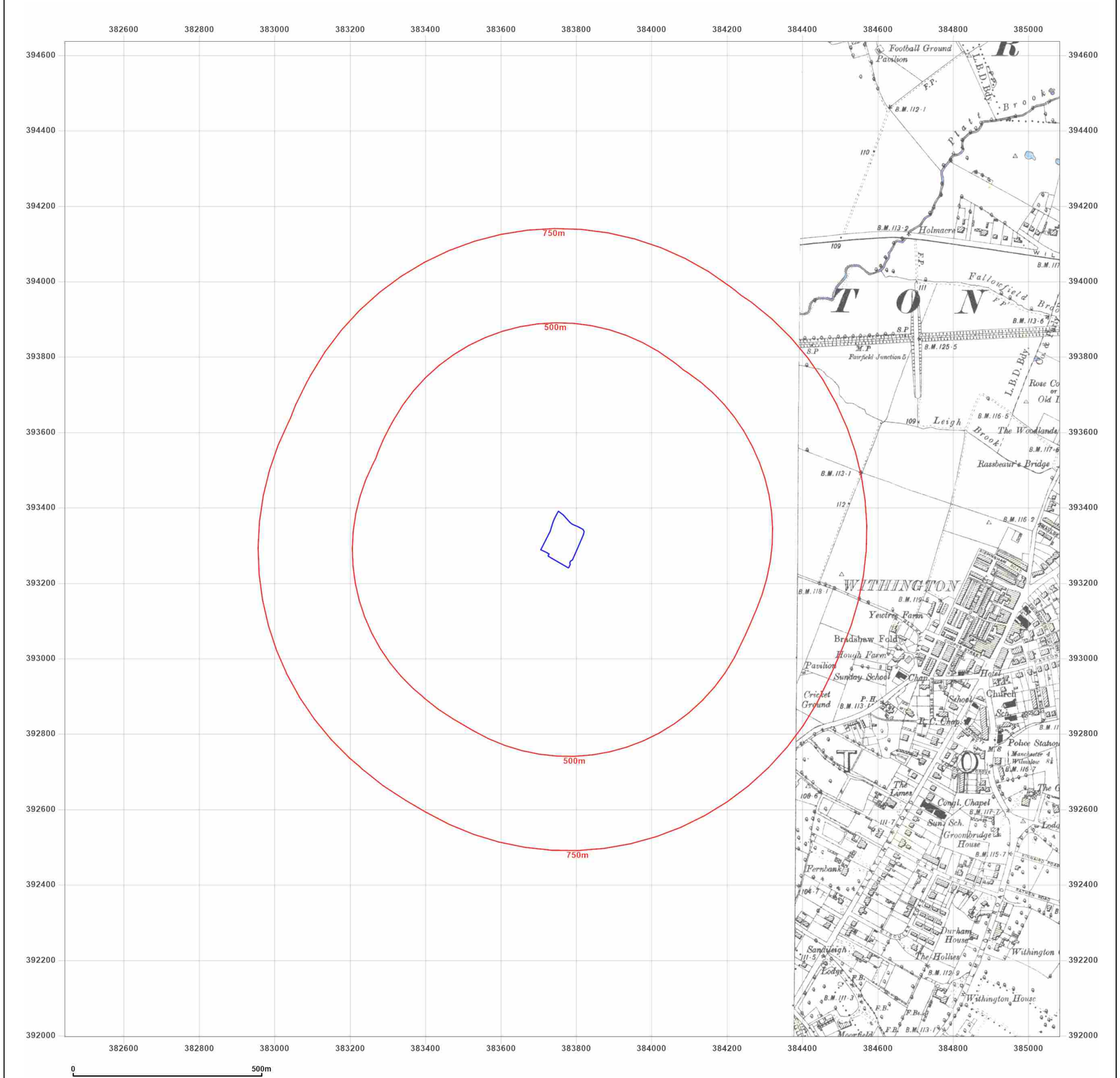
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Site Details:

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MANCHESTER, M20 1NA

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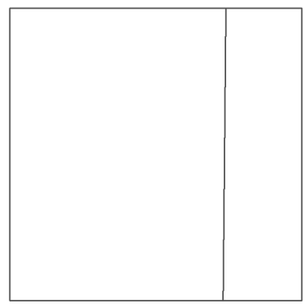
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Map date: **1892**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1892
Revised 1892
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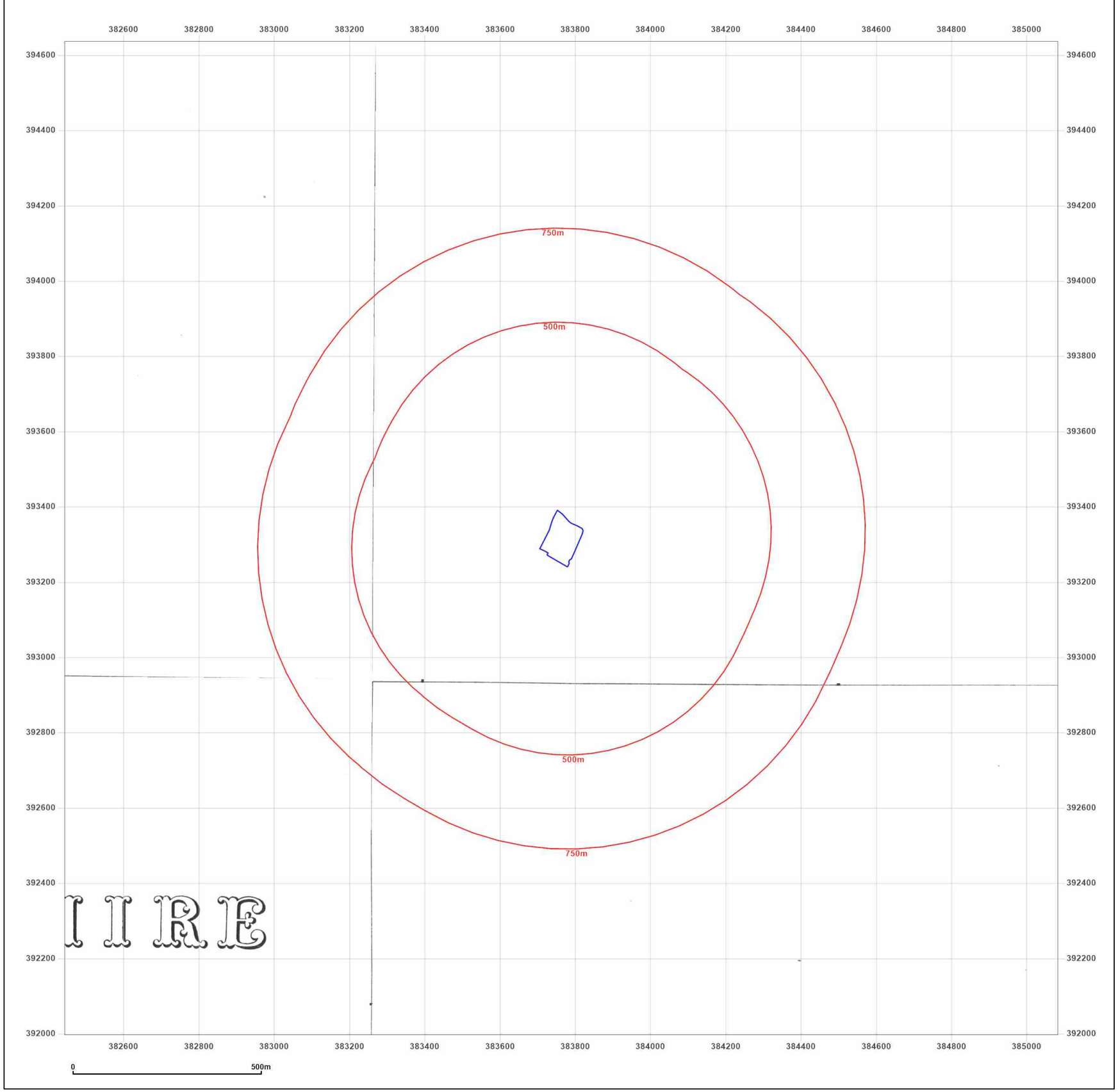
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Groundsure INSIGHTS

Site Details:

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480 HOUGH END LEISURE
CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

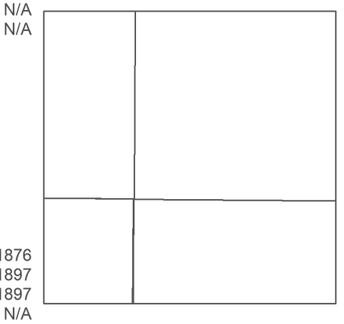
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Revised 1897
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1876
Revised 1897
Edition 1897
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1897
Edition 1897
Copyright N/A
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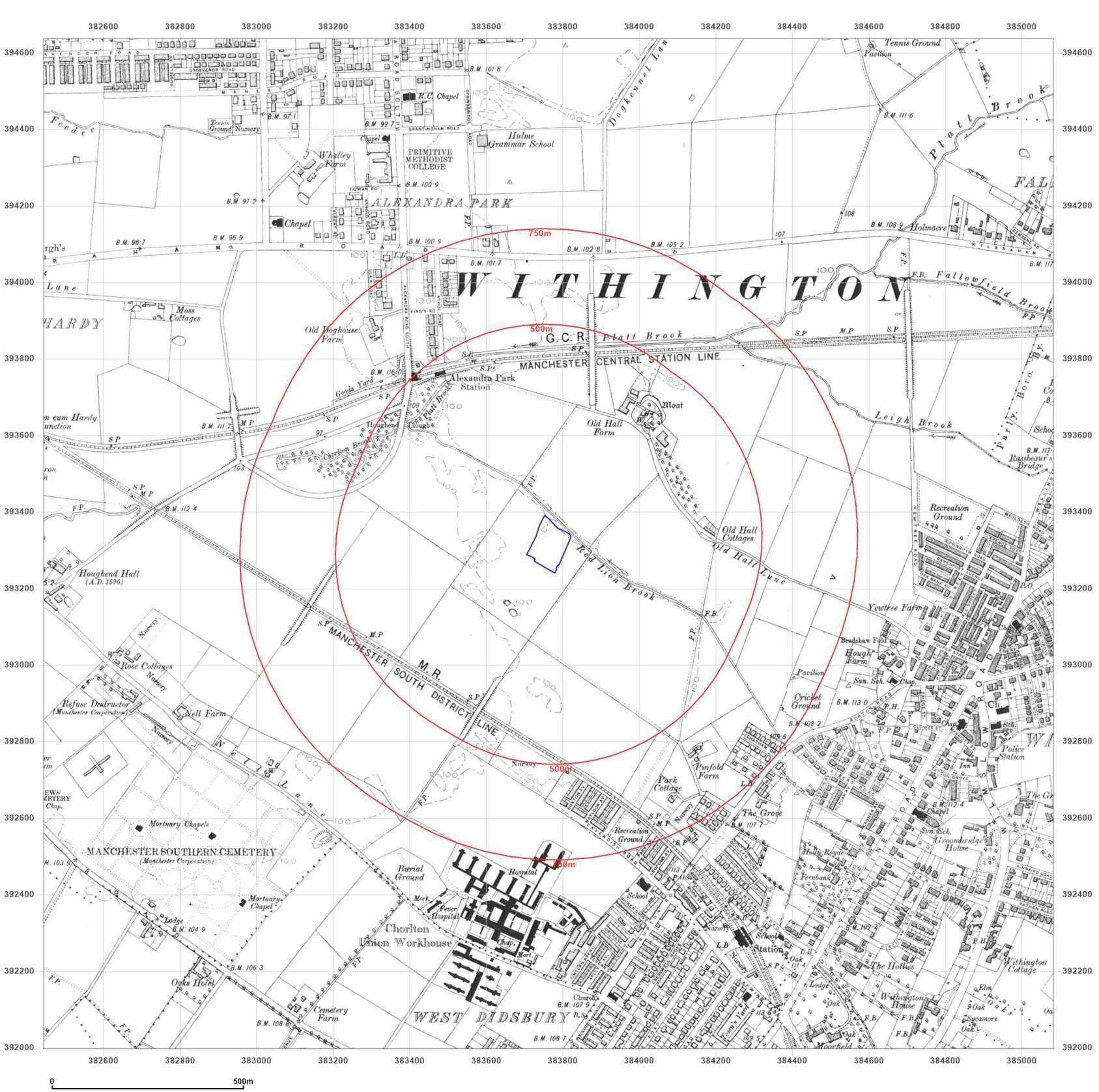
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Groundsure INSIGHTS

Site Details:

HOUGH END LEISURE CENTRE,
480 HOUGH END LEISURE CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1905**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1892
Revised 1905
Edition 1905
Copyright N/A
Levelled N/A

Surveyed 1892
Revised 1905
Edition 1905
Copyright N/A
Levelled N/A

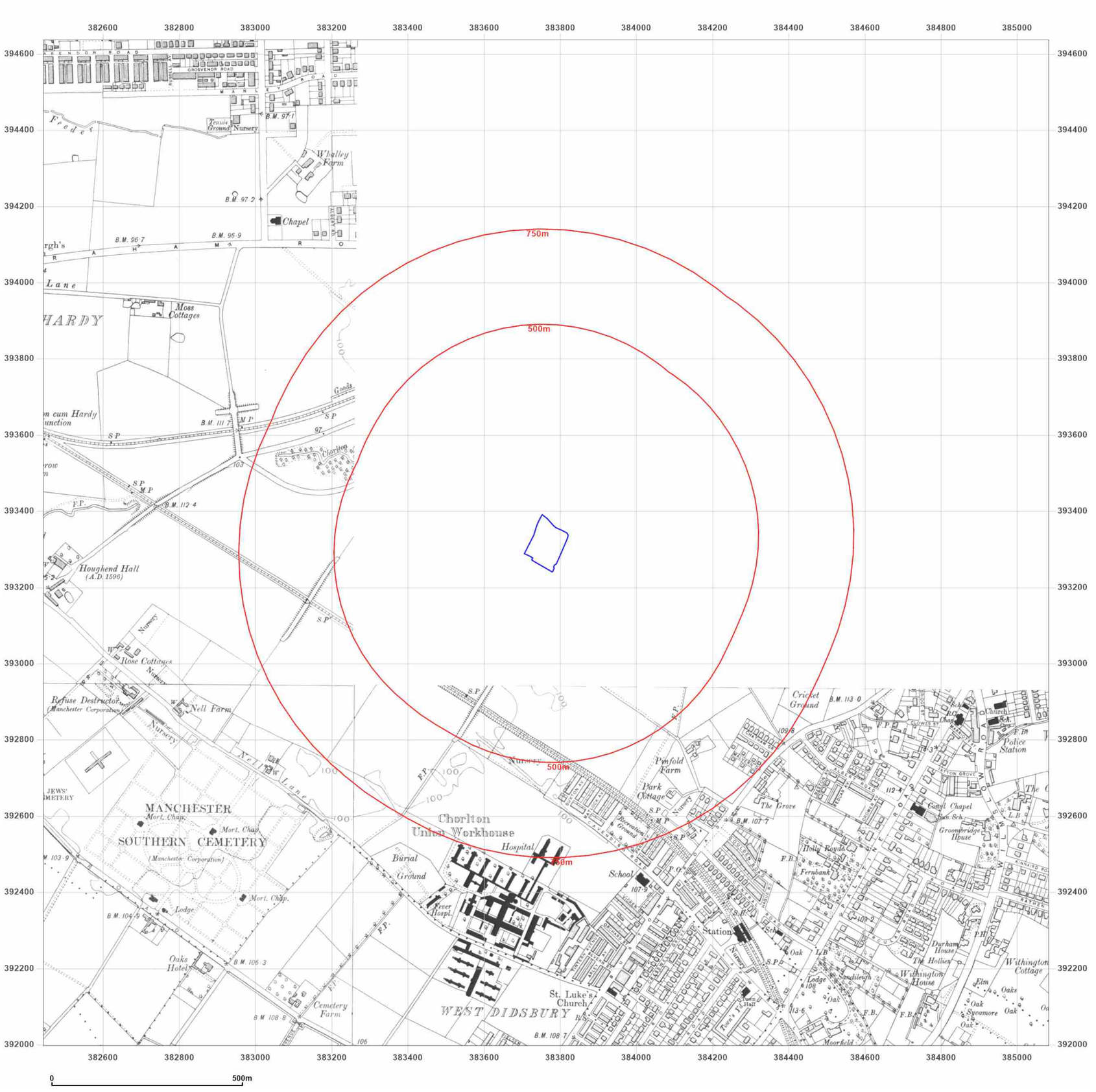
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Site Details:

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480 HOUGH END LEISURE
CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1908-1911**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1911
Edition 1911
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1908
Edition 1908
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1908
Edition 1911
Copyright N/A
Levelled N/A

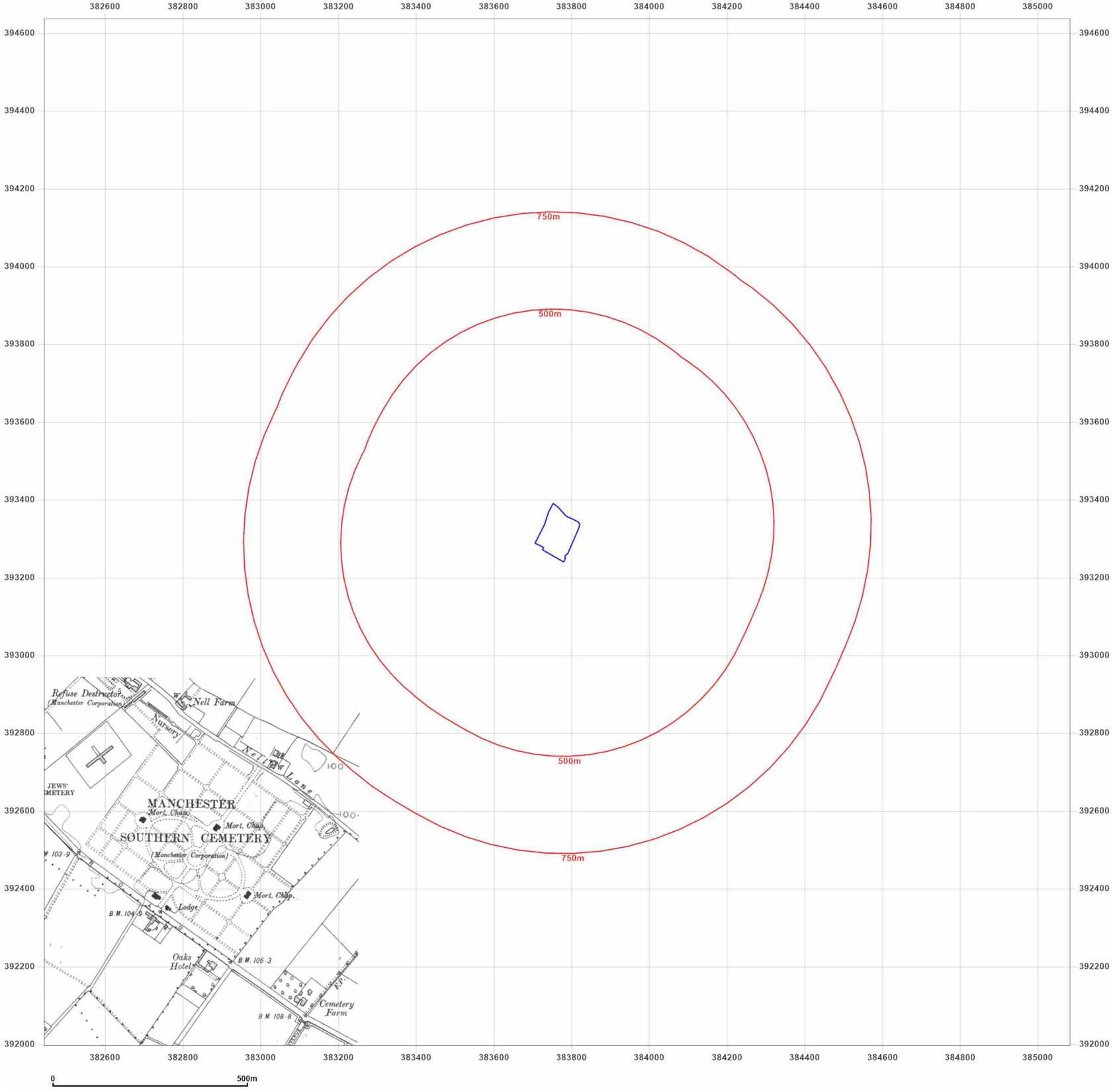
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Groundsure INSIGHTS

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CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1911**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1908
Edition 1911
Copyright N/A
Levelled N/A

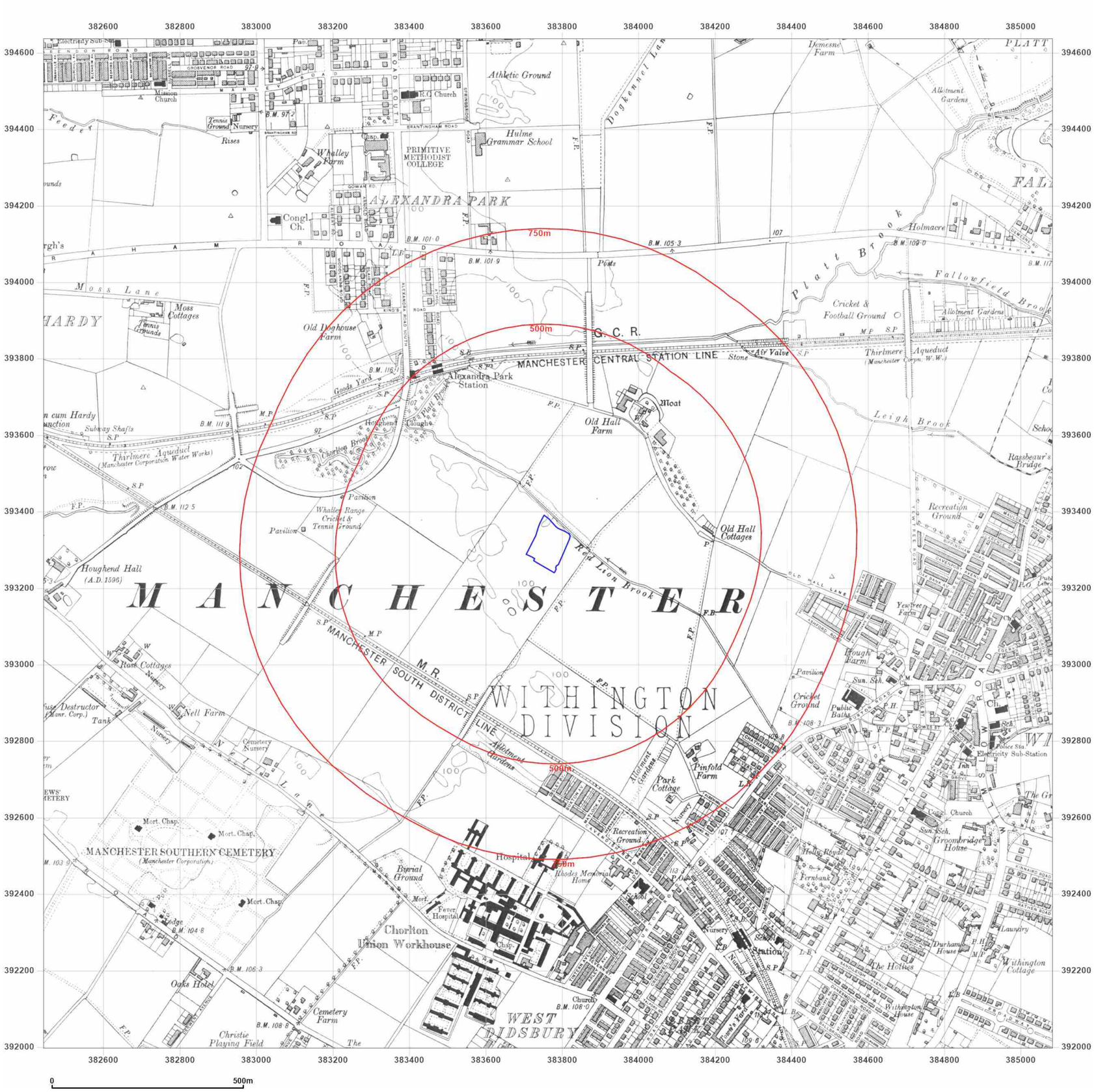
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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1844
Revised 1916
Edition 1923
Copyright N/A
Levelled 1915

Surveyed 1844
Revised 1916
Edition 1923
Copyright N/A
Levelled 1915

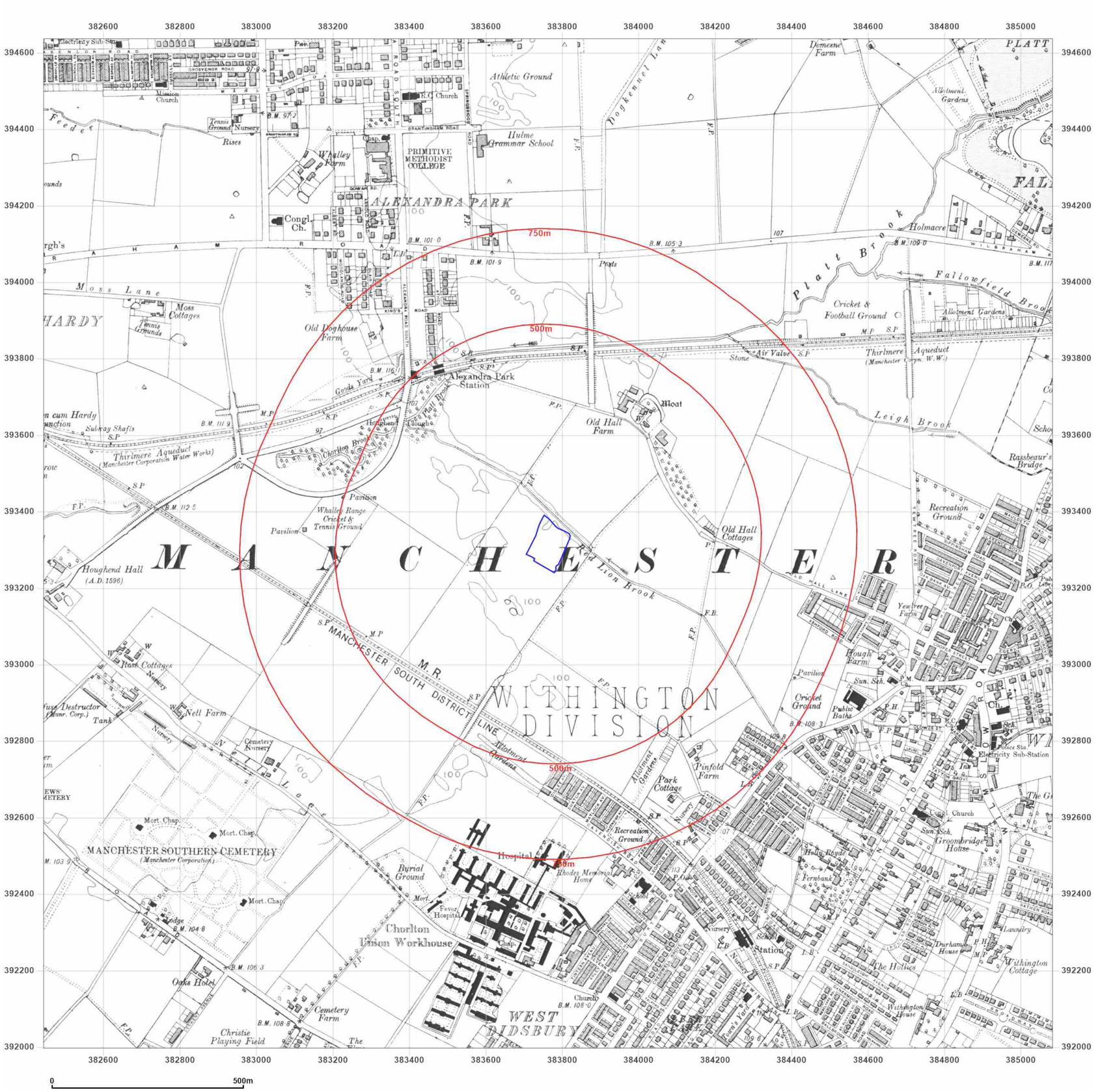
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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1844
Revised 1916
Edition 1923
Copyright N/A
Levelled 1915

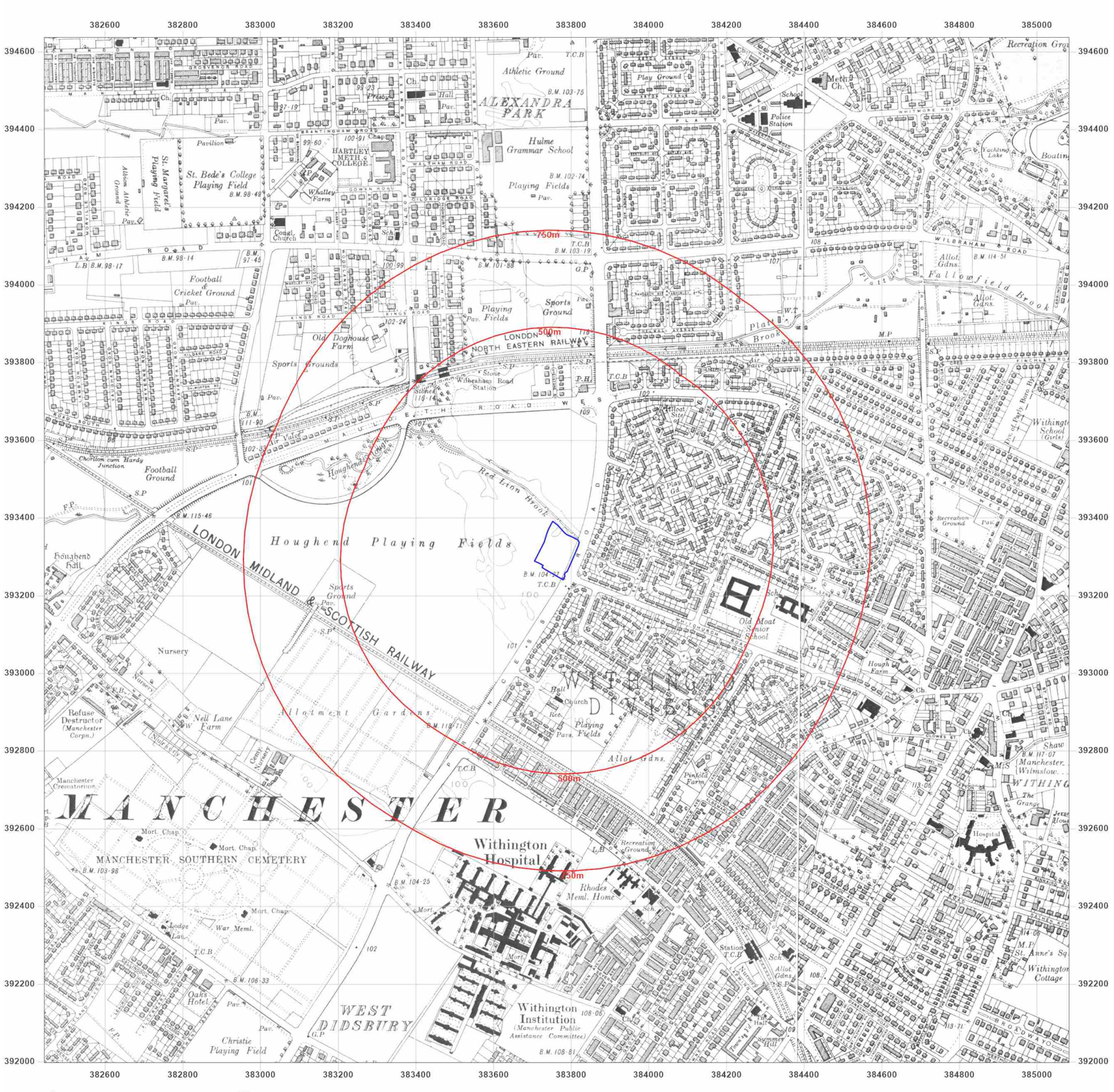
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Groundsure INSIGHTS

Site Details:

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480 HOUGH END LEISURE CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1934**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1844
Revised 1934
Edition 1934
Copyright N/A
Levelled 1927

Surveyed 1844
Revised 1934
Edition 1934
Copyright N/A
Levelled 1927

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Site Details:

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1844
Revised 1938
Edition 1938
Copyright N/A
Levelled 1927

Surveyed 1844
Revised 1938
Edition 1938
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Site Details:

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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1872
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Groundsure INSIGHTS

Site Details:

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Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: Provisional

Map date: **1955**

Scale: 1:10,560

Printed at: 1:10,560

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

Surveyed N/A
Revised 1955
Edition N/A
Copyright 1955
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Site Details:

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: Provisional

Map date: **1965-1966**

Scale: 1:10,560

Printed at: 1:10,560

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

Surveyed 1965
Revised 1965
Edition N/A
Copyright 1965
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Site Details:

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1981-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1977
Revised 1981
Edition N/A
Copyright 1981
Levelled 1976

Surveyed 1981
Revised 1983
Edition N/A
Copyright 1983
Levelled 1981

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Site Details:

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **1988-1989**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1985
Revised 1988
Edition N/A
Copyright 1988
Levelled 1981

Surveyed 1986
Revised 1989
Edition N/A
Copyright 1989
Levelled 1981

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Site Details:

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CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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2001

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Site Details:

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480 HOUGH END LEISURE CENTRE, PRINCESS ROAD,
MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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2010

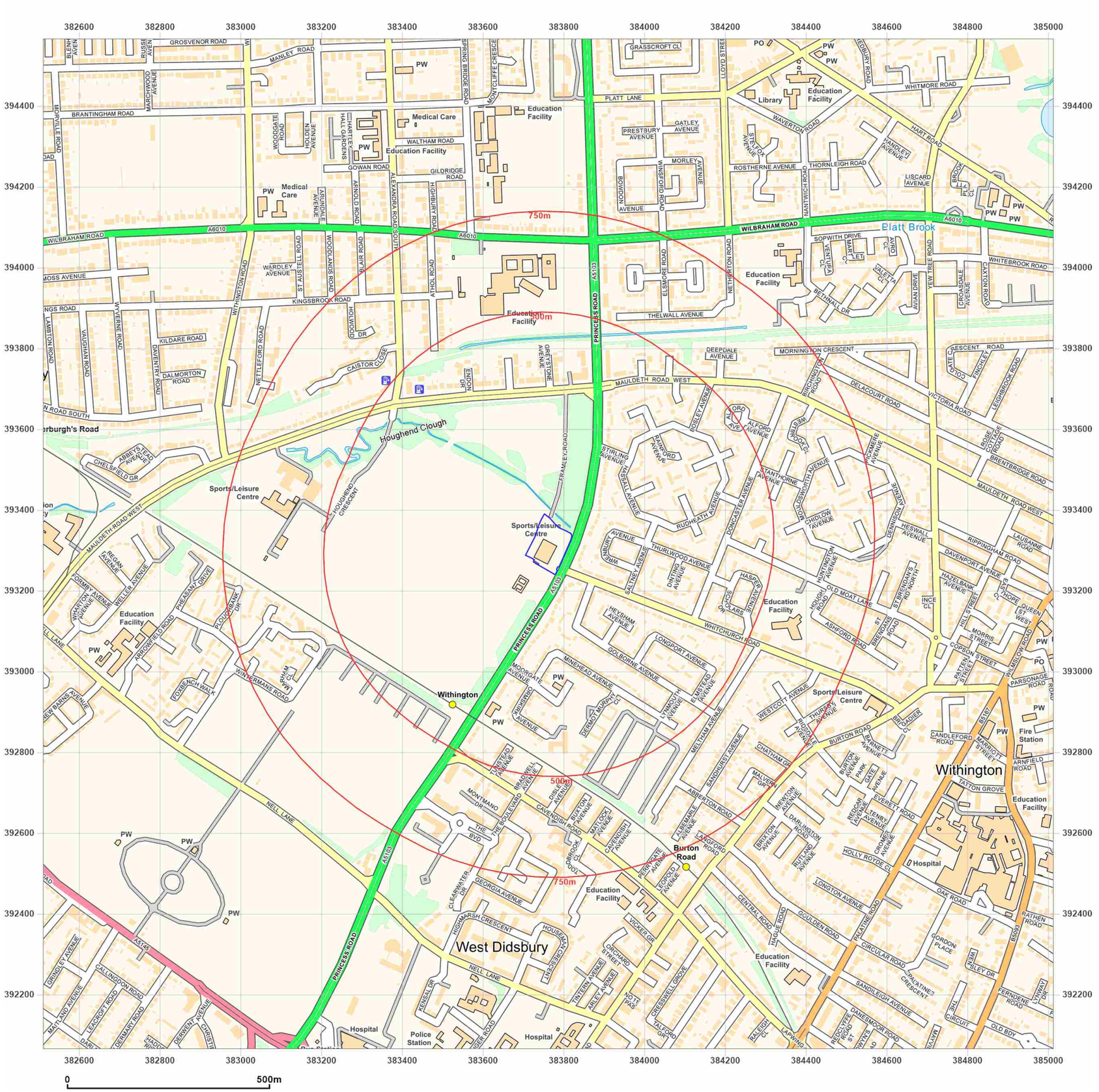
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Groundsure INSIGHTS

Site Details:

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MANCHESTER, M20 1NA

Client Ref: G21424
Report Ref: GS-8272552
Grid Ref: 383762, 393316

Map Name: National Grid

Map date: **2021**

Scale: 1:10,000

Printed at: 1:10,000

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2021

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APPENDIX 2

GROUNDSURE ENVIRO + GEO INSIGHT REPORT

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

HOUGH END LEISURE CENTRE, 480 HOUGH END LEISURE CENTRE, PRINCESS ROAD, MANCHESTER, M20 1NA

Order Details

Date: 19/10/2021

Your ref: G21424

Our Ref: GS-8272553

Client: Geoinvestigate Ltd

Site Details

Location: 383761 393319

Area: 0.93 ha

Authority: Manchester City Council



Summary of findings p. 2

OS MasterMap site plan p.12

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	0	1	1	31	-
15	1.2	Historical tanks	0	0	0	0	-
15	1.3	Historical energy features	0	0	4	3	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	1	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	2.1	Historical industrial land uses	0	2	1	36	-
19	2.2	Historical tanks	0	0	0	0	-
19	2.3	Historical energy features	0	0	8	11	-
20	2.4	Historical petrol stations	0	0	0	0	-
20	2.5	Historical garages	0	0	0	4	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
22	3.1	Active or recent landfill	0	0	0	0	-
22	3.2	Historical landfill (BGS records)	0	0	0	0	-
23	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
23	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
23	3.5	Historical waste sites	0	0	0	0	-
23	3.6	Licensed waste sites	0	0	0	0	-
23	3.7	Waste exemptions	0	0	0	2	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
25	4.1	Recent industrial land uses	1	0	0	-	-
26	4.2	Current or recent petrol stations	0	0	0	1	-
26	4.3	Electricity cables	0	0	0	0	-
26	4.4	Gas pipelines	0	0	0	0	-
26	4.5	Sites determined as Contaminated Land	0	0	0	0	-

26	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
27	4.7	Regulated explosive sites	0	0	0	0	-
27	4.8	Hazardous substance storage/usage	0	0	0	0	-
27	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
27	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
27	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	0	0	1	-
28	4.12	Radioactive Substance Authorisations	0	0	0	0	-
28	**4.13**	**Licensed Discharges to controlled waters**	0	0	0	2	-
29	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
29	4.15	Pollutant release to public sewer	0	0	0	0	-
29	4.16	List 1 Dangerous Substances	0	0	0	0	-
29	4.17	List 2 Dangerous Substances	0	0	0	0	-
29	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
30	4.19	Pollution inventory substances	0	0	0	0	-
30	4.20	Pollution inventory waste transfers	0	0	0	0	-
30	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
31	**5.1**	**Superficial aquifer**	Identified (within 500m)				
33	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
34	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
35	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
35	5.5	Groundwater vulnerability- local information	None (within 0m)				
36	**5.6**	**Groundwater abstractions**	0	0	0	0	1
37	5.7	Surface water abstractions	0	0	0	0	0
37	5.8	Potable abstractions	0	0	0	0	0
37	5.9	Source Protection Zones	0	0	0	0	-
38	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
39	**6.1**	**Water Network (OS MasterMap)**	0	1	2	-	-

40	**6.2**	**Surface water features**	0	2	0	-	-
40	**6.3**	**WFD Surface water body catchments**	1	-	-	-	-
41	**6.4**	**WFD Surface water bodies**	0	0	0	-	-
41	**6.5**	**WFD Groundwater bodies**	1	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
42	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
42	7.2	Historical Flood Events	0	0	0	-	-
42	7.3	Flood Defences	0	0	0	-	-
43	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
43	7.5	Flood Storage Areas	0	0	0	-	-
44	7.6	Flood Zone 2	None (within 50m)				
44	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding	
45	**8.1**	**Surface water flooding**	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding	
47	**9.1**	**Groundwater flooding**	High (within 50m)

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
48	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
49	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
49	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
49	10.4	Special Protection Areas (SPA)	0	0	0	0	0
49	10.5	National Nature Reserves (NNR)	0	0	0	0	0
50	**10.6**	**Local Nature Reserves (LNR)**	0	0	0	0	1
50	10.7	Designated Ancient Woodland	0	0	0	0	0
50	10.8	Biosphere Reserves	0	0	0	0	0
50	10.9	Forest Parks	0	0	0	0	0
51	10.10	Marine Conservation Zones	0	0	0	0	0
51	**10.11**	**Green Belt**	0	0	0	0	1
51	10.12	Proposed Ramsar sites	0	0	0	0	0

51	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
52	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
52	10.15	Nitrate Sensitive Areas	0	0	0	0	0
52	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
53	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
54	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
55	11.1	World Heritage Sites	0	0	0	-	-
55	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
55	11.3	National Parks	0	0	0	-	-
55	11.4	Listed Buildings	0	0	0	-	-
56	11.5	Conservation Areas	0	0	0	-	-
56	11.6	Scheduled Ancient Monuments	0	0	0	-	-
56	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
57	**12.1**	**Agricultural Land Classification**	Urban (within 250m)				
58	12.2	Open Access Land	0	0	0	-	-
58	12.3	Tree Felling Licences	0	0	0	-	-
58	12.4	Environmental Stewardship Schemes	0	0	0	-	-
58	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
59	**13.1**	**Priority Habitat Inventory**	2	3	0	-	-
60	13.2	Habitat Networks	0	0	0	-	-
60	13.3	Open Mosaic Habitat	0	0	0	-	-
60	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
61	**14.1**	**10k Availability**	Identified (within 500m)				
62	**14.2**	**Artificial and made ground (10k)**	0	0	3	3	-
64	**14.3**	**Superficial geology (10k)**	1	1	1	1	-

65	14.4	Landslip (10k)	0	0	0	0	-
66	14.5	Bedrock geology (10k)	1	0	0	2	-
67	14.6	Bedrock faults and other linear features (10k)	0	0	0	2	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
68	15.1	50k Availability	Identified (within 500m)				
69	15.2	Artificial and made ground (50k)	0	0	0	0	-
69	15.3	Artificial ground permeability (50k)	0	0	-	-	-
70	15.4	Superficial geology (50k)	1	1	1	3	-
71	15.5	Superficial permeability (50k)	Identified (within 50m)				
71	15.6	Landslip (50k)	0	0	0	0	-
71	15.7	Landslip permeability (50k)	None (within 50m)				
72	15.8	Bedrock geology (50k)	1	0	0	2	-
73	15.9	Bedrock permeability (50k)	Identified (within 50m)				
73	15.10	Bedrock faults and other linear features (50k)	0	0	0	2	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
74	16.1	BGS Boreholes	0	0	6	-	-
Page	Section	Natural ground subsidence					
76	17.1	Shrink swell clays	Negligible (within 50m)				
77	17.2	Running sands	Low (within 50m)				
79	17.3	Compressible deposits	Negligible (within 50m)				
80	17.4	Collapsible deposits	Very low (within 50m)				
81	17.5	Landslides	Very low (within 50m)				
82	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
83	18.1	Natural cavities	0	0	0	0	-
84	18.2	BritPits	0	0	0	0	-
84	18.3	Surface ground workings	0	2	3	-	-
84	18.4	Underground workings	0	0	0	0	0
84	18.5	Historical Mineral Planning Areas	0	0	0	0	-

85	18.6	Non-coal mining	0	0	0	0	0
85	18.7	Mining cavities	0	0	0	0	0
85	**18.8**	**JPB mining areas**	Identified (within 0m)				
85	18.9	Coal mining	None (within 0m)				
86	18.10	Brine areas	None (within 0m)				
86	18.11	Gypsum areas	None (within 0m)				
86	18.12	Tin mining	None (within 0m)				
86	18.13	Clay mining	None (within 0m)				

Page	Section	Radon					
87	**19.1**	**Radon**	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
88	**20.1**	**BGS Estimated Background Soil Chemistry**	1	1	-	-	-
88	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
88	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
89	21.1	Underground railways (London)	0	0	0	-	-
89	21.2	Underground railways (Non-London)	0	0	0	-	-
89	21.3	Railway tunnels	0	0	0	-	-
89	21.4	Historical railway and tunnel features	0	0	0	-	-
89	21.5	Royal Mail tunnels	0	0	0	-	-
90	21.6	Historical railways	0	0	0	-	-
90	21.7	Railways	0	0	0	-	-
90	21.8	Crossrail 1	0	0	0	0	-
90	21.9	Crossrail 2	0	0	0	0	-
90	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 22/04/2019

Site Area: 0.93ha

Recent site history - 2015 aerial photograph



Capture Date: 11/06/2015

Site Area: 0.93ha

Recent site history - 2009 aerial photograph



Capture Date: 02/06/2009

Site Area: 0.93ha

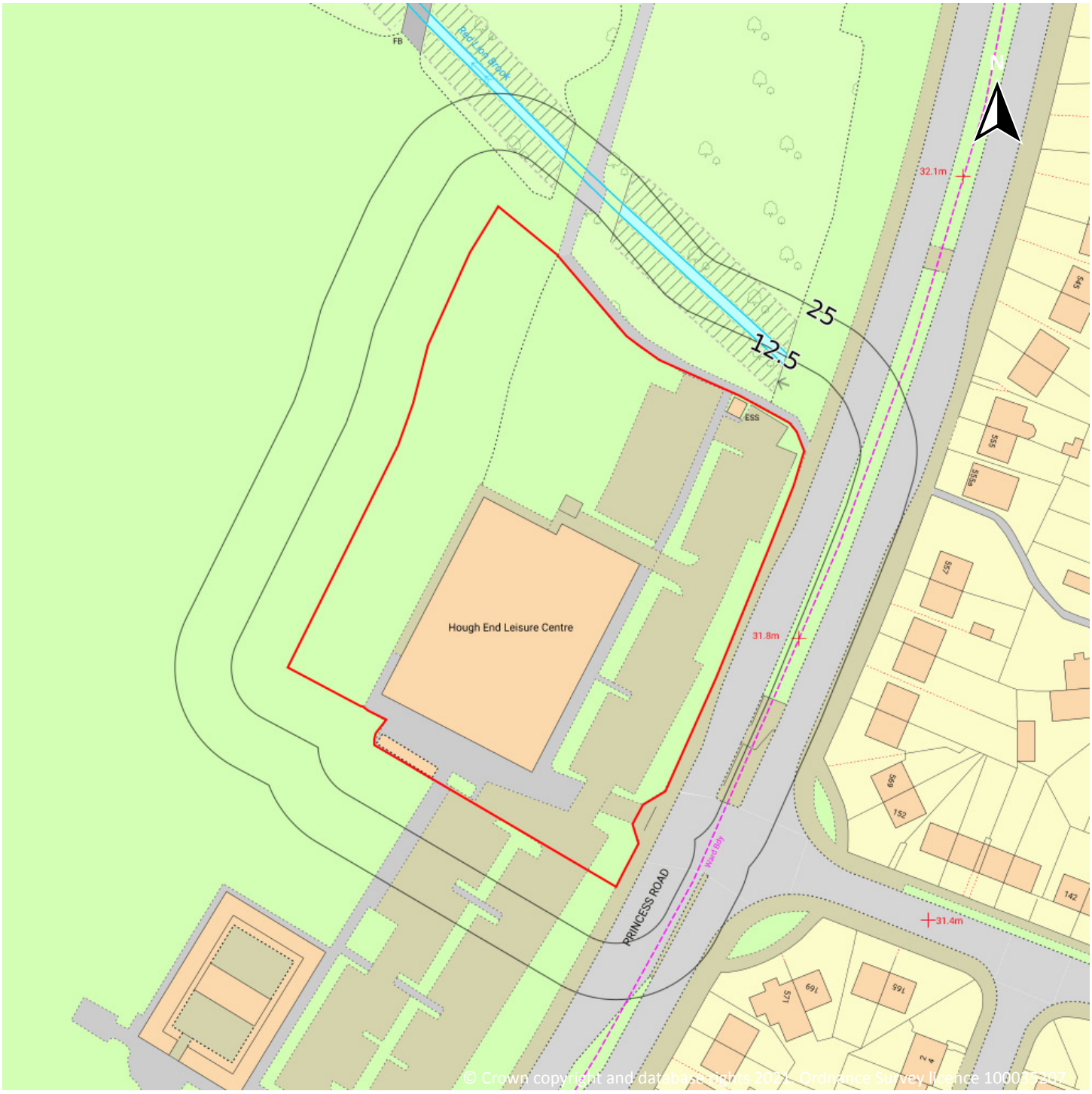
Recent site history - 2000 aerial photograph



Capture Date: 27/06/2000

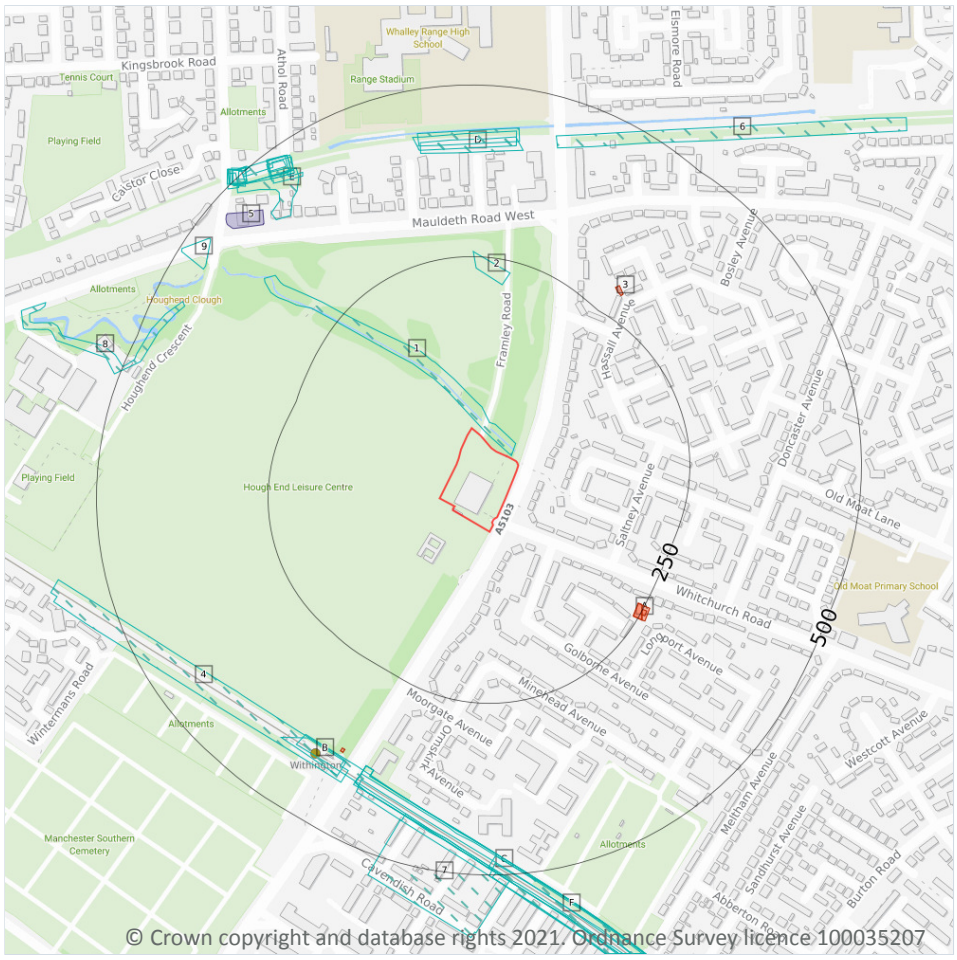
Site Area: 0.93ha

OS MasterMap site plan



Site Area: 0.93ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	33

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	4m NE	Cuttings	1955 - 1966	870773

ID	Location	Land use	Dates present	Group ID
2	214m N	Nursery	1851	831870
C	385m SW	Cuttings	1988	858457
C	385m SW	Cuttings	1966	879364
C	385m SW	Cuttings	1978	902841
C	391m SW	Cuttings	1911	913829
4	392m SW	Cuttings	1892 - 1966	879676
B	394m SW	Cuttings	1938	917245
C	399m SW	Cuttings	1934 - 1938	876274
D	402m N	Cuttings	1892	903552
C	407m SW	Cuttings	1892	869641
E	407m NW	Unspecified Pit	1955	840486
D	408m N	Cuttings	1934 - 1938	989481
D	414m N	Cuttings	1955	947775
6	427m N	Cuttings	1892	974123
7	429m S	Nursery	1905 - 1911	912960
E	442m NW	Railway Station	1892	928212
8	453m NW	Unspecified Ground Workings	1955	800609
E	453m NW	Railway Station	1923	847827
9	454m NW	Unspecified Pit	1905	840485
E	455m NW	Railway Station	1905	933517
E	457m NW	Railway Station	1966	869242
E	458m NW	Railway Station	1916	877936
E	458m NW	Railway Station	1934	974953
E	458m NW	Railway Station	1938	937707
E	467m NW	Railway Building	1892	820243
F	472m S	Cuttings	1955	935152
F	483m S	Cuttings	1938	924433
E	485m NW	Railway Station	1938	967159

ID	Location	Land use	Dates present	Group ID
E	487m NW	Railway Building	1978	988132
E	487m NW	Railway Building	1916	913392
E	487m NW	Railway Building	1934	916855
E	488m NW	Railway Building	1892 - 1905	906062

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	0

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	7

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	240m SE	Electricity Substation	1983	74121
A	240m SE	Electricity Substation	1950 - 1973	72429
A	247m SE	Electricity Substation	1992	82565
A	250m SE	Electricity Substation	1986	75328
A	250m SE	Electricity Substation	1992	80641
3	286m NE	Electricity Substation	1973 - 1992	79454
B	380m SW	Electricity Substation	1974 - 1992	66817

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	1

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
5	424m NW	Garage	1982 - 1994	25402

This data is sourced from Ordnance Survey / Groundsure.

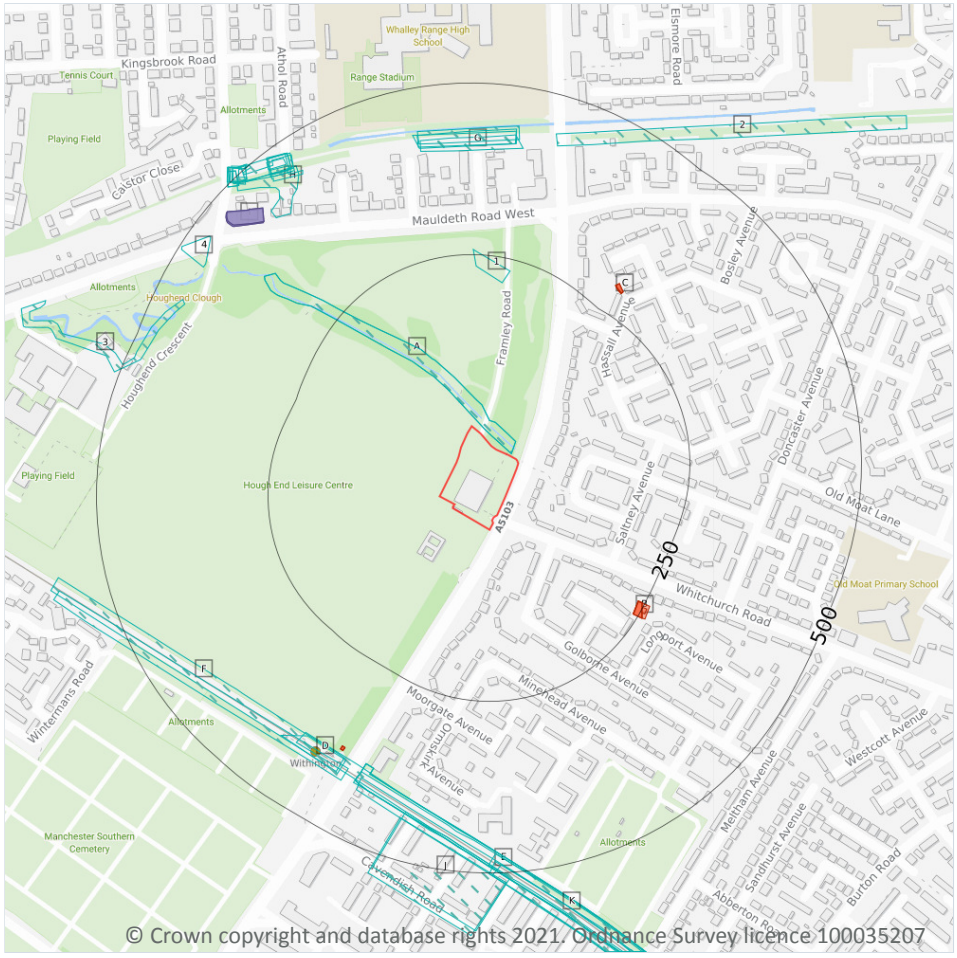
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

Historical garages

2.1 Historical industrial land uses

Records within 500m	39

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
A	4m NE	Cuttings	1955	870773
A	4m NE	Cuttings	1966	870773
1	214m N	Nursery	1851	831870

ID	Location	Land Use	Date	Group ID
E	385m SW	Cuttings	1978	902841
E	385m SW	Cuttings	1966	879364
E	385m SW	Cuttings	1988	858457
E	391m SW	Cuttings	1911	913829
F	392m SW	Cuttings	1966	879676
D	394m SW	Cuttings	1938	917245
E	399m SW	Cuttings	1938	876274
G	402m N	Cuttings	1892	903552
F	404m SW	Cuttings	1892	879676
E	407m SW	Cuttings	1892	869641
H	407m NW	Unspecified Pit	1955	840486
G	408m N	Cuttings	1938	989481
G	409m N	Cuttings	1934	989481
G	414m N	Cuttings	1955	947775
2	427m N	Cuttings	1892	974123
J	429m S	Nursery	1911	912960
J	439m S	Nursery	1905	912960
H	442m NW	Railway Station	1892	928212
3	453m NW	Unspecified Ground Workings	1955	800609
H	453m NW	Railway Station	1923	847827
4	454m NW	Unspecified Pit	1905	840485
H	455m NW	Railway Station	1905	933517
H	457m NW	Railway Station	1966	869242
H	458m NW	Railway Station	1934	974953
H	458m NW	Railway Station	1916	877936
H	458m NW	Railway Station	1938	937707
H	467m NW	Railway Building	1892	820243
K	472m S	Cuttings	1955	935152

ID	Location	Land Use	Date	Group ID
K	483m S	Cuttings	1938	924433
H	485m NW	Railway Station	1938	967159
H	487m NW	Railway Building	1978	988132
H	487m NW	Railway Building	1934	916855
H	487m NW	Railway Building	1916	913392
H	488m NW	Railway Building	1905	906062
H	488m NW	Railway Building	1892	906062
K	488m S	Cuttings	1934	876274

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**0**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**19**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
B	240m SE	Electricity Substation	1983	74121
B	240m SE	Electricity Substation	1983	74121
B	240m SE	Electricity Substation	1983	74121
B	240m SE	Electricity Substation	1973	72429
B	240m SE	Electricity Substation	1950	72429

ID	Location	Land Use	Date	Group ID
B	241m SE	Electricity Substation	1950	72429
B	247m SE	Electricity Substation	1992	82565
B	250m SE	Electricity Substation	1986	75328
B	250m SE	Electricity Substation	1992	80641
C	286m NE	Electricity Substation	1983	79454
C	286m NE	Electricity Substation	1983	79454
C	286m NE	Electricity Substation	1973	79454
C	287m NE	Electricity Substation	1992	79454
C	287m NE	Electricity Substation	1992	79454
D	380m SW	Electricity Substation	1974	66817
D	380m SW	Electricity Substation	1983	66817
D	380m SW	Electricity Substation	1989	66817
D	380m SW	Electricity Substation	1989	66817
D	380m SW	Electricity Substation	1992	66817

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	4

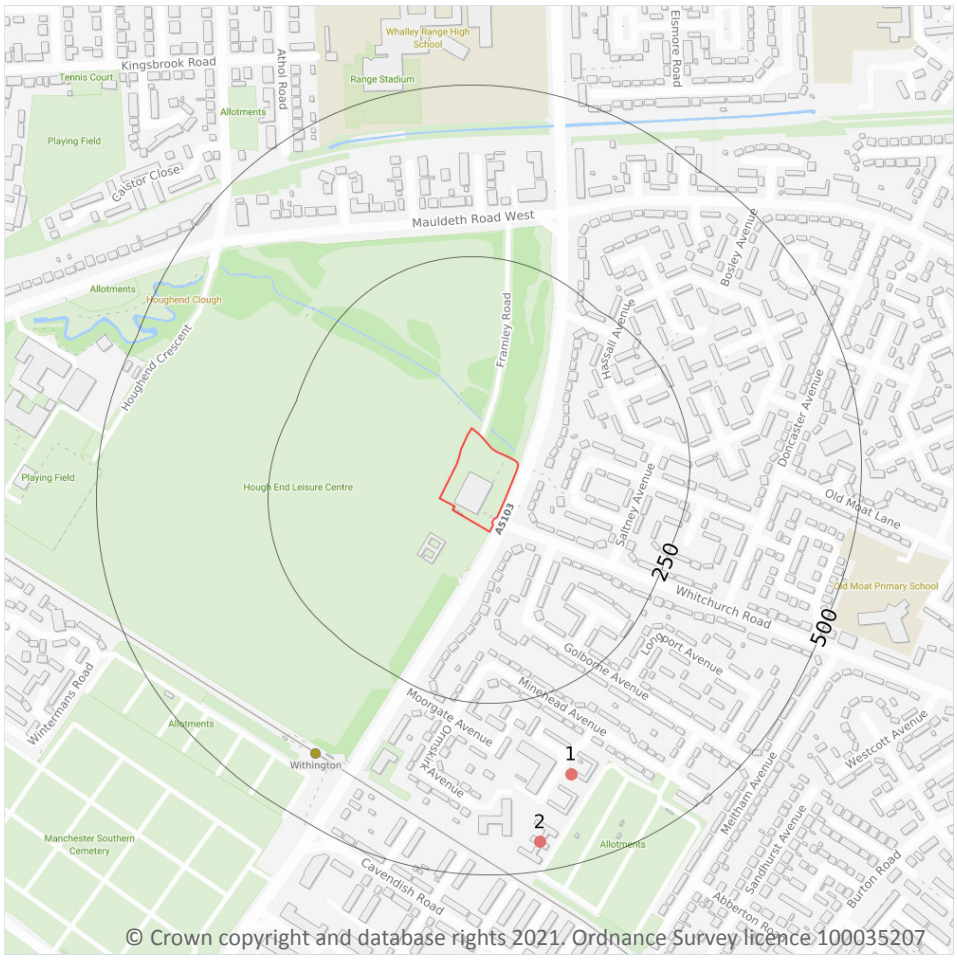
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
I	424m NW	Garage	1983	25402
I	424m NW	Garage	1982	25402
I	425m NW	Garage	1993	25402
I	425m NW	Garage	1994	25402

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	2

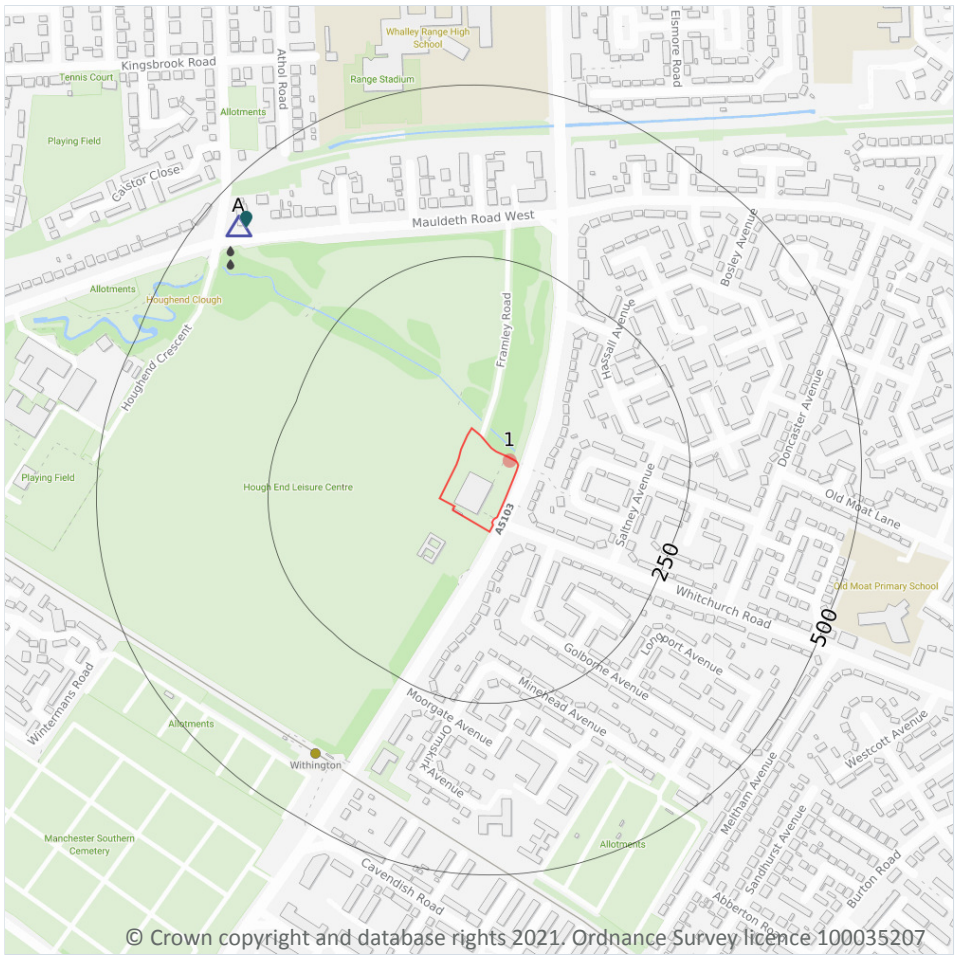
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 22**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	373m S	FORMER COMMUNITY CENTER, DERMOT MURPHY WAY, WITHINGTON, MANCHESTER, M20 1FQ	WEX129830	Using waste exemption	Not on a farm	Use of waste in construction
2	458m S	91, DERMOT MURPHY CLOSE, MANCHESTER, M20 1FQ	WEX271275	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Current or recent petrol stations

Licensed pollutant release (Part A(2)/B)

Licensed Discharges to controlled waters

4.1 Recent industrial land uses

Records within 250m	1

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Electricity Sub Station**	**Greater Manchester, M20**	**Electrical Features**	**Infrastructure and Facilities**

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Company	Address	LPG	Status
A	450m NW	TEXACO	312, Mauldeth Road West, Alexandra Road South, Chorlton-Cum-Hardy, Manchester, Greater Manchester, M21 7RF	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Address	Details	
A	447m NW	Mauldeth Road West Service Station, Mauldeth Road West, Chorlton, M21 7RF	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	**0**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	**2**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Address	Details	
A	425m NW	MAULDETH ROAD WEST, MAULDETH ROAD, CHORLTON-CUM-HARDY	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0230 Permit Version: 1 Receiving Water: CHORLTON BROOK	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01/01/1995 Revocation Date: 16/05/2004
A	436m NW	MAULDETH ROAD WEST, MAULDETH ROAD, CHORLTON-CUM-HARDY	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0230 Permit Version: 2 Receiving Water: CHORLTON BROOK	Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 17/05/2004 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

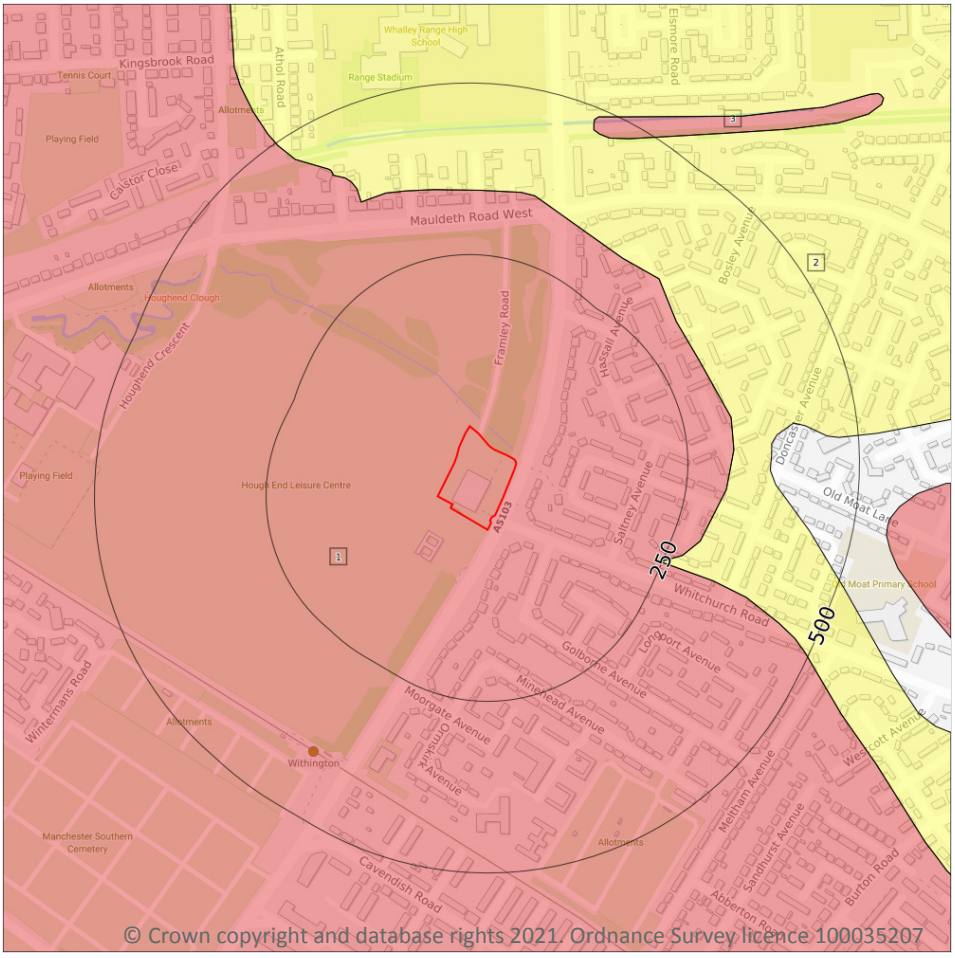
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	3

Aquifer status of groundwater held within superficial geology.

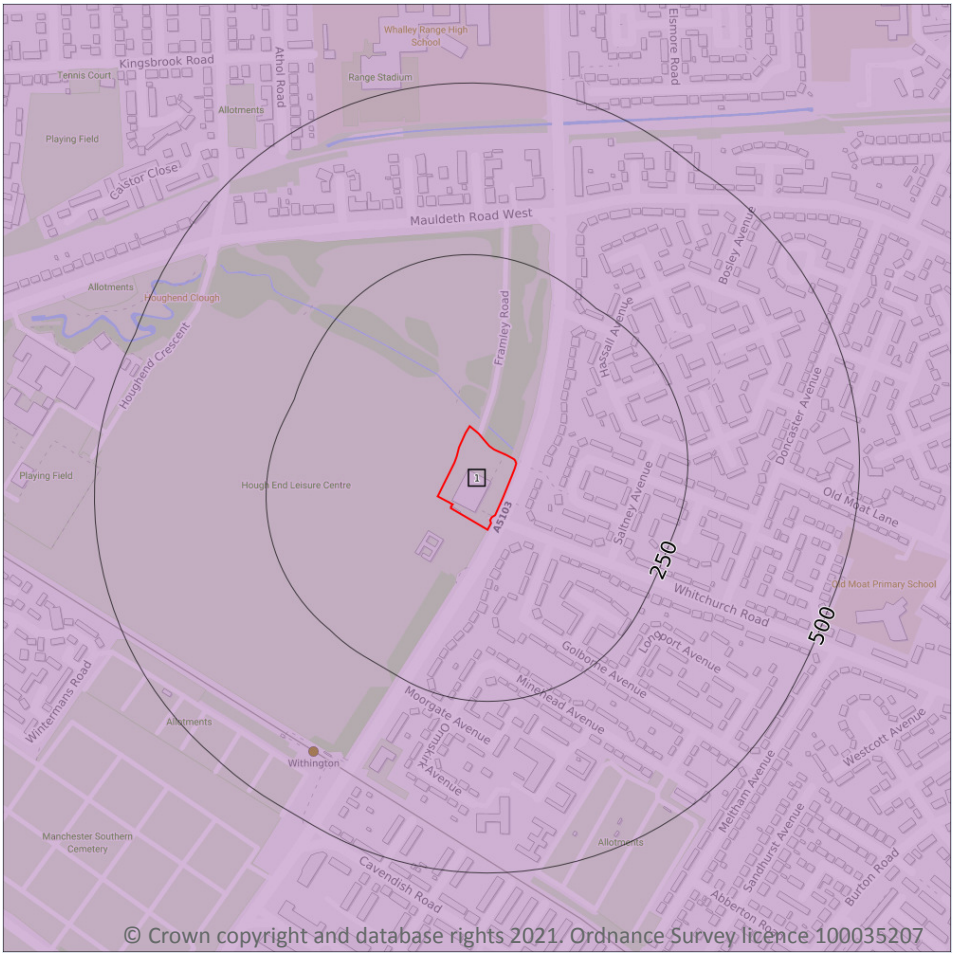
Features are displayed on the Hydrogeology map on **page 31**

ID	Location	Designation	Description
1	**On site**	**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	248m E	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

ID	Location	Designation	Description
3	466m NE	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	1

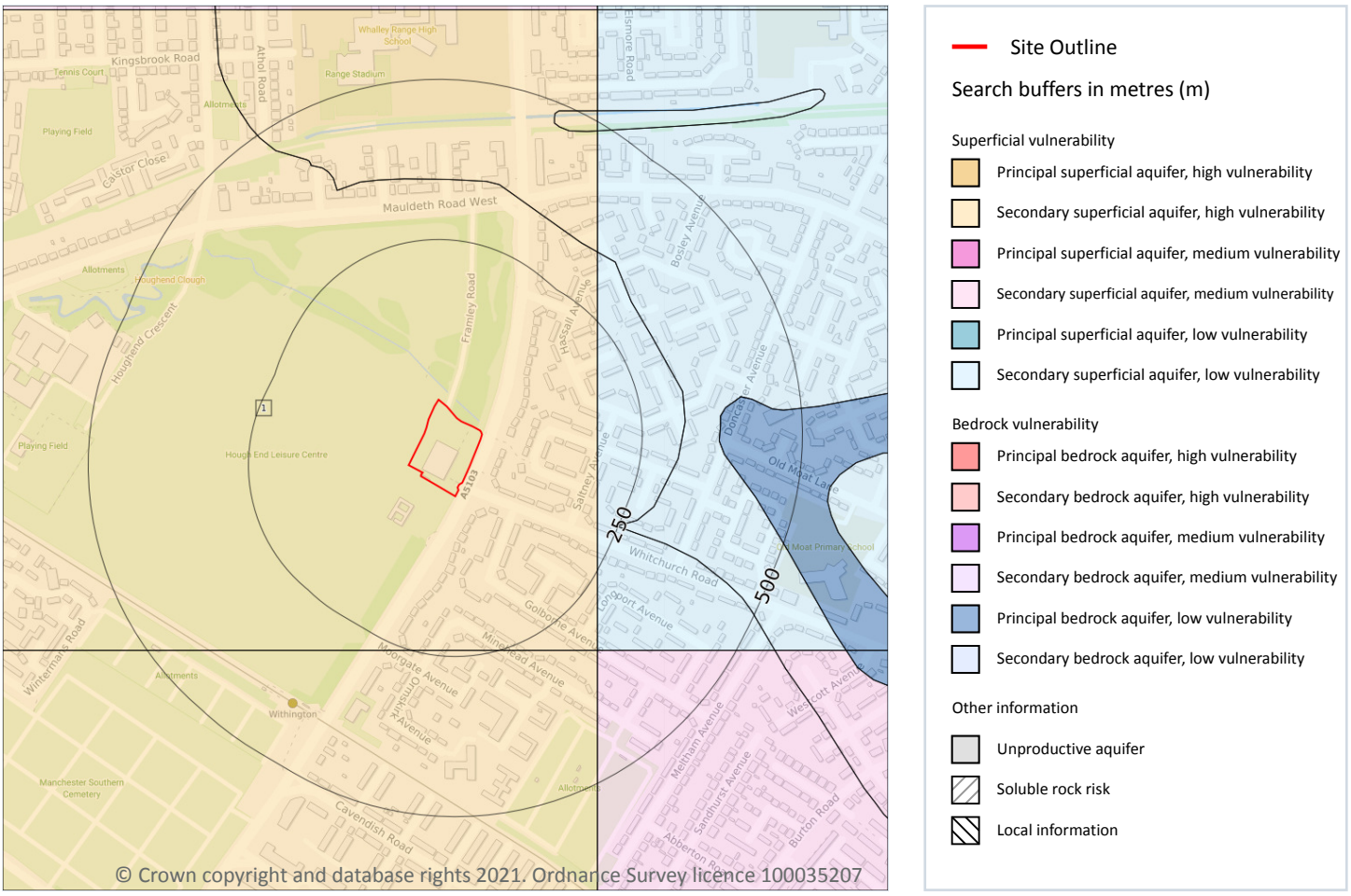
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 33**

ID	Location	Designation	Description
1	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**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m	1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 34**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

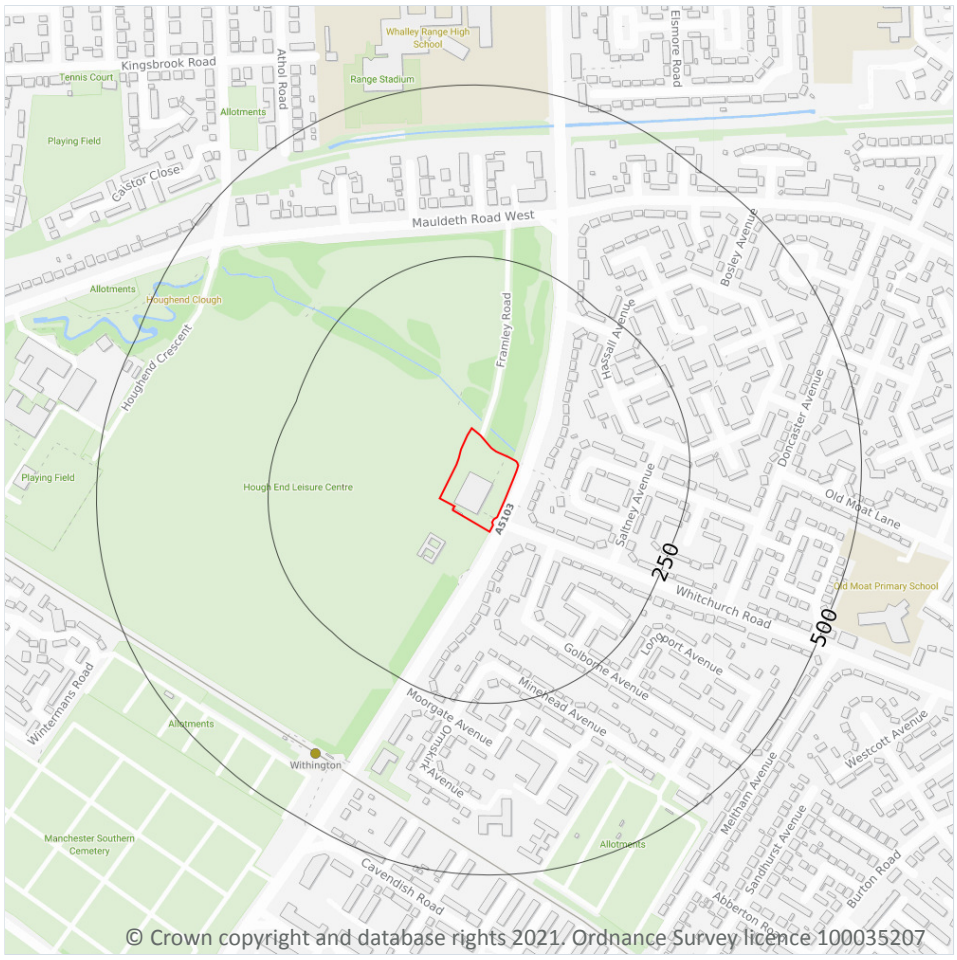
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	1

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 36**

ID	Location	Details	
-	1895m SW	Status: Active Licence No: 2569015015 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: BOREHOLE AT CHORLTON-CUM-HARDY GOLF CLUB Data Type: Point Name: CHORLTON CUM HARDY GOLF CO LTD Easting: 382230 Northing: 392100	Annual Volume (m^3): 8,500 Max Daily Volume (m^3): 70 Original Application No: - Original Start Date: 04/09/1998 Expiry Date: - Issue No: 101 Version Start Date: 01/04/2019 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	**0**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

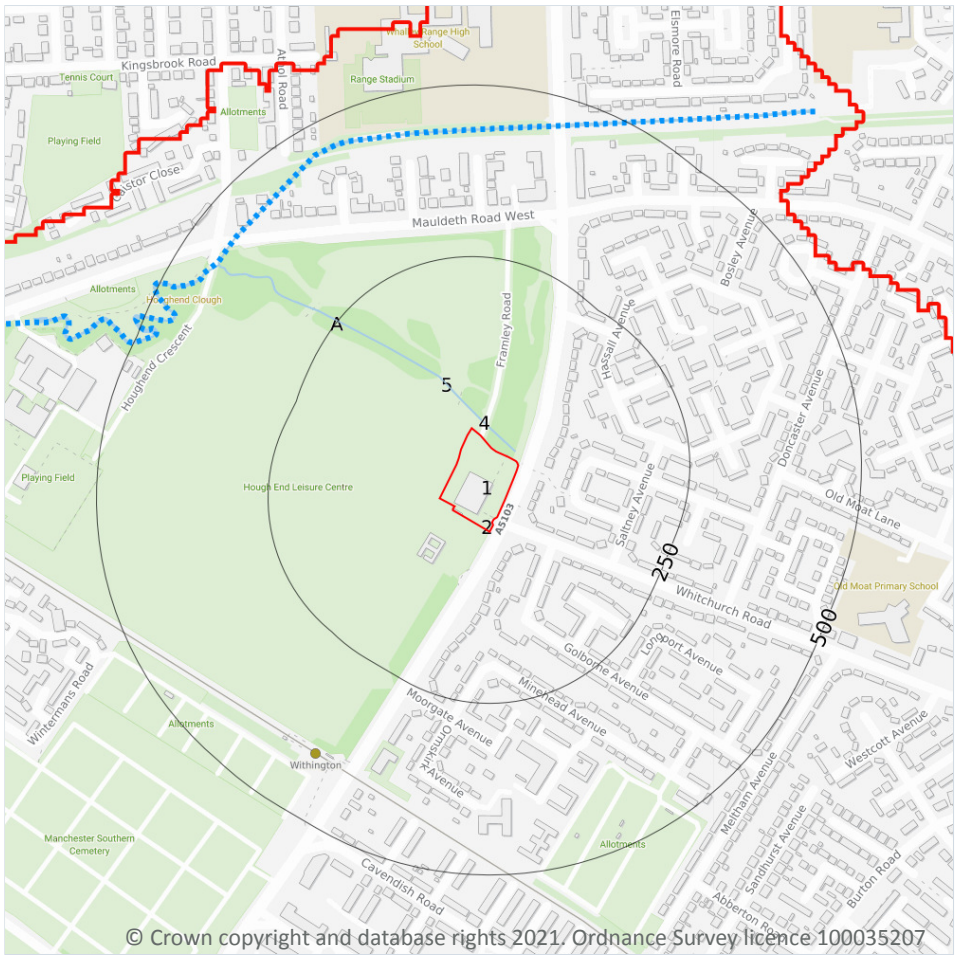
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	3

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 39**

ID	Location	Type of water feature	Ground level	Permanence	Name
4	12m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Red Lion Brook

ID	Location	Type of water feature	Ground level	Permanence	Name
5	88m NW	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	Red Lion Brook
A	90m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Red Lion Brook

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	2

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 39**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 39**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	**On site**	**River WB catchment**	**Chorlton Brook (Princess Parkway to Mersey)**	**GB112069061040**	**Bollin, Dean, Upper Mersey**	**Upper Mersey**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 39**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
7	434m N	River	Chorlton Brook (Princess Parkway to Mersey)	GB112069061040	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 39**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	**On site**	**Manchester and East Cheshire Permo-Triassic Sandstone Aquifers**	**GB41201G101100**	**Poor**	**Poor**	**Poor**	**2015**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

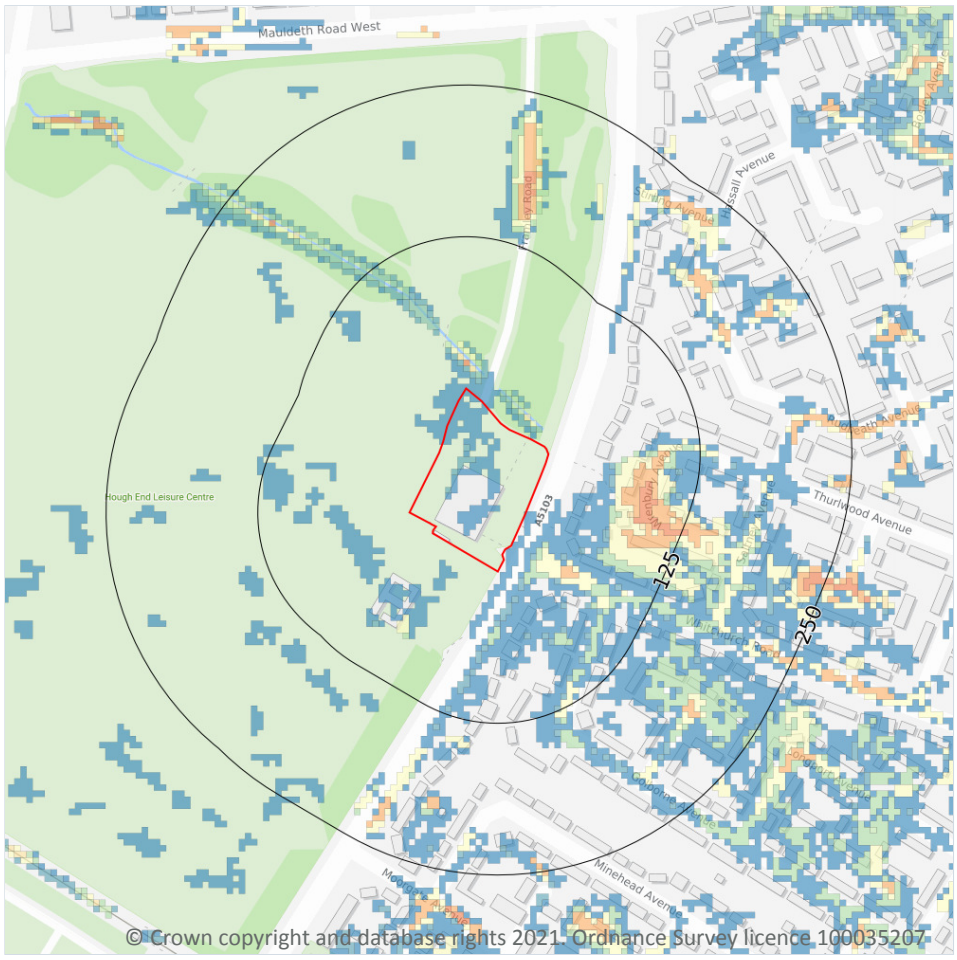
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 1000 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 45**

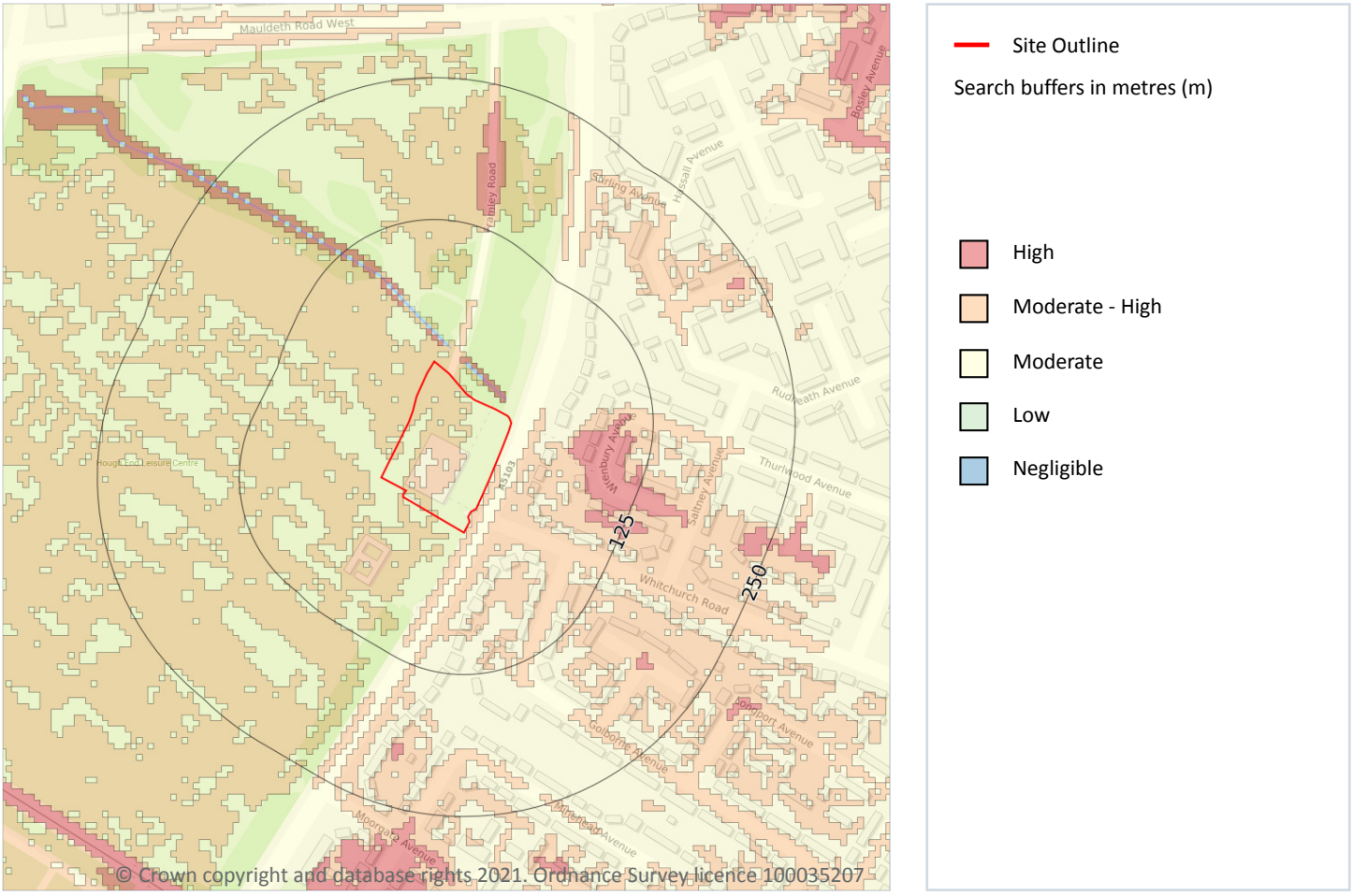
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site	**Moderate-High**
Highest risk within 50m	**High**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 47**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



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Site Outline

Search buffers in metres (m)

Local Nature Reserves (LNR)

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	1

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 48**

ID	Location	Name	Data source
-	1828m SW	Chorlton Water Park	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 48**

ID	Location	Name	Local Authority name
-	1523m S	Merseyside and Greater Manchester	Manchester

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 53**

ID	Location	Type of developments requiring consultation
1	**On site**	**Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons > 4000m². Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

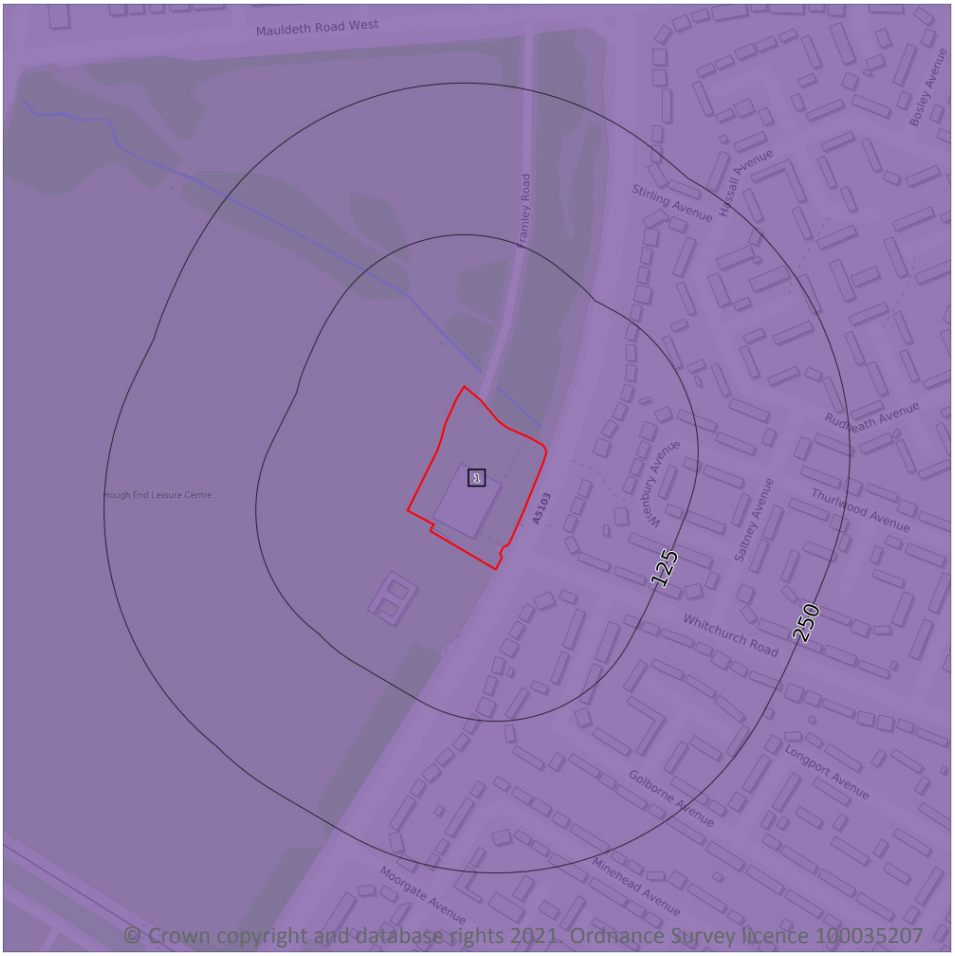
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 57**

ID	Location	Classification	Description
1	**On site**	**Urban**	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	5

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 59**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
2	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
3	7m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	11m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	44m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

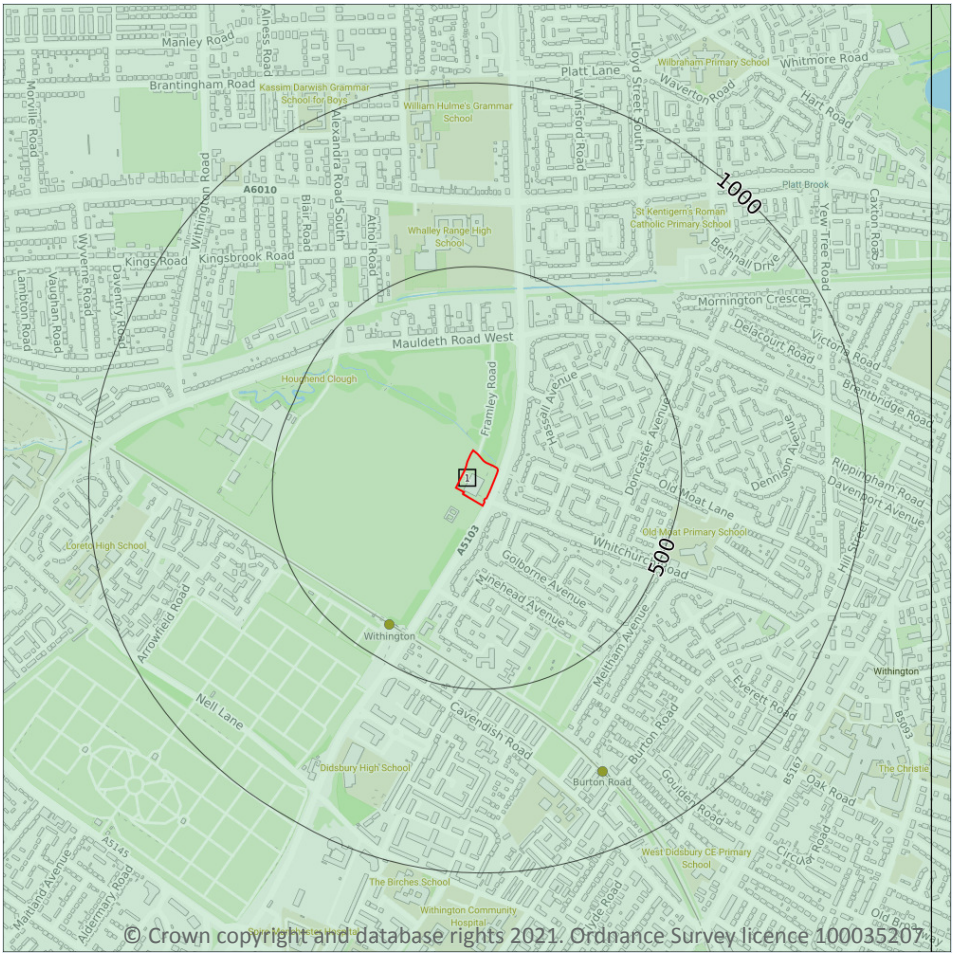
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 61**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**SJ89SW**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	6

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

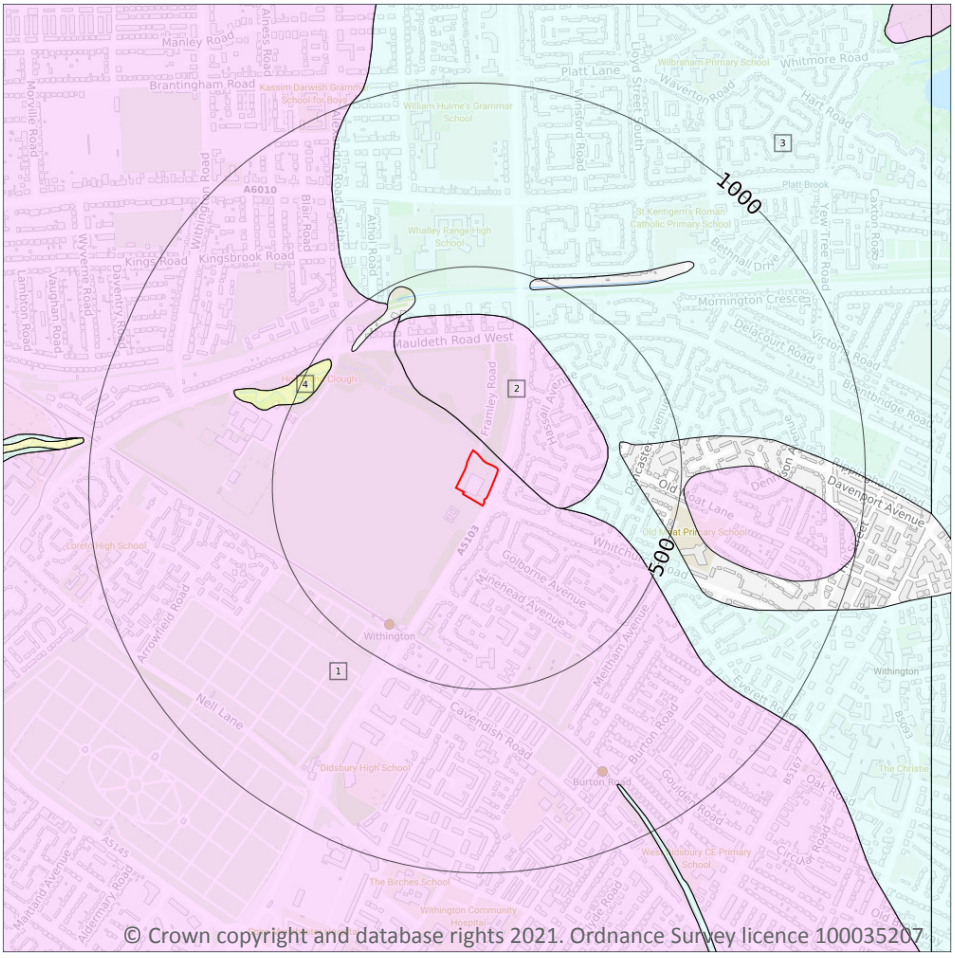
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 62**

ID	Location	LEX Code	Description	Rock description
1	77m NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	97m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
3	234m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	370m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

ID	Location	LEX Code	Description	Rock description
5	385m SW	WGR-VOID	Worked Ground (Undivided)	Void
6	405m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **4**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 64**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**GFSDD-XSV**	**Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel**	**Sand And Gravel**
2	24m NE	GFICD-XSV	Glaciofluvial Ice Contact Deposits, Devensian - Sand And Gravel	Sand And Gravel
3	200m E	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

ID	Location	LEX Code	Description	Rock description
4	447m NW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

This data is sourced from the British Geological Survey.

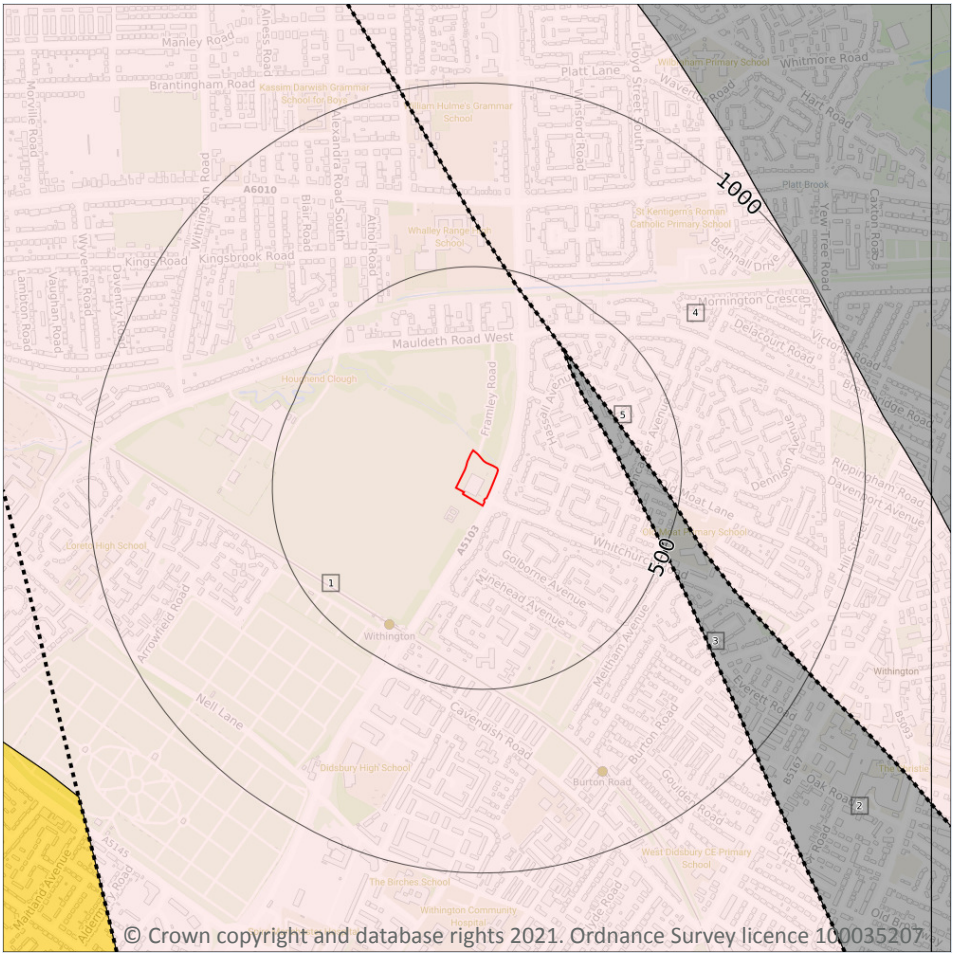
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **3**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 66**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**WLSF-SDST**	**Wilmslow Sandstone Formation - Sandstone**	**Early Triassic Epoch**
2	301m NE	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
4	338m NE	WLSF-SDST	Wilmslow Sandstone Formation - Sandstone	Early Triassic Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	2

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 66**

ID	Location	Category	Description
3	301m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
5	338m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 68**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**Full**	**EW098_stockport_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

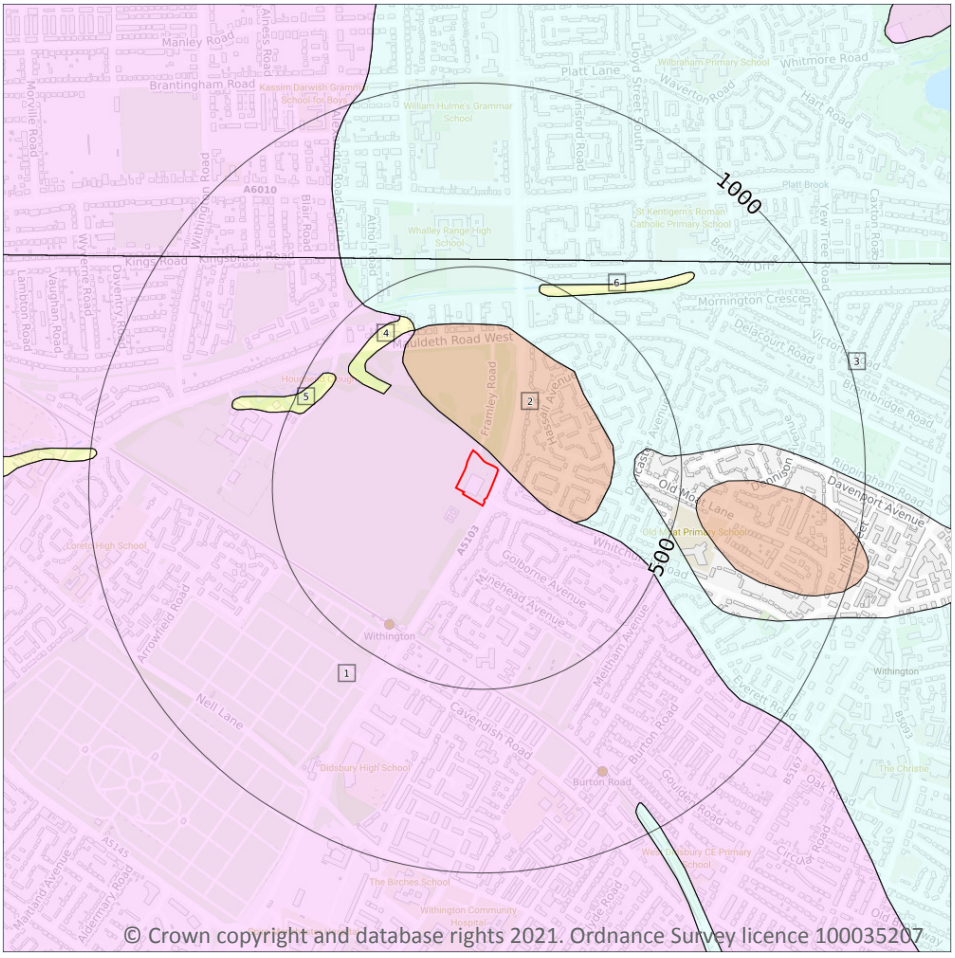
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **6**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 70**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**GFSDD-XSV**	**GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN**	**SAND AND GRAVEL**
2	16m NE	SSA-S	SHIRDLEY HILL SAND FORMATION	SAND
3	248m E	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
4	285m NW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
5	420m NW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
6	466m NE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**2**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Very High**	**High**
16m NE	Intergranular	High	High

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

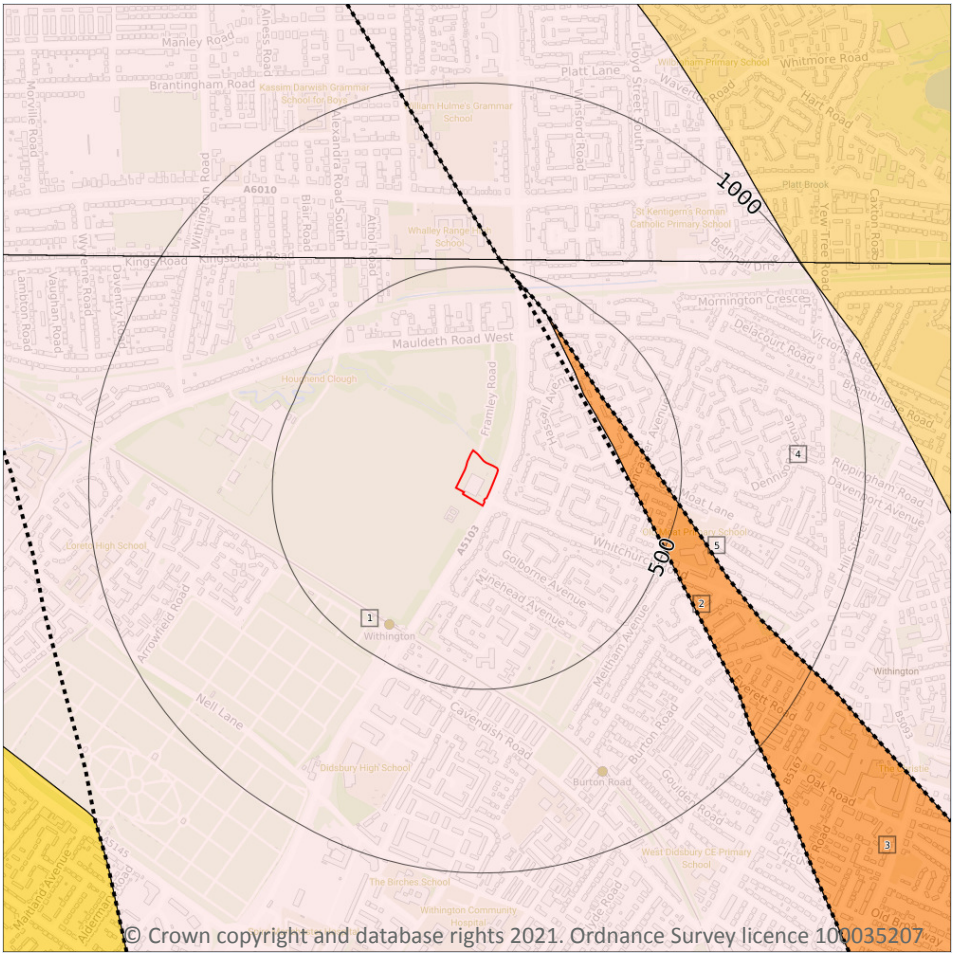
15.7 Landslip permeability (50k)

Records within 50m	**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	3

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 72**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**WLSF-SDST**	**WILMSLOW SANDSTONE FORMATION - SANDSTONE**	**-**
3	305m NE	CHES-PESST	CHESTER FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	OLENEKIAN
4	345m NE	WLSF-SDST	WILMSLOW SANDSTONE FORMATION - SANDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**High**	**High**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	2

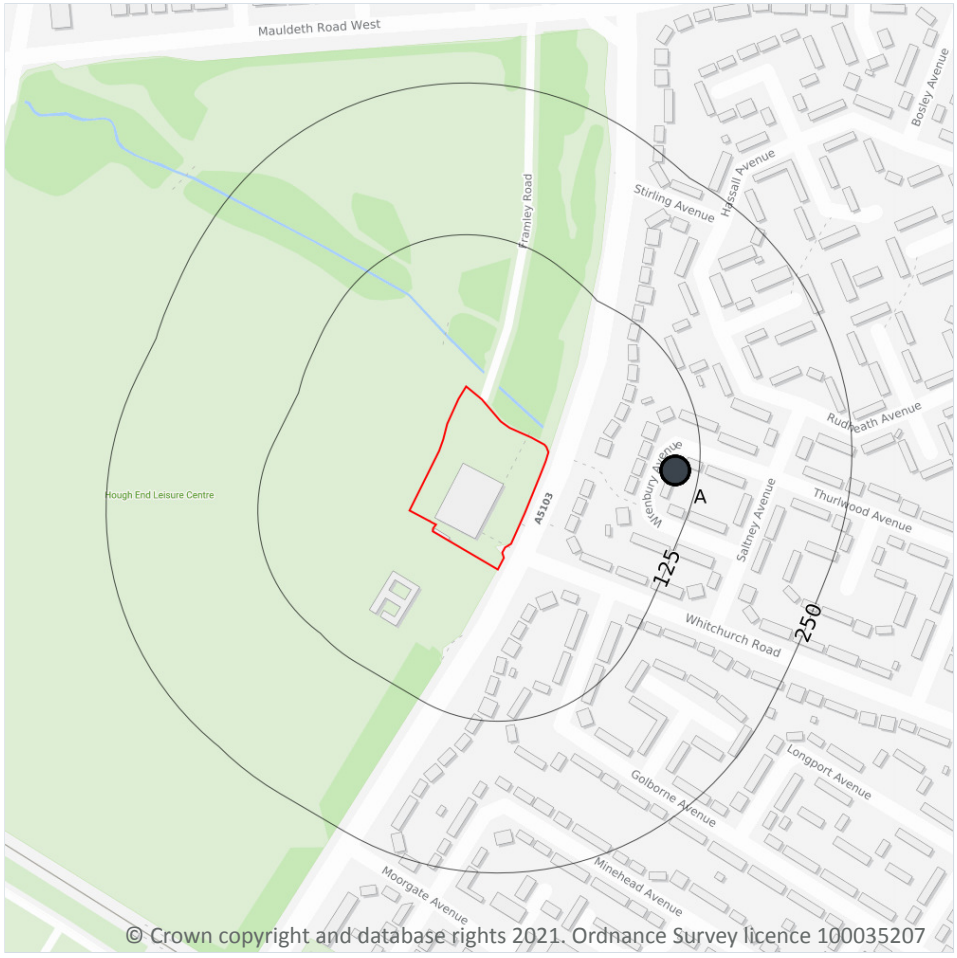
Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 72**

ID	Location	Category	Description
2	296m NE	FAULT	Fault, inferred
5	345m NE	FAULT	Fault, inferred

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m **6**

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

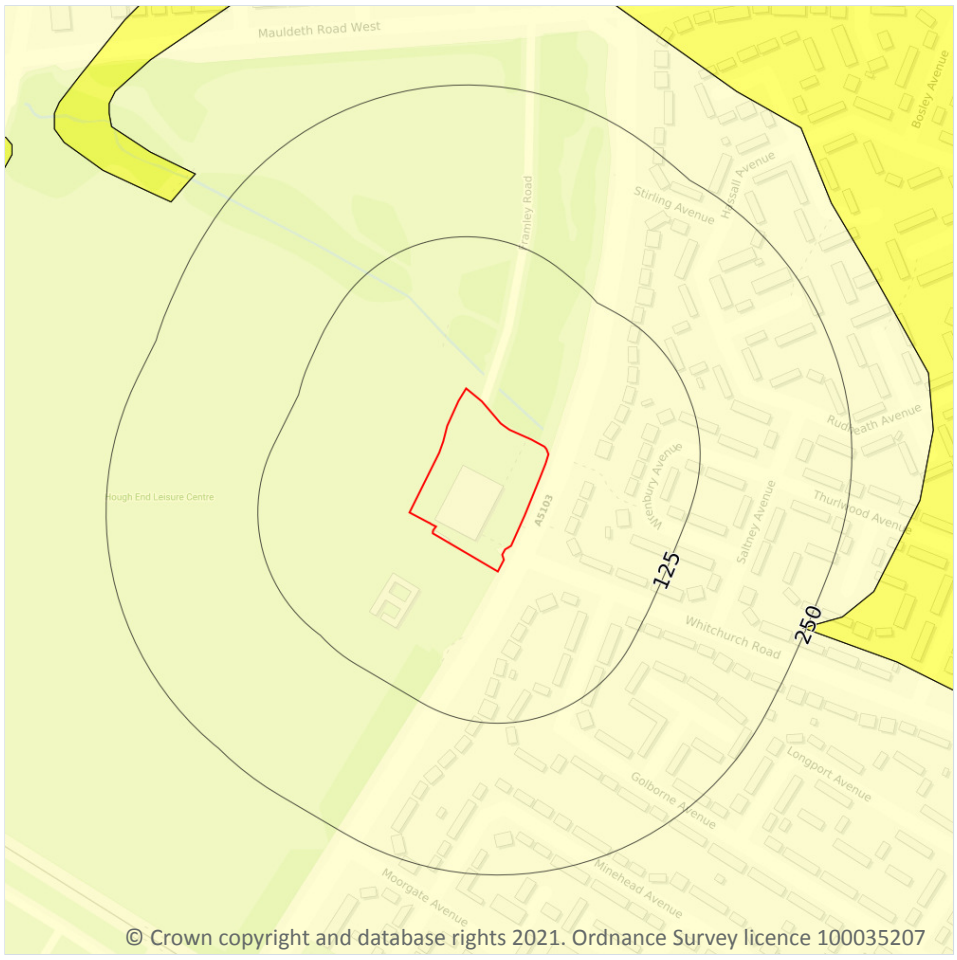
Features are displayed on the Boreholes map on **page 74**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	105m E	383924 393322	24 WRENBURY AVENUE 3	-	Y	N/A
A	105m E	383924 393322	24 WRENBURY AVENUE 2	-	Y	N/A
A	105m E	383924 393322	24 WRENBURY AVENUE 4	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	105m E	383924 393322	24 WRENBURY AVENUE TP 2	-	Y	N/A
A	105m E	383924 393322	24 WRENBURY AVENUE 1	-	Y	N/A
A	105m E	383924 393322	24 WRENBURY AVENUE TP 1	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

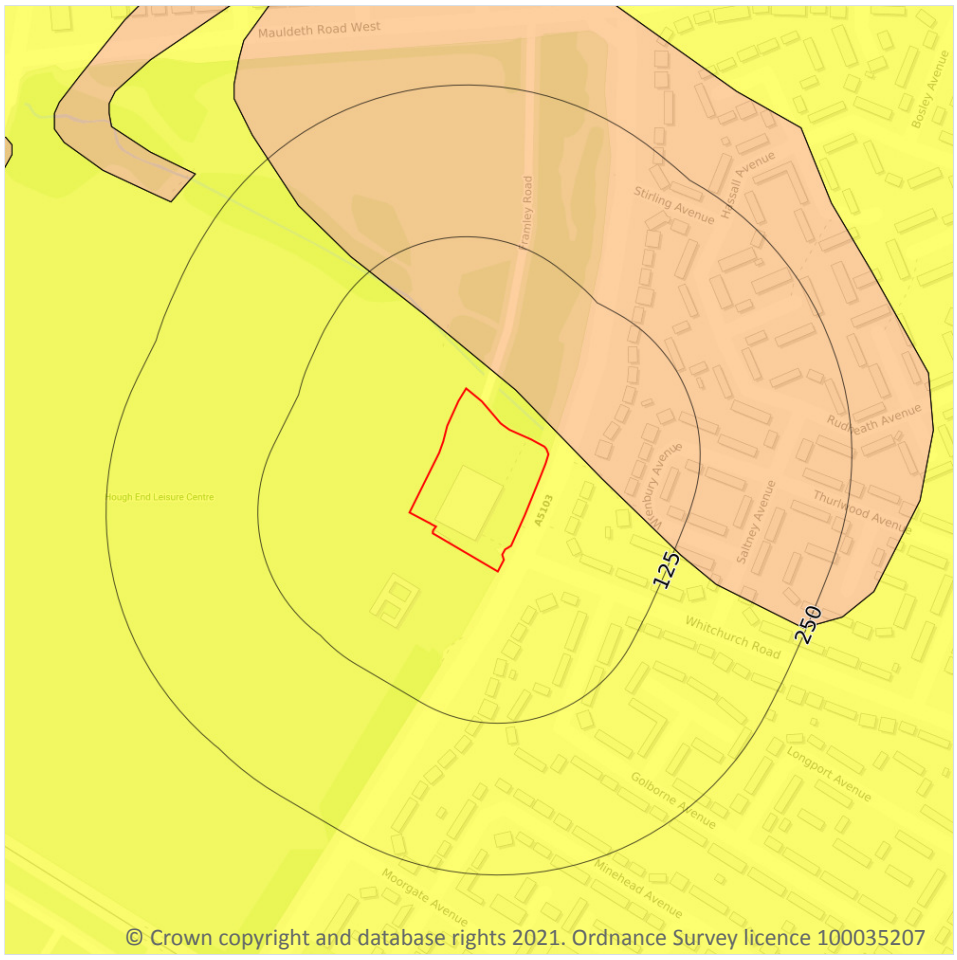
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 76**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

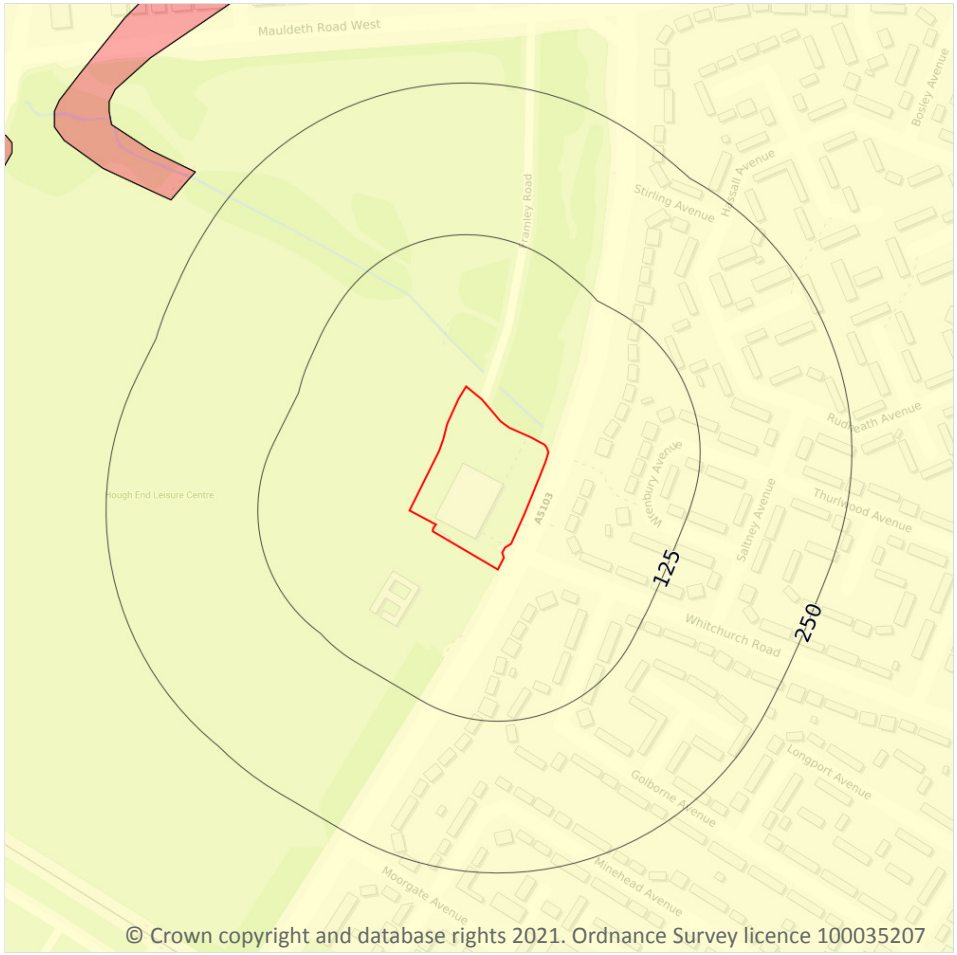
Features are displayed on the Natural ground subsidence - Running sands map on **page 77**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
16m NE	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	1

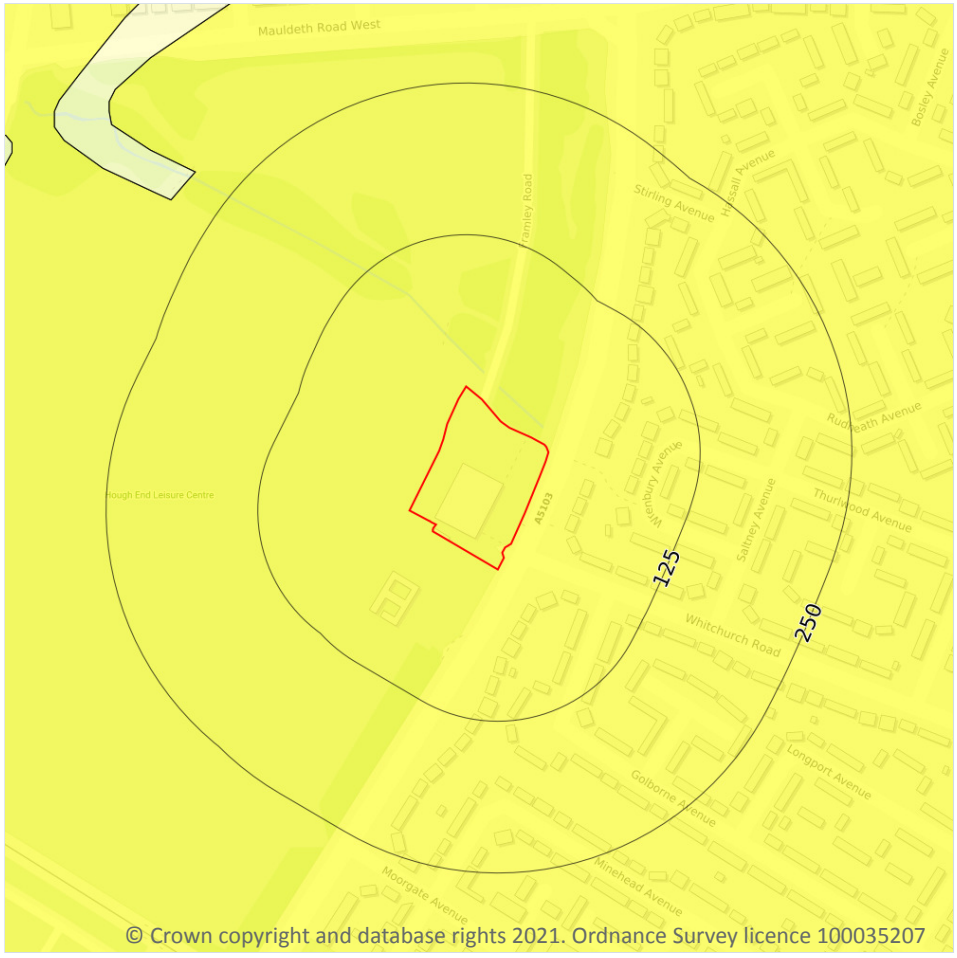
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 79**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

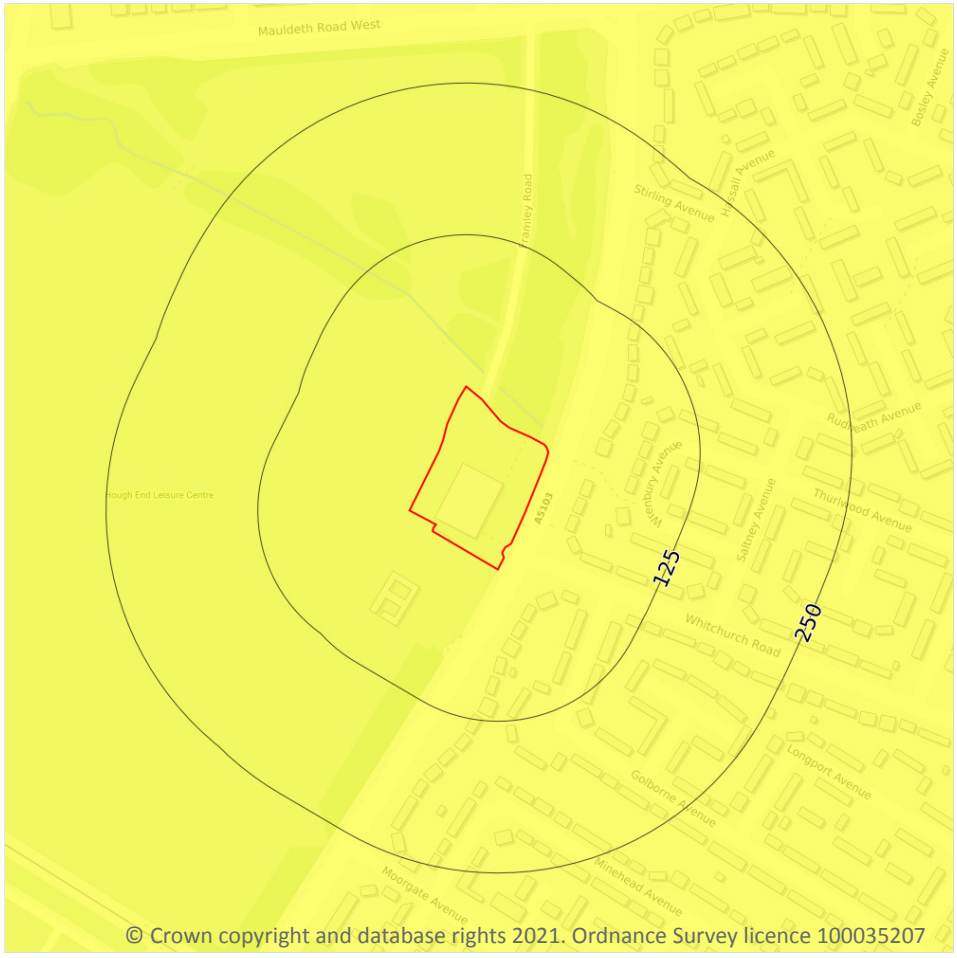
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 80**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 81**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

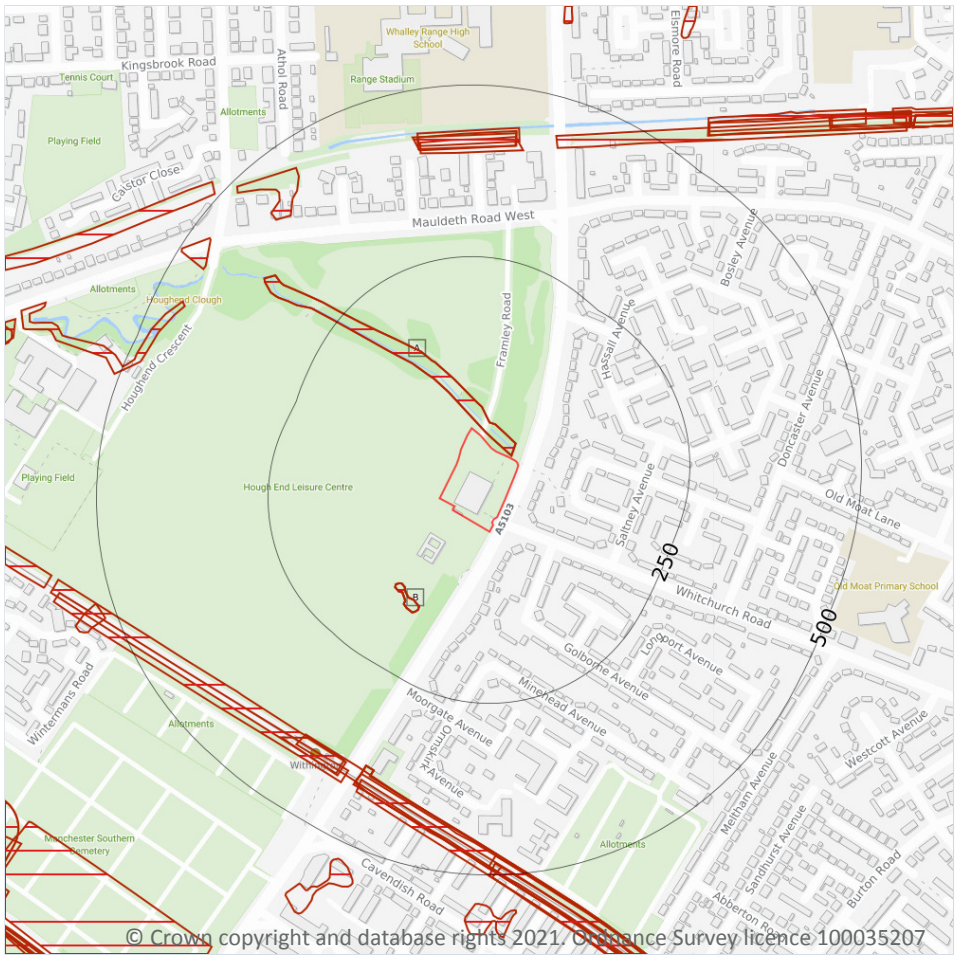
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 82**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	5

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 83**

ID	Location	Land Use	Year of mapping	Mapping scale
A	4m NE	Cuttings	1966	1:10560
A	4m NE	Cuttings	1955	1:10560
B	130m SW	Ponds	1923	1:10560
B	130m SW	Ponds	1905	1:10560
B	130m SW	Ponds	1892	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	1

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

Location	Details
On site	**Whilst outside of an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) may have information such as mining plans and maps held within their archive that have occurred within 1km of this property. Please note, the plans held by JPB may also relate to non-mining records. Further details and a quote for services (if appropriate) can be obtained by emailing this report to enquiries.gs@jpb.co.uk.**

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

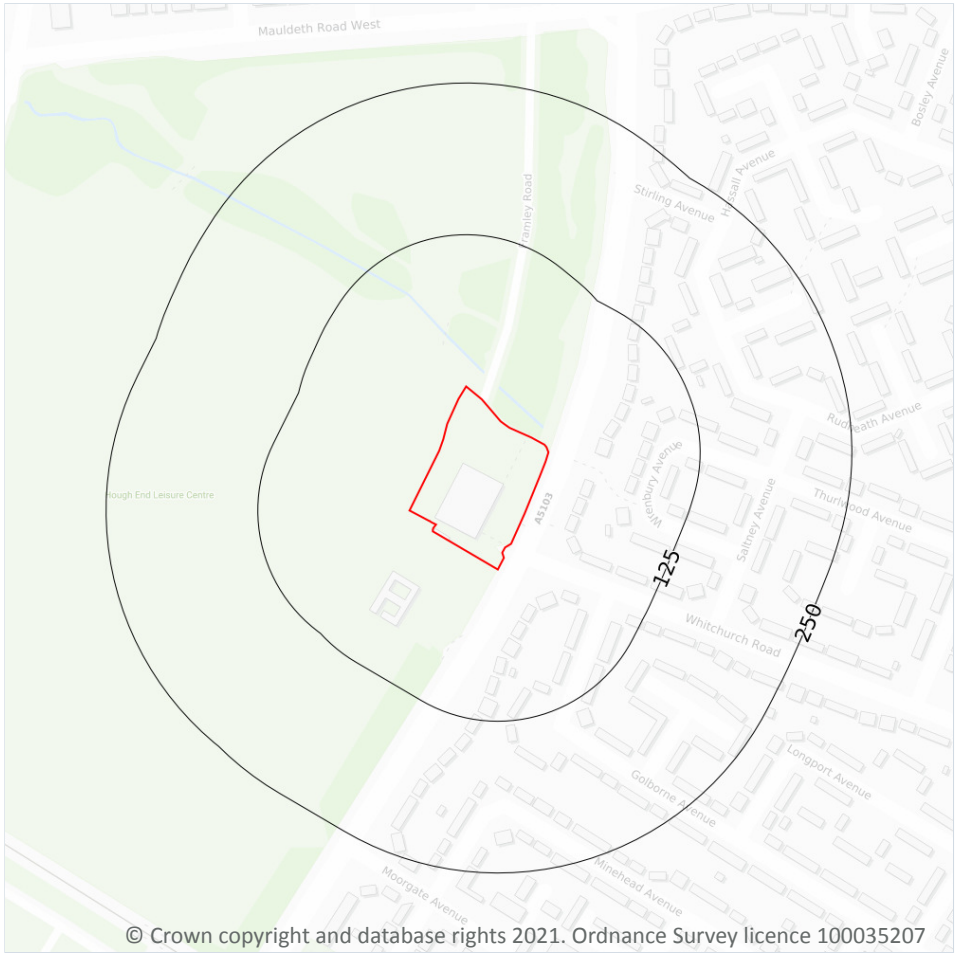
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 87**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	2

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**30 - 45 mg/kg**
16m NE	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

APPENDIX 3

Coffey Geotechnics reports

REMEDIATION STRATEGY – HOUGH END LEISURE CENTRE

Laing O'Rourke Construction Limited

Archway 3, Birley Fields, Manchester, M15 5QJ

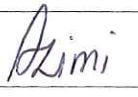
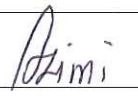
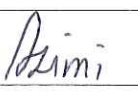
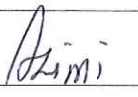
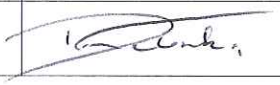
02108AB_R_001B_Remediation Strategy-KA.doc
March 2014

Document Verification

Job title: Remediation Strategy – Hough End Leisure Centre — Job number: 02108AB

Document title: Remediation Strategy – Hough End Leisure Centre

Document ref: 02108AB_R_001B_Remediation Strategy-KA.doc

Issue	Date				
A	03/03/14	Filename	02108AB_R_001B_Remediation Strategy-KA.doc		
		Description	Remediation Strategy for Hough End Leisure Centre, a proposed development in the Chorlton-cum-Hardy district of Manchester. The document sets out the ground-related remediation requirements of the site prior to and during construction.		
			Prepared by	Checked by	Approved by
		Name	Kourosh Azimi	Ralph Sibley P.P.	David Tonks
		Signature			
B	05/03/14	Filename	02108AB_R_001B_Remediation Strategy-KA.doc		
		Description	Revised Remediation Strategy for Hough End Leisure Centre. This version allows for possibility of capping the asbestos affected ground with new hardstandings underlain by a marker layer of geotextile, as an alternative remediation solution to segregation and disposal of asbestos affected ground.		
			Prepared by	Checked by	Approved by
		Name	Kourosh Azimi	Ralph Sibley P.P.	David Tonks
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

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Figure 1: Exploratory Holes Location Plan

Figure 2: Asbestos Delineation Grid – Proposed Additional Sampling Locations

1 INTRODUCTION

Redevelopment of a site in the Chorlton-cum-Hardy district of Manchester is proposed comprising the construction of a new leisure centre and associated facilities.

1.1 Previous Investigations and Reporting

Coffey Geotechnics Ltd (Coffey) completed a desk study report and an interpretative ground investigation report for the site in September and November 2013, respectively. The desk study (Ref.1) included a geoenvironmental and geotechnical appraisal of the site based on the review of publically-available information and a site walk-over survey.

The desk study was then followed by an intrusive ground investigation which included exploratory hole formation, soil and groundwater sampling, laboratory testing and ground gas monitoring of the site. The findings of the ground investigation were presented in factual and interpretative reports which included exploratory hole records, site and laboratory test results and an assessment of the encountered ground conditions for the proposed development from geoenvironmental and geotechnical perspectives (Ref. 2).

From a geoenvironmental perspective, the desk study and ground investigation did not indicate the existence of widespread or gross ground contamination, in relation to the proposed development. However, the localised presence of asbestos-containing matter was identified in near-surface Made Ground at one location; and although not encountered, the potential for ground locally impacted with hydrocarbons could not be entirely discounted.

As a result, and in order to satisfy a planning condition for the development, a Remediation Strategy is required for the redevelopment.

1.2 Appointment

Consequently, Laing O'Rourke Construction Ltd (Laing O'Rourke) has commissioned Coffey to provide geoenvironmental consultancy services in relation to the remediation and validation of the new development at the site. These services will comprise:

- Preparation of a Remediation Strategy for the development (this document);
- Attendance at site during construction to inspect, oversee and provide guidance specifically for the (remediation) ground works, and;
- Validation of the effective implementation of the required remedial activities.

1.3 Objectives

Based on the available information, the geoenvironmental remediation requirements for redevelopment of the site are detailed in this document (Remediation Strategy). The objectives of this Strategy are to:

- Present a strategy for the safe, economic and sustainable geoenvironmental risk mitigation of the site for the intended end use as a leisure centre;

- Set out the requirements for gathering data to demonstrate that the remediation objectives and criteria are met, and thus enable documentation of the foregoing in the Validation Report.

2 SITE SETTING

2.1 Site Location and Description

The site is located in the Chorlton-cum-Hardy district of Manchester, centred on National Grid Reference SJ 837 932. The site is roughly rectangular in shape, measuring about 1.5 hectares in plan area and accessed from off Princess Road to the southeast.

At the time of investigation, the site was occupied by single-storey sports pavilion (changing facilities) in the south western end, together with an adjoining car park, access roads/paths and landscaped grounds.

2.2 Proposed Development

The development is to comprise a new two-storey leisure centre building with a swimming pool, "changing village", plant area, squash courts, and reception at ground floor, and with fitness suite, dance hall, and dry changing facilities at 1st floor level. It is understood that the proposed development also includes areas of soft landscaping.

2.3 Planning Application

Coffey has been provided with a copy of the Planning Application for the proposed development (Ref. 3). Under Condition 5a of the application, the requirement for submitting "a scheme for the investigation of the site and remediation measures" to the Local Planning Authority is identified. Condition 5a also states that, before the development commences, a report is to be prepared outlining what measures, if any, are required to remediate the land (the Site Investigation Report and/or Remediation Strategy) and be submitted to and approved in writing by the Local Planning Authority. This document is intended to address that requirement. Condition 5b relates to the effective implementation of the Remediation Strategy and the associated documentation to provide validation.

2.4 Findings of Previous Work

From a review of the site history, it was undeveloped land (which included two field ponds) in the mid to late 19th Century. In the early 20th Century the site area formed part of the Alexandra Park Aerodrome; this was only operational between 1918 and 1924 (with the main aerodrome buildings located to the northwest). By 1934 the aerodrome became Hough End Playing Fields, the ponds were in-filled and Princess Road was established to the southeast of the site. Residential development occurred in the north-eastern part of the site (and on land beyond) by 1955, but was subsequently demolished and cleared by 1975, by which date the current sports pavilion was built. The adjacent car park was then constructed and the site's current/recent configuration attained by 1982. No further significant changes at or adjacent to the site are indicated since 1982.

The intrusive ground investigation was undertaken at the subject site between 30th September and 4th October 2013. This comprised four boreholes (to depths of 3.10-5.50m bgl) and seven trial pits (to depths of 2.40-3.10m bgl), together with sampling and in-situ testing.

Ground conditions encountered during the investigation comprised Made Ground over (sequentially): Glaciofluvial Sheet Deposits (GSD), Glacial Till and (weathered strata of the) Wilmslow Sandstone Formation. The cohesive Glacial Till, underlying the GSD, is indicated to be laterally variable beneath the site, being absent beneath the north eastern section and increasing in thickness to the southwest.

Additionally, the depth to the Drift/Wilmslow Sandstone Formation interface is indicated to increase across the site from northeast to southwest

Groundwater entries were recorded at depths of between 0.70m and 5.00m during hole formation. During subsequent monitoring, groundwater levels were recorded at depths of between 1.9m and 2.8m bgl (28.36 – 28.87m AOD).

Chemical laboratory testing was undertaken on soil samples including screening of samples of Made Ground for asbestos. The results of this testing, when compared with Generic Quantitative Risk Assessment (GQRA) criteria relevant to the proposed development indicated concentrations of most tested determinands to be below their respective screening values. However asbestos (Chrysotile) was positively identified in one sample of Made Ground (taken from TP7 at 0.3m) as shown on Figure 1.

From the ground gas monitoring the site was indicated to classify as CGS 1 in accordance with BS8485:2007. Therefore, no specific ground gas protection measures are required to provide protection to the proposed new development.

In consequence, the Final Ground Investigation Report (Ref. 2) concluded that appropriate mitigation of risk and protection of construction workers will be required, and landscaped areas may require capping with uncontaminated cover soils. Site-won soils may be suitably uncontaminated in this regard. Specific remediation to protect controlled waters was not indicated to be necessary.

3 REMEDIATION REQUIREMENTS

3.1 Introduction

The risk appraisal process (Ref 2) has identified potential risks to human health from contamination at shallow depths within the Made Ground. These geoenvironmental risks were generally considered to be "very low to low", and the potential (known/suspected) on-site contaminants relate to:

- Localised asbestos within Made Ground; and
- Possible hydrocarbons associated with the current building heating systems.

Risks to construction workers from ingestion and direct contact were considered "moderate" due to the need for such workers to be in contact with the soil and possibly groundwater during construction.

The presence of asbestos in Made Ground, as summarised in Section 2.4, and the potential for localised ground impacted with hydrocarbons, result in the need for geoenvironmental remedial activities and risk mitigation.

The remediation requirements presented in this Section are intended to render the site suitable for the intended end use as a leisure centre and the associated facilities, thereby addressing Conditions 5a and 5b of the Planning Application.

3.2 Scope

In broad terms, the scope of geoenvironmental remedial actions required to be undertaken can be summarised as follows. More details are provided in the subsequent paragraphs of this Section:

- Remediation (via delineation and placement of a marker and capping layer) of the near-surface Made Ground at and around TP7 found to be impacted by asbestos; this will involve further sampling and testing to delineate the impacted zone, with the assistance of an asbestos specialist;

- Contingency for encountering elsewhere at the site, during the redevelopment ground works, ground that is locally compacted with contaminants such as further asbestos-containing matter, hydrocarbons or similar; this will involve communications between Laing O'Rourke and Coffey, site visits at appropriate times (e.g. during site clearance, and if/when suspect ground conditions are encountered, and may necessitate further sampling and laboratory testing, with additional assessment and provision of recommendations);

- Sorting, segregation and possibly additional testing of site-won soil materials, particularly if such are to be re-used in the redevelopment (e.g. as uncontaminated capping soils in new/modified landscaped areas).

3.3 Provision of an Asbestos Specialist

As described previously, traces of asbestos have been found in Made Ground at shallow depth in one location on site (TP7). Site clearance will include localised de-vegetation, topsoil strip and removal of existing surface hardstandings; this will need to be undertaken prior to commencing the main construction works. Therefore, an asbestos specialist should be provided for the project, particularly prior to and during the site clearance. This is required in order to ensure that all risks relating to

asbestos at the site are mitigated and that the work is undertaken in accordance with current guidance and legislation.

3.4 Remediation of Asbestos-Impacted Ground at TP7

The asbestos-impacted ground at and around TP7 will need to be remediated for the redevelopment. This will involve further sampling and testing of near-surface Made Ground around TP7 to delineate the area affected, then placing a marker layer (such as geotextile) over the area delineated as affected by asbestos ('delineated area', for brevity) and covering the marker with new hardstandings or a similar capping layer such as 600mm of uncontaminated fill .

The required delineation work can be undertaken at a very early stage in the redevelopment process, immediately following the site clearance. Following removal of the surface hardstanding at and around TP7, near-surface soil sampling is to be undertaken at a series of locations, as indicated on Figure 2 and summarised below:

- Soil sampling is to be undertaken initially at a series of sampling locations on a regular grid pattern at a radius of 5.0m from TP7.
- Each sampling point will be taken to (the shallower of) the base of the Made Ground or a depth of 1.0m bgl; soils shall be described and recorded, and representative soil samples taken from each (Made Ground) horizon, with a minimum 1 sample per sampling point. All sampling point locations will be clearly set-out on site, and surveyed for location using suitable (e.g. GPS) equipment.
- Each sample will be tested for the presence (and if necessary concentration) of asbestos by a suitably accredited laboratory.
- If asbestos is detected in any of the soil samples from the initial 5m radius sampling locations, samples shall then be taken from a second series of sampling locations on a regular grid pattern at a radius of 10m from TP7, and tested for asbestos.
- The sampling and testing strategy should be extended outwards from TP7 with an increasing radius of 10m intervals from TP7 until no asbestos is identified in the samples of Made Ground.
- Following effective delineation of the asbestos-affected ground, the delineated area should be marked by placing a marker layer such as geotextile, underlying a suitable capping layer such as new hardstandings or 600mm of uncontaminated fill, provided that:

    a. The extent of the ground affected by asbestos is limited to the areas where new hardstandings / 600mm of uncontaminated fill can be placed. For example, if the ground affected by asbestos is proved to be extended across to areas of soft landscaping, placement of the marker and hardstandings / uncontaminated fill may not be feasible in that specific soft landscaping area. In this case, the asbestos-impacted soils should be excavated out (to a maximum depth of 600mm below finished levels), segregated and removed to landfill. Such works will need to be carried out under the supervision and direction of an Asbestos Specialist as described in Section 3.3.

    b. The required finished levels across the delineated area should not prompt stripping the Made Ground, as this would defeat the purpose of not disturbing the asbestos-contaminated ground.

If asbestos-impacted soils are found to extend to depths of greater than 600mm, left in situ and capped, future ground intrusive works should be prohibited within the affected area unless special protective measures are applied. The Validation Report will be an important reference for stakeholders including those responsible for future site management and the CDM-Coordinator. It is anticipated that the Validation Report will be referenced in the Health & Safety File for the development.

3.5 Other Potential Ground Contamination Sources

As indicated previously, it is possible that localised ground that is impacted with contaminants may exist elsewhere at the site and may be encountered during the site redevelopment. Accordingly, the remediation strategy needs to include contingency measures for dealing with such. The contingency measures are described in the following paragraphs.

On completion of the site clearance, to include breaking out of all residual hardstanding, de-vegetation and removal of Topsoil, the exposed formation is to be inspected and recorded by a geoenvironmental engineer.

If during this inspection, or at any other time during the ground works' activities, ground is exposed that is suspected to be impacted with contaminants (such as asbestos, hydrocarbons or similar) the suspect ground is to be sampled and tested, and the test results are to be subjected to further consideration and assessment.

In the event that such work confirms the presence of further contaminated ground conditions that could pose a risk to receptors (human health, controlled waters buildings and/or the environment) the impacted area is to be delineated, and appropriate measures agreed and implemented. Such measures could comprise or include: excavation to a suitable depth, segregation and off-site removal to landfill or possibly covering with an uncontaminated cover system (similar to the process described in Section 3.4). If such ground contamination relates to asbestos-impacted soils, the work would need to be undertaken in accordance with the requirements of an asbestos specialist.

Therefore it is a requirement that the site is to be visited and inspected by a qualified geoenvironmental engineer at key stages during the ground works' phases of the site redevelopment.

3.6 Re-use of Site-won Soil Materials

The proposed development will include areas of soft landscaping. Cover soils (including topsoil) to be used in these areas should be uncontaminated and of sufficient thickness. Topsoil will need to comply with the appropriate Standard as set out in the employer's requirements for the development.

Subject to confirmation by validation testing, it is anticipated that site-won soils may be suitably uncontaminated for re-use as soil fill in the redevelopment. All such soils that are to be considered for re-use should be segregated and stockpiled in areas which can be accessed and inspected conveniently. The soil stockpiles should be inspected by a suitably qualified geoenvironmental engineer to check if they are suitable for such re-use and (in the case of cover soils) are free from material such as broken glass, sharps, tree roots, entrained contaminants, etc. Such stockpiled soil materials will also require testing with an appropriate frequency; this testing should include geotechnical testing to confirm suitability (particularly if to be reused as structural or engineered fill) and chemical testing to confirm them to be suitably uncontaminated.

With regard to landscaped areas the following requirements should also be met:

- A minimum thickness of 150mm of uncontaminated topsoil is required to promote and sustain plant growth within any general landscaped (grassed) area.
- A minimum thickness of 450mm topsoil is required to promote plant growth within any proposed planted areas (greater thickness if any deeper rooting species are proposed).
- Validation will need to include sampling, testing and measurement to confirm adequate cover thicknesses.

3.7 Imported Soil Materials

For all imported soils, appropriate chain of custody records should be obtained and provided for inclusion in the Validation Report

4 VALIDATION OF SITE-WON OR IMPORTED SOIL MATERIALS

4.1 Frequency of Validation Testing

The validation programme has been developed in general accordance with the Environment Agency's guidance on Verification of Remediation of Land Contamination (Ref. 4). The testing frequency proposed here is based on such guidance, together with Coffey's professional judgement and experience.

In relation to the validation of site-won or imported soil materials for use in the proposed areas of soft landscaping, the requirements for on-site testing are as follows:

- A testing frequency of 1No sample per 100m^3 of material from an approved Greenfield source. The source of the imported soil should be clearly identified and there must be a minimum of 4No samples tested from each separate source.

Ideally, imported soil materials should be sampled and tested either before they are brought to site or when stockpiled on arrival. This will effectively eliminate the need to sample and test soils after placement. Site inspection will subsequently be limited to confirmation of adequate cover thickness via hand-excavated validation pits as described below.

4.2 Validation of the Landscaping Cover System Thickness

Confirmatory inspections are to be undertaken by an independent geoenvironmental engineer. Records, including photographic evidence, are to be retained for review, as required.

The number of validation pits required will be based on a grid system. A 30m grid across the areas of new/modified landscaping will be adopted.

4.3 Validation Laboratory Testing and Assessment

It is proposed that the validation laboratory testing for imported or site-won soil materials to be used in the redevelopment should include for the following standard suite of tests:

Metal suite, pH, SOM, total TPH, total PAH and asbestos.

Appropriate Soil Guideline Values (SGVs) are then to be used as criteria to confirm that the sampled soil materials meet the chemical requirements.

4.4 Validation Reporting

Upon completion of the remediation works described in this document, a Validation Report is to be prepared to include details of the works undertaken, presenting factual data and records such as laboratory test results, site visit records, and photographic evidence. The Validation Report is to assess conformity and demonstrate compliance of the implemented remedial measures with the requirements set out herein. The Validation Report should then be submitted to the Planning Local Authority for their review and approval / comments.

5 CONCLUSIONS

A site located in the Chorlton-cum-Hardy district of Manchester is to be redeveloped as a new leisure centre and associated facilities. As a result of the findings of a development-specific ground investigation and to satisfy a condition of the Planning Application, a Remediation Strategy for the development has been prepared. The approved Remediation Strategy is to be implemented to mitigate geo-environmental risks in relation to the intended end use.

The scope of the geoenvironmental remedial actions, which forms the Remediation Strategy for the development, can be summarised as follows:

- Remediation (via delineation and placement of a marker and capping layer) of the near-surface Made Ground at and around TP7 found to be impacted by asbestos; this will involve further sampling and testing to delineate the impacted zone, with the assistance of an asbestos specialist;

- Contingency for encountering elsewhere at the site, during the redevelopment ground works, ground that is locally compacted with contaminants such as further asbestos-containing matter, hydrocarbons or similar; this will involve communications between Laing O'Rourke and Coffey, site visits at appropriate times (e.g. during site clearance, and if/when suspect ground conditions are encountered, and may necessitate further sampling and laboratory testing, with additional assessment and provision of recommendations);

- Sorting, segregation and possibly additional testing of site-won soil materials, particularly if such are to be re-used in the redevelopment (e.g. as uncontaminated capping soils in new/modified landscaped areas).

- If placement of the marker and hardstandings / uncontaminated fill is proved unfeasible due to the extent of the ground affected by asbestos, the asbestos-impacted soils should be excavated out (to a maximum depth of 600mm below finished levels), segregated and removed to landfill. Such works will need to be carried out under the supervision and direction of an Asbestos Specialist as described in Section 3.3.

The effective implementation of the above remedial actions are to be independently documented, and presented in a Validation Report for the remediated development, The Validation Report will include details of the works undertaken, factual data and records such as laboratory test results, site visit records, and photographic evidence.

REFERENCES

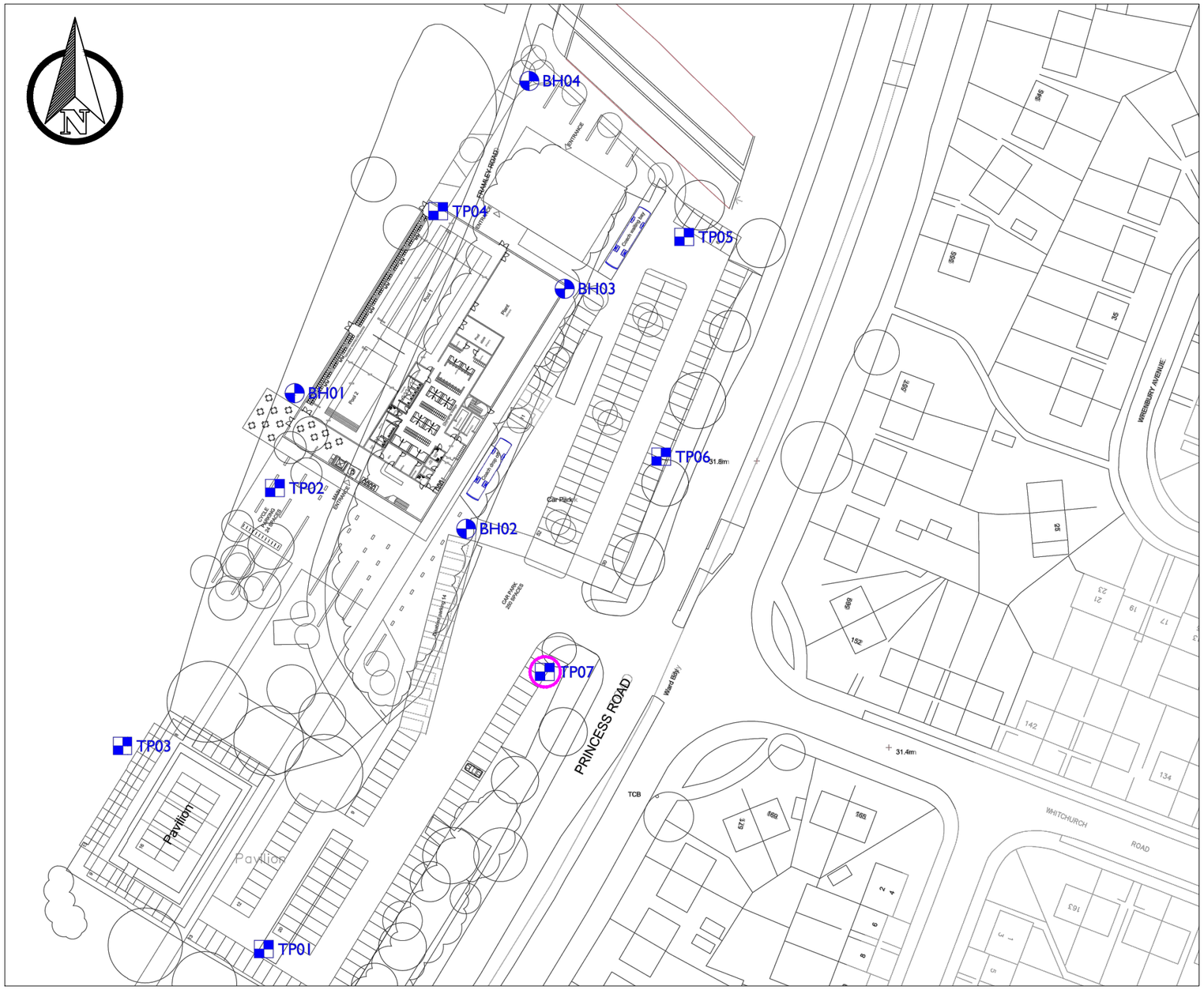
1) Geo-environmental and Geotechnical Desk Study, Hough End Leisure Centre, Manchester. Prepared by Coffey Geotechnics on behalf of BDP (September 2013).

2) Final Ground Investigation Report, Hough End Leisure Centre, Manchester. Prepared by Coffey Geotechnics on behalf of BDP (November 2013).

3) Planning Application Rev. A – 104518/VO/2013/S1 (13th February 2014).

4) Verification of Remediation of Land Contamination – Environment Agency Report: SC030114/R1 (February 2010).

Figures



Key:

- Borehole
- Trial Pit
- Asbestos Identified

Hole ID	Easting (mE)	Northing (mN)	Level (m OD)
BH01	383718.338	393310.179	31.066
BH02	383755.587	393280.697	31.205
BH03	383777.003	393332.862	31.175
BH04	383769.317	393378.085	30.793
TP01	383711.623	393189.294	30.973
TP02	383713.993	393289.565	31.211
TP03	383680.796	393233.501	30.931
TP04	383749.489	393349.751	31.073
TP05	383802.98	393344.178	31.405
TP06	383797.997	393296.392	31.659
TP07	383772.693	393249.621	31.579

Notes:

drawn	DT
date	27.02.14
scale	1:1000
original size	A3

coffey

client: LAING O'ROURKE LIMITED

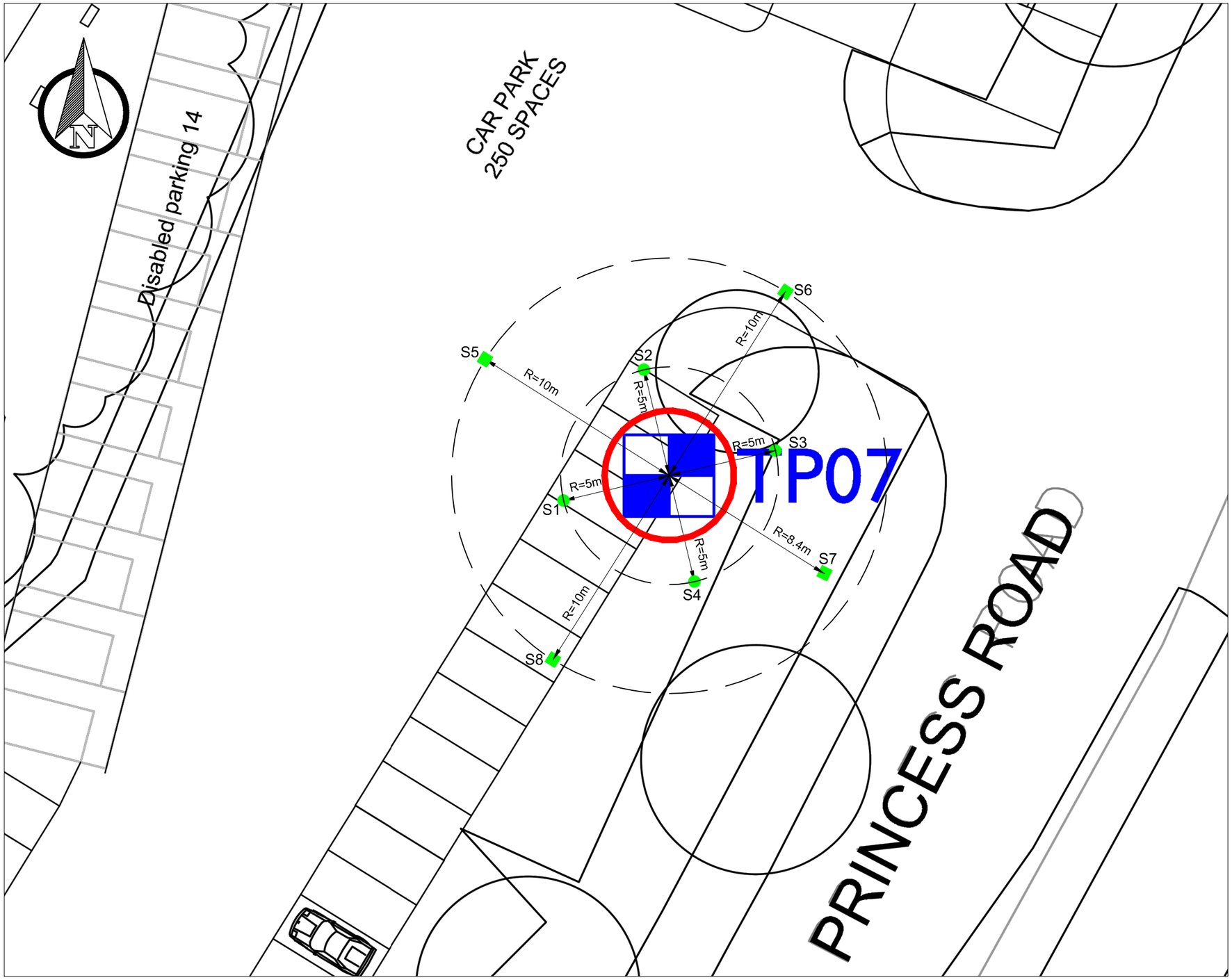
project: HOUGH END REMEDIATION

title: EXPLORATORY HOLE LOCATION PLAN

project no: 02108AB

fig no: FIGURE 1

E-file Ref : F:\GEOT\Current Server Data\Server_2100.Done\02108AB Hough End Remediation\Drawings\1 - CWD\02108AB_D2_01_DT_EXPLORATORY HOLE LOCATION PLAN.dwg



Key:

- Trial Pit
- Asbestos Identified
- Additional Sampling Locations (5m Radius)
- Additional Sampling Locations (10m Radius)

Notes:

drawn	DT
date	27.02.14
scale	1:200
original size	A3

coffey

client:	LAING O'ROURKE LIMITED
project:	HOUGH END REMEDIATION
title:	ASBESTOS DELINEATION GRID: PROPOSED ADDITIONAL SAMPLING LOCATIONS
project no: 02108AB	fig no: FIGURE 2

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SPECIALISTS MANAGING THE EARTH

GEO-ENVIRONMENTAL AND GEOTECHNICAL DESK STUDY

BDP Limited
Hough End Leisure Centre, Manchester

02108AA_R_001A_RS-Desk Study
20th September 2013

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Document Verification

Job title	Hough End Leisure Centre, Manchester		Job number 02108AA
Document title	Geo-Environmental and Geotechnical Desk Study		File reference
Document ref	02108AA_R_001A_RS-Desk Study		

Issue No	Date				
1	20/09/13	Filename	02108AA_R_001A_RS-Desk Study		
		Description			
			Prepared by	Checked by	Approved by
		Name	Ralph Sibley	Eugene Gallagher	Eugene Gallagher
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
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		Signature			

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Figure 1: Site Location Plan

Figure 2: Proposed Development

Figure 3: Proposed Development with Historical Pond Locations

Figure 4: Proposed Exploratory Hole Locations

Appendices

Appendix A: Envirocheck Report

Appendix B: Historical Maps (Envirocheck)

Appendix C: Geology Data Sheets (Envirocheck)

Appendix D: BGS Borehole Logs

Appendix E: Coal Authority Report

Appendix F: Preliminary UXO Risk Assessment (Envirocheck)

Appendix G: Service Drawings

1 INTRODUCTION

This report relates to the proposed construction of a new Leisure Centre development, at Hough End Fields, off Princess Road to the south of Manchester. The location of the site is shown on Figure 1.

Coffey Geotechnics Ltd (Coffey) was appointed by BDP Limited by email dated 9th September 2013, following a proposal by Coffey dated 1st August 2013, to carry out a desk study and ground investigation at for the proposed Hough End Leisure Centre. This report comprises the Desk Study element of the service provision. Site descriptions have been based on observations made during a site inspection and walkover study, undertaken in September 2013, and from available published information, together with data supplied by BDP.

The site is currently occupied by a (mainly) single-storey sports pavilion (changing facilities) which includes a small second-storey element inferred to be a plant room or similar. The proposed new development is to comprise a new two-storey building with a swimming pool, changing village, plant area, squash courts, and reception at ground floor, and with fitness suite, dance hall, and dry changing facilities at 1st floor level. The proposed ground investigation is for the new building and car park, and therefore these are the areas which are considered in this report. Details of the proposed development were obtained from the Site Investigation Brief (Ref. 1) provided by BDP.

The layout of the proposed development is shown on Figure 2.

This report presents the findings from the review of the available geological, hydrogeological, hydrological, historical and environmental information for the site. It presents initial guidance on environmental and human health risks associated with the existing site and proposed development. An evaluation of ground conditions and geotechnical constraints is also provided, including advice on preliminary foundation design. It is noted that any assessment of ground conditions and parameters at this stage is subject to verification by implementation of a full ground investigation. Recommendations are given for the proposed intrusive ground investigation to assist design of the new development.

2 THE SITE

2.1 Site Location

The site is located in the Chorlton-cum-Hardy district of Manchester, centred on National Grid Reference SJ 837 932. The site is approximately square, measuring about 0.8 hectares in plan area and accessed from off Princess Road to the southeast. Figure 1 shows the site location.

2.2 Site Description

A walk-over survey was carried out on the 11th September 2013 and the site description is based on observations made during this, together with maps of the site and surrounding area obtained from the Landmark Information Group ("Envirocheck" data). A copy of the Envirocheck data for the site, as obtained by BDP and provided to Coffey, is provided in Appendix A.

The site is bounded by a landscaped/wooded zone to the southeast, beyond which is a section of Princess Road (the A5103). To the northeast is an area of asphalt-surfaced hard-standing, which extends onto the south-eastern section of the subject site. To the southwest and northwest the site is bounded by the grounds of the Hough End Fields playing fields. Other than the margin of the highway to the southeast, site boundaries were not demarcated at ground level.

As previously indicated, an existing sports pavilion is located in the northern quadrant of the site; this is surrounded by asphalt/paved hard-standing providing pedestrian access to all sides. The south-eastern section of the site is mainly surfaced with asphalt hard-standing, with vegetated landscaping features, and is used for vehicular parking. The south-western section of the site is vegetated, including areas of trees/bushes, and includes part of an existing sports pitch. Some low mounds of soil (possibly topsoil or similar) were observed to be stockpiled in the southern corner of the asphalt hard-standing, in the south-eastern section of the site.

In terms of topography the site was observed to be ostensibly flat with ground levels appearing to reduce very slightly from east to west. No significant slopes or existing retaining structures were observed at or bordering the site.

The proposed development comprises two areas, the leisure centre building and the proposed car park area (Figure 2). The leisure centre building is to be located in the south-eastern half of the site and is roughly rectangular in shape, measuring 70m (reducing to 61m) long by 35m wide. The proposed new car park is to be located in the north-western half of the site and is similarly rectangular in plan shape. Access to the proposed development is to be gained from off the existing asphalt-surfaced hard-standing area located to the northeast of the site.

2.3 Historical Review of the Site and Surroundings

Information regarding the history of the site and the surrounding area was determined from a review of historical map extracts obtained as part of the Envirocheck data; these historical maps are reproduced in Appendix B. In addition, reference has been made to information presented in a Site Appraisal report prepared by BDP (Ref.2).

Map date	Scale	Onsite features	Nearby features
1848	1:10,560	2 ponds are depicted at/close to the south western boundary of the site. Remaining site area is shown to have been undeveloped (open fields).	The site was surrounded by several open fields, with a track to the immediate southeast. Red Lion Brook flowing southeast to northwest was depicted approximately 200m to the north east of the site.
1894	1:2,500	No significant changes at the site.	Manchester South District Line (railway) was shown approximately 250m southwest of the site.
1894-1895	1:10,560	No significant changes at the site.	Manchester Central Station Line was shown approximately 400m north of the site. Alexandra Park Station which is on the Manchester South District Line was located approximately 600m north west of the site. Residential and commercial developments had been constructed on land approximately 500m to the south east of the site. A hospital and Chorlton Union Workhouse were located approximately 700m south of the site.
1908-1911 **1911** **1922** **1923**	1:10,560 1:10,560 1:2,500 1:10,560	No significant changes at the site.	No significant changes in the surrounding area are depicted on the OS maps; however, BPD information indicated that the site formed part of the Alexandra Park Aerodrome; this was operational between 1918 and 1924, and the main aerodrome buildings were located to the northwest.
1934	1:10,560	The two ponds previously located on site were no longer depicted	Princess Road had been constructed immediately southeast of the site The former aerodrome to the north/west was labelled as Hough

			End Playing Field. Manchester Central Station Line was entitled London & North Eastern Railway on this edition. Mauldeth Road West had been constructed approximately 500m to the north of the site. Manchester South District Line was entitled London Midland & Scottish Railway on this edition. The hospital located to the south of the site is entitled Withington Hospital. Substantial residential and commercial development had occurred in the site vicinity
1938	1:10,560	No significant changes at the site.	No significant changes depicted in the surrounding area.
1951-1958 **1952-1958** **1955**	1:2,500 1:2,500 1:10,560	No significant changes at the site.	Extensive residential development had been constructed to the north between the site and the Mauldeth Road West. This included Framley Road immediately north of the site. Buildings are depicted in the area of the former aerodrome hangers approximately 500m to the north west of the site.
1965-1966	1:10,000	No significant changes at the site.	No significant changes depicted in the surrounding area.
1975	1:25,000	An undefined building is depicted within the site demesne.	The residential development previously depicted north of the site is shown to have been removed (demolished and cleared) on this edition.
1951-1986 **1961-1983**	1:1,250 1:1,250	The building is labelled as a pavilion on these editions.	Framley Road and Red Lion Brook are still depicted on these editions.

1981-1985	1:10,000	The car park at the site, and extending to the northeast, was established in its current configuration.	The London Midland & Scottish Railway to the south west is shown to have been dismantled by these dates.
1989 **1992** **2006** **2013**	1:10,000 1:1,250 1:10,000 1:10,000	No significant changes at the site.	No significant changes depicted in the surrounding area.

In summary, the site was undeveloped land (which included two field ponds) in the mid to late 19th Century. In the early 20th Century the site area formed part of the Alexandra Park Aerodrome; this was only operational between 1918 and 1924 (with the main aerodrome buildings located to the northwest). By 1934 the aerodrome became Hough End Playing Fields, the ponds were in-filled and Princess Road was established to the southeast of the site. Residential development occurred to the northeast of the site by 1955, but was subsequently demolished and cleared by 1975, by which date the current pavilion was built. The adjacent car park was constructed and the site's current configuration attained by 1982. Since this date no further significant changes at or adjacent to the site are indicated.

2.4 Services

Using service plans obtained and provided by BDP, and reproduced within Appendix G, a check of the site for underground services has been carried out. These may impact both construction of the proposed development and the proposed ground investigation (see Figure 4 and Section 7).

The service plans indicate the presence of the following underground services on/adjoining the site:

- Telecommunications plant along the south-eastern site boundary (BT)
- High and low voltage electricity cables along the south-eastern site boundary, and low voltage supplies extending onto the site from that boundary serving the existing pavilion along its south-western margin (Electricity North West Ltd)
- Street lighting electricity supplies along the south-eastern site boundary (Manchester City Council)
- Public drains and water supplies along the south-eastern site boundary, with one distribution main apparently extending onto the site's eastern corner (United Utilities Ltd).

Given the developed nature of the site, it is considered likely that the existing building is served by a suite of utilities (gas, electricity, water, drainage and possibly telecoms). It is noted that the plans provided do not guarantee the exact locations of the services. In addition, the existence/locations of private services may not necessarily be recorded. However, due allowance for the presence of such should be made during ground investigation works, and subsequent construction ground works.

2.5 Environmental Incidents and Records

Enquires to an information database (Envirocheck, Appendix A) for records of landfill sites and other environmentally sensitive issues indicate the following:

Licensed Landfills – No known/recorded currently-operational landfills have been identified within 1000m of the site.

Previously Licensed Landfills – No known/recorded non-operational landfill sites have been identified within 1000m of the site.

Waste treatment and transfer sites – No known/recorded Environment Agency waste treatment, transfer or disposal sites within 1000m of the site.

Pollution incidents – No known/recorded on-site pollution incidents have been identified. One recorded pollution incident (to controlled waters) has been identified within a 250m radius, and relates to "chemicals other organic" at the Chorlton Brook, 190m to the north. It is classified as Category 3 (minor impact). Five more have been identified within a 500m radius; one of these was a Category 2 significant impact, the remainder were Category 3. Seven further recorded pollution incidents have been identified within 1000m of the study site.

Radioactive substances – No Registered Radioactive Substances have been identified within a 500m radius of the site; four have been identified within 1000m, all relating to the South Manchester University Hospitals located 900m to the south. These licences have now been revoked.

Dangerous or hazardous sites – No known/recorded Dangerous or Hazardous Substances sites have been identified within 1000m of the site.

Fuel sites – No known/recorded fuel stations have been identified within 500m of the site; four have been identified within 1000m, the closest being 560m northwest.

Trade uses – No potentially contaminative industrial sites have been identified within 250m of the site, but two (both inactive) are within 500m; these related to servicing/repair of washing machines (265m southeast) and carpet, curtain and upholstery cleaners (495m southeast).

Environmentally sensitive sites – No known/recorded environmentally sensitive sites (e.g. sites of special scientific interest) have been identified within 1000m of the site.

2.6 Ordnance Risk Assessment

A Preliminary Unexploded Ordnance (UXO) Risk Assessment for the subject site has been obtained by BDP from 6 Alpha Associates Ltd, via Envirocheck, and is reproduced in Appendix F.

This document concludes that the UXO probability assessment has a rating of 5, indicating a medium possibility of a UXO encounter. The Borough, within which the site is located, sustained 26 high explosive bomb strikes per 1000 acres, a moderate bombing density. Although no primary bombing targets were identified in the vicinity, nearby railway infrastructure could have been targeted opportunistically. Several incendiary bomb strikes were recorded within 100m of the subject site. Given that the site was undeveloped during WWII it is possible that bomb strikes and UXO could have gone unnoticed.

Therefore, the UXO report concludes that further investigation into the UXO threat is required, and further action is needed to address the level of UXO risk. Accordingly, a detailed UXO Risk Assessment is recommended.

For an independent review, Coffey has consulted the "Index of Online Manchester Bomb Damage Records" (Ref. 3). This confirms that 4 bomb strikes (inferred to be incendiary bombs) were recorded within 100m, all to the east of the site on the opposite side of Princess Street. Several other bomb

strikes were recorded at greater distances to the south of the site, but again on the south-eastern side of Princess Street. No bomb strikes were recorded within the demesne of Hough End Playing Fields.

From the foregoing, the risk of encountering UXO at the subject site during the ground investigation and/or subsequently during construction of the development cannot be discounted, and we concur that a detailed UXO Risk Assessment should be instigated. In addition, the ground investigation contractor should be made aware of the risk relating to potential UXO at the subject site, and should take appropriate precautions during their activities, to mitigate risks.

3 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

3.1 General

This section includes a review of the geological, hydrogeological, hydrological and ground land use data obtained through available published sources.

3.2 Geology

The following publications of the British Geological Survey were examined with reference to the geology underlying the site:

- 1:50,000 Scale Geological Sheet 98 – Stockport (Solid and Drift editions) (Ref. 4 and 5)
- 1:10,560 Scale Geological Sheet SJ 89 SW (Ref. 6)

In addition, BDP has obtained and provided site-specific Geology Data Sheets, as part of the Envirocheck information. These are reproduced in Appendix C.

Given the developed nature of the site, deposits of Made Ground are inferred to exist, overlying the natural geology.

The geological data show that the natural drift underlying the site are granular Glaciofluvial Sheet Deposits. In the site area deposits of (predominantly cohesive - Glacial) Till are depicted, and from our experience are likely to underlie the Glaciofluvial Sheet Deposits. The records also indicate (Recent/Post-Glacial) Alluvium and Shirdley Hill Sand in the site area (to the northwest and northeast respectively); neither is likely to underlie either the Glaciofluvial Sheet Deposits or Till beneath the subject site.

The solid geology beneath the site is shown to be Permo-Triassic strata of the Wilmslow Sandstone Formation (Sherwood Sandstone Group), comprising predominantly sandstones. In the site area, these strata generally dip to the southwest at shallow to moderate angles.

No known/recorded geological faults or similar have been identified at or close to the subject site. However, the possibility of minor geological faulting cannot be totally discounted.

The nearest recorded major fault to the site is located some 500m to the northeast; it trends northwest to southeast and has a down-throw to the southwest.

There are no BGS records of boreholes on the site. The closest boreholes for which records have been obtained were located approximately 505m northwest and 490m southwest of the site, and were drilled to depths of 81m and 12.19m respectively. The former provides very little information, while the latter (two boreholes) show the ground at that location to consist of topsoil over medium dense gravelly sands underlain by soft to firm or firm to stiff clay. Competent rock was not proven in any of these boreholes. Copies of the borehole records are provided in Appendix D.

3.3 Hydrogeology

According to the Envirocheck Report, Page 7 (Appendix A) the bedrock is designated as a Principal Aquifer, while the overlying superficial deposits are designated as a Secondary A Aquifer. Principal Aquifers are described by the EA (Ref. 7) as:

"… layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer"

The site is also classified as having "Unknown" leaching potential (due its urban location – therefore inferred to be High vulnerability, until/unless proven otherwise) described by the EA (Ref. 8) as:

"Soils of high leaching potential (HU) are soils with little ability to attenuate diffuse source pollutants and in which non-absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or shallow groundwater"

Details of licensed abstractions and protection zones have been obtained as part of the Envirocheck Report (Appendix A).

The site is not within or close to (within 500m of) any currently-defined EA Source Protection Zone.

No known/recorded licensed groundwater abstractions have been identified within 1000m of the subject site.

3.4 Hydrology

Details of the local hydrology have been obtained via inspection of topographical maps and through the information database as provided in the Envirocheck Report (Appendix A).

The nearest known/recorded surface watercourse to the site is the west-flowing Red Lion Brook, which is located approximately 180m north of the site, and becomes the Chorlton Brook to the north west of the site. There is an EA river quality sampling point on this watercourse 747m northeast of the site. The latest reported results (2000-2009) show it has a biological grade of D (Fair) and a chemical quality grade of B (Very Good).

The site is not indicated to lie within or close to any Environment Agency Indicative Flood Zones. Several Zone 2 areas are indicated some 400m west of the site. One Zone 3 area is indicated some 500m west of the site; Zone 3 is defined as:

"Zone 3 estimates the annual probability of flooding as 1 in 100 (1%) or greater from rivers and one in two hundred (0.5%) or greater from the sea."

No known/recorded licensed surface water abstractions have been identified within 1000m of the site.

3.5 Mineral Extraction

A site-specific report has been obtained from the Coal Authority and is reproduced in Appendix E. From this, the following summary can be made:

- The Coal Authority Report indicates the site is not in the zone of likely physical influence on the surface from past underground workings.
- The site is not in the likely zone of influence of any present or future underground coal workings.
- There are no known coal entries within, or within 20m of, the site boundary.
- The site is not within the boundary of past, present or future opencast sites.

- The site lies outside the Cheshire Brine Compensation District.

See Appendix E for full details of the Coal Authority Report.

Based on the foregoing, and from consideration of the underlying geology, risks to development at the site of ground movements/subsidence relating to coal or brine extraction activities can be discounted.

3.6 Radon

According the BRE publication BR211, Report: Guidance on Protective Measures for New Dwellings (England and Wales) 2007 (Ref. 9), the site does not lie in an area where protective measures against radon gas are required.

4 ENVIRONMENTAL CONSIDERATIONS

4.1 General

Sections 2 and 3 provide site-specific information regarding potential environmental considerations during ground investigation and construction. Some environmental considerations raised by the information identified for the site are discussed below. In accordance with BDP's Site Investigation Brief a fully-detailed, "contaminated land" conceptual model and risk assessment (environmental and human heath) is not required at the desk study stage.

For the purpose of this report, the proposed end use of the site comprises a leisure centre development and a car park. The proposed ground investigation is focussed in the areas of the intended new building and car park. Typical receptors in this context will be construction workers, end users (leisure centre users and maintenance staff), controlled waters and ecology (vegetation in landscaping).

4.2 Potential Contamination Sources

As summarised above, the site and areas surrounding the site have undergone an historical progression from undeveloped farm land (with field ponds) to the recent/current land use as playing fields with a sports pavilion and areas of hard-standing for vehicle parking. It is noted that:

- Sections of the site never appear to have been developed; however these included field ponds which were presumably in-filled (prior to 1934) with unknown, potentially contaminated materials. In addition, such features can have the potential to generate hazardous ground gas, due to entrained organic/degradable materials.
- It is possible that contaminants associated with the recent use as a sports pavilion/car park could be present on the site. Such contaminants could include hydrocarbons/similar used for heating purposes (if the sports pavilion may have had some form of on-site fuel powered heating system) and/or resulting from accidental spillages/leakage of hydrocarbons from vehicles in the parking areas, or possibly historical fly-tipped wastes.

There is likely to be Made Ground beneath the developed area of the site. Historically, coal ash and clinker was a common component of Made Ground and are often associated with toxic/phytotoxic elements, sulphates and poly-aromatic hydrocarbons (PAH) contamination.

4.3 Other Geo-Environmental Matters

- The site is underlain by a Secondary A (superficial) and Principal (bedrock) Aquifer with soils of unknown, inferred to be high, leaching potential.
- The proposed redevelopment site lies outside of any Environment Agency Indicative Flood Zone 3 areas.
- There is indicated to be "Medium" possibility of UXO encounter at the subject site.

4.4 Preliminary Identification of Risks

The overall risk to human health, with the exception of construction site workers, is likely to be low. Once the development is complete it is assumed that the surfacing will be predominantly hard-standing (with limited soft landscaping areas) and will therefore prevent direct contact with the underlying ground.

The risk to site workers from toxic/phytotoxic elements and hydrocarbons may be higher than that quoted above due to the closer proximity of staff to potentially contaminated ground conditions during site works. It is likely that these risks may be controlled by appropriate PPE during ground works' activities. However, further assessment after site-specific testing is recommended.

The in-filled former ponds could include localised contaminants and represent potential sources of hazardous ground gas, and the proposed building may require measures to protect from such ground gas.

On the basis of the site history, current features and observations made during the site inspection, gross/site-wide mobile ground contamination sources are considered unlikely to exist. Therefore, the site is considered unlikely to pose a significant pollution risk to controlled waters (either groundwater or surface water). Accordingly, groundwater remediation is not anticipated to be required for the proposed development. This needs to be confirmed by further assessment following the ground investigation.

Excavation and removal of existing foundations and site clearance will also present risks to site workers. Care should be taken during development to ensure that all excavations are adequately supported and drained. Removal and disposal of what could be contaminated ground materials will need consideration.

5 PRELIMINARY GROUND MODEL

5.1 General

Information on the ground conditions at the site is available through the geological map for the site (Refs. 3, 4 and 5) and publicly available borehole records obtained through the British Geological Survey (BGS).

There are no BGS borehole records located within the site boundary. The closest detailed borehole records to the site are approximately 490m southwest of the site. These are reproduced in Appendix D.

The sparse nature of the information available, and the distance from the site in question, means that all interpretation of the ground conditions at this stage is highly speculative. Guidance given in this report, which is based on this information, should be considered indicative only and will be subject to change after site specific information is obtained from the proposed ground investigation.

The geotechnical test results from the BGS boreholes in Appendix D are presented (in tabulated form, where appropriate) using the following abbreviations: SPT = Standard Penetration Test N value; c_u = undrained shear strength; c' = effective shear strength; φ_u = undrained angle of frictional resistance; φ' = angle of frictional resistance; γ = unit weight.

Generally, equivalent c_u may be calculated from a SPT N value by the expression: $c_u = N * f$, where f is a correlation coefficient derived from plasticity data based on the curve proposed by Stroud (Ref 10).

5.2 Ground Model

A summary of the information on strata obtained from the BGS boreholes is shown in Table 5-1. The boreholes were both formed to depths of 12.19m below ground level.

Table 5-1: Summary of available ground information

Stratum	Description	Depth to Base (m)		Thickness (m)	
		Min.	Max.	Min.	Max.
Topsoil/Made Ground	Topsoil only encountered in the BGS boreholes; Made Ground likely to exist at the subject site.	0.45	0.60	0.45	0.60
Glaciofluvial Sheet Deposits	Medium dense poorly graded slightly gravelly medium to coarse SAND	4.57	4.57	3.97	4.12
Glacial Till	Soft to firm and firm to stiff brown slightly sandy, slightly gravelly CLAY with silt lenses	Not proven	Not proven	At least 7.62	At least 7.62
Weathered Bedrock	Wildmoor Sandstone Formation	Not proven	Not proven	N/A	N/A

Groundwater entries were not recorded in the boreholes, and water was added (to assist hole formation) within the granular Glaciofluvial Sheet Deposits. In the absence of any site-specific information, it has been assumed that the Glaciofluvial Sheet Deposits could be water-bearing, in which case perched groundwater at the subject site would be shallower than 4-5m below ground level.

This information has been used to produce a preliminary ground model for geotechnical preliminary design purposes. Conservative maximum depths of Made Ground have been inferred. Ground water has been taken at 2-3m below ground level.

The information from the BGS boreholes is consistent with the published geological information for the site.

Table 5-2: Preliminary Ground Model

Stratum	Description	Depth to Base (m BELOW GROUND LEVEL)
Topsoil/Made Ground	Granular soils (sub-base to hard-standing) could include ash and clinker fragments. In-filled former ponds may include low strength/compressible, possibly organic cohesive deposits	1.0 (could be deeper, say 3.0 in former pond areas)
Glaciofluvial Sheet Deposits	Medium dense silty/gravelly sand	5.0
Till	Soft to firm, becoming stiff, variably sandy/ gravelly clay	Not proven
Bedrock	Sandstone	Not proven

5.3 Description of Materials

The Made Ground across most of the site is inferred to be granular (sub-base type materials beneath the existing hard-standing areas) and could include fragments of ash, clinker and similar. This is consistent with the historical use of ash and clinker as fill. A unit weight for this material of 18kN/m^3 has been adopted for the preliminary foundation design. Topsoil is likely to exist at ground level in other areas. The in-filled ponds could include low strength/compressible cohesive soils which may be organic or include peat horizons. Other engineering properties of these materials have not been assigned as it would be prudent not to rely on any benefit from such for foundation design.

Glaciofluvial Sheet Deposits were encountered beneath the Topsoil and consist of medium dense gravelly sand. SPT N values for this layer range from 14 to 18 with an average value of 16. A conservative design SPT N value of 15 has been selected for the preliminary foundation design. Due to the granular nature of this layer it has been assumed that, under loading, it will behave in a drained manner. Selected preliminary design parameters for this soil layer are; unit weight, γ = 20kN/m^3; angle of frictional resistance, φ' = 32°; and zero cohesion (i.e. c' = 0kN/m^2).

The Glacial Till is described as soft to firm and firm to stiff brown slightly sandy/gravelly clay with occasional silt lenses. This layer was encountered in both of the boreholes below 4.57m depth. Triaxial test results for this lithology give deviator stress values ranging from 51 kN/m^2 to 213 kN/m^2 with an average value of 115 kN/m^2. For the purpose of the preliminary design the soil has been assumed to behave in an undrained manner due to its clayey nature. Assumed design parameters for this layer are γ = 18kN/m^3, c_u = 55 kN/m^2 and φ_u = 0°. A c_u value of 55 kN/m^2 is consistent with "firm clay" which is appropriate for this lithology at relatively shallow depths.

Bedrock was not proven in either borehole.

The parameters selected for preliminary design are summarised in Table 5-3.

Table 5-3: Summary of Ground Parameters

Stratum	Ground Parameters				
	Unit Weight, γ (kN/m^3)	**Assumed SPT N Value (blows/300mm)**	**φ' (˚)**	**c' ($kN/m^{2)}$**	**c_u (kN/m^2)**
Made Ground	18	N/A	N/A	N/A	N/A
Glaciofluvial Sheet Deposits	20	15	32	0	N/A
Till	18	N/A	N/A	N/A	55

6 GEOTECHNICAL CONSIDERATIONS

6.1 General

Preliminary geotechnical advice is required for the design of the foundations to the new development at Hough End Leisure Centre. The proposed development includes a two-storey building with swimming pools and (presumably) relatively widely-spaced structural elements to create large open-plan areas. From the inferred ground conditions, it is anticipated that shallow spread foundations may be feasible. Preliminary foundation design recommendations are given below. Due to the sparse nature of the information available on ground conditions the preliminary foundation design is subject to verification by completion of a ground investigation.

Further considerations include temporary excavations and site drainage.

6.2 Proposed Development

For the purpose of this Desk Study the proposed development comprises the construction of a leisure centre building and new car parking areas.

At this stage, preliminary loads for the proposed development have not been provided. However, to accommodate the swimming pool tank, it has been indicated that excavations to depths in the order of 2.50m below ground level will be required.

6.3 Preliminary Foundation Design Recommendations

Preliminary foundation design has been undertaken based on the ground model described in Section 5.

Made Ground is likely to be unsuitable for the support of any major structure, owing to the risk of excessive total and/or differential consolidation settlements resulting from the loading of such strata. Therefore, foundation pressures should be taken through Made Ground to the underlying (competent) Glaciofluvial Sheet Deposits. It should be feasible to design shallow spread foundations, taken into these strata on the basis of a (preliminary) presumed net bearing pressure of 150 kN/m^2. Once more information is available regarding the loading requirements of the building (and the site-specific ground conditions) the foundation details can be refined to provide an optimum design solution.

The Glaciofluvial Sheet Deposits are anticipated to be encountered at relatively shallow depths below ground level (i.e. no more than 1.0m). However, within the areas of the in-filled former ponds, the depths to “competent” natural bearing strata are likely to be greater, possibly in the order of 3-4m below ground level. Hence, as part of the proposed ground investigation, the locations of the former ponds need to be determined in order to establish if they will impinge on the proposed new building footprint. If this is found to be the case, it may be sensible to adjust the building location in order to avoid impinging on the former ponds. If that is not feasible, it is likely that foundations would need to be taken to greater depths (via trench-fill or similar) to penetrate through the Made Ground to the competent natural strata.

Alternative foundation solutions, such as ground improvement and/or piled foundations would also be feasible, but are not considered in detail, at this stage, as they are unlikely to be as cost-effective as shallow spread foundations.

If it can be confirmed that the proposed building footprint will not impinge upon the former pond locations, it should be feasible to utilise a ground-bearing floor slab for the leisure centre.

With regard to the proposed swimming pool, if its base is set at a depth in the order of 2.50m below ground level, this is inferred to be founded entirely within the Glaciofluvial Sheet Deposits. Given that such strata are granular and underlain by cohesive Till, they could be water-bearing. Therefore, the design and construction of the swimming pool will need to take into account groundwater conditions, both during construction and in relation to long-term performance. In the short-term (during construction) groundwater control measures (dewatering) may be required during the excavation to build the swimming pool. The pool will also need to be suitably tanked/waterproof, both to contain water, and also to keep out groundwater. Furthermore, the design and construction may need to include measures to counter uplift groundwater forces (buoyancy), particularly when the pool is emptied for cleaning/maintenance.

As stated in Section 6.1 the foregoing preliminary design recommendations are based on limited geotechnical information and are subject to verification by completion of an appropriate ground investigation.

7 SUMMARY AND RECOMMENDATIONS

7.1 Summary

Based on the findings of this Desk Study for the Hough End Leisure Centre the following conclusions are presented:

- The site is recorded as being underlain by drift deposits comprising granular Glaciofluvial Sheet Deposits, beneath which is cohesive Till. The underlying solid strata are of the Wilmslow Sandstone Formation.
- Service plans show there to be underground on-site services, which may interfere with the location of the proposed exploratory holes and subsequent development.
- In consideration of the historical use and development of the site it is possible that there could be some form of on-site ground contamination. Potential contamination sources could include toxic/phytotoxic elements, sulphates and/or PAHs (associated with ash and clinker fill), possibly hydrocarbon contamination (oils/lubricants relating to on-site heating systems or spillages in current parking areas) and materials used to infill the former on-site field ponds, which could also represent sources of hazardous ground gas. These will be investigated during the ground investigation.
- Using the information available, a preliminary ground model was developed and is shown in Table 5-2. A preliminary foundation assessment and design was carried out based on this ground model. Shallow spread foundations, designed on a (preliminary) presumed net bearing pressure of 150 kN/m^2 may be feasible for the proposed building. The locations of the former ponds may need to be confirmed to ensure they do not impinge on the proposed building. Otherwise, foundations may need to be locally deepened, or the proposed building position adjusted.
- The base of the swimming pool (2.50m below ground level) is inferred to be within the Glaciofluvial Sheet Deposits. Its design and construction will need to take into account of groundwater conditions. During construction, groundwater control/dewatering may be required to keep the excavation dry. The design and construction may need to include measures to counter uplift groundwater forces (buoyancy), particularly when the pool is emptied for cleaning and maintenance.

7.2 Recommendations

- Coffey (1st August 2013) initially proposed a ground investigation comprising 4 No. boreholes (with gas/groundwater monitoring installations), 4 No. trial pits (with in situ soakaway tests) and 4 No. in situ CBR tests. The desk study has revealed the presence of in-filled former ponds, close to the proposed new building and car park. Accordingly, we consider that an additional 2 No. trial pits should be excavated in suitable locations to determine if the in-filled ponds intersect the new building and car park. Proposed locations of exploratory holes are shown in Figure 4.

  In order to avoid contact with any underground services, it is recommended that the positions of the boreholes and trial pits should be agreed after completion of a CAT scan at the start of the

ground investigation. It is suggested that a 'backup' location for each exploration hole is also agreed on site prior to excavation of hand dug pits and subsequent drilling in the event of uncovering any unidentified services at the preferred location during excavation of the pits.

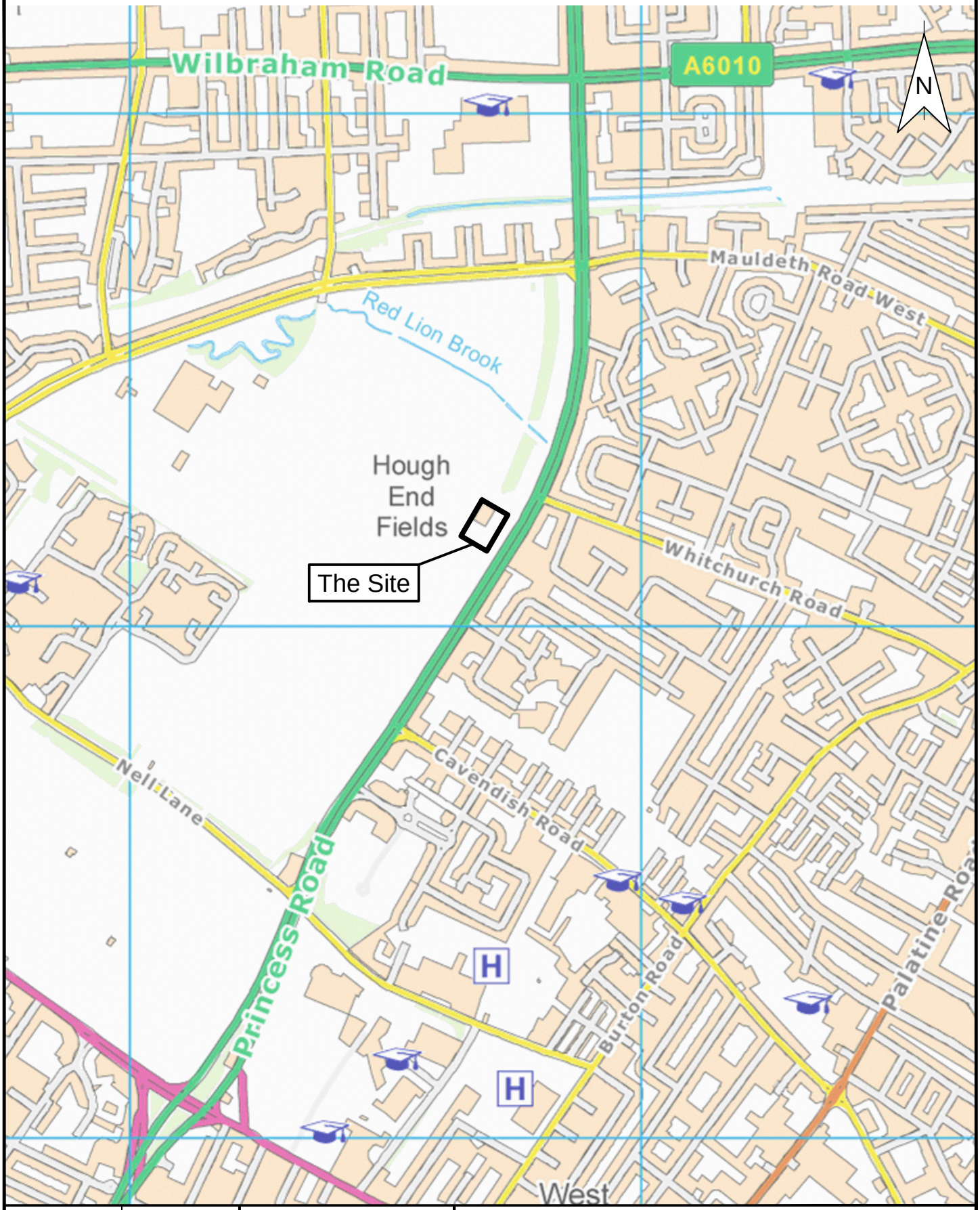
- Potential contaminants identified in section 4.2 of this report should be tested for during the ground investigation to inform a geo-environmental appraisal at interpretation stage. No specific chemical test regime for soil has been proposed for the ground investigation, but it should include standard soil suites, speciated petroleum hydrocarbons including BTEX and PCBs. When carrying out hand dug pits a photo ionisation detector (PID) should be used to check for volatile organic compounds. If the PID detects any volatile organic compounds (VOC), then specific VOC tests should be carried out. Groundwater sampling and testing should also be undertaken, together with ground gas monitoring to determine the site's Characteristic Gas Situation.
- It is anticipated that shallow "spread" foundations (pads/strips) should be feasible to support the proposed building. Recommendations based on the preliminary ground model suggest that the Glaciofluvial Sheet Deposits should be capable of providing a (preliminary) presumed net bearing pressure of 150 kN/m^2, subject to confirmation of the on-site ground conditions.
- The preliminary ground model proposed in this report is subject to verification by implementation of an appropriate ground investigation as per Coffey's proposal dated 1st August 2013, modified by the variations described herein.

REFERENCES

1. BDP Ltd, Hough End Leisure Centre, Site Investigation Brief, BDP(REP)CS001, July 2013
2. BDP Ltd Hough End Leisure Centre, Site Appraisal, BDP(REP)CS002, 11/09/2013
3. Index of Online Manchester Bomb Damage Record Maps, at: http://enriqueta.man.ac.uk/luna/servlet/view/all/who/Manchester%20City%20Council%20City%20Architect%27s%20Department%20%28Building%20Surveyor%27s%20Division%29?sort=Reference_Number,Page,Current_Repositor
4. British Geological Survey 1:50,000 Scale Geological Sheet 85 – Stockport (solid)
5. British Geological Survey 1:50,000 Scale Geological Sheet 85 – Stockport (drift)
6. British Geological Survey 1:10,560 Scale Geological Sheet SJ 89 SW (solid and drift)
7. Environment Agency "what's in your backyard website (consulted 17th September 2013): http://www.environment-agency.gov.uk/homeandleisure/
8. Environment Agency Groundwater Vulnerability Sheet 17 (1996)
9. BRE (2007), BR211 Radon: Guidance on Protective Measures for New Buildings, BRE Report BR211
10. CIRIA Report 143, 1995, The Standard Penetration Test (SPT): Methods and Use, CIRIA

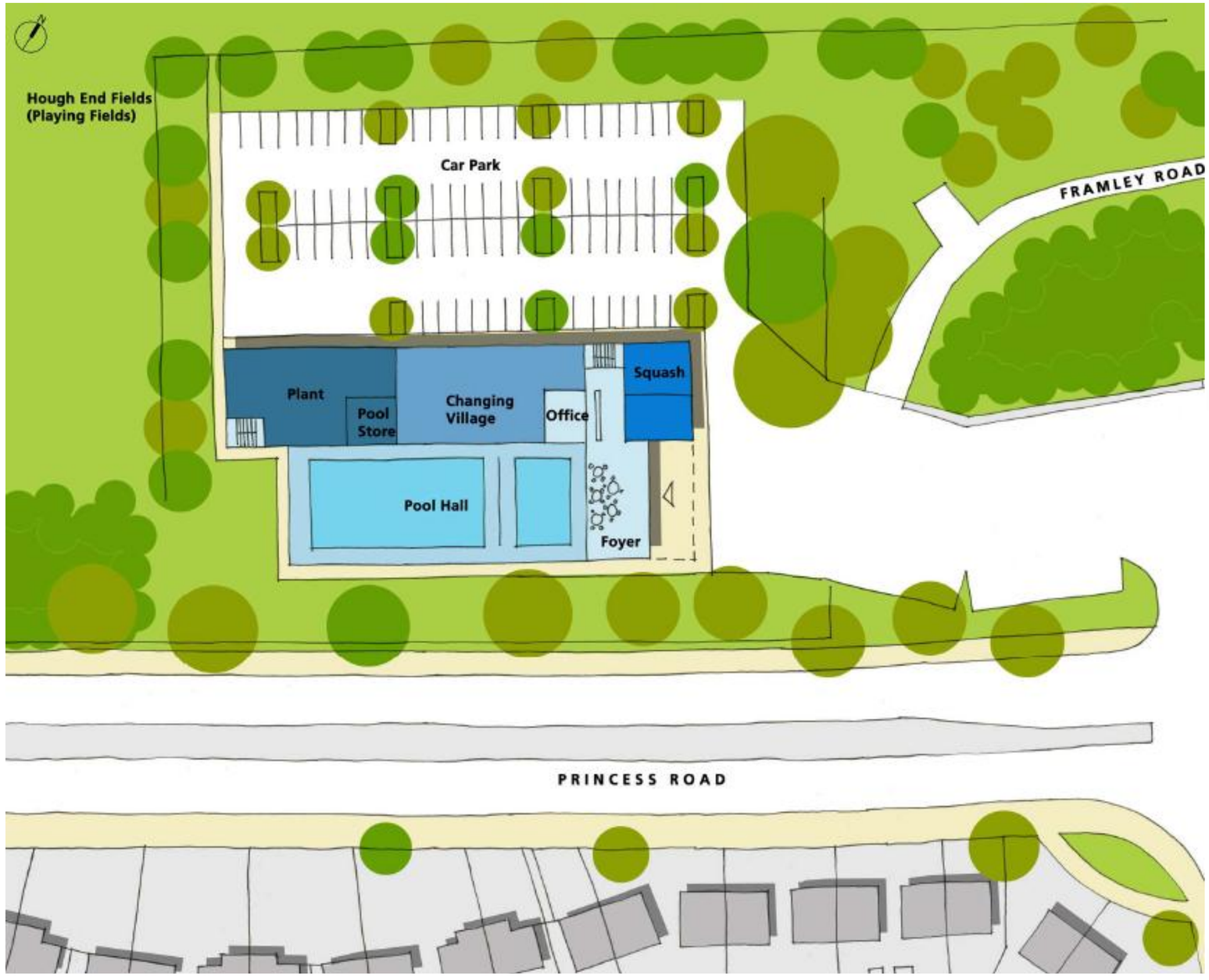
Figures

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drawn	SN	coffey	client:	BDP
date	SEP. 2013		project:	HOUGH END LEISURE CENTRE
scale	NTS		title:	SITE LOCATION PLAN
original size	A4		project no: 02108AA	fig no: Figure 1

E-file Ref : F:\GEOT\Current Server Data\Server_2100.Done\02108AA Hough End Leisure Centre G\Drawings\1 - CWD\02108AA-D1.02-SN-PLAN.dwg



NOTE:
Please note that the proposals are indicative only at this stage, further detail to be developed with user / stakeholder groups

General Facilities

Pool Hall	Wet area including main pool 25 m x 12.5 m, depth 1.1 m to max. depth 2.0 m 6-lane (competition) pool with portable hoist for disabled access. Learner pool 12 m x 8.0 m, depth 0.75 – 0.9 m.
Café / Reception / Servery Space	Welcoming entrance foyer and reception area with café area overlooking pool hall. Servery for hot and cold drinks and snacks.
Squash Courts	2 squash courts 9.75 m x 6.4 m x 5.64 m high
Fitness Suite	60 station fitness suite with 5 m high floor to ceiling windows to two elevations
Dance Studio	Space for 30 with folding partition dividing the space into two separate areas for flexibility
Wet Change	Unisex changing village
Dry Change	Male and Female members dry changing rooms with separate sauna facilities
Circulation	Circulation has been kept to a minimum to create an economical footprint

Notes:

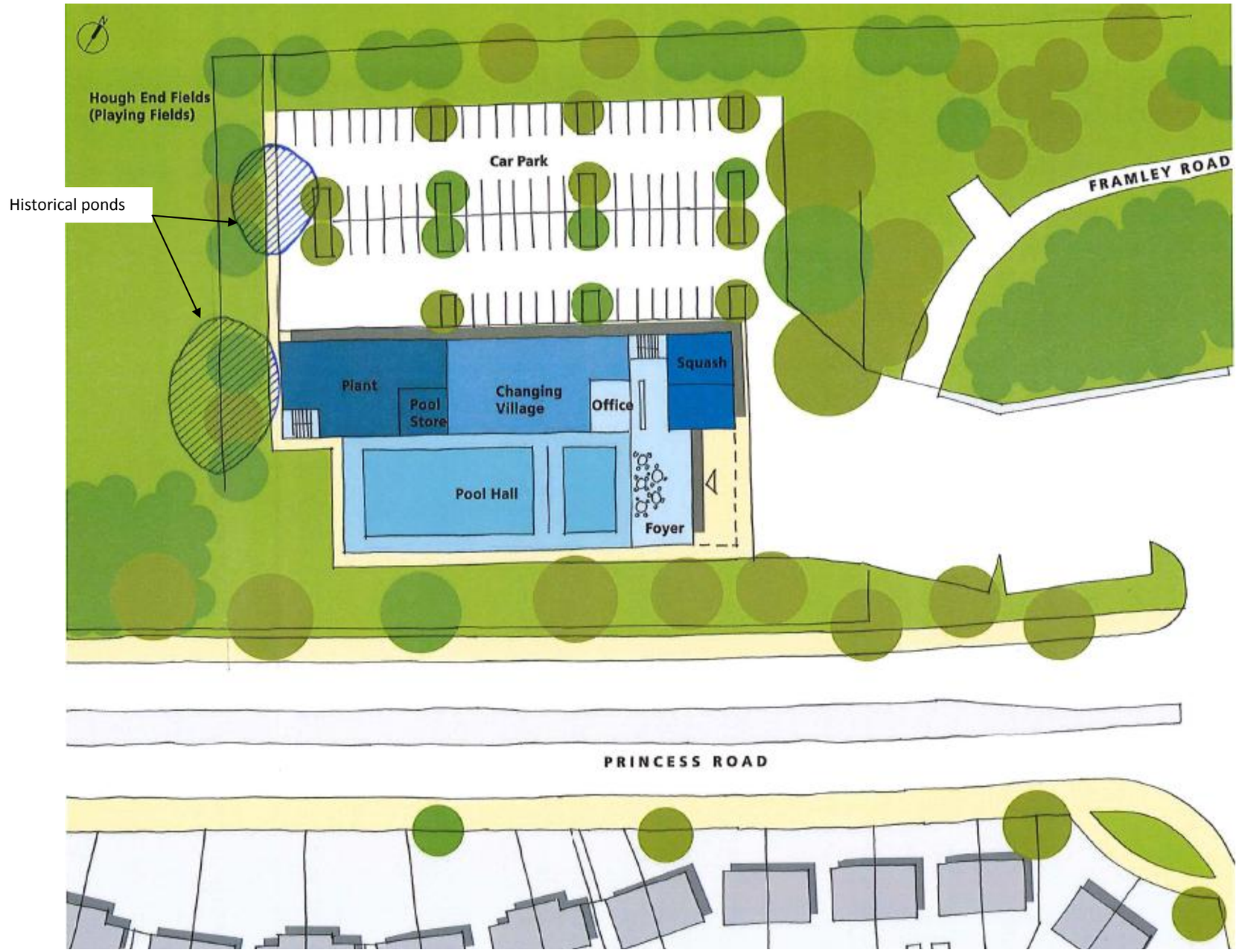
1. Do not scale from this drawing.
2. Proposed Development Plan Extracted from BDP Drawing HLC_01

drawn	RDB
date	Sep-13
scale	NTS
original size	A3

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: BDP
project: HOUGH END LEISURE CENTRE
title: PROPOSED DEVELOPMENT PLAN
project no: 02108AA
fig no: FIGURE 002

E-File Ref : F:\GEOT\Current Server Data\Server_2100.Done\02108AA Hough End Leisure Centre GI\Reports\Desk Study\figures\02108AA_F_002A_RB-Proposed development.doc



Notes:

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2. Proposed Development Plan Extracted from BDP Drawing HLC_01

drawn	RDB
date	Sep-13
scale	NTS
original size	A3

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: BDP

project: HOUGH END LEISURE CENTRE

title: PROPOSED DEVELOPMENT PLAN WITH LOCATIONS OF HISTORICAL PONDS

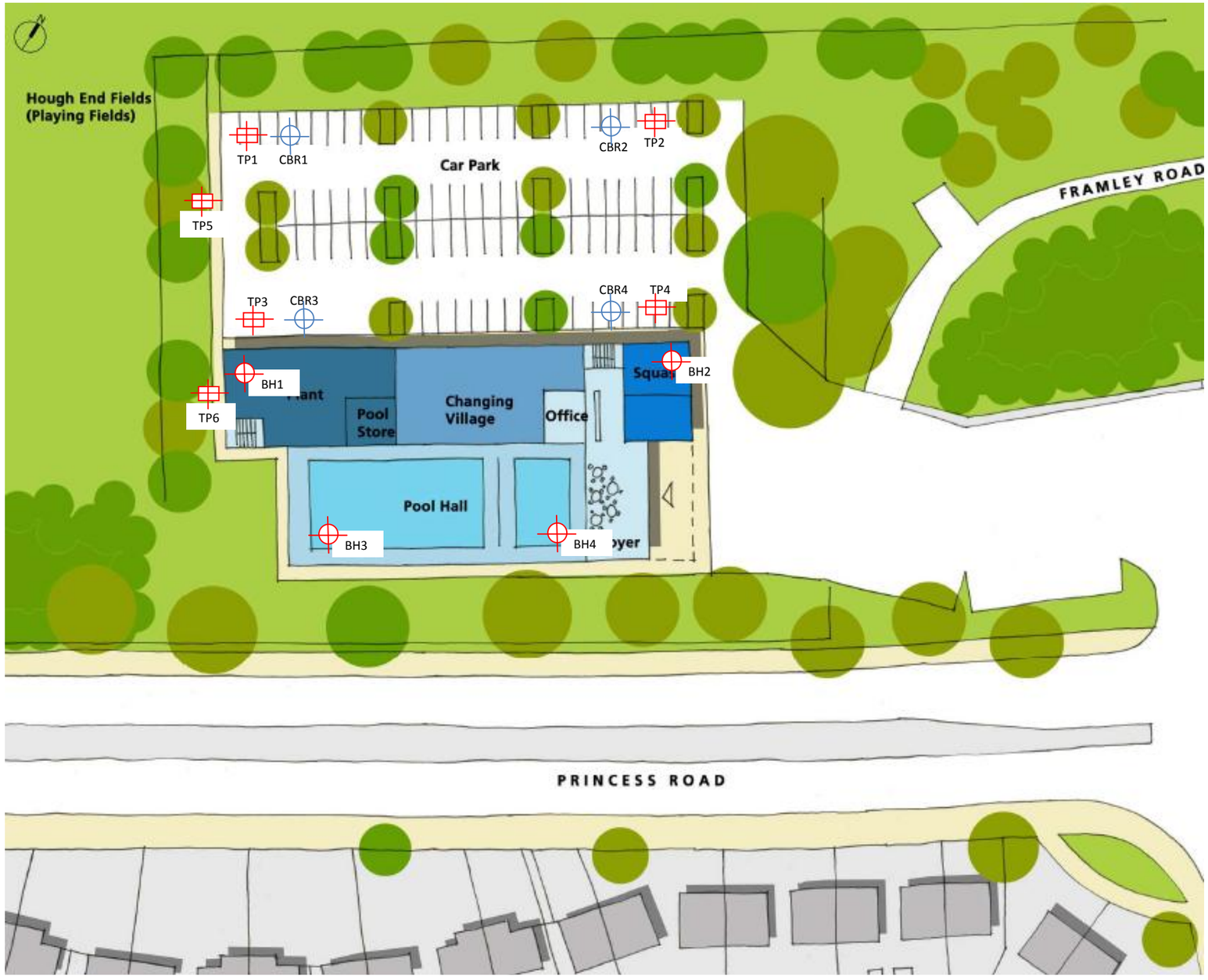
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fig no: FIGURE 003

E-File Ref : F:\GEOT\Current Server Data\Server_2100.Done\02108AA Hough End Leisure Centre GI\Reports\Desk Study\figures\02108AA_F_003A_RB-Proposed development plan with historical pond locations.doc

KEY

- TRIALPIT/SOAKWAY TEST
- BOREHOLE TO 15m
- CBR TEST



Notes:

1. Do not scale from this drawing.
2. Proposed Development Plan Extracted from BDP Drawing HLC_01

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date	Sep-13
scale	NTS
original size	A3

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: BDP

project: HOUGH END LEISURE CENTRE

title: PROPOSED EXPLORATORY HOLE LOCATION PLAN

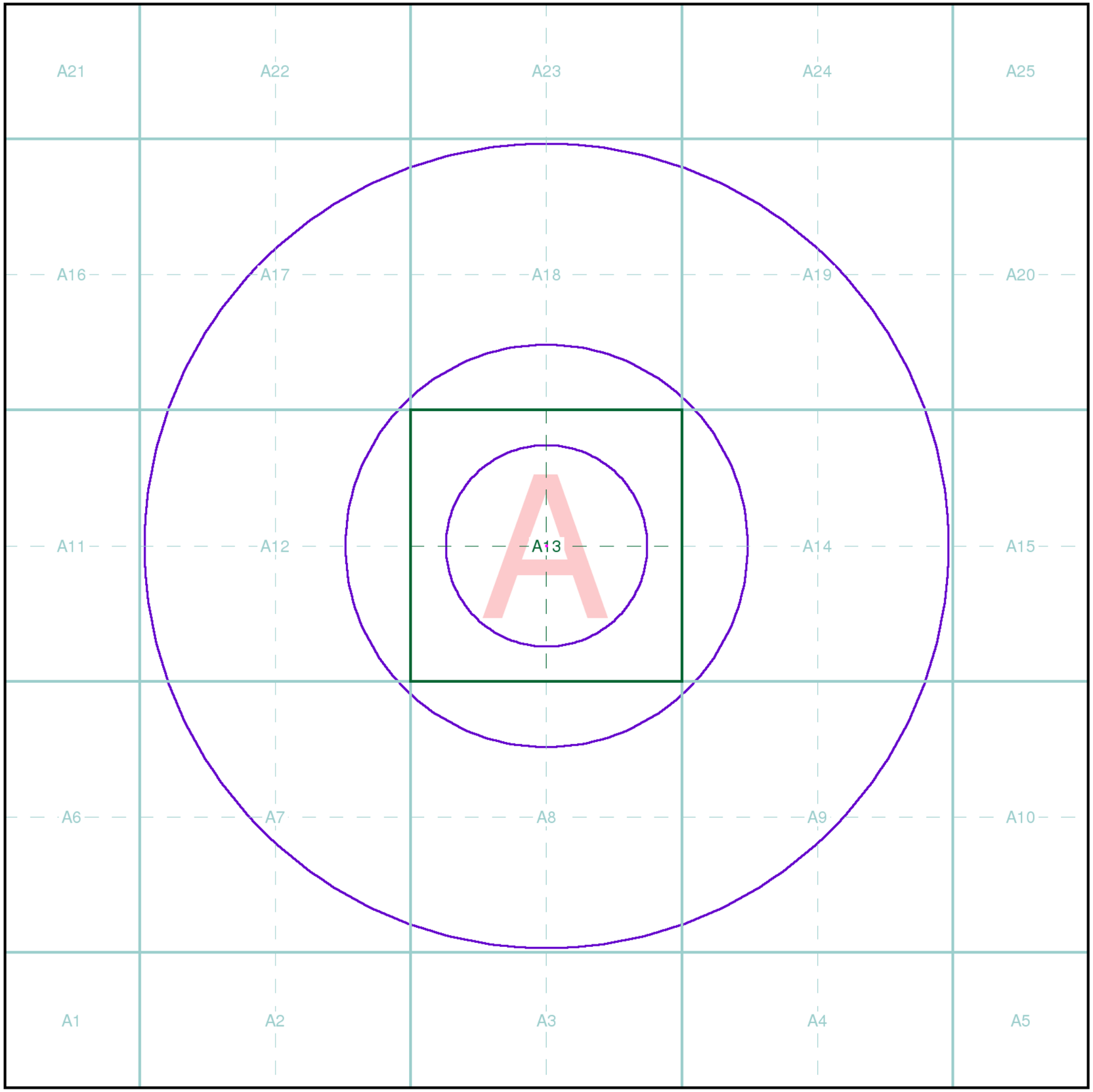
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fig no: FIGURE 004

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Appendix A

Envirocheck Report and Data



Envirocheck®

Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Ordnance Survey® Licensed Partner

British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Miss T Lunt, Building Design Partnership (Sheffield), 1 North Bank, Sheffield, S3 8JY

Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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General

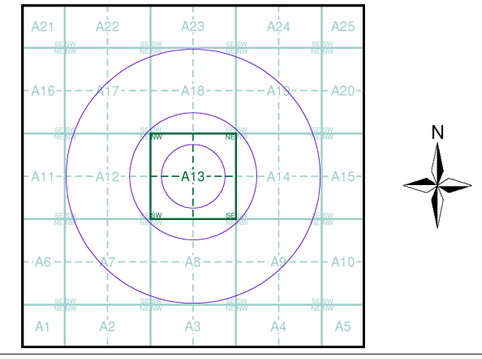
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

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

Estimated Soil Chemistry Arsenic - Slice A



Order Details

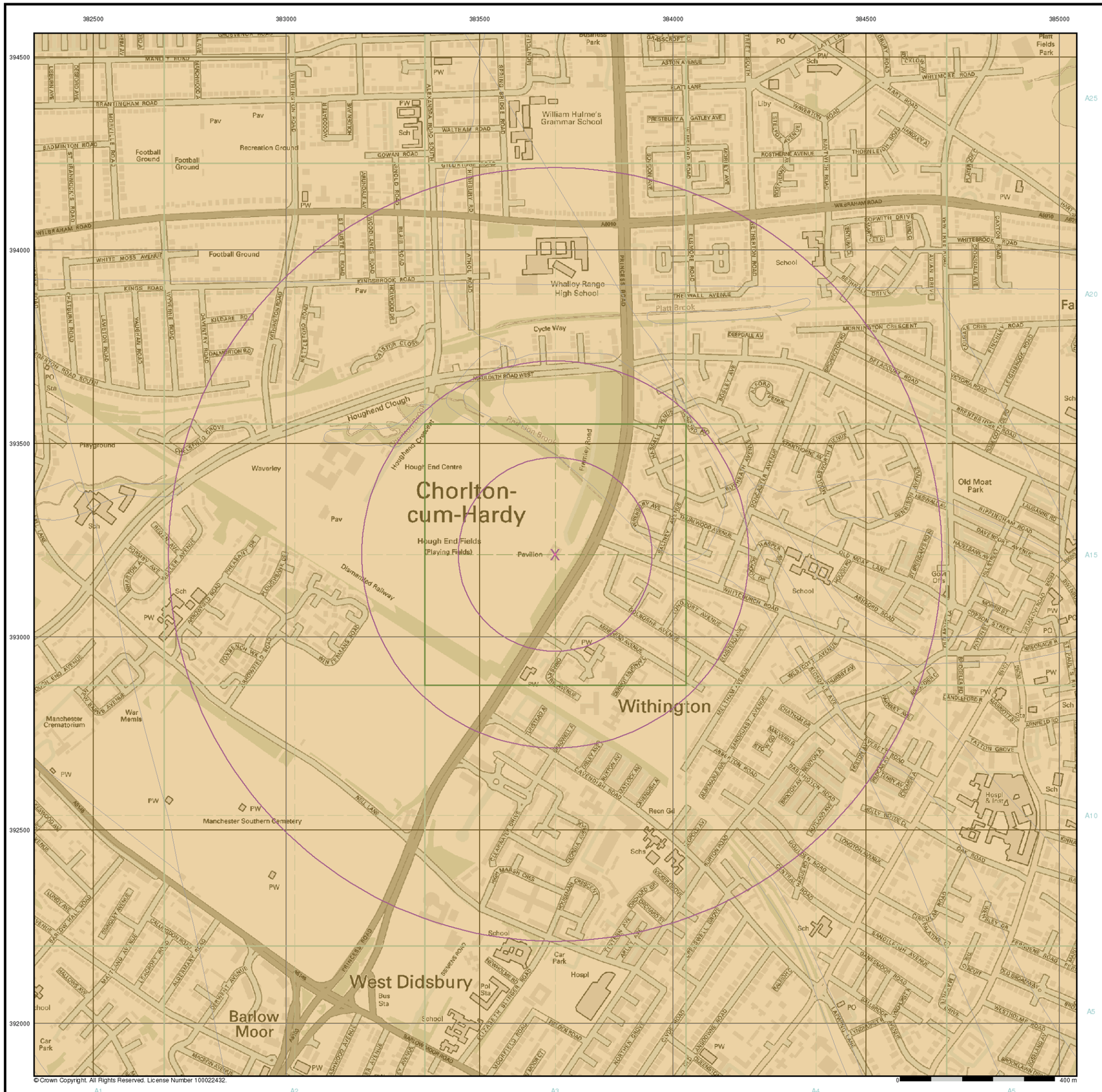
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Search Buffer (m):	1000

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General

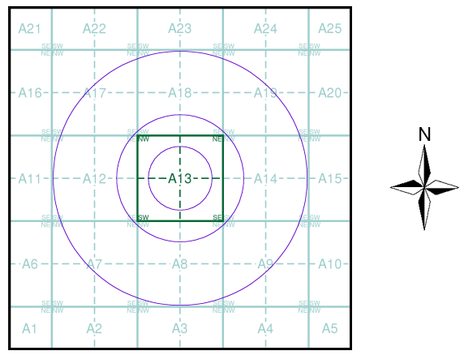
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

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

Estimated Soil Chemistry Cadmium - Slice A



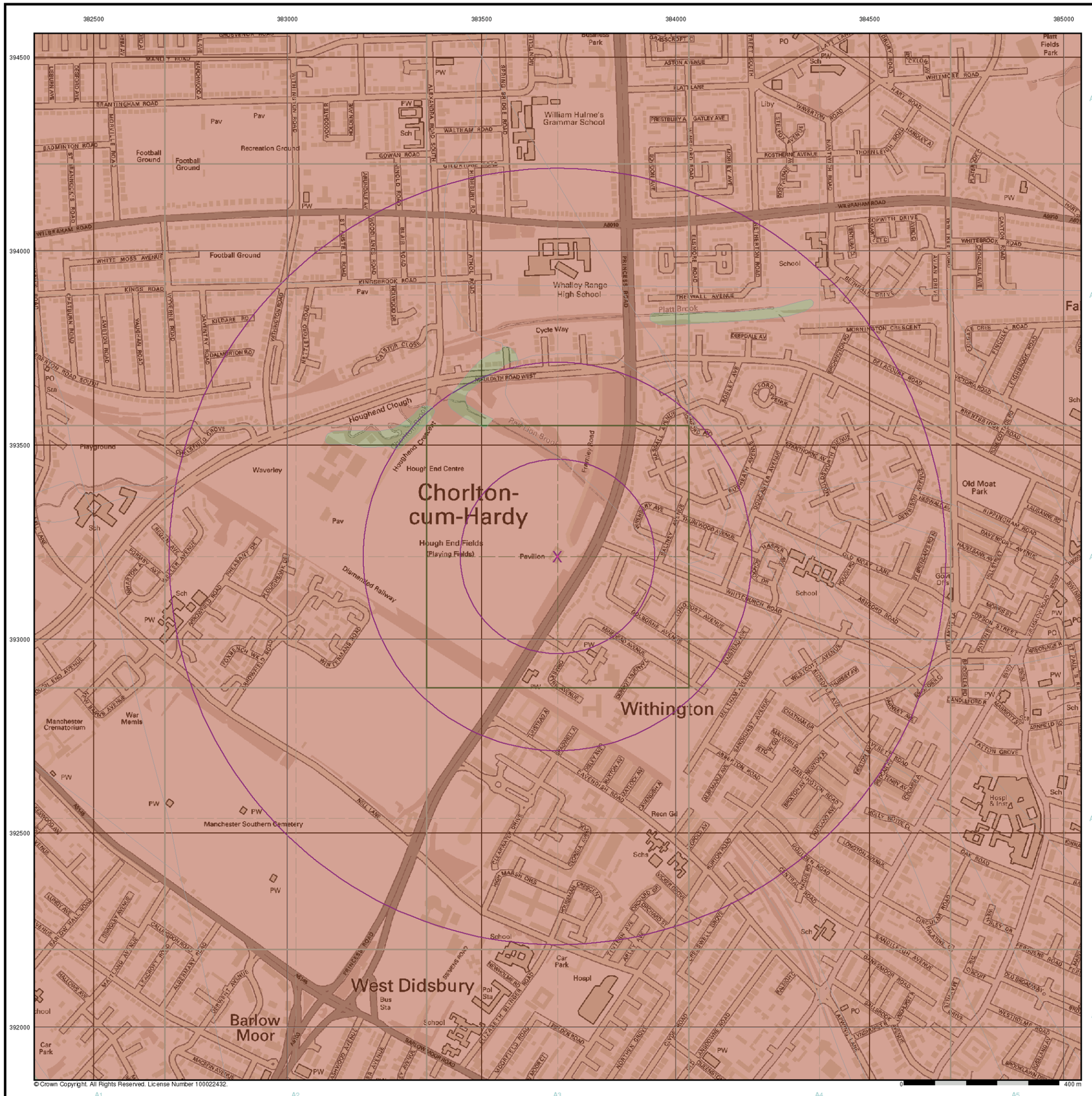
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Search Buffer (m):	1000

Site Details

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General

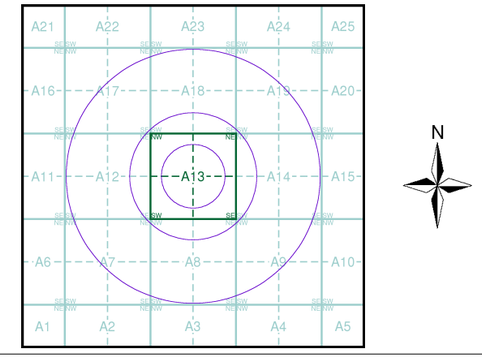
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

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- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A

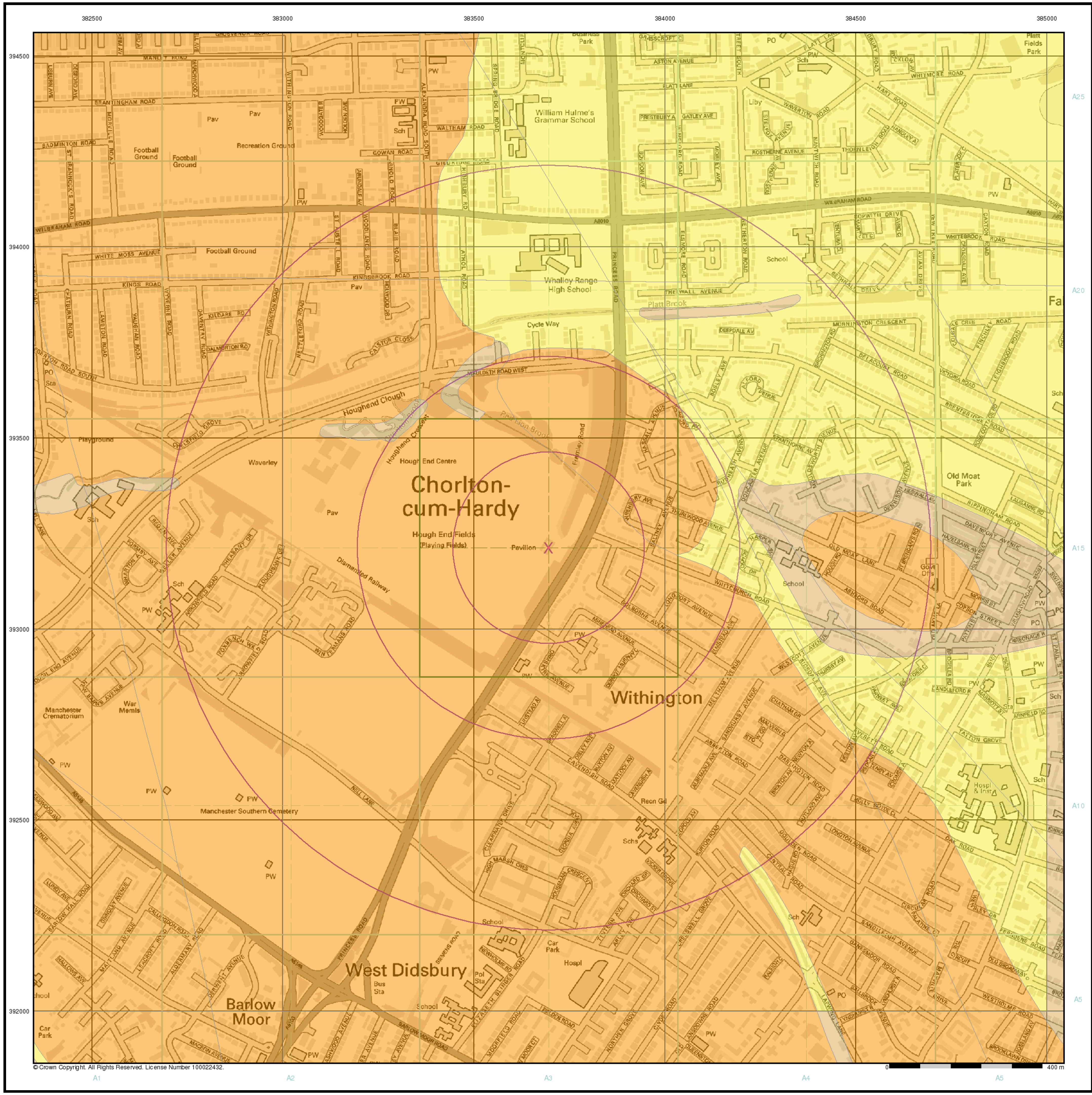


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Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

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General

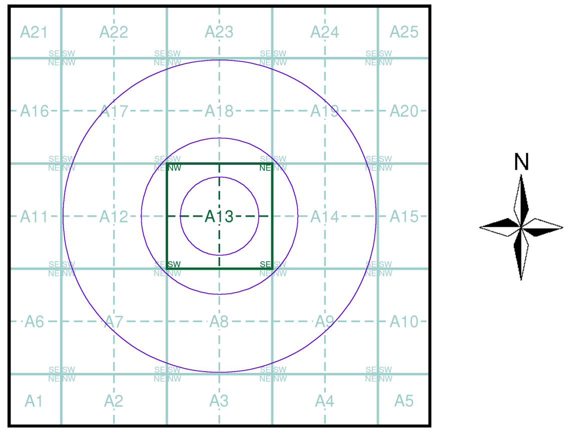
Specified Site   Specified Buffer(s)   X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

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

Estimated Soil Chemistry Lead - Slice A



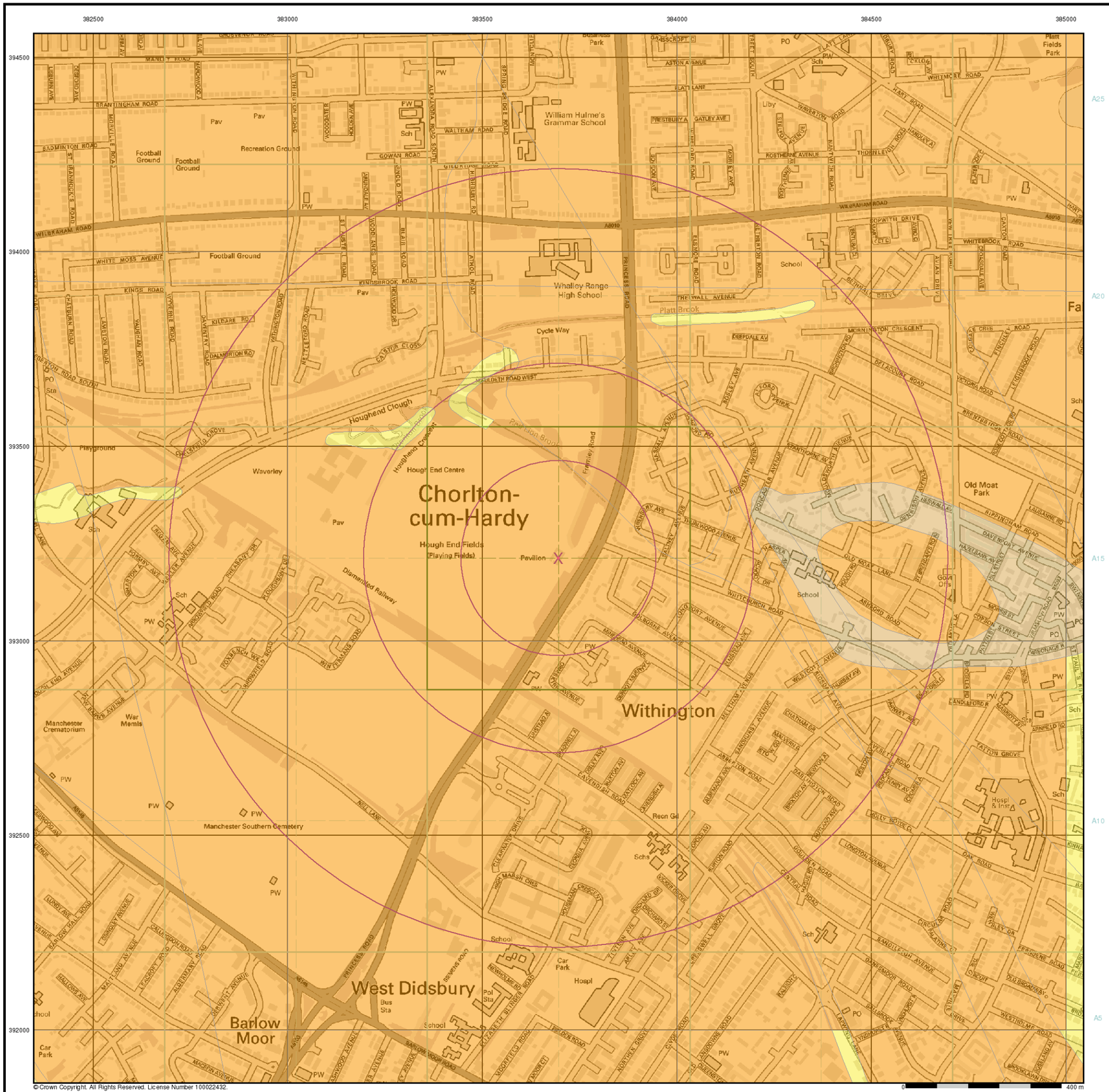
Order Details

Order Details:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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General

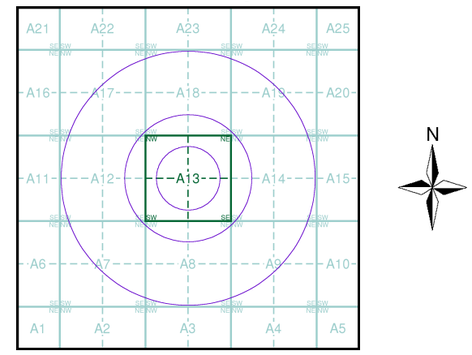
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

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

Estimated Soil Chemistry Nickel - Slice A



Order Details

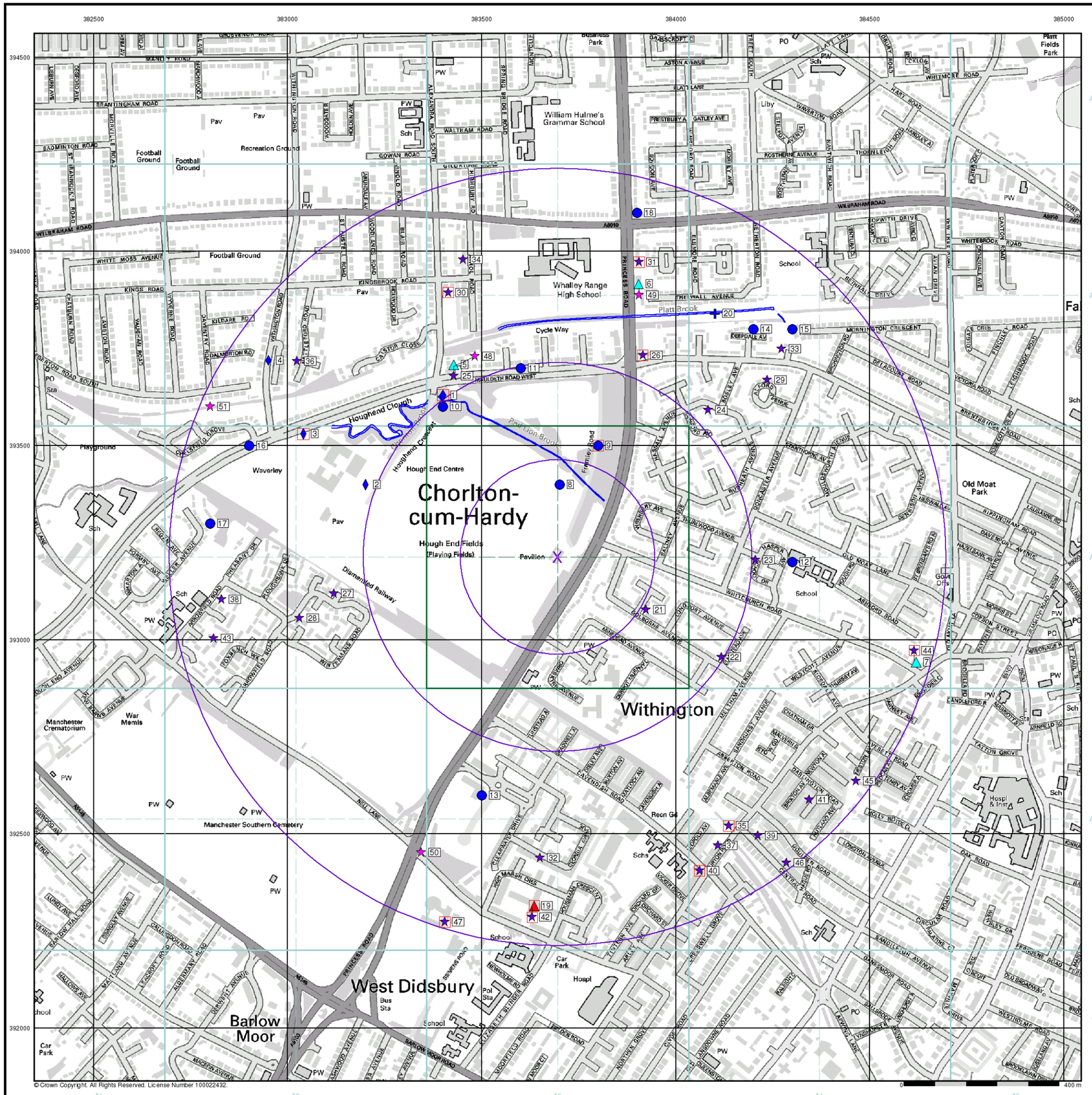
Order Details:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
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Site Details

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General

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

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

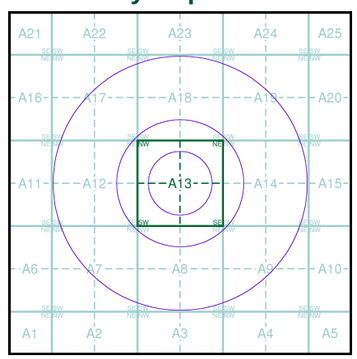
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



Order Details

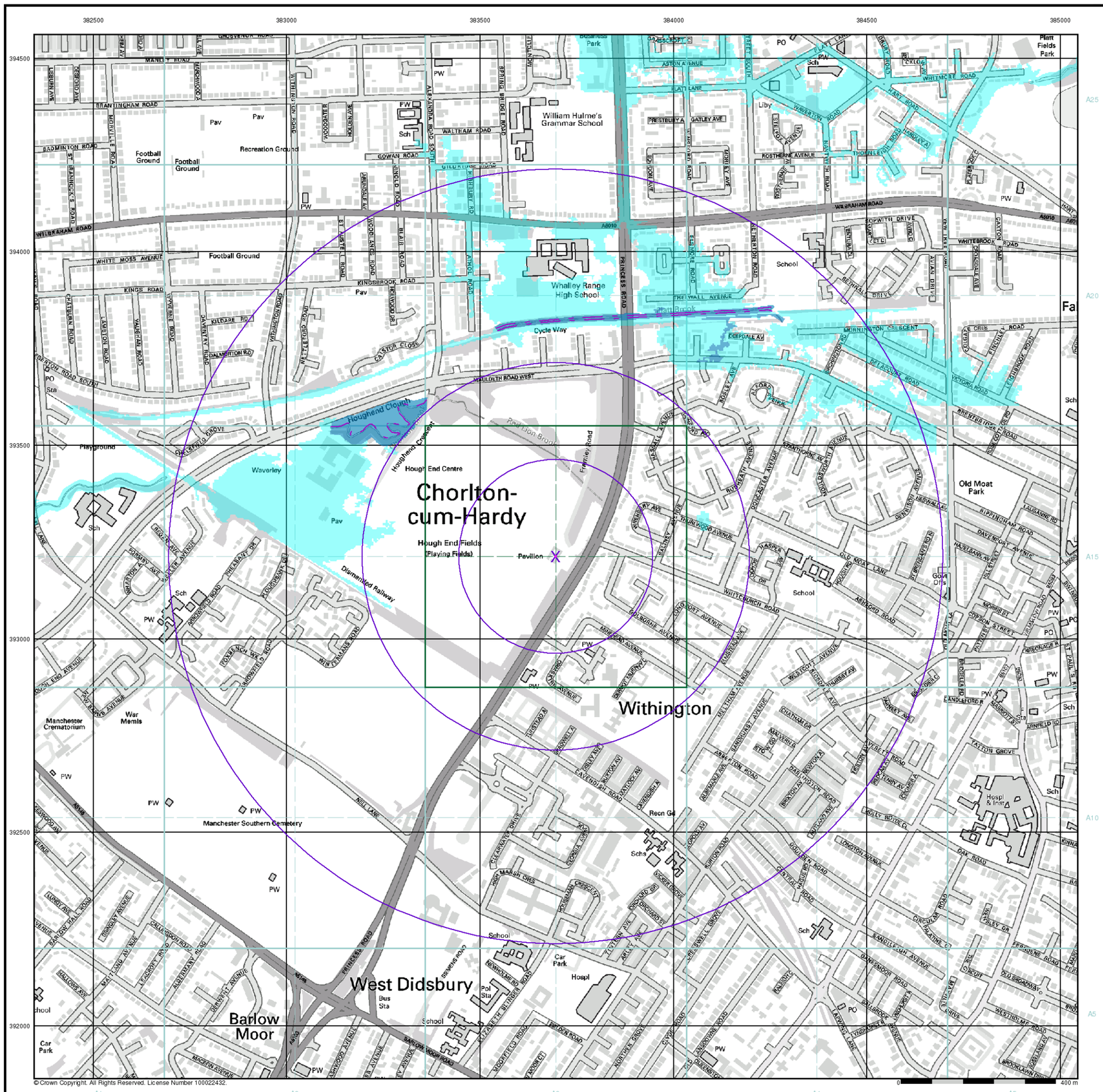
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Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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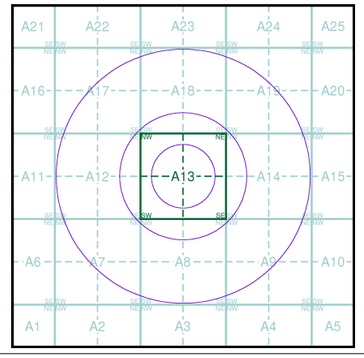
General

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

Agency and Hydrological (Flood)

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

Flood Map - Slice A



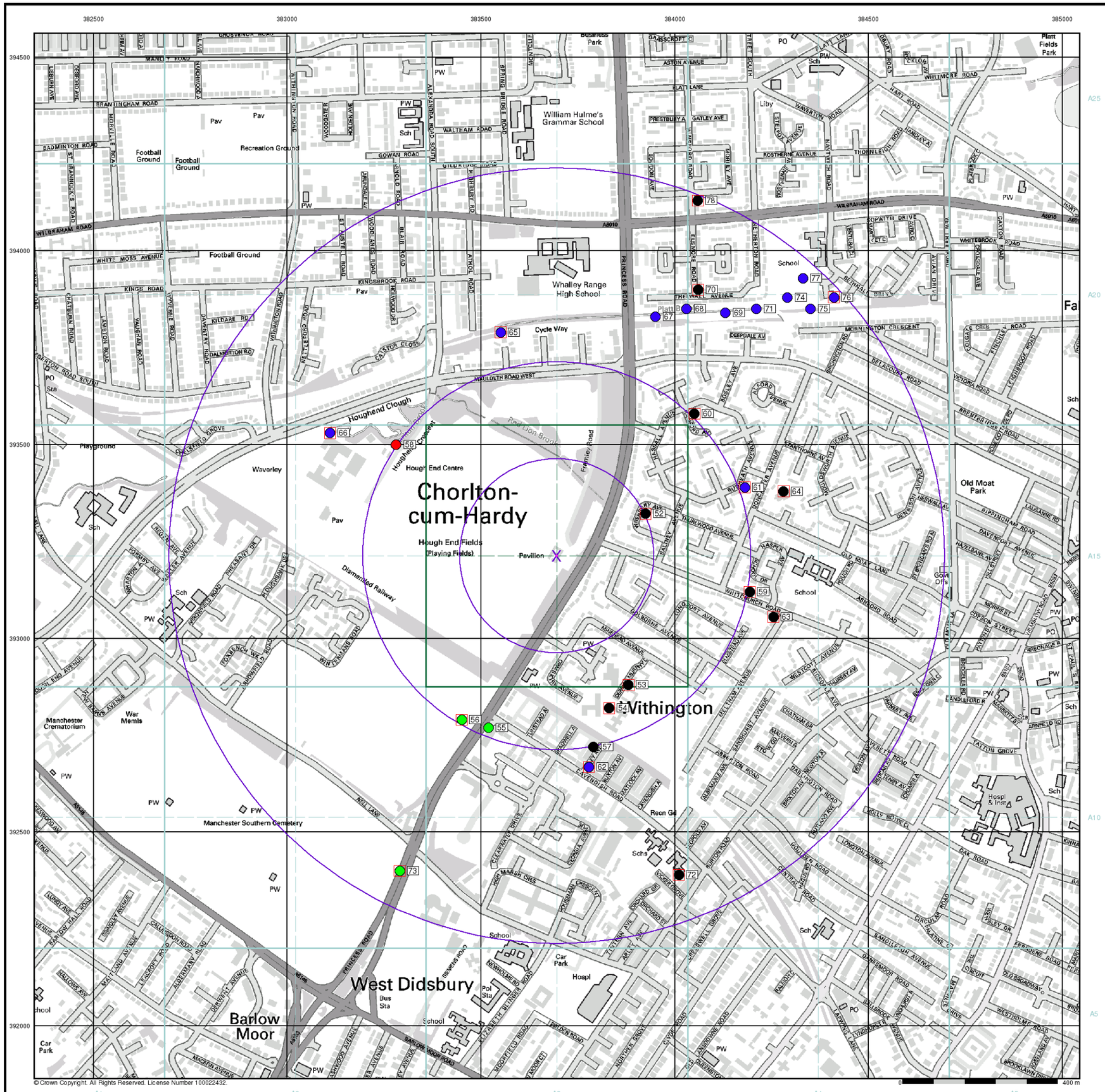
Order Details

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Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

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Envirocheck®

General

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

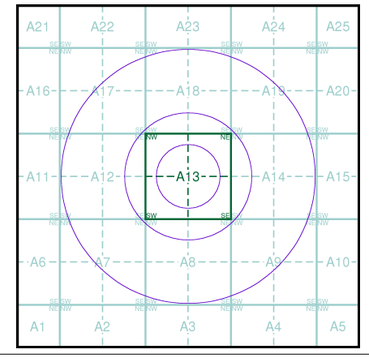
Agency and Hydrological (Boreholes)

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

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

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

Borehole Map - Slice A



Order Details

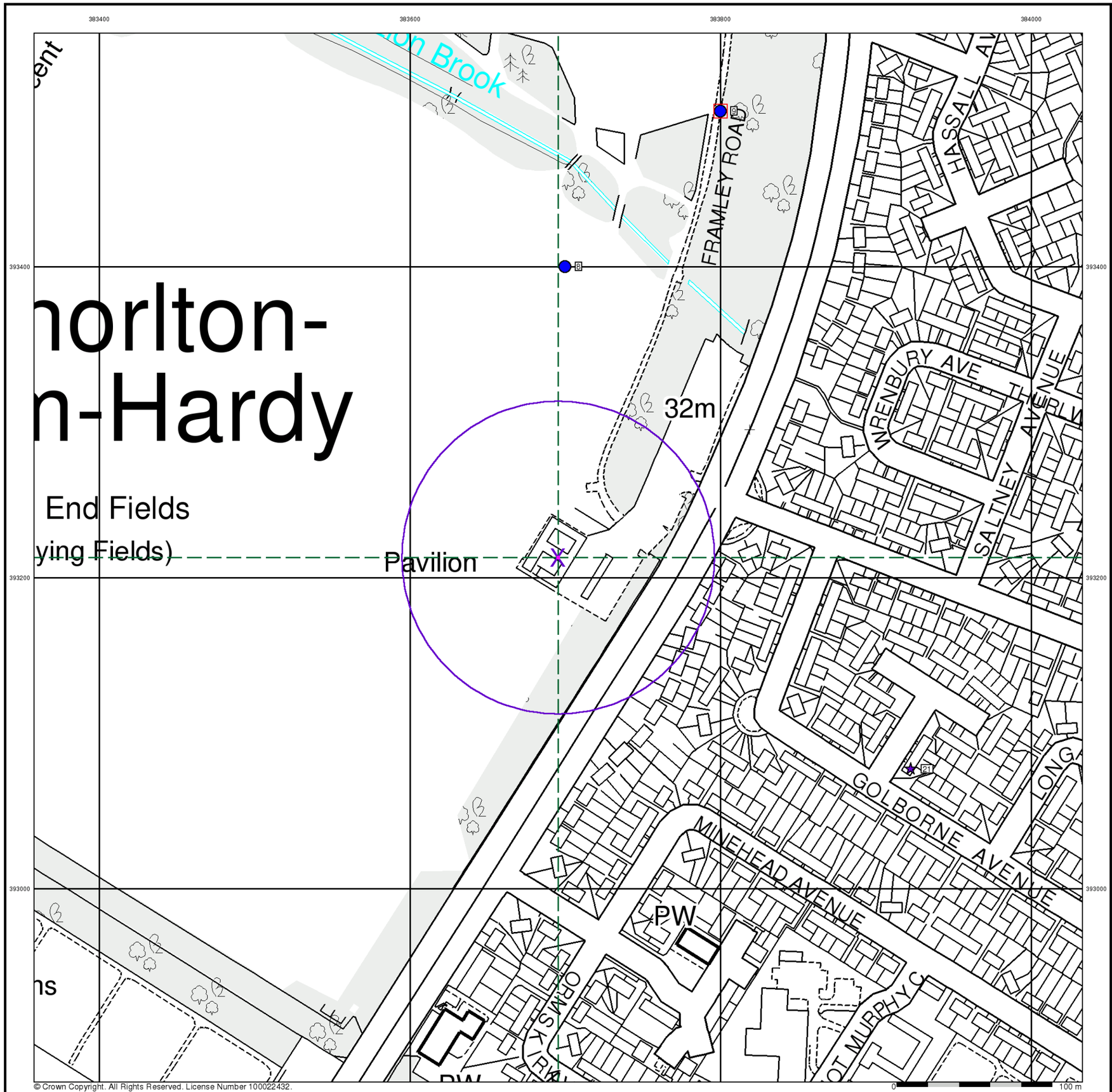
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Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

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Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

General

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

Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

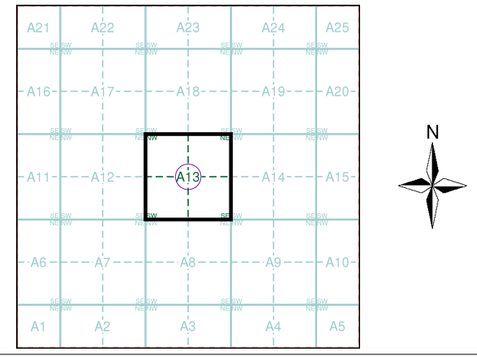
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
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- Local Authority Recorded Landfill Site
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- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A13



Order Details

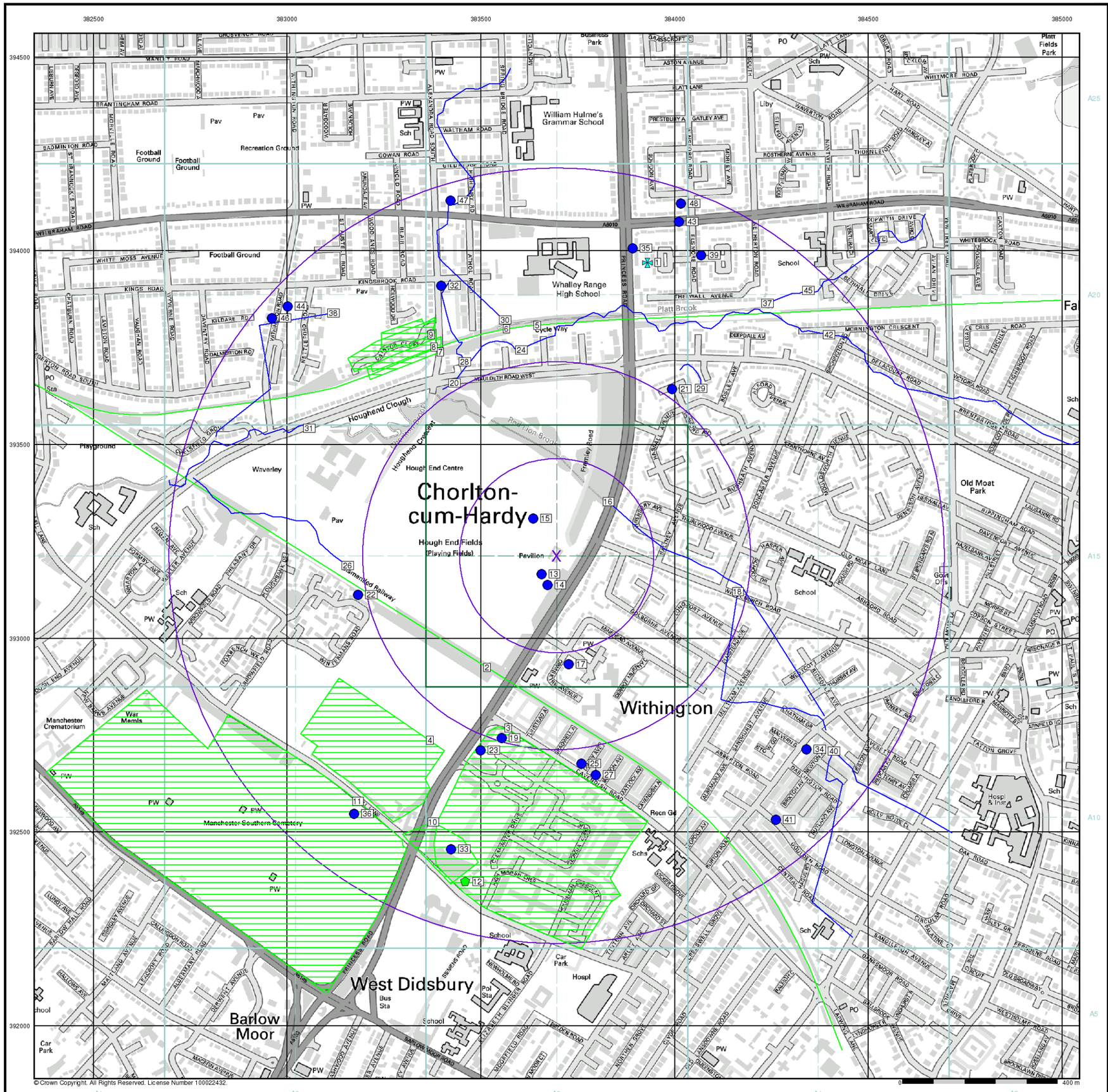
Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01

Site Details

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Envirocheck® Historical

General

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

Several of Type at Location

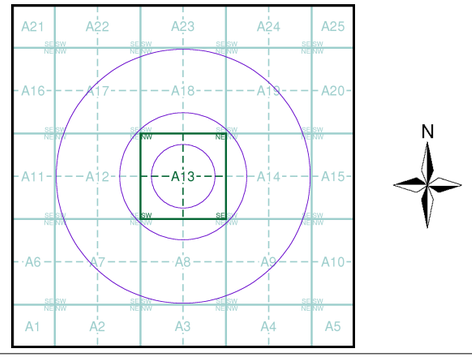
Historical Building Plans

Area Cleared due to Enemy Action

Historical Land Use

- Former Marsh
- Historical Flood Liability
- Historical Flood Liability (Location)
- Potentially Contaminative Industrial Use (Past Land Use)
- Potentially Contaminative Industrial Use (Past Land Use) (Linear)
- Potentially Contaminative Industrial Use (Past Land Use) (Location)
- Potentially Infilled Land (Non-Water)
- Potentially Infilled Land (Non-Water) (Linear)
- Potentially Infilled Land (Non-Water) (Location)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water) (Linear)
- Potentially Infilled Land (Water) (Location)

Historical Data Report - Slice Map A



Order Details

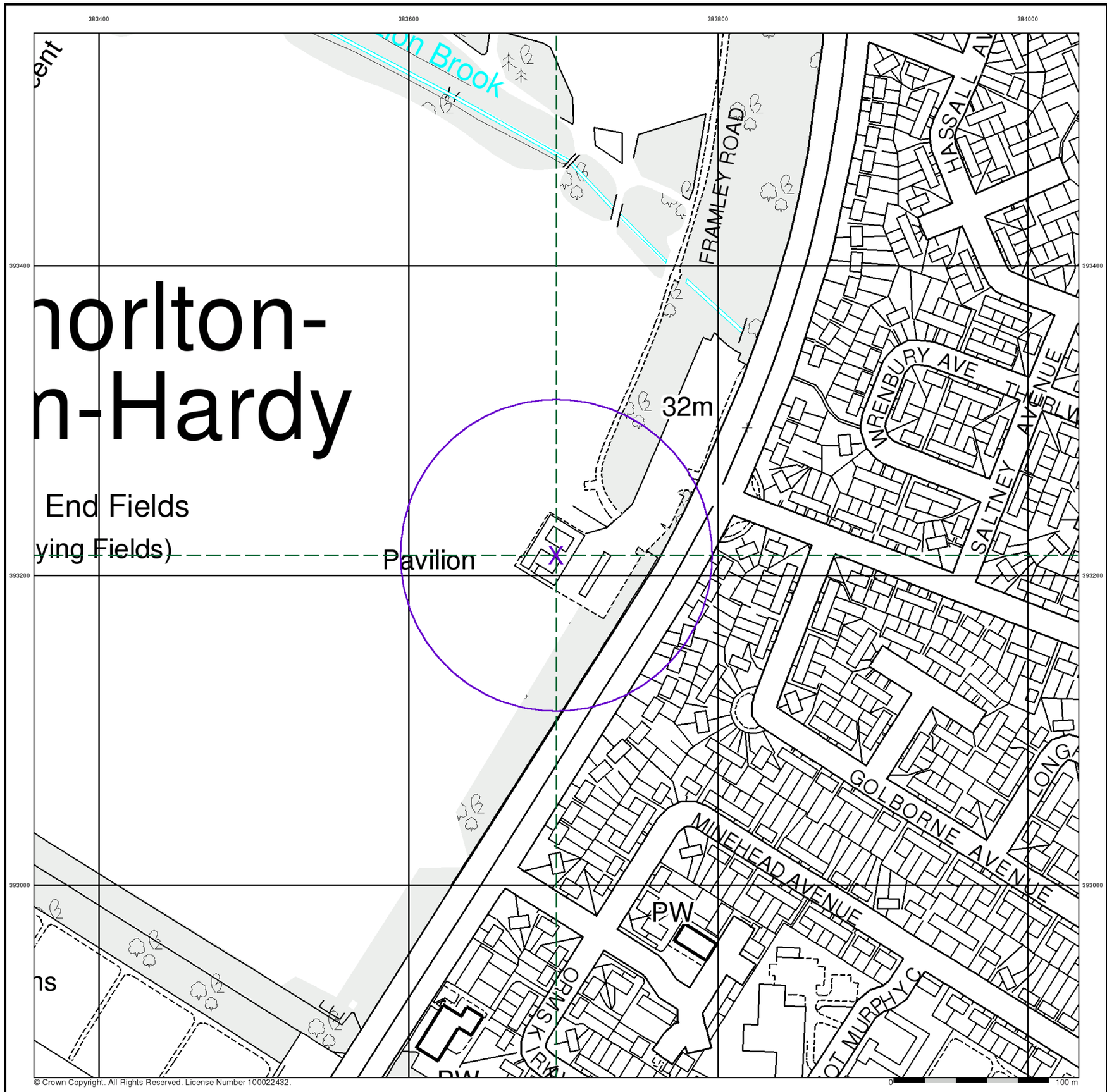
Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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Envirocheck® Historical

General

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

Several of Type at Location

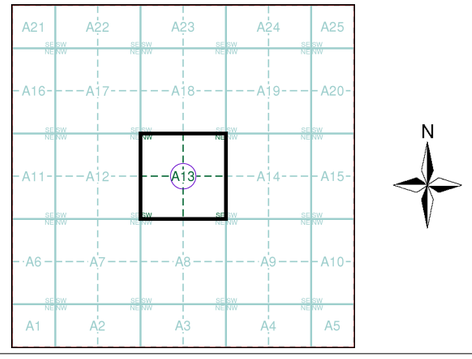
Historical Building Plans

- Area Cleared due to Enemy Action
- Asbestos
- Above Ground Fuel Tanks
- Benzene/Benzole/Naphtha, Naphthalene/Kerosene
- Electricity Generation
- Electricity Sub-Stations
- Gas Industry
- Gas Storage
- Gas Use
- Oil Industry
- Oil Storage
- Oil Use
- Paint based Oils
- Paraffin
- Petrol and Diesel Industry
- Petrol and Diesel Storage
- Petrol and Diesel Use
- Potential Fuel Gas
- Potential Fuel Oil
- Potential Fuel Use
- Potential Petrol and Diesel
- Potential Tanks
- Potentially Fuel-related Tanks
- Underground Fuel Tanks

Historical Tanks and Energy Facilities

- (B) Electrical Sub Station Facility
- (E) Electricity Industry Facility
- (G) Gas Industry Facility
- (V) Gas Monitoring Facility
- (M) Miscellaneous Power Facility
- (O) Oil Industry Facility
- (S) Petroleum Storage Facility
- (P) Potential Tank
- (T) Tank

Historical Data Report - Segment A13



Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Plot Buffer (m):	100

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group

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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Envirocheck® Report:

Historical Data Report Datasheet

Order Details:

Order Number:
48987548_1_1

Customer Reference:
TLL/AW/P2005641

National Grid Reference:
383700, 393210

Slice:
A

Site Area (Ha):
0.01

Search Buffer (m):
1000

Site Details:

Greater Manchester Police Sports & Social Club Ltd
Mauldeth Road West, Chorlton cum Hardy
MANCHESTER
M21 7SX

Client Details:

Miss T Lunt
Building Design Partnership (Sheffield)
1 North Bank
Sheffield
S3 8JY

Contents

Report Section	Page Number
Summary	-
Historical Building Plans Information	-
Historical Land Use Information	1
Historical Tanks and Energy Facilities	-
Historical Map List	4
Useful Contacts and Further Information	6

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v47.0

Envirocheck® Historical

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Historical Building Plans Information					
Areas Cleared Due To Enemy Action					
Above Ground Fuel Tanks (100m)				n/a	n/a
Asbestos (100m)				n/a	n/a
Benzene/Benzole/Naphtha, Naphthalene/Kerosene (100m)				n/a	n/a
Electricity Generation (100m)				n/a	n/a
Electricity Sub-Stations (100m)				n/a	n/a
Gas Industry (100m)				n/a	n/a
Gas Storage (100m)				n/a	n/a
Gas Use (100m)				n/a	n/a
Oil Industry (100m)				n/a	n/a
Oil Storage (100m)				n/a	n/a
Oil Use (100m)				n/a	n/a
Paint based Oils (100m)				n/a	n/a
Paraffin (100m)				n/a	n/a
Petrol and Diesel Industry (100m)				n/a	n/a
Petrol and Diesel Storage (100m)				n/a	n/a
Petrol and Diesel Use (100m)				n/a	n/a
Potential Fuel Gas (100m)				n/a	n/a
Potential Fuel Oil (100m)				n/a	n/a
Potential Fuel Use (100m)				n/a	n/a
Potential Petrol and Diesel (100m)				n/a	n/a
Potential Tanks (100m)				n/a	n/a
Potentially Fuel-related Tanks (100m)				n/a	n/a
Underground Fuel Tanks (100m)				n/a	n/a
Historical Land Use Information					
Former Marshes	pg 1				1
Historical Flood Liabilities					
Potentially Contaminative Industrial Uses (Past Land Use)	pg 1			2	9
Potentially Infilled Land (Non-Water)					
Potentially Infilled Land (Water)	pg 1		4	3	29

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Historical Tanks and Energy Facilities					
Electrical Sub Station Facilities (100m)				n/a	n/a
Electricity Industry Facilities (100m)				n/a	n/a
Gas Industry Facilities (100m)				n/a	n/a
Gas Monitoring Facilities (100m)				n/a	n/a
Miscellaneous Power Facilities (100m)				n/a	n/a
Oil Industry Facilities (100m)				n/a	n/a
Petroleum Storage Facilities (100m)				n/a	n/a
Potential Tanks (100m)				n/a	n/a
Tanks (100m)				n/a	n/a

Historical Land Use Information

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Former Marshes** Use: Former Marsh Date of Mapping: 1848	A18NE (N)	792	1	383929 393969
2	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Railways Date of Mapping: 1894 - 1955	A13SW (SW)	340	1	383516 392925
3	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Hospitals Date of Mapping: 1894 - 1989	A8NW (S)	467	1	383569 392764
4	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Cemetery or Graveyard Date of Mapping: 1955 - 1989	A8NW (SW)	579	1	383368 392736
5	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Railways Date of Mapping: 1894 - 1989	A18SW (N)	598	1	383644 393808
6	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Railways Date of Mapping: 1894 - 1989	A18SW (N)	600	1	383566 393798
7	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Railways Date of Mapping: 1908 - 1955	A18SW (NW)	606	1	383396 393739
8	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Road haulage Date of Mapping: 1989	A18SW (NW)	622	1	383385 393752
9	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Machinery: engines, building and general industrial [manufacture] Date of Mapping: 1955	A18SW (NW)	656	1	383372 393783
10	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Cemetery or Graveyard Date of Mapping: 1894 - 1938	A8SW (SW)	758	1	383377 392526
11	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Cemetery or Graveyard Date of Mapping: 1894 - 1989	A7NE (SW)	816	1	383182 392580
12	**Potentially Contaminative Industrial Uses (Past Land Use)** Use: Hospitals Date of Mapping: 1911 - 1938	A8SW (S)	874	1	383459 392372
13	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A13SW (SW)	62	1	383656 393166
14	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A13SW (S)	77	1	383671 393140
15	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A13NW (NW)	114	1	383634 393309
16	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A13NE (NE)	194	1	383829 393353
17	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A13SE (S)	281	1	383726 392934
18	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A14SW (E)	477	1	384163 393121
19	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NW (S)	492	1	383553 392743
20	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A18SW (NW)	518	1	383432 393659
21	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SE (NE)	524	1	383992 393644

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12SE (W)	524	1	383182 393113
23	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NW (S)	539	1	383498 392712
24	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SW (N)	540	1	383604 393744
25	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NE (S)	541	1	383758 392677
26	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12SE (W)	541	1	383155 393188
27	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NE (S)	554	1	383796 392669
28	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SW (NW)	555	1	383458 393714
29	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A19SW (NE)	571	1	384068 393645
30	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A18SW (N)	621	1	383562 393819
31	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12NE (NW)	719	1	383056 393542
32	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NW (NW)	759	1	383396 393910
33	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8SW (S)	805	1	383423 392456
34	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9NW (SE)	815	1	384340 392714
35	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	819	1	383892 394007
36	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A7NE (SW)	847	1	383172 392548
37	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1955	A19SW (NE)	849	1	384239 393865
38	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SE (NW)	852	1	383118 393840
39	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A19NW (NE)	861	1	384067 393989
40	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9NE (SE)	876	1	384410 392708
41	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9SW (SE)	886	1	384261 392532
42	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1923	A19SE (NE)	905	1	384398 393783

Historical Land Use Information

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
43	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	918	1	384010 394075
44	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SW (NW)	930	1	383000 393831
45	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1955	A19NW (NE)	944	1	384345 393897
46	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SW (NW)	958	1	382961 393827
47	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NW (N)	958	1	383421 394130
48	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	964	1	384016 394122

No Historical Building Plans information available.

The following mapping has been analysed for Historical Land Use Information:

1:10,560	Mapsheet	Published Date
Lancashire And Furness	111_00	1848
Cheshire	009_00	1882
Cheshire	010_00	1882
Lancashire And Furness	111_NE	1894
Lancashire And Furness	111_NW	1894
Lancashire And Furness	111_SW	1894
Lancashire And Furness	111_SE	1895
Cheshire	009_NE	1899
Cheshire	009_SE	1899
Cheshire	010_SW	1899
Lancashire And Furness	111_NE	1908
Lancashire And Furness	111_NW	1908
Cheshire	009_NE	1911
Cheshire	009_SE	1911
Cheshire	010_SW	1911
Lancashire And Furness	111_SE	1911
Lancashire And Furness	111_SW	1911
Lancashire And Furness	111_NE	1923
Lancashire And Furness	111_SE	1923
Lancashire And Furness	111_SW	1923
Lancashire And Furness	111_NW	1933
Cheshire	009_NE	1938
Cheshire	009_SE	1938
Cheshire	010_SW	1938
Ordnance Survey Plan	SJ89SE	1955
Ordnance Survey Plan	SJ89SW	1955
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SJ89SW	1989
Ordnance Survey Plan	SJ89SE	1990

Historical Map List

The following mapping has been analysed for Historical Tanks and Energy Facilities:

1:2,500	Mapsheet	Published Date
Ordnance Survey Plan	SJ8393	1952
Ordnance Survey Plan	SJ8392	1956
Ordnance Survey Plan	SJ8492	1958
Ordnance Survey Plan	SJ8493	1958
1:1,250	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SJ8393NE	1951
Ordnance Survey Plan	SJ8393NW	1951
Ordnance Survey Plan	SJ8393SE	1951
Ordnance Survey Plan	SJ8393SW	1951
Ordnance Survey Plan	SJ8392NE	1956
Ordnance Survey Plan	SJ8392NW	1956
Ordnance Survey Plan	SJ8492NW	1958
Ordnance Survey Plan	SJ8493NW	1958
Ordnance Survey Plan	SJ8493SW	1958
Ordnance Survey Plan	SJ8393NW	1961
Ordnance Survey Plan	SJ8393NE	1973
Ordnance Survey Plan	SJ8393SE	1973
Ordnance Survey Plan	SJ8392NE	1974
Ordnance Survey Plan	SJ8392NW	1975
Ordnance Survey Plan	SJ8393SW	1983

Useful Contacts and Further Information

Contact	Name and Address	Contact Details
1	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk

Historical Building Plans Information

This data set contains potentially contaminative features such as asbestos, petrol, oil and tanks captured from Historical Building Plans. The Historical Building Plans were produced by the London-based firm Charles E. Goad Ltd. as fire insurance plans, dating back to 1885. The firm ceased production of fire insurance plans in 1970. Most of the important towns and cities of the British Isles are covered. Historical Building Plans are usually at the scales of 1:480 (1 inch to 40 feet) for the British Isles. They were updated every 5-6 years by means of revision sheets designed to be pasted on to the original plans.

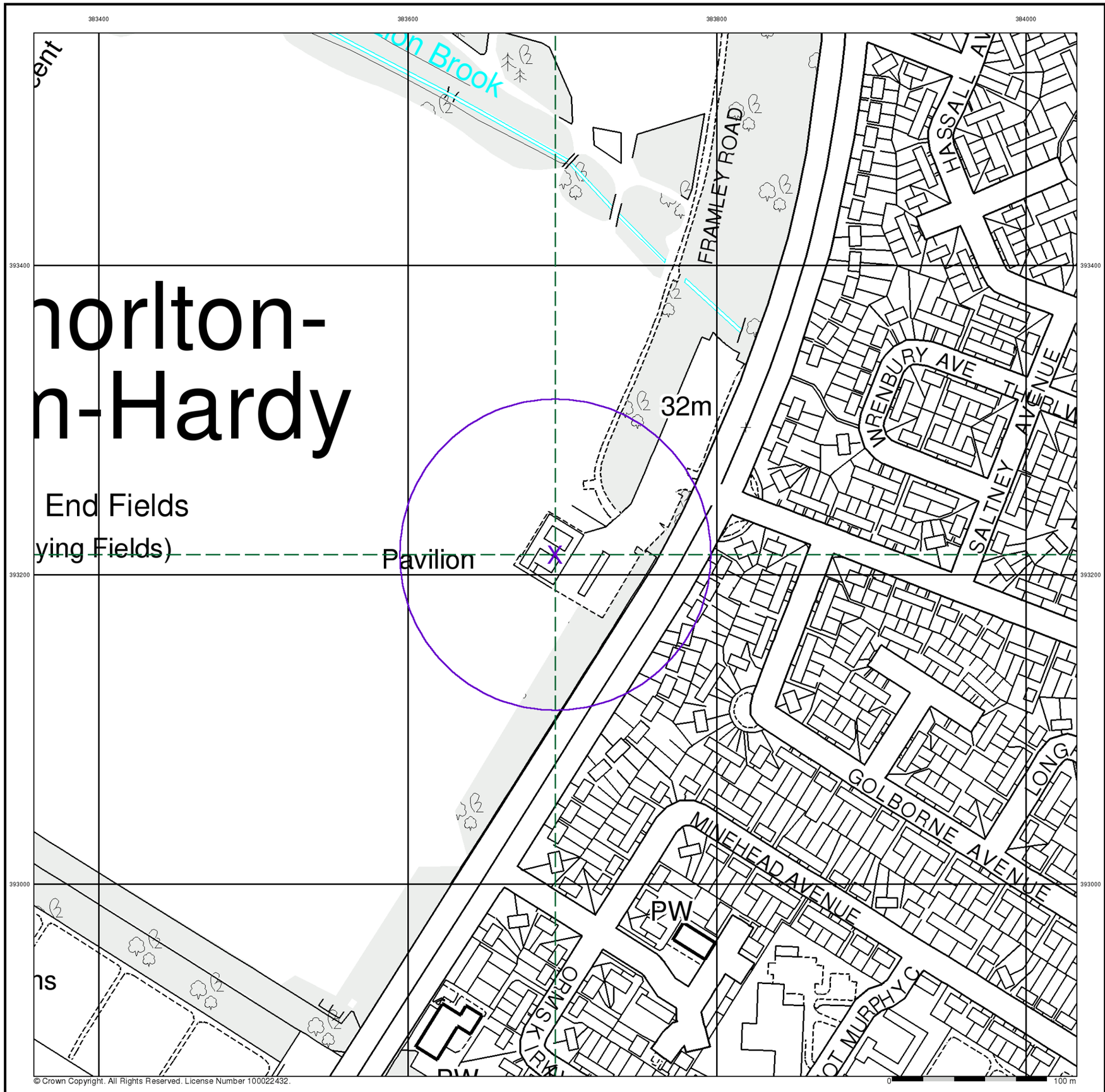
It should be noted that Historical Building Plans are only available for certain major towns and cities and in some cases there may only be partial coverage of the search area. It cannot therefore be assumed that the absence of responses under the Historical Building Plans section of this report indicates that no hazards exist. Please check the Historical Building Plans Map List table in the Historical Map List section of this report to establish if Historical Building Plans are available for this search area.

Historical Land Use Information

Landmark's Historical Land Use Data is the result of combined analysis of historical map data captured at 1:10,560 and 1:10,000. A unique comprehensive database of Historic Land Use from the 1840's to 1996 it includes 67 different types of potentially contaminated past industrial land use. This entailed analysing over 60,000 maps and is drawn from at least four, and up to six historical map editions. In addition a seventh layer was also created, known as the land use layer, containing areas of infilled land which are plotted via comparison between two or more map editions.

Historical Tanks and Energy Facilities

In addition to HLUD, additional analysis uncovered some of the most dangerous sources of contamination (past and present tanks, petrol storage, oil, gas, electricity, miscellaneous facilities). This data set covers over 390,000 Historical Tanks and Energy facilities in Great Britain and was captured from post war 1:2500 and 1:1250 Ordnance Survey historical mapping covering a period from 1943 to 1996.



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Envirocheck® Mining

Historical Land Use Information (1:2,500)

General

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

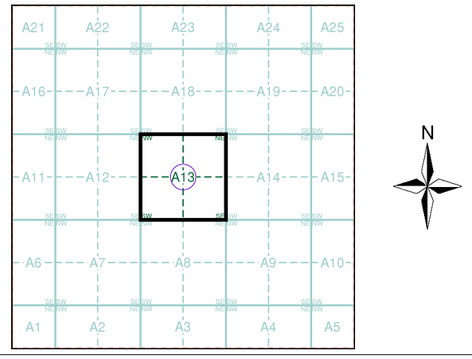
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▭
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▭
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▥

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▭

Mining and Ground Stability - Segment A13



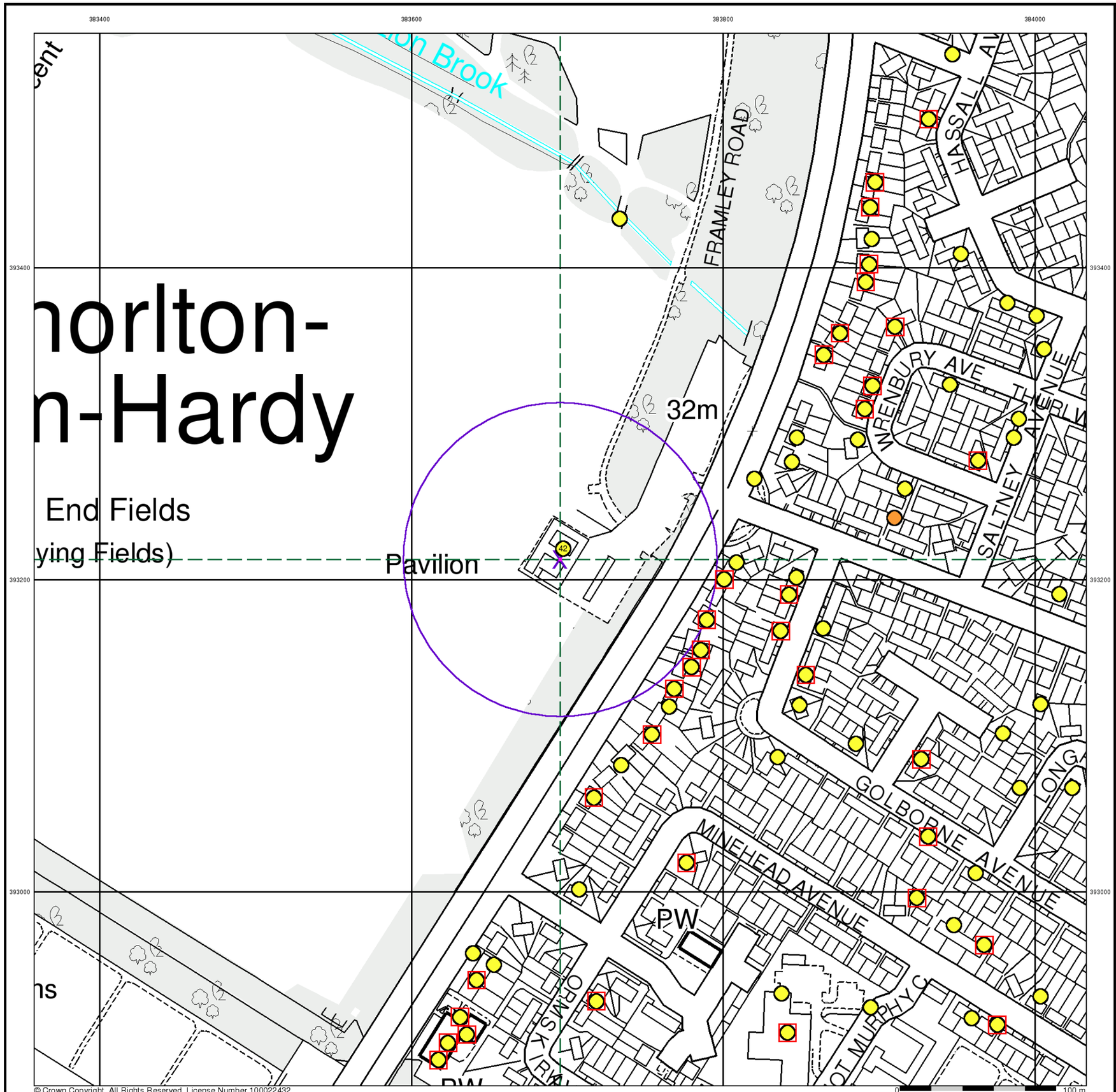
Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Plot Buffer (m):	100

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck® Mining

Motion Map Data (1:2,500)

General

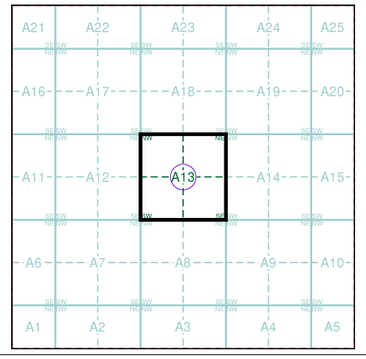
Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Average Velocity Gradient

Upward Movement > 3.5mm per year	
Upward Movement 1.5mm to 3.5mm per year	
Stable 1.5mm to -1.5mm per year	
Downward Movement -1.5mm to -3.5mm per year	
Downward Movement > -3.5mm per year	

Mining and Ground Stability - Segment A13



Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Plot Buffer (m):	100

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group

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

Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:
48987548_1_1

Customer Reference:
TLL/AW/P2005641

National Grid Reference:
383700, 393210

Slice:
A

Site Area (Ha):
0.01

Search Buffer (m):
1000

Site Details:

Greater Manchester Police Sports & Social Club Ltd
Mauldeth Road West, Chorlton cum Hardy
MANCHESTER
M21 7SX

Client Details:

Miss T Lunt
Building Design Partnership (Sheffield)
1 North Bank
Sheffield
S3 8JY

Contents

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).	
Mining and Natural Cavities Data	-
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.	
Historical Land Use Information (1:2,500)	-
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.	
Historical Land Use Information (1:10,000)	1
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.	
Ground Stability Data (1:50,000)	3
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.	
Motion Map Data (1:2,500)	4
The Motion Map Data (1:2,500) section contains data which is plotted to indicate long-term stability trends from analysis of satellite radar data.	
Historical Map List	5
The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.	
Data Currency	6
Data Suppliers	8
Useful Contacts	9

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The brine subsidence data relating to the Driotwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

Report Version v47.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites					
Coal Mining Affected Areas			n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)				n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts					
Disturbed Ground					
General Quarrying					
Heap, unknown constituents					
Mineral Railway					
Mining & quarrying general					
Mining of coal & lignite					
Quarrying of sand & clay, operation of sand & gravel pits					
Former Marshes	pg 1				1
Potentially Infilled Land (Non-Water)					
Potentially Infilled Land (Water)	pg 1		4	3	29

Envirocheck® Mining

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Ground Stability Data (1:50,000)					
Brine Compensation Area			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 3	Yes		n/a	n/a
Salt Mining Related Features					
Subsidence Insurance Claims				n/a	n/a
Subsidence Investigations	pg 3		1	n/a	n/a
Motion Map Data (1:2,500)					
Motion Map (100m)	pg 4		2	n/a	n/a

Report Version v47.0

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Former Marshes** Use: Former Marsh Date of Mapping: 1848	A18NE (N)	792	-	383929 393969
2	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A13SW (SW)	62	-	383656 393166
3	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A13SW (S)	77	-	383671 393140
4	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A13NW (NW)	114	-	383634 393309
5	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A13NE (NE)	194	-	383829 393353
6	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A13SE (S)	281	-	383726 392934
7	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A14SW (E)	477	-	384163 393121
8	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NW (S)	492	-	383553 392743
9	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A18SW (NW)	518	-	383432 393659
10	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SE (NE)	524	-	383992 393644
11	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12SE (W)	524	-	383182 393113
12	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NW (S)	539	-	383498 392712
13	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SW (N)	540	-	383604 393744
14	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NE (S)	541	-	383758 392677
15	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12SE (W)	541	-	383155 393188
16	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8NE (S)	554	-	383796 392669
17	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18SW (NW)	555	-	383458 393714
18	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1908	A19SW (NE)	571	-	384068 393645
19	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A18SW (N)	621	-	383562 393819
20	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A12NE (NW)	719	-	383056 393542
21	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NW (NW)	759	-	383396 393910

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A8SW (S)	805	-	383423 392456
23	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9NW (SE)	815	-	384340 392714
24	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	819	-	383892 394007
25	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A7NE (SW)	847	-	383172 392548
26	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1955	A19SW (NE)	849	-	384239 393865
27	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SE (NW)	852	-	383118 393840
28	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A19NW (NE)	861	-	384067 393989
29	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9NE (SE)	876	-	384410 392708
30	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A9SW (SE)	886	-	384261 392532
31	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1923	A19SE (NE)	905	-	384398 393783
32	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	918	-	384010 394075
33	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SW (NW)	930	-	383000 393831
34	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1955	A19NW (NE)	944	-	384345 393897
35	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A17SW (NW)	958	-	382961 393827
36	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NW (N)	958	-	383421 394130
37	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	A18NE (N)	964	-	384016 394122

Ground Stability Data (1:50,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Brine Compensation Area The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
38	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	0	1	383695 393213
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	0	1	383695 393213
	Potential for Ground Dissolution Stability Hazards No Hazard				
39	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	0	1	383695 393213
40	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	0	1	383695 393213
41	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	195	1	383835 393349
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	0	1	383695 393213
	Subsidence Investigations Site Investigation Date: 21st December 2005 Root Survey: No CCTV Drain Survey: Yes Depth of Foundation Footing: Not Supplied Soil Classification: Not Supplied			-	

Motion Map Data (1:2,500)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	**Motion Map** Average Velocity Gradient (mmyear): -1.0	A13NE (N)	8	-	383697 393220
43	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A13SE (SE)	99	-	383783 393167

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Ordnance Survey Plan	SJ8392	1956
Ordnance Survey Plan	SJ8492	1958
Ordnance Survey Plan	SJ8493	1958

The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Lancashire And Furness	111_00	1848
Cheshire	009_00	1882
Cheshire	010_00	1882
Lancashire And Furness	111_NE	1894
Lancashire And Furness	111_NW	1894
Lancashire And Furness	111_SW	1894
Lancashire And Furness	111_SE	1895
Cheshire	009_NE	1899
Cheshire	009_SE	1899
Cheshire	010_SW	1899
Lancashire And Furness	111_NE	1908
Lancashire And Furness	111_NW	1908
Cheshire	009_NE	1911
Cheshire	009_SE	1911
Cheshire	010_SW	1911
Lancashire And Furness	111_SE	1911
Lancashire And Furness	111_SW	1911
Lancashire And Furness	111_NE	1923
Lancashire And Furness	111_SE	1923
Lancashire And Furness	111_SW	1923
Lancashire And Furness	111_NW	1933
Cheshire	009_NE	1938
Cheshire	009_SE	1938
Cheshire	010_SW	1938
Ordnance Survey Plan	SJ89SE	1955
Ordnance Survey Plan	SJ89SW	1955
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SJ89SW	1989
Ordnance Survey Plan	SJ89SE	1990

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2013	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Mining Report Service	January 2012	As notified
Man Made Mining Cavities Peter Brett Associates	June 2013	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Peter Brett Associates	June 2013	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
Historical Land Use Information (1:2,500)	**Version**	**Update Cycle**
Subterranean Features Landmark Information Group Limited	September 2013	Bi-Annually
Ground Stability Data (1:50,000)	**Version**	**Update Cycle**
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	February 2011	Annually
Subsidence Insurance Claims SP Property Services	October 2012	Quarterly
Subsidence Investigations CET Structures Ltd	October 2012	Quarterly

Motion Map Data (1:2,500)	Version	Update Cycle
Motion Map		
Nigel Press Associates - Hampshire	February 2011	As notified
Nigel Press Associates - Cambridge	January 2011	As notified
Nigel Press Associates - Ipswich	January 2011	As notified
Nigel Press Associates - Norwich	January 2011	As notified
Nigel Press Associates - Peterborough	January 2011	As notified
Nigel Press Associates - Barnstaple	July 2010	As notified
Nigel Press Associates - Derbyshire	July 2010	As notified
Nigel Press Associates - Humberside	July 2010	As notified
Nigel Press Associates - Kent	July 2010	As notified
Nigel Press Associates - Lincolnshire	July 2010	As notified
Nigel Press Associates - Nottinghamshire	July 2010	As notified
Nigel Press Associates - Birmingham	May 2009	As notified
Nigel Press Associates - Bournemouth	May 2009	As notified
Nigel Press Associates - Brighton	May 2009	As notified
Nigel Press Associates - Bristol	May 2009	As notified
Nigel Press Associates - Cardiff	May 2009	As notified
Nigel Press Associates - Central London	May 2009	As notified
Nigel Press Associates - Cheltenahm	May 2009	As notified
Nigel Press Associates - Coventry	May 2009	As notified
Nigel Press Associates - Crawley	May 2009	As notified
Nigel Press Associates - Edinburgh	May 2009	As notified
Nigel Press Associates - Exeter	May 2009	As notified
Nigel Press Associates - Glasgow	May 2009	As notified
Nigel Press Associates - Isle of Wight	May 2009	As notified
Nigel Press Associates - Leeds	May 2009	As notified
Nigel Press Associates - Leicester	May 2009	As notified
Nigel Press Associates - Liverpool	May 2009	As notified
Nigel Press Associates - Manchester	May 2009	As notified
Nigel Press Associates - Milton Keynes	May 2009	As notified
Nigel Press Associates - Newcastle	May 2009	As notified
Nigel Press Associates - Northwich	May 2009	As notified
Nigel Press Associates - Nottingham	May 2009	As notified
Nigel Press Associates - Oxford	May 2009	As notified
Nigel Press Associates - Plymouth	May 2009	As notified
Nigel Press Associates - Portsmouth	May 2009	As notified
Nigel Press Associates - Preston	May 2009	As notified
Nigel Press Associates - Reading	May 2009	As notified
Nigel Press Associates - Sheffield	May 2009	As notified
Nigel Press Associates - Stoke	May 2009	As notified
Nigel Press Associates - Swindon	May 2009	As notified
Nigel Press Associates - Tonbridge	May 2009	As notified
Nigel Press Associates - North London	November 2008	As notified
Nigel Press Associates - Head Office	September 2008	As notified

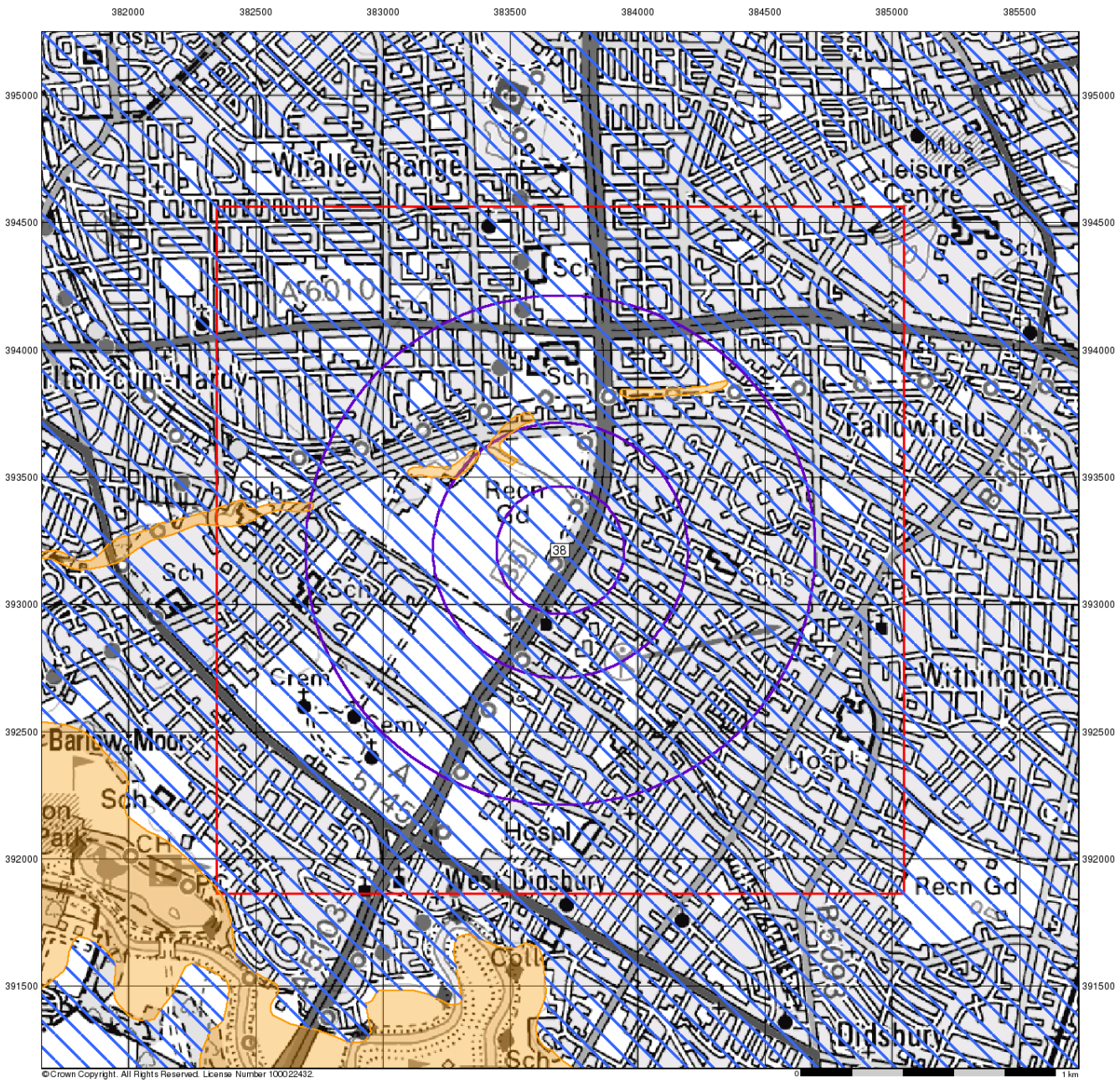
Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	Ordnance Survey Licensed Partner
British Geological Survey	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
The Coal Authority	THE COAL AUTHORITY
Ove Arup	ARUP
Peter Brett Associates	pba peterbrett
Wardell Armstrong	wardell armstrong your earth our world
Johnson Poole & Bloomer	JPB

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



Envirocheck® Mining

Ground Stability Data (1:50,000)

General

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

Potential for Compressible Ground Stability Hazards

High | Low | Moderate | Very Low

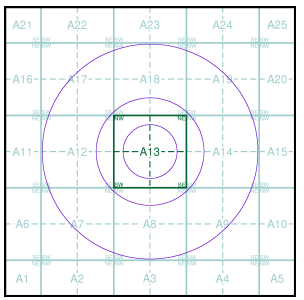
Potential for Collapsible Ground Stability Hazards

High | Low | Moderate | Very Low

Brine Pumping and Salt Mining

	Point	Polygon
Brine Pumping Related Feature	▲	▨
Salt Mining Related Feature	▲	▨

Mining and Ground Stability - Slice A



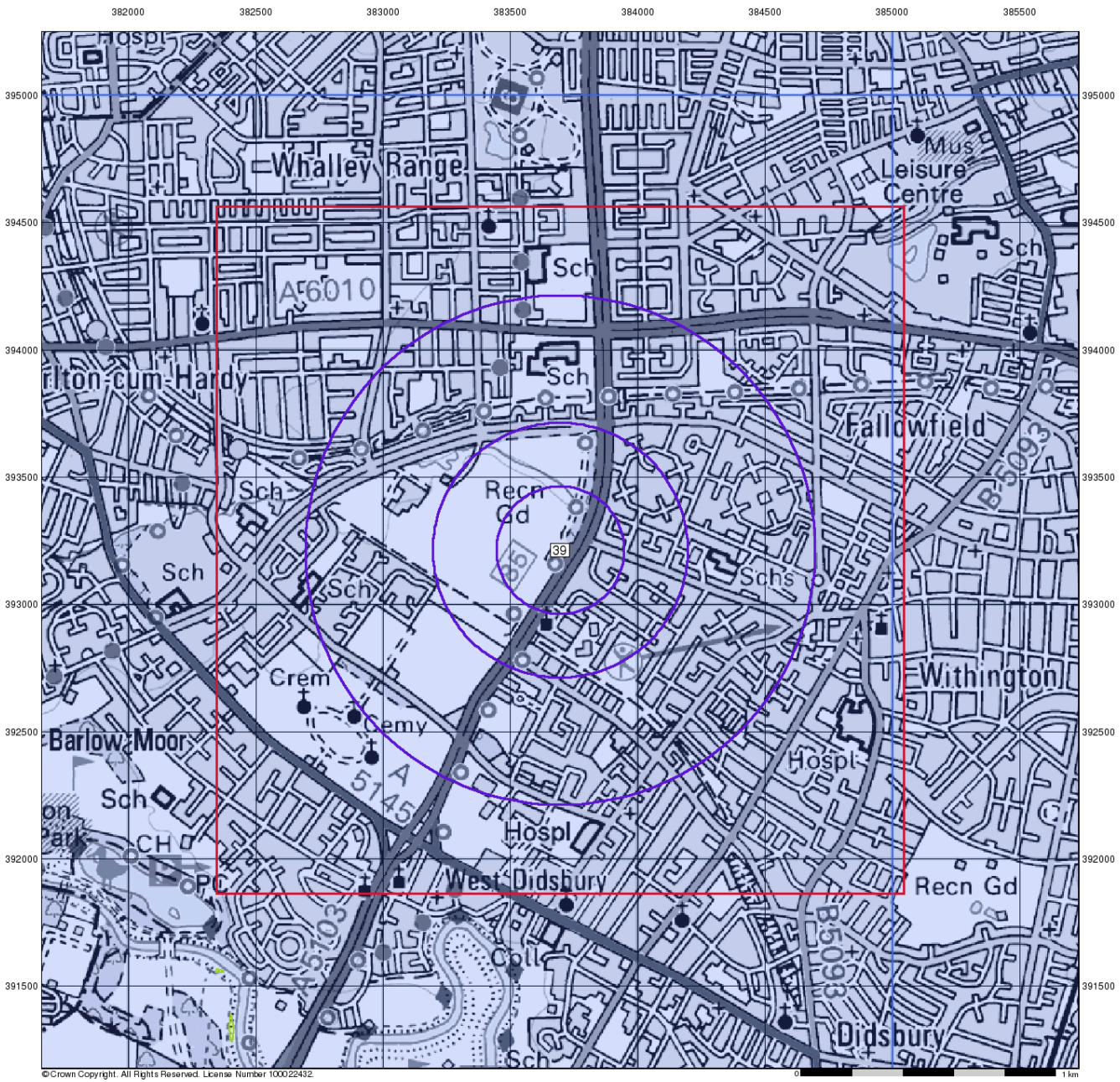
Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck® Mining

Ground Stability Data (1:50,000)

General

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

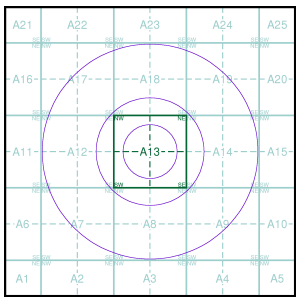
Potential for Landslide Ground Stability Hazards

High | Low
Moderate | Very Low

Potential for Ground Dissolution Stability Hazards

High | Low
Moderate | Very Low

Mining and Ground Stability - Slice A



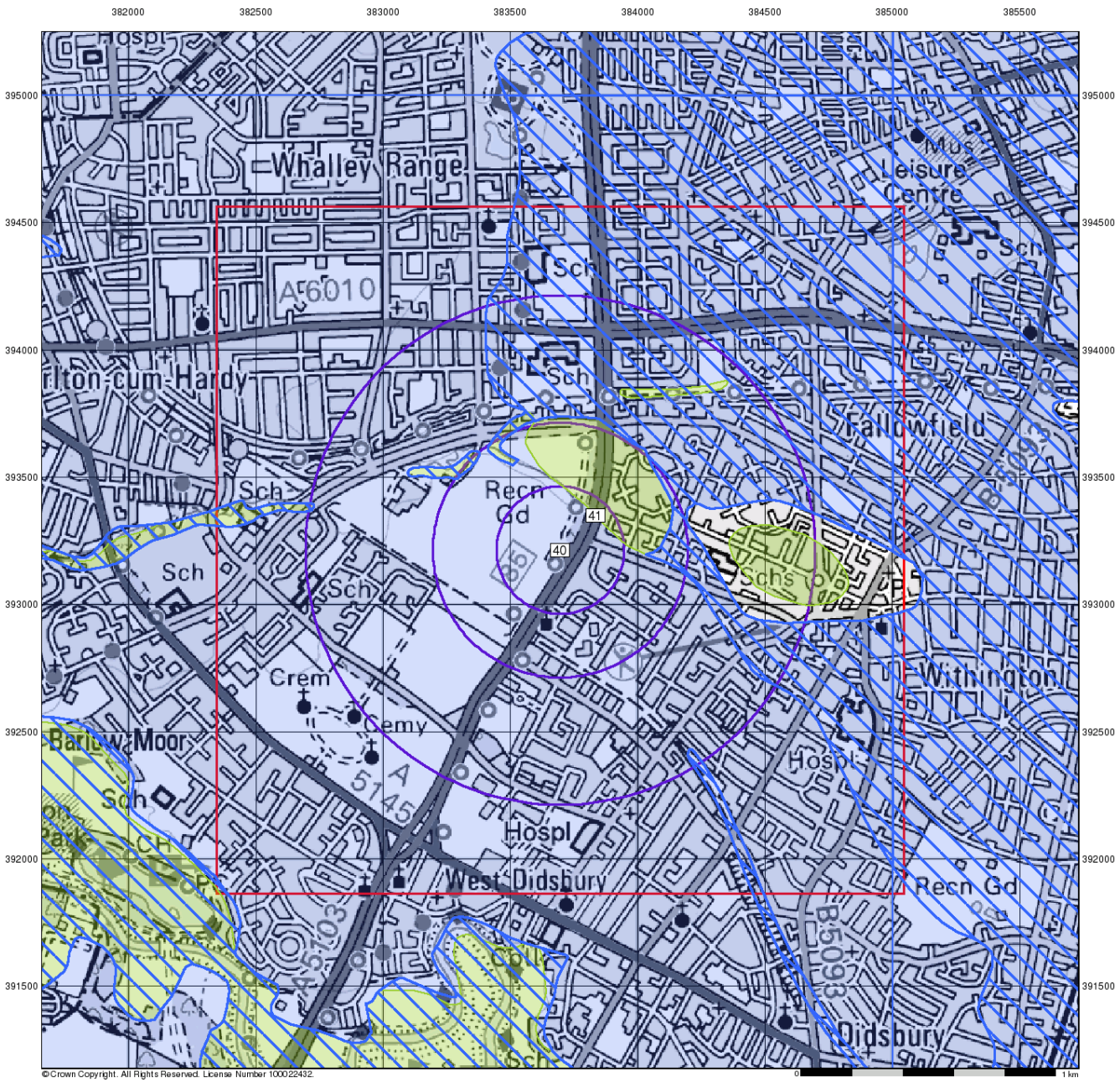
Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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



Envirocheck® Mining

Ground Stability Data (1:50,000)

General

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

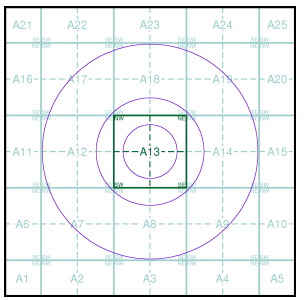
Potential for Running Sand Ground Stability Hazards

High | Low
Moderate | Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

High | Low
Moderate | Very Low

Mining and Ground Stability - Slice A



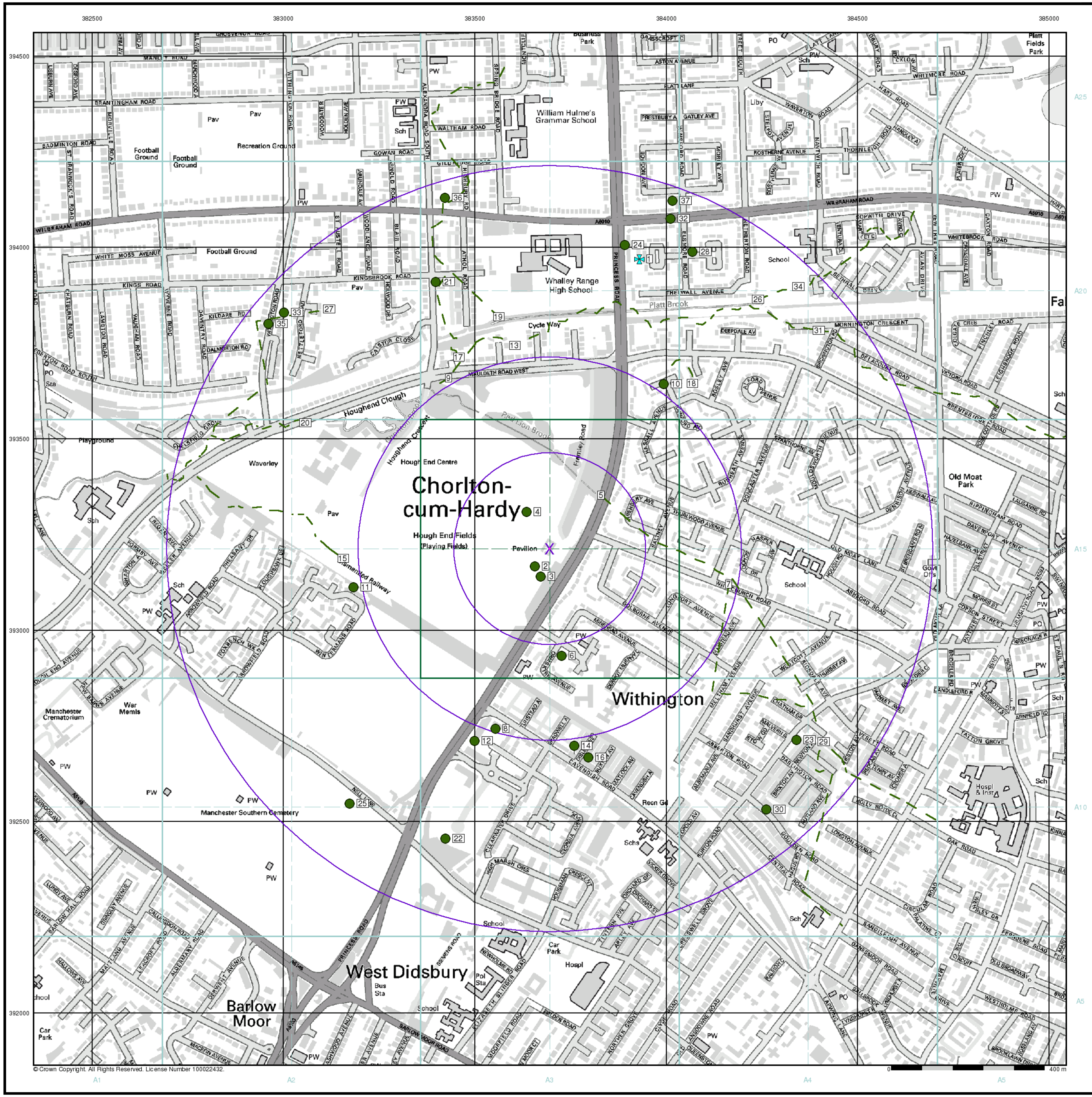
Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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Envirocheck® Mining

Historical Land Use Information (1:10,000)

General

Specified Site · Specified Buffer(s) · X Bearing Reference Point · Map ID

Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts			
Disturbed Ground			
General Quarrying			
Heap, unknown constituents			
Mineral Railway			
Mining and Quarrying General			
Mining of Coal & Lignite			
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits			

Historical Land Use

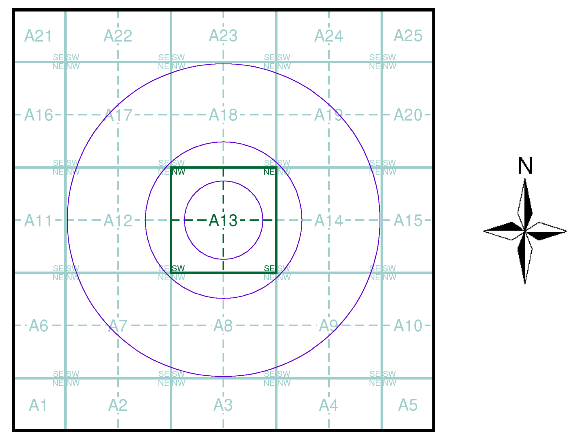
	Point	Line	Polygon
Potentially Infilled Land (Non-Water)			
Potentially Infilled Land (Water)			
Former Marsh			

Mining Data

Potential Mining Area

BGS Recorded Mineral Site

Mining and Ground Stability - Slice A



Order Details

Order Number: 48987548_1_1
Customer Ref: TLL/AW/P2005641
National Grid Reference: 383700, 393210
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Envirocheck® Report:

Flood Screening Report Datasheet

Order Details:

Order Number:
48987548_1_1

Customer Reference:
TLL/AW/P2005641

National Grid Reference:
383700, 393210

Slice:
A

Site Area (Ha):
0.01

Search Buffer (m):
1000

Site Details:

Greater Manchester Police Sports & Social Club Ltd
Mauldeth Road West, Chorlton cum Hardy
MANCHESTER
M21 7SX

Client Details:

Miss T Lunt
Building Design Partnership (Sheffield)
1 North Bank
Sheffield
S3 8JY

Envirocheck® Flood

Contents

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer(s) selected. For ease of reference, the report is broken down into seven sections of data.	
EA / CEH Flood Data	-
This section details data from the Environment Agency and the Centre for Ecology and Hydrology. The EA data is reported to a distance of 250m from the edge of the site polygon and details both Zone 2 (extreme) and Zone 3 flood extents, as well as flood defences, flood water storage areas and areas benefiting from flood defences. The CEH data is reported to a distance of 250m from the edge of the site polygon and covers flood data for Scotland, divided into levels based on the frequency and magnitude of a predicted 100 year term. All data sets within this section are plotted and feature on the EA / CEH Flood Data (1:10,000) map. For added value, OS Contour data is also plotted, detailing contours, spot heights and air heights.	
RMS Flood Data	1
This section contains the Risk Management Solutions flood data. The data is based upon the likelihood of a flood occurence for 3 flood return periods; these being 75 years, 100 years and 1000 years. Each return period is depicted on a separate 1:10,000 scale map and reports features to a distance of 250m from the edge of the site polygon. Each return period can detail both defended and/or undefended flood features, with each feature also reporting an associated flood depth. In addition pluvial flood features are also detailed where applicable, but tidal flooding is not included. For added value, OS Contour data is also plotted, detailing contours, spot heights and air heights.	
BGS Flood Data	2
This section contains two BGS data sets; namely Geological Indicators of Flooding and Groundwater Flooding Susceptibility, both of which report features out to a possible 1000m, with coverage in England, Wales and Scotland. Each data set is plotted on a seperate BGS Flood Data (1:50,000) map.	
EA Detailed River Network Data	3
This section details 3 sources of data that depict and detail the river network of England and Wales, captured primarily from the water features theme of Ordnance Survey's OS MasterMap Topography Layer. The DRN Lines data set details all the types of rivers, drains and streams which can be found in England and Wales. The DRN Nodes data set details the river, drain and stream node intersections which divide the detailed river network data. All nodes are defined as being one of the following: A source, sink, junction, or pseudo node, interactions or not assigned. The DRN Offline Drainage dataset details water features from OS MasterMap that do not connect into the river network and are generally limited in length. All data sets within this section are plotted and feature on the EA Detailed River Network (1:10,000) map. For added value, OS Contour data is also plotted, detailing contours, spot heights and air heights.	
EA Historic Flood Events Data	-
This section details Historic Flood data sourced from the Environment Agency and from data held by Landmark. The EA Historic Flood Events data is reported to a distance of 1000m from the edge of the site polygon and details recorded historic flood events from 1703 to October 2008. The data also contains information on the source and cause of the flood, and how the flood outline was established. Also included in this section is Landmark's Historical Flood Liabilities data set, which identifies areas that are liable to flood based on systematic analysis of historical mapping dating back to the mid 19th century. Both data sets within this section are plotted and feature on the EA Historical Flood (1:10,000) map. For added value, OS Contour data is also plotted, detailing contours, spot heights and air heights.	

Contents

EA NaFRA Data	**5**
This section details the National Flood Risk Assessment (NaFRA) data sourced from the Environment Agency and is reported to a distance of 1000m from the edge of the site polygon. The NaFRA data provides an indication of flood risk at a national level. The data has been created by calculating the actual likelihood of flooding to areas of land within the flood plain of an extreme flood (0.1% or 1 in 1000 chance in any year). The method considers the probability that the flood defences will overtop or breach, and the distance of the impact cell from the river or the sea. It enables a comparison of the relative risks and their distribution within each of these catchments, rather than a detailed, local assessment of the risk at a specific location. EA do not hold information on properties (including floor levels). NaFRA data can therefore only assessed if there are properties within the impact cells where EA have assessed the flood risk. The data within this section is plotted and feature on the EA NaFRA Data (1:50,000) map.	
Flood Insurance Risk Data	**12**
This section contains flood risk data from Crawford and Company. This dataset is not plotted on any of the associated Flood maps. Crawford & Co have generated an Insurance Claims rating for Flood Risk. The risk is determined by comparing the number of flood insurance claims made to the number of properties in the postcode sector. The data will also include flood claims from domestic accidents or blocked drains, as well as flooding from river or tidal events. Flood insurance claim ratings are reported for the site only.	
Data Currency	**13**
Data Suppliers	**14**
Useful Contacts	**15**

Report Version v47.0

Envirocheck® Flood

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
EA / CEH Flood Data					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
RMS Flood Data					
RMS 75 year Flood Return	pg 1		3	n/a	n/a
RMS 100 year Flood Return	pg 1		5	n/a	n/a
RMS 1000 year Flood Return	pg 1		1	n/a	n/a
BGS Flood Data					
BGS Geological Indicators of Flooding	pg 2			2	2
BGS Groundwater Flooding Susceptibility	pg 2	1		1	5
EA Detailed River Network Data					
Detailed River Network Lines	pg 3		1		7
Detailed River Network Nodes	pg 4		1		5
Detailed River Network Offline Drainage					
EA Historic Flood Events Data					
Historic Flood Events					
Historical Flood Liabilities					
EA National Flood Risk Assessment Data					
National Flood Risk Assessment	pg 5			11	87
Flood Insurance Risk Data					
Postcode Sector Flood Insurance Claim Ratings	pg 12	1	n/a	n/a	n/a

Report Version v47.0

RMS Flood Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	RMS 75 year Flood Return Flood Type/Depth: 75 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NE (E)	127	2	383822 393218
	RMS 75 year Flood Return Flood Type/Depth: 75 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13SW (S)	162	2	383695 393052
	RMS 75 year Flood Return Flood Type/Depth: 75 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NE (N)	229	2	383696 393441
	RMS 100 year Flood Return Flood Type/Depth: 100 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NE (N)	6	2	383695 393219
	RMS 100 year Flood Return Flood Type/Depth: 100 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13SW (S)	51	2	383695 393163
	RMS 100 year Flood Return Flood Type/Depth: 100 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NW (NW)	73	2	383656 393274
	RMS 100 year Flood Return Flood Type/Depth: 100 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13SW (S)	113	2	383655 393107
	RMS 100 year Flood Return Flood Type/Depth: 100 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NW (W)	184	2	383523 393275
	RMS 1000 year Flood Return Flood Type/Depth: 1000 year pluvial flood, depth is not applicable Flood Hazard: Pluvial & Minor River Flood Risk	A13NE (N)	6	2	383695 393219

BGS Flood Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Geological Indicators of Flooding Flooding Type: Inland Flooding Flood Potential Code: Higher flood potential from rivers: the first areas to experience the effects of inland flooding in a river catchment.	A13NW (NW)	382	3	383509 393546
	BGS Geological Indicators of Flooding Flooding Type: Inland Flooding Flood Potential Code: Higher flood potential from rivers: the first areas to experience the effects of inland flooding in a river catchment.	A12NE (NW)	481	3	383340 393535
	BGS Geological Indicators of Flooding Flooding Type: Inland Flooding Flood Potential Code: Higher flood potential from rivers: the first areas to experience the effects of inland flooding in a river catchment.	A18SE (N)	654	3	383941 393818
	BGS Geological Indicators of Flooding Flooding Type: Inland Flooding Flood Potential Code: Higher flood potential from rivers: the first areas to experience the effects of inland flooding in a river catchment.	A12NW (W)	983	3	382727 393381
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (N)	0	3	383695 393213
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (W)	396	3	383300 393213
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (W)	563	3	383150 393350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	646	3	383050 393200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SW (W)	705	3	383000 393100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8SW (S)	946	3	383450 392300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A17NW (NW)	978	3	383000 393900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Detailed River Network Lines** River Type: Secondary River River Name: Red Lion Brook Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13NE (NE)	188	1	383816 393357
2	**Detailed River Network Lines** River Type: Primary River River Name: Chorlton Brook Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: CHORLTON PLATT GORE Water Course Reference: CHOP	A17SE (NW)	507	1	383318 393551
3	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: CHORLTON PLATT GORE Water Course Reference: CHOP	A18SW (NW)	524	1	383376 393628
4	**Detailed River Network Lines** River Type: Primary River River Name: Platt Brook Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: CHORLTON PLATT GORE Water Course Reference: CHOP	A18SW (N)	606	1	383544 393799
5	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Currently Undefined Water Course Name: CHORLTON PLATT GORE Water Course Reference: CHOP	A12NE (NW)	670	1	383115 393546
6	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Leigh Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Currently Undefined Water Course Name: CRINGLE BLACK BROOK Water Course Reference: CRIN	A19SW (NE)	829	1	384312 393766

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**Detailed River Network Lines** River Type: Primary River River Name: Leigh Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: CRINGLE BLACK BROOK Water Course Reference: CRIN	A19SW (NE)	843	1	384281 393818
8	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Currently Undefined Water Course Name: CHORLTON PLATT GORE Water Course Reference: CHOP	A19SW (NE)	849	1	384252 393853
9	**Detailed River Network Nodes** River Node Type: Source Hydrographic Area: D011	A13NE (NE)	188	1	383816 393357
10	**Detailed River Network Nodes** River Node Type: Junction Hydrographic Area: D011	A18SW (NW)	525	1	383362 393617
11	**Detailed River Network Nodes** River Node Type: Pseudo (OS MasterMap polygon boundary) Hydrographic Area: D011	A18SW (N)	606	1	383544 393799
12	**Detailed River Network Nodes** River Node Type: Pseudo (OS MasterMap polygon boundary) Hydrographic Area: D011	A12NE (NW)	670	1	383115 393546
13	**Detailed River Network Nodes** River Node Type: Pseudo (OS MasterMap polygon boundary) Hydrographic Area: D011	A19SW (NE)	843	1	384282 393818
14	**Detailed River Network Nodes** River Node Type: Junction Hydrographic Area: D011	A19SW (NE)	849	1	384252 393853

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A14NW (E)	377	1	384060 393306
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	421	1	383280 393278
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	426	1	383280 393302
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A12SE (W)	443	1	383272 393084
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	444	1	383261 393301
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	489	1	383288 393482
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	493	1	383224 393354
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	495	1	383332 393548
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	497	1	383200 393249
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	497	1	383332 393551
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	500	1	383300 393519
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	505	1	383220 393382
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	506	1	383350 393583
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A12SE (W)	506	1	383196 393136

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	515	1	383204 393366
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	515	1	383308 393551
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	518	1	383311 393560
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (NW)	527	1	383362 393620
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	530	1	383216 393438
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	531	1	383250 393501
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	536	1	383204 393426
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	540	1	383320 393601
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (W)	544	1	383152 393214
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	547	1	383250 393531
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	548	1	383607 393754
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	563	1	383204 393486
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	565	1	383208 393498
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (NE)	566	1	384005 393686

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (NE)	579	1	384005 393702
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (NE)	582	1	383985 393718
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	585	1	383695 393798
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	589	1	383695 393801
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	590	1	383650 393801
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	592	1	383750 393802
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	593	1	383503 393774
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	593	1	383503 393774
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	593	1	383515 393778
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	603	1	383529 393792
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	615	1	383539 393807
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	617	1	383544 393811
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	620	1	383543 393814
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18SW (N)	621	1	383621 393829

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	622	1	383868 393810
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	630	1	383897 393810
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	630	1	383165 393551
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	634	1	383900 393813
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	639	1	383700 393851
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (NE)	647	1	383965 393801
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	657	1	383897 393838
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NE (NW)	662	1	383100 393501
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18SE (N)	672	1	383905 393851
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	678	1	384241 393614
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	687	1	384250 393618
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	689	1	383100 393559
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18NW (N)	690	1	383650 393901
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SE (NW)	729	1	383100 393634

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	740	1	384250 393702
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	753	1	384100 393847
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18NE (N)	754	1	383849 393951
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A18NE (N)	770	1	383905 393954
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18NE (N)	772	1	383921 393951
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18NW (N)	782	1	383440 393951
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NW (W)	783	1	382950 393451
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18NE (N)	788	1	383850 393986
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	791	1	384245 393782
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	797	1	384200 393830
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	800	1	384237 393801
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A17SW (NW)	801	1	383000 393610
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	816	1	384309 393750
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	816	1	384309 393751

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	828	1	384312 393765
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A18NW (N)	834	1	383425 394001
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	834	1	384316 393769
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	835	1	384333 393751
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	840	1	384300 393796
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	842	1	384281 393818
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	848	1	384284 393823
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SW (NE)	856	1	384361 393750
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NW (W)	866	1	382850 393401
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	870	1	384385 393742
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	879	1	384489 393590
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A17SW (NW)	884	1	382900 393598
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	914	1	384429 393758
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NW (W)	916	1	382800 393401

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A14NE (E)	919	1	384553 393542
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	919	1	384429 393766
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A17SW (NW)	926	1	382850 393590
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A12NW (W)	939	1	382776 393402
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A18NW (N)	959	1	383500 394151
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: No Result Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	962	1	384444 393817
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	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	980	1	384581 393633
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Low Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	985	1	384584 393638
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	985	1	384600 393601
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	990	1	384600 393613
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Moderate Source: Environment Agency, Head Office Catchment Area: Mersey	A19SE (NE)	997	1	384600 393630
	National Flood Risk Assessment (NaFRA) Flood Risk Assessment Code: Significant Source: Environment Agency, Head Office Catchment Area: Mersey	A12NW (W)	1000	1	382720 393428

Flood Insurance Risk Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Postcode Sector Flood Insurance Claim Ratings Insurance Rating: Very Low Flood Insurance Claim Rating - No Recorded Claims Postcode Sector: M21 7	A13NE (N)	0	4	383695 393213

Data Currency

EA / CEH Flood Data	Version	Update Cycle
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2013	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2013	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	August 2013	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	August 2013	Quarterly
Flood Defences Environment Agency - Head Office	August 2013	Quarterly
RMS Flood Data	**Version**	**Update Cycle**
RMS 75 year Flood Return Risk Management Solutions - North West Catchment	December 2008	As notified
RMS 100 year Flood Return Risk Management Solutions - North West Catchment	December 2008	As notified
RMS 1000 year Flood Return Risk Management Solutions - North West Catchment	December 2008	As notified
BGS Flood Data	**Version**	**Update Cycle**
BGS Geological Indicators of Flooding British Geological Survey - National Geoscience Information Service	February 2011	Annually
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually
EA Detailed River Network Data	**Version**	**Update Cycle**
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Nodes Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually
EA Historic Flood Events Data	**Version**	**Update Cycle**
Historic Flood Events Environment Agency - Head Office	April 2013	Quarterly
Historical Flood Liabilities Landmark Information Group Limited	December 1999	Not Applicable
EA National Flood Risk Assessment Data (NaFRA)	**Version**	**Update Cycle**
National Flood Risk Assessment Environment Agency - Head Office	October 2012	Annually
Flood Insurance Risk Data	**Version**	**Update Cycle**
Postcode Sector Flood Insurance Claim Ratings Crawford and Company	June 2013	Quarterly

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Centre for Ecology and Hydrology	
British Geological Survey	
Risk Management Solutions	

Useful Contacts

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2	**Landmark Information Group Limited** Legal and Financial, Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9966 Fax: 0844 844 9980 Email: info@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk
3	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
4	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

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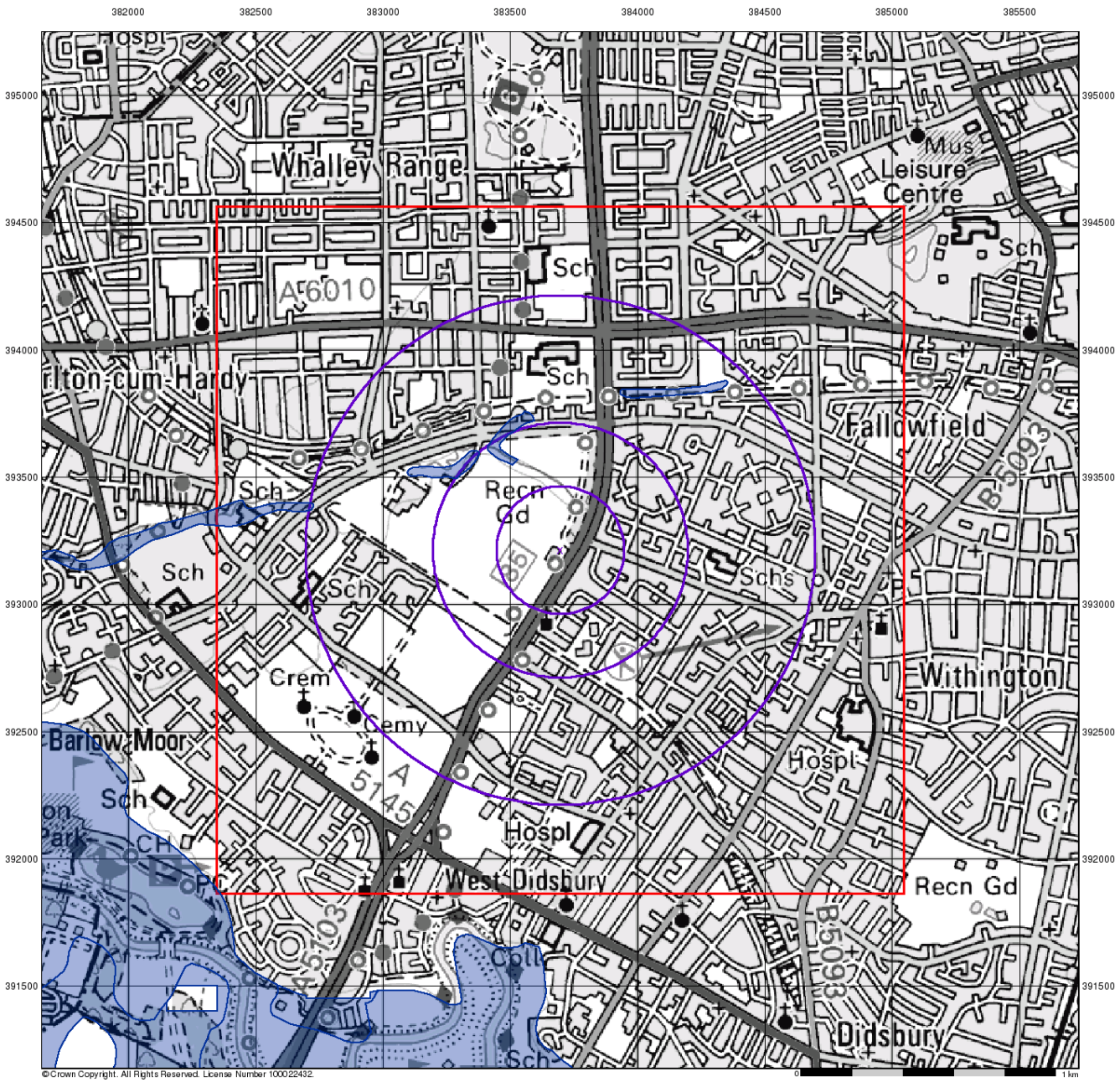
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Envirocheck® Flood

BGS Flood Data (1:50,000)

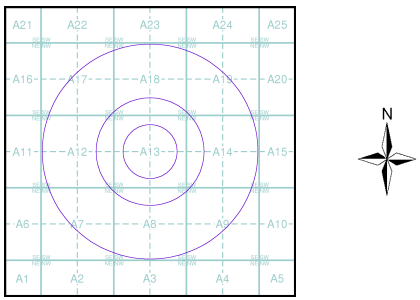
General

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

BGS Geological Indicators of Flooding

- Coastal
- Inland
- Bodies of Water

BGS Flood Data Map - Slice A



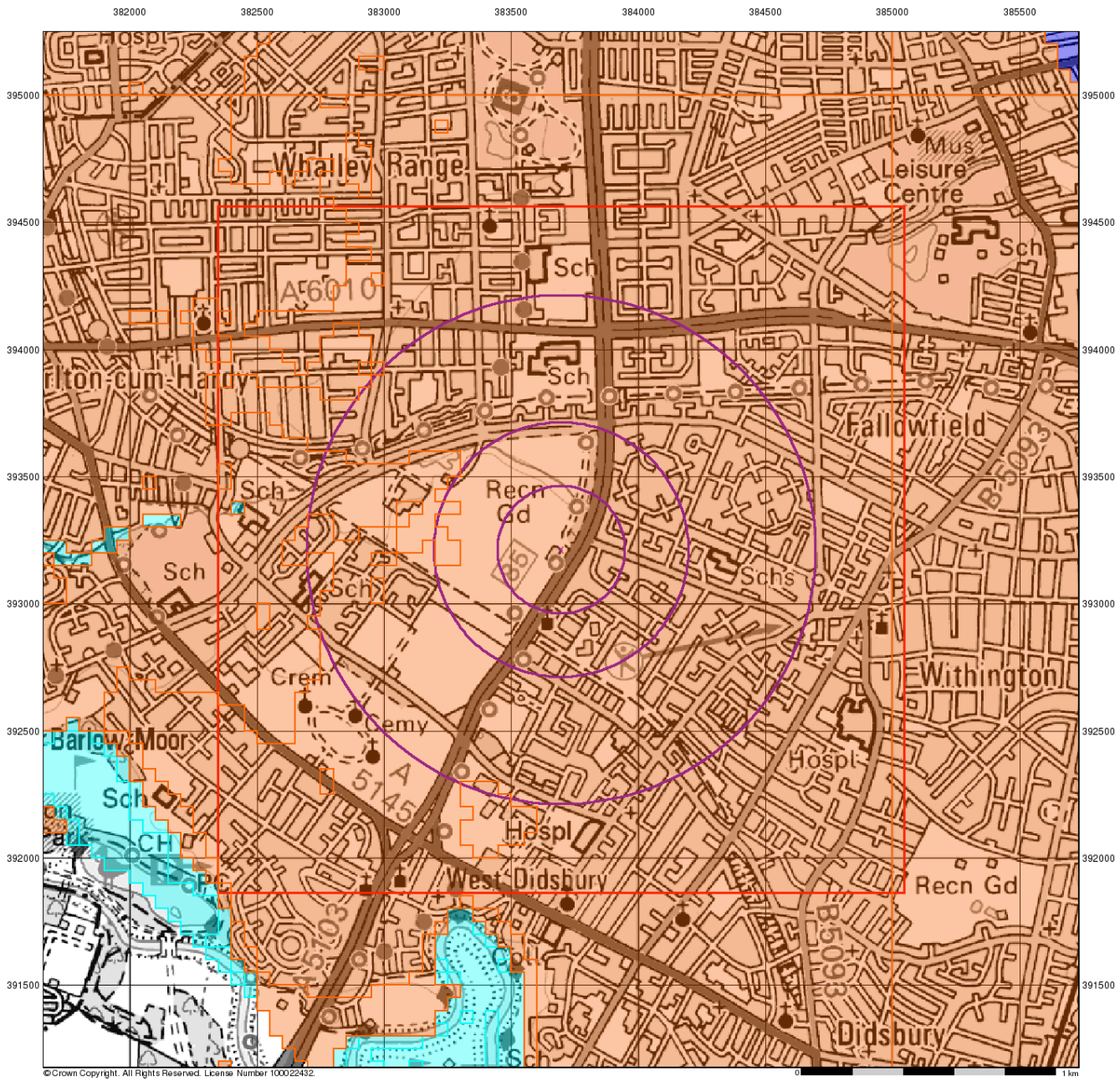
Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck® Flood

BGS Flood Data (1:50,000)

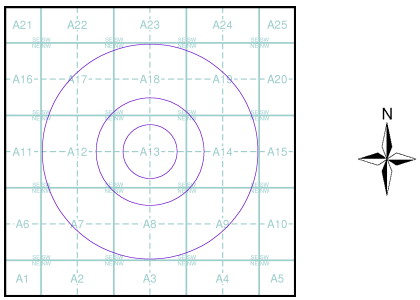
General

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

BGS Groundwater Flooding Susceptibility

- Potential for Groundwater Flooding to Occur at Surface
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A



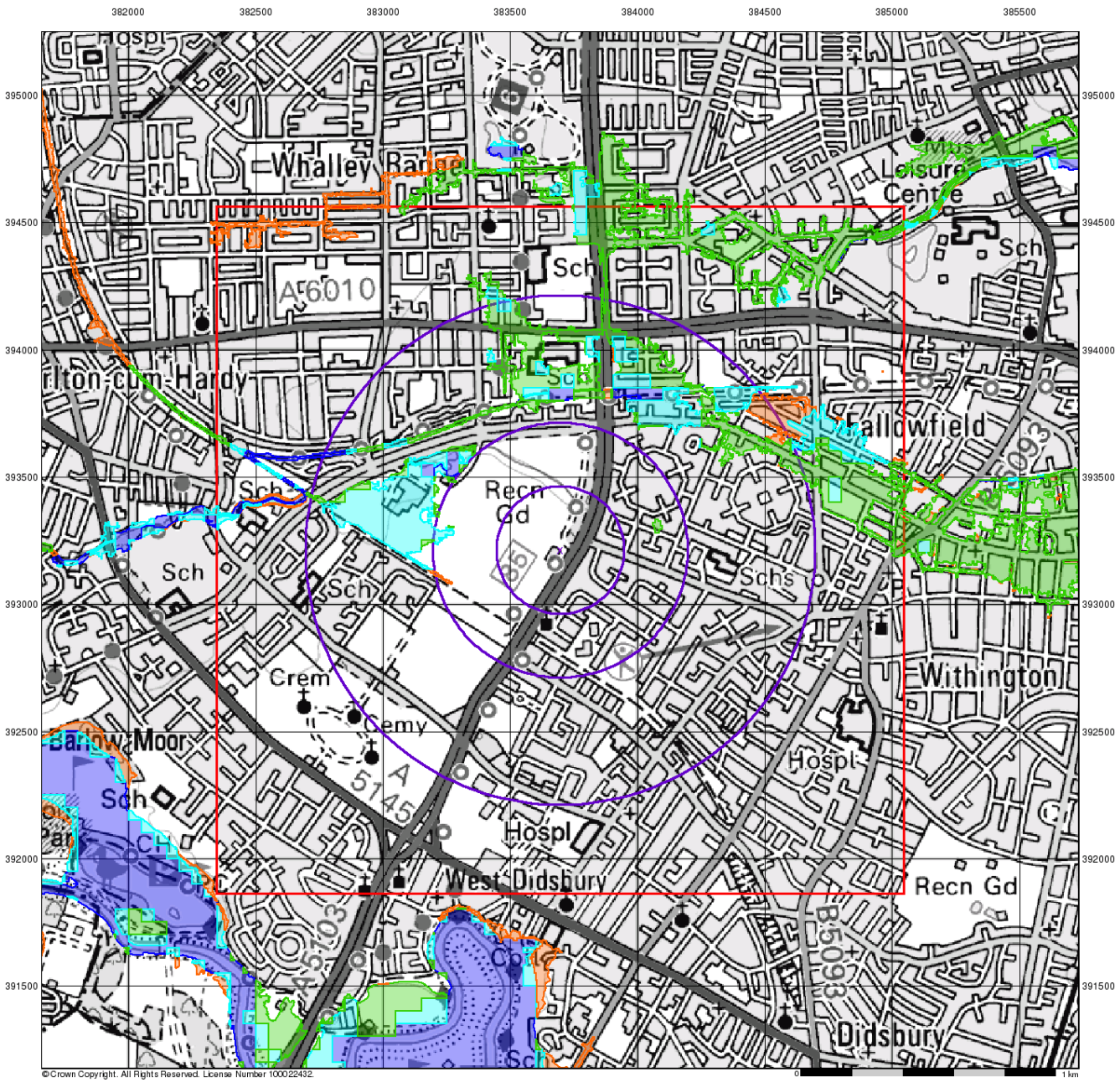
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National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck® Flood

EA NaFRA Data (1:50,000)

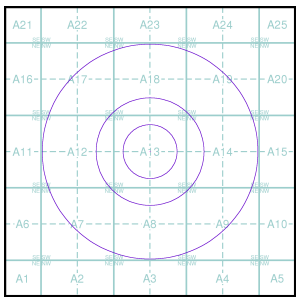
General

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

National Flood Risk Assessment (NaFRA)

- Significant Risk
- Moderate Risk
- Low Risk
- No Result

EA NaFRA Data Map - Slice A



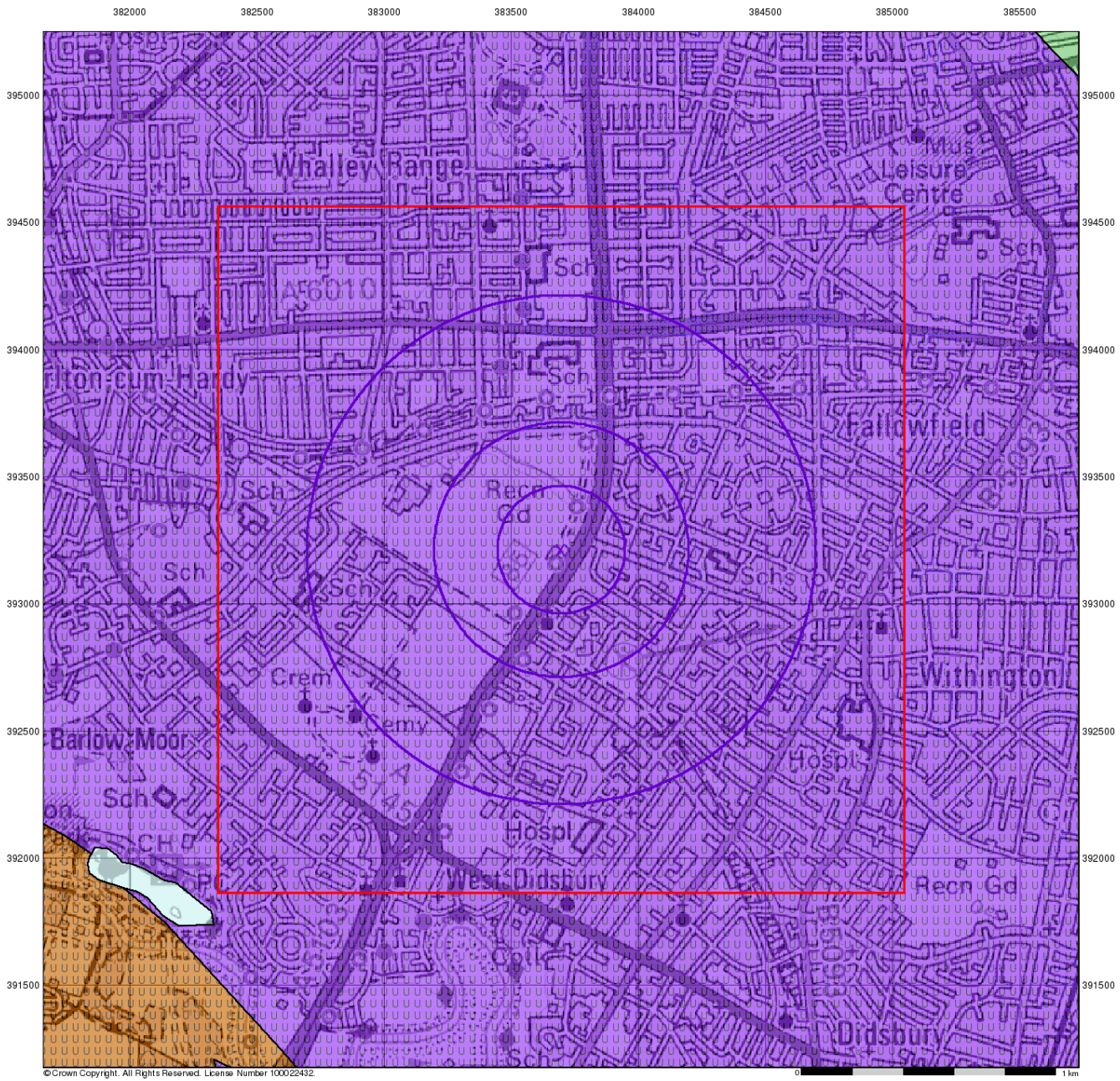
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Groundwater Vulnerability

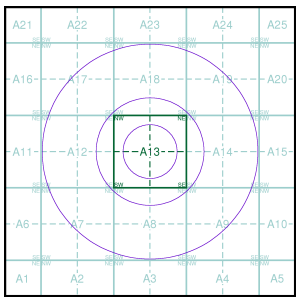
General

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

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



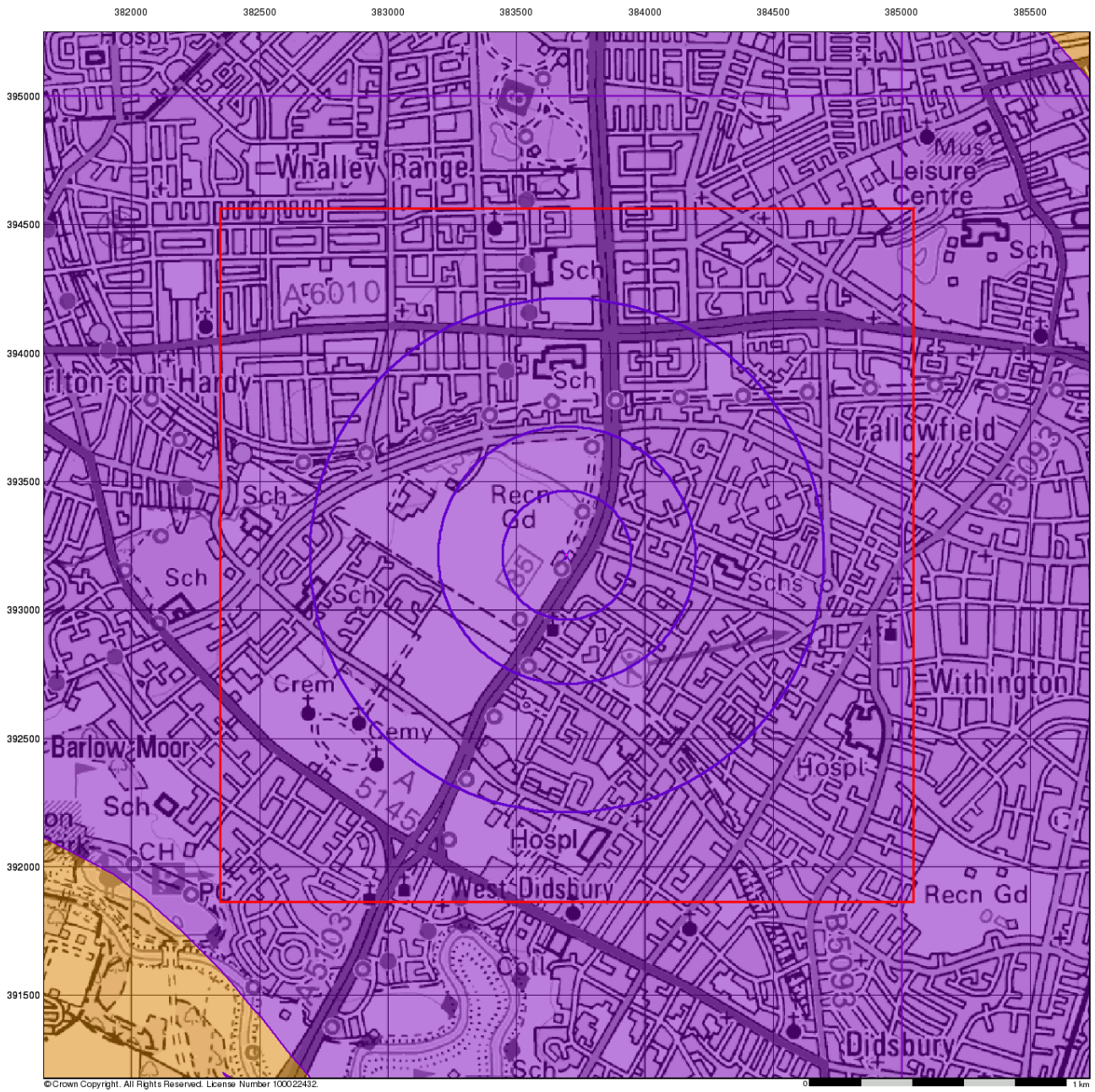
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Bedrock Aquifer Designation

General

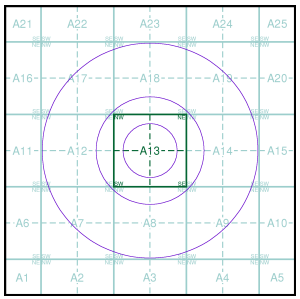
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



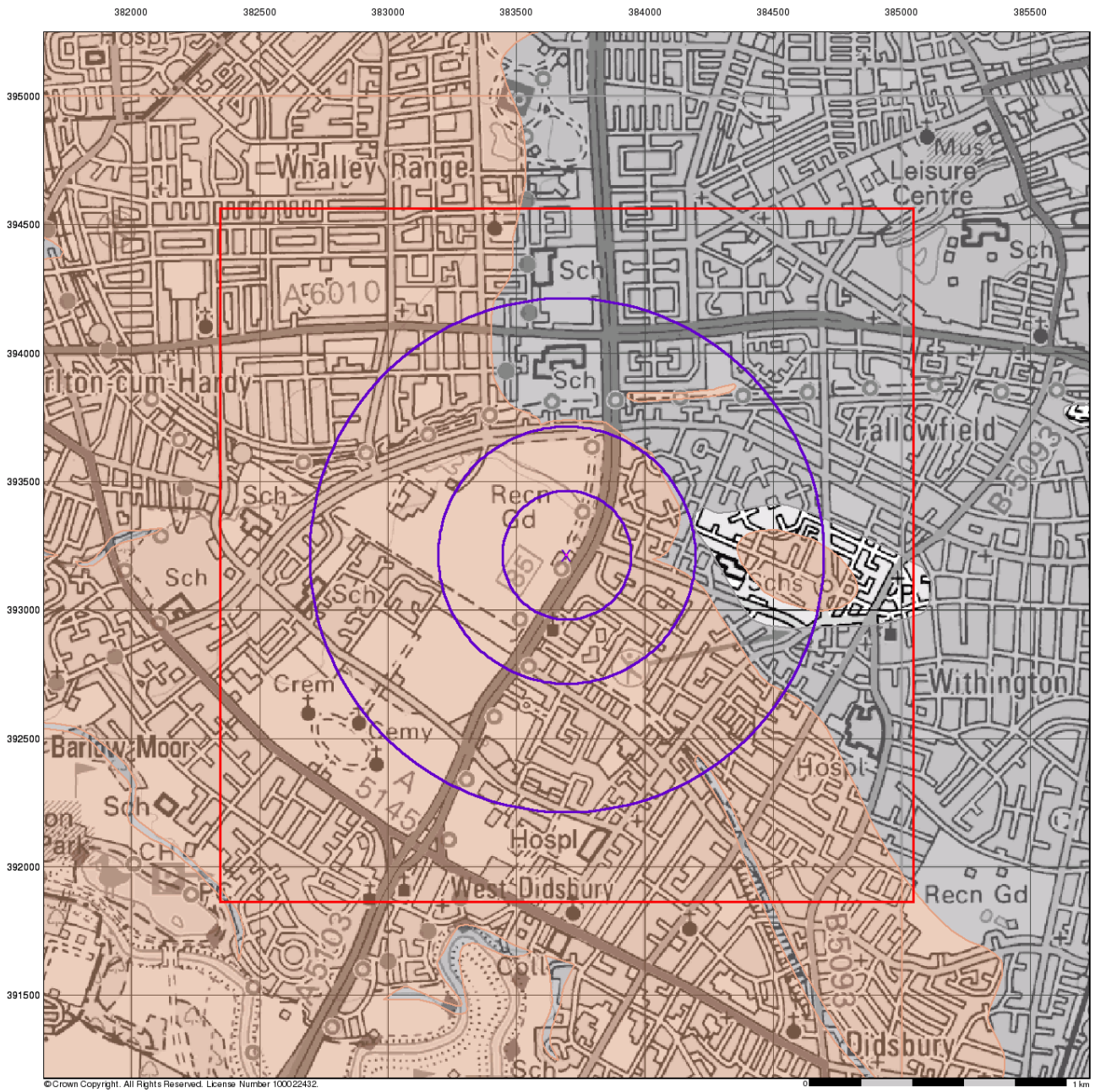
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Site Details

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Superficial Aquifer Designation

General

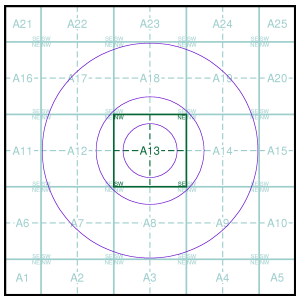
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



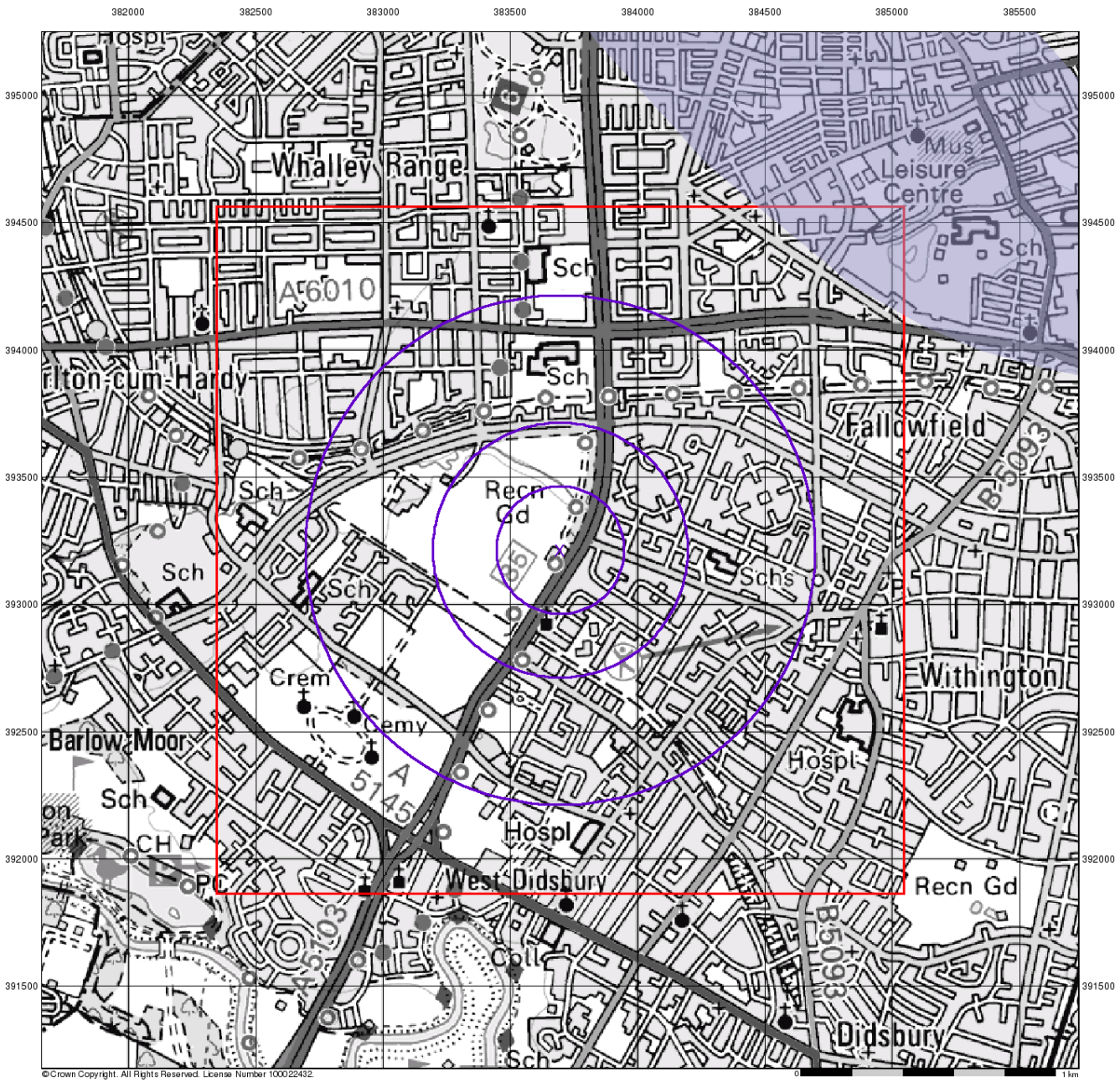
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Source Protection Zones

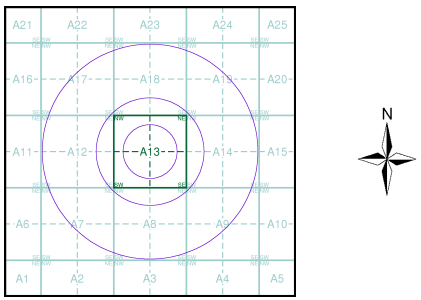
General

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

Agency and Hydrological

- Source Protection Zone I
- Source Protection Zone II
- Source Protection Zone III
- Zone of Special Interest
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



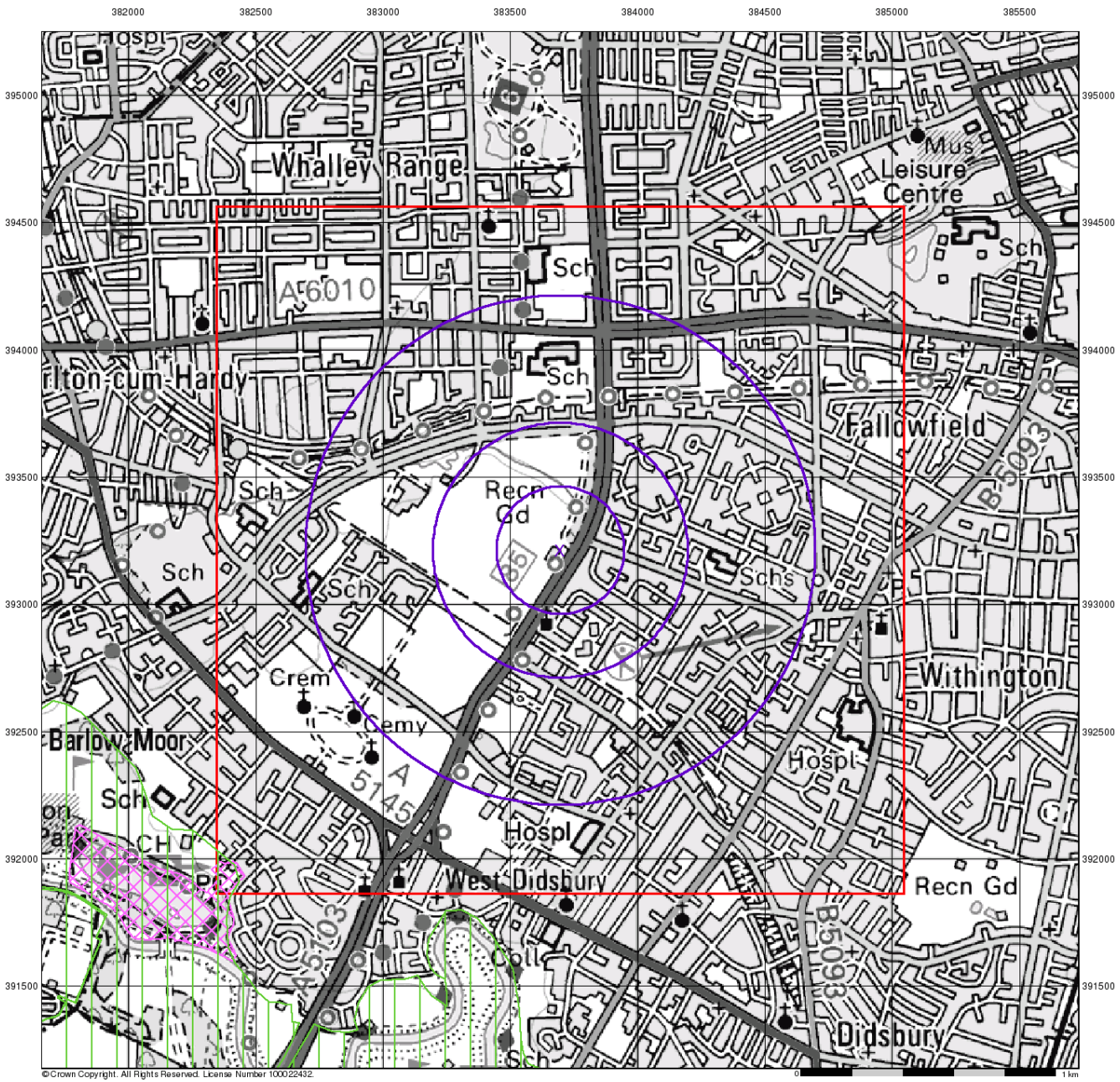
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Sensitive Land Uses

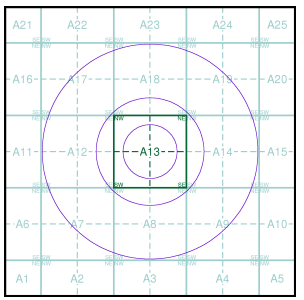
General

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

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
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Site Details

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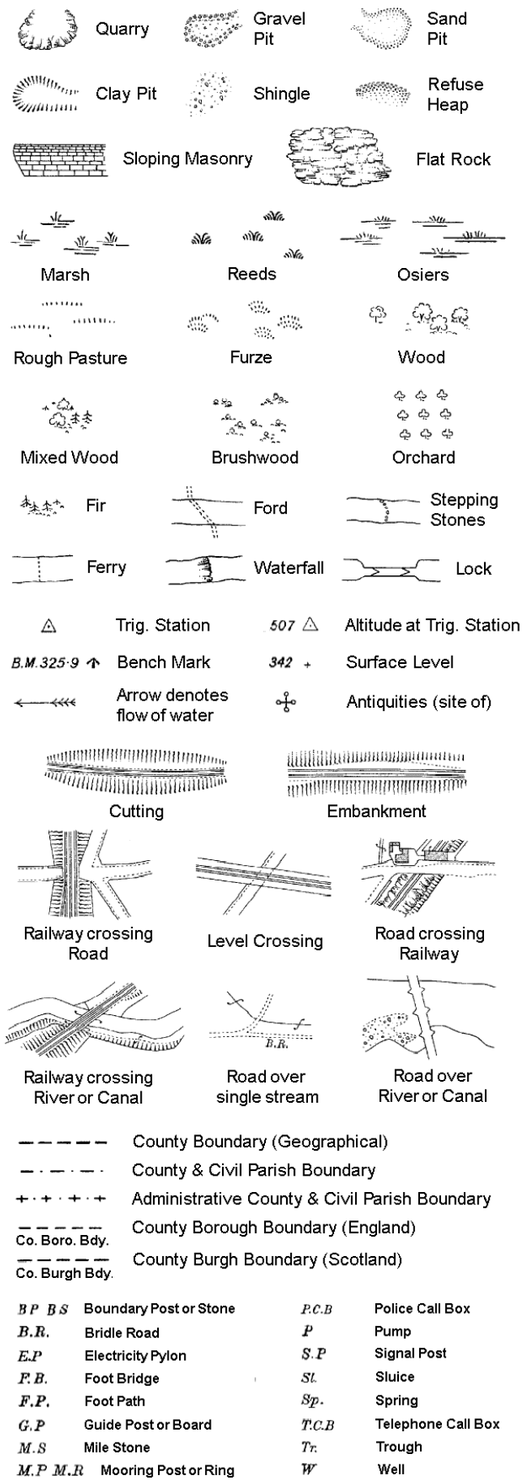
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Web: www.envirocheck.co.uk

Appendix B

Historical Maps (Envirocheck)

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

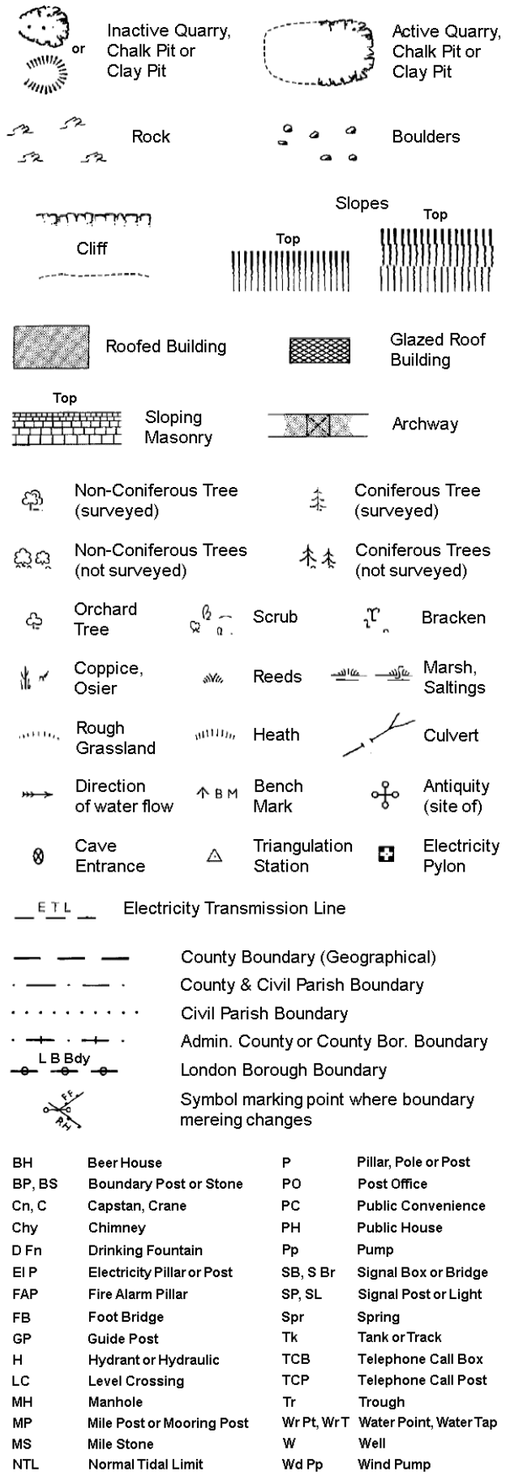
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

BP BS	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	Sl.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

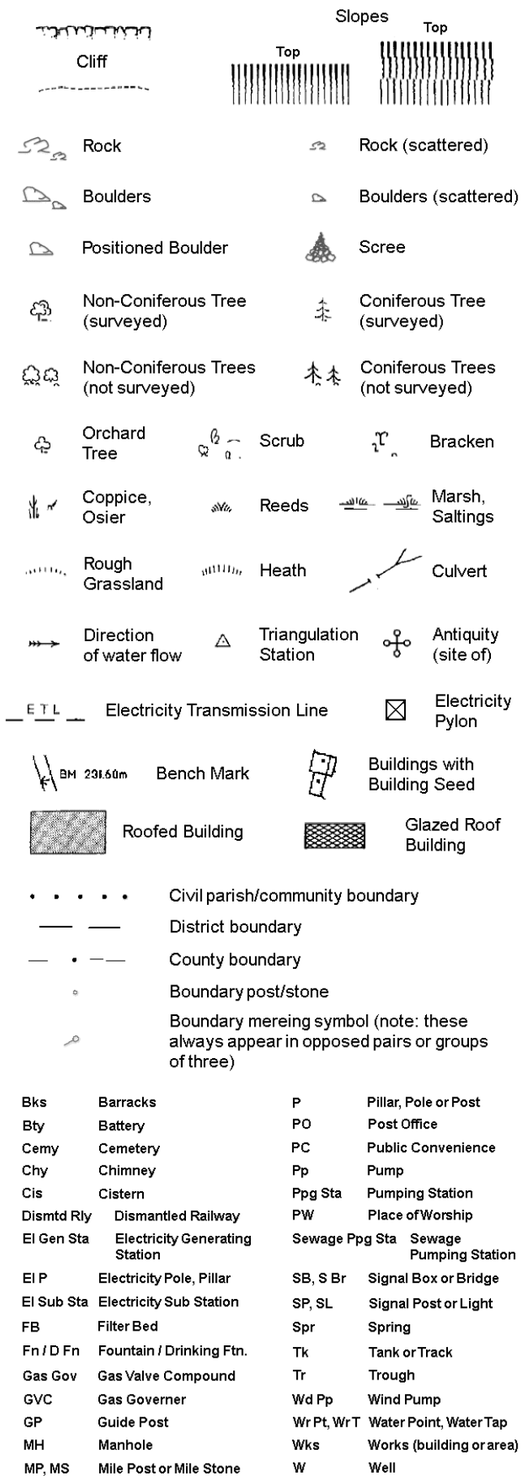
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

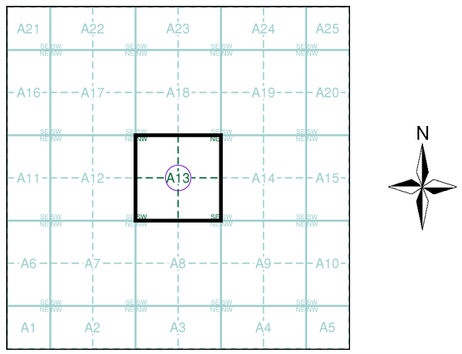
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cheshire	1:2,500	1872	2
Lancashire And Furness	1:2,500	1894	3
Cheshire	1:2,500	1898	4
Lancashire And Furness	1:2,500	1907	5
Cheshire	1:2,500	1910	6
Lancashire And Furness	1:2,500	1922	7
Ordnance Survey Plan	1:1,250	1951 - 1958	8
Additional SIMs	1:1,250	1951 - 1986	9
Ordnance Survey Plan	1:2,500	1952 - 1958	10
Ordnance Survey Plan	1:1,250	1961 - 1983	11
Supply of Unpublished Survey Information	1:1,250	1976	12
Supply of Unpublished Survey Information	1:1,250	1977	13
Additional SIMs	1:1,250	1977 - 1989	14
Additional SIMs	1:1,250	1980 - 1983	15
Additional SIMs	1:1,250	1981 - 1986	16
Large-Scale National Grid Data	1:1,250	1992	17
Large-Scale National Grid Data	1:1,250	1993	18
Large-Scale National Grid Data	1:1,250	1994	19

Historical Map - Segment A13



Order Details

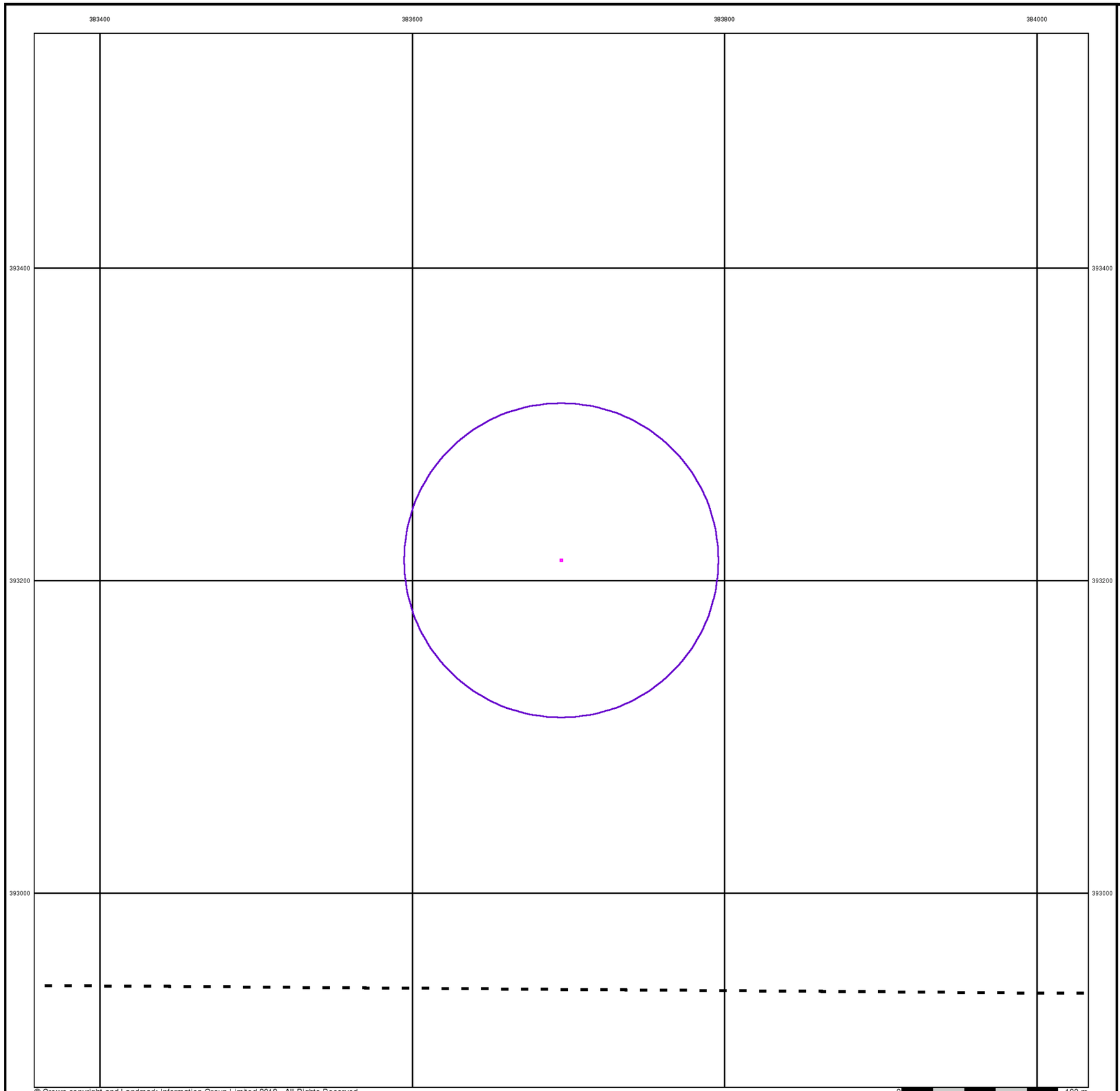
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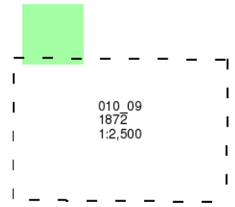
Cheshire

Published 1872

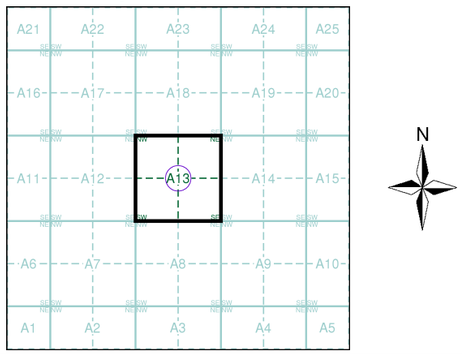
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

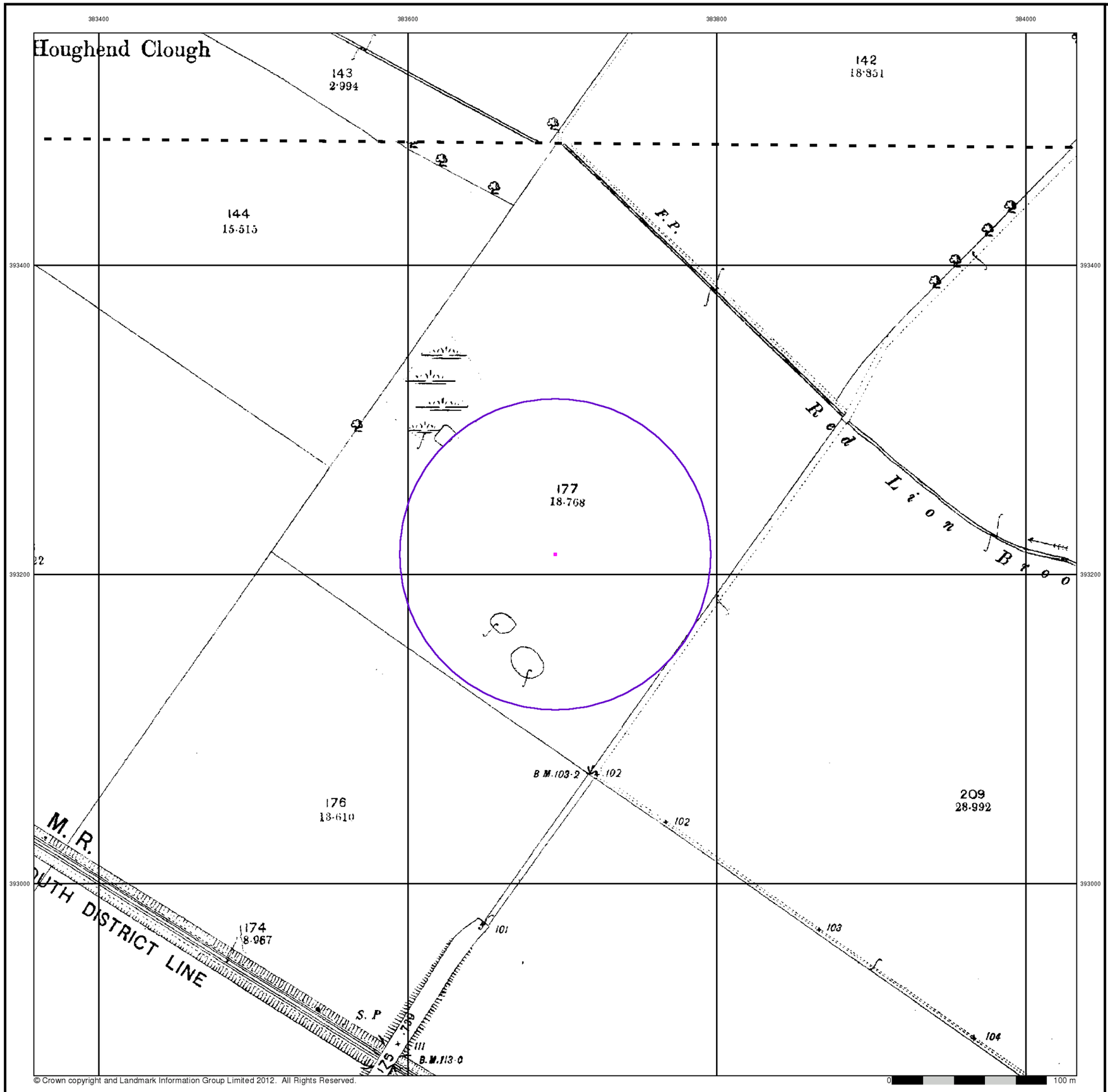
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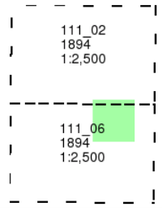
Lancashire And Furness

Published 1894

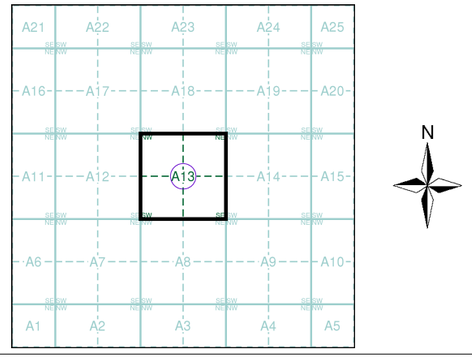
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Map Name(s) and Date(s)



Historical Map - Segment A13



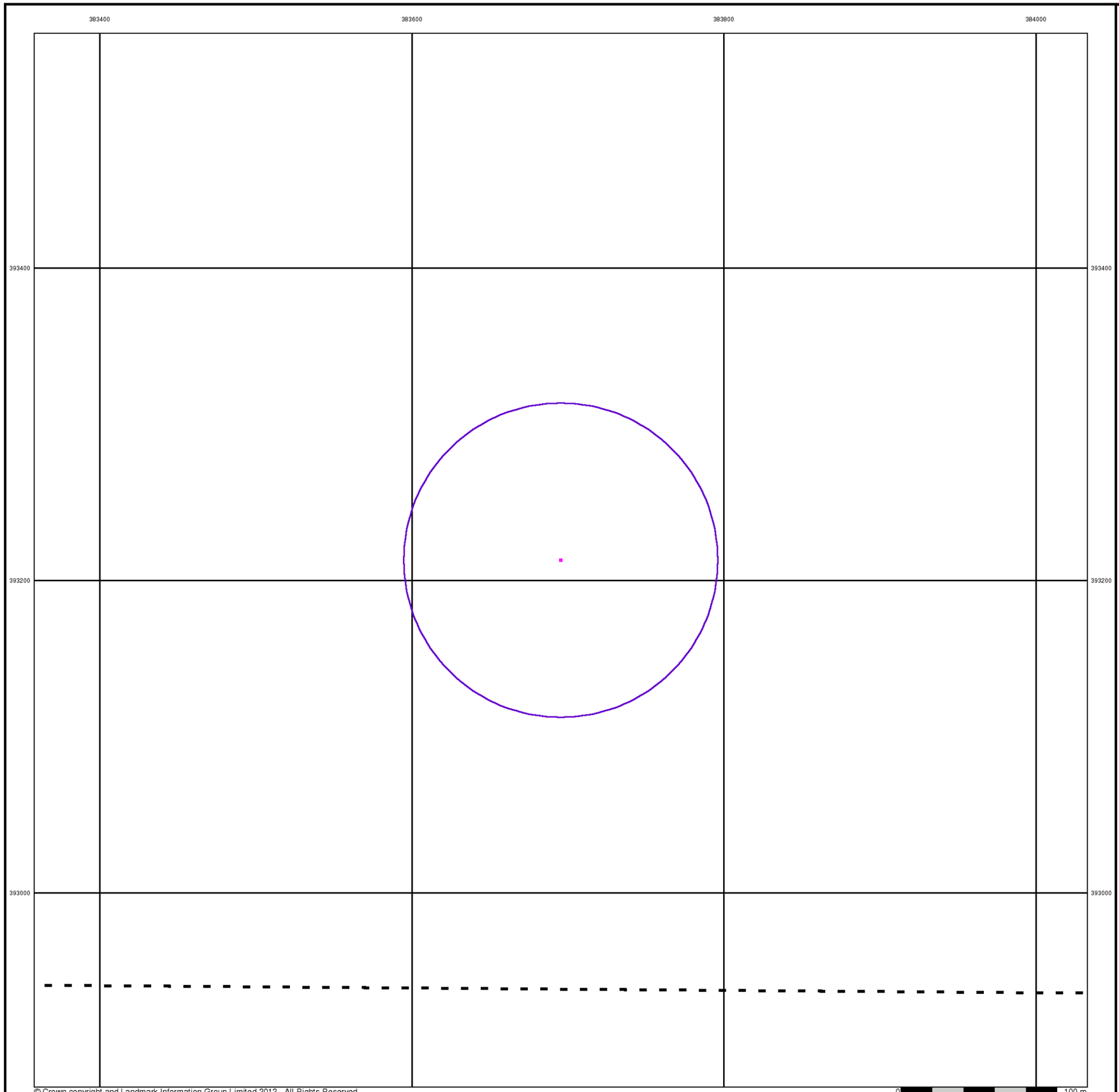
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0 100 m

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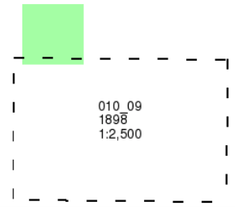
Cheshire

Published 1898

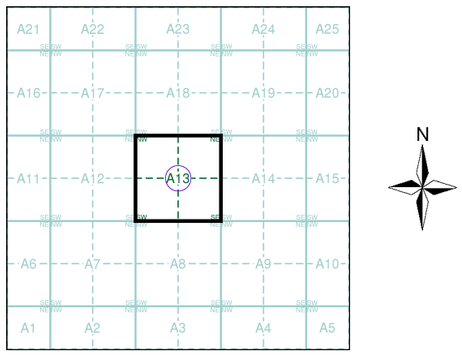
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Map Name(s) and Date(s)



Historical Map - Segment A13



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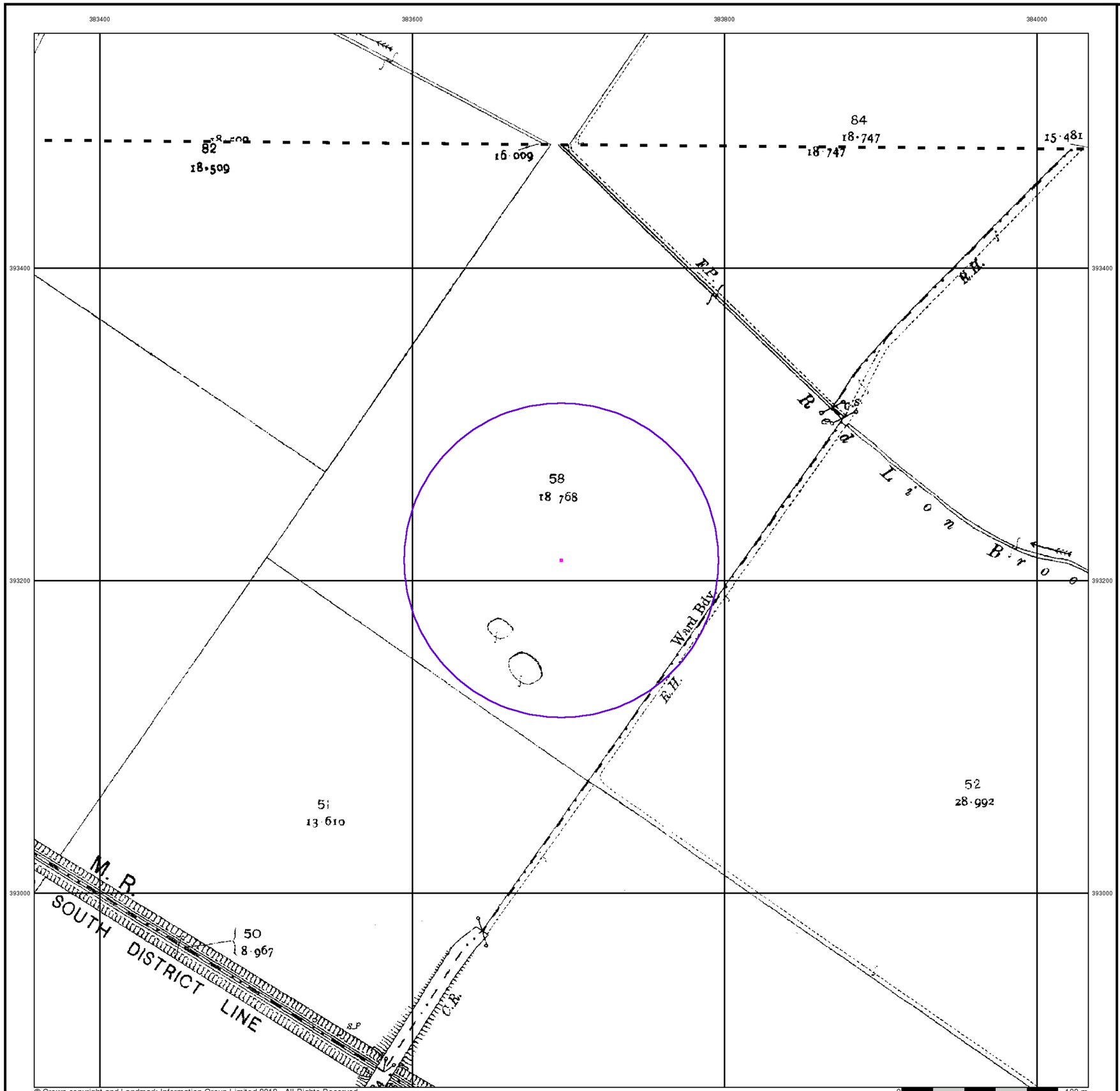
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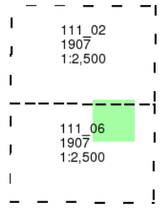
Lancashire And Furness

Published 1907

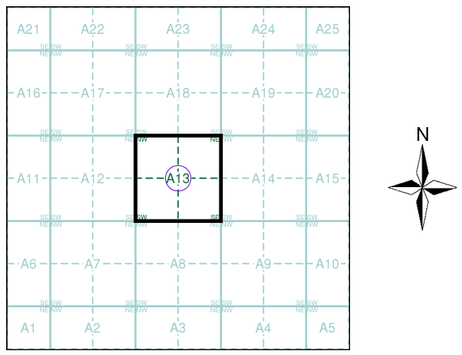
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



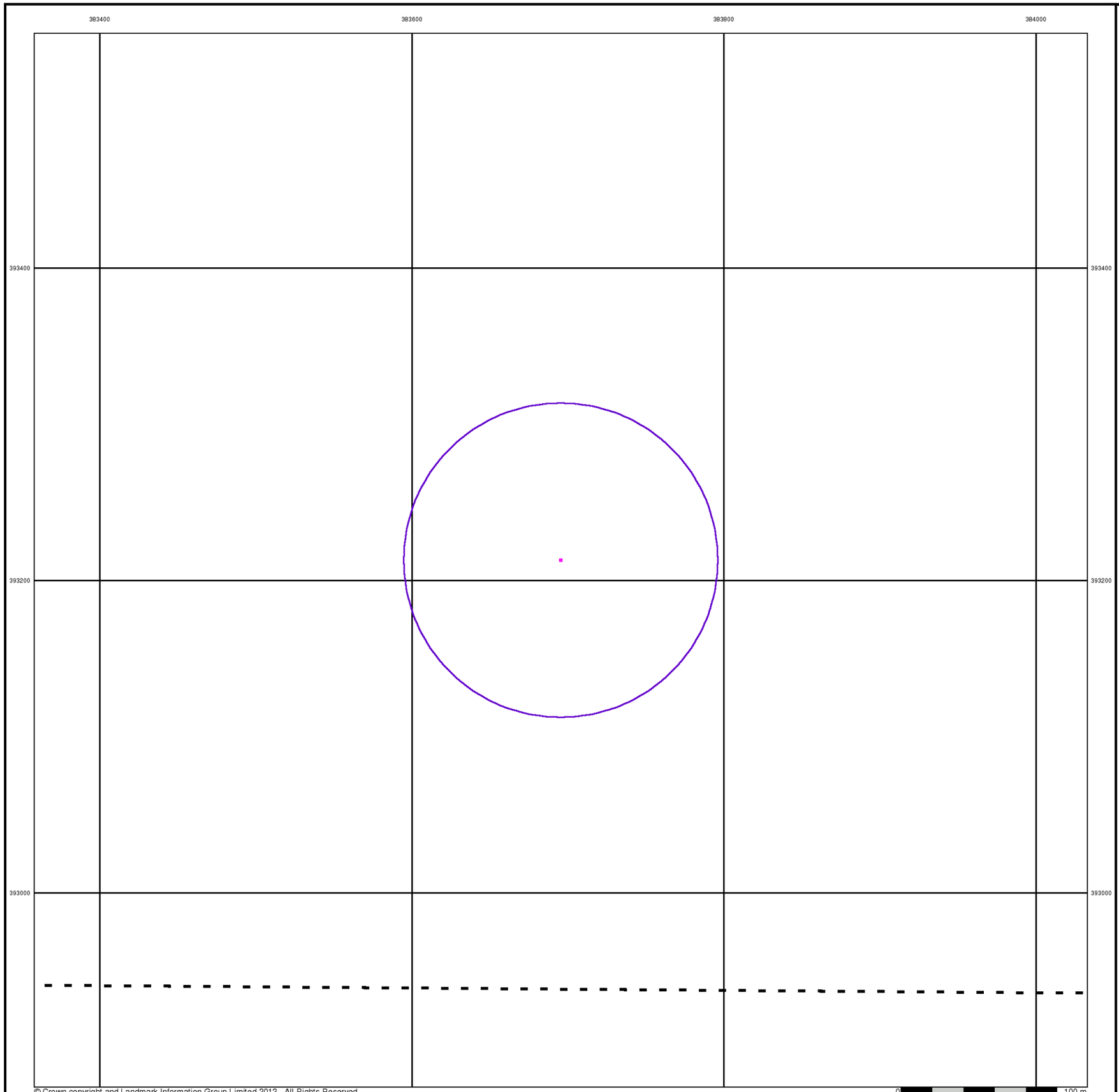
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National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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0 100 m

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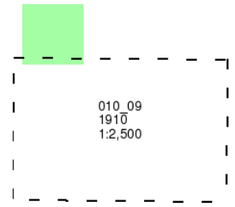
Cheshire

Published 1910

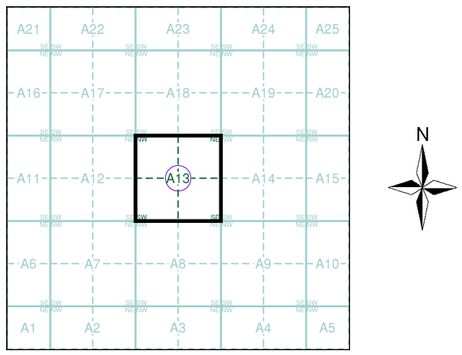
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

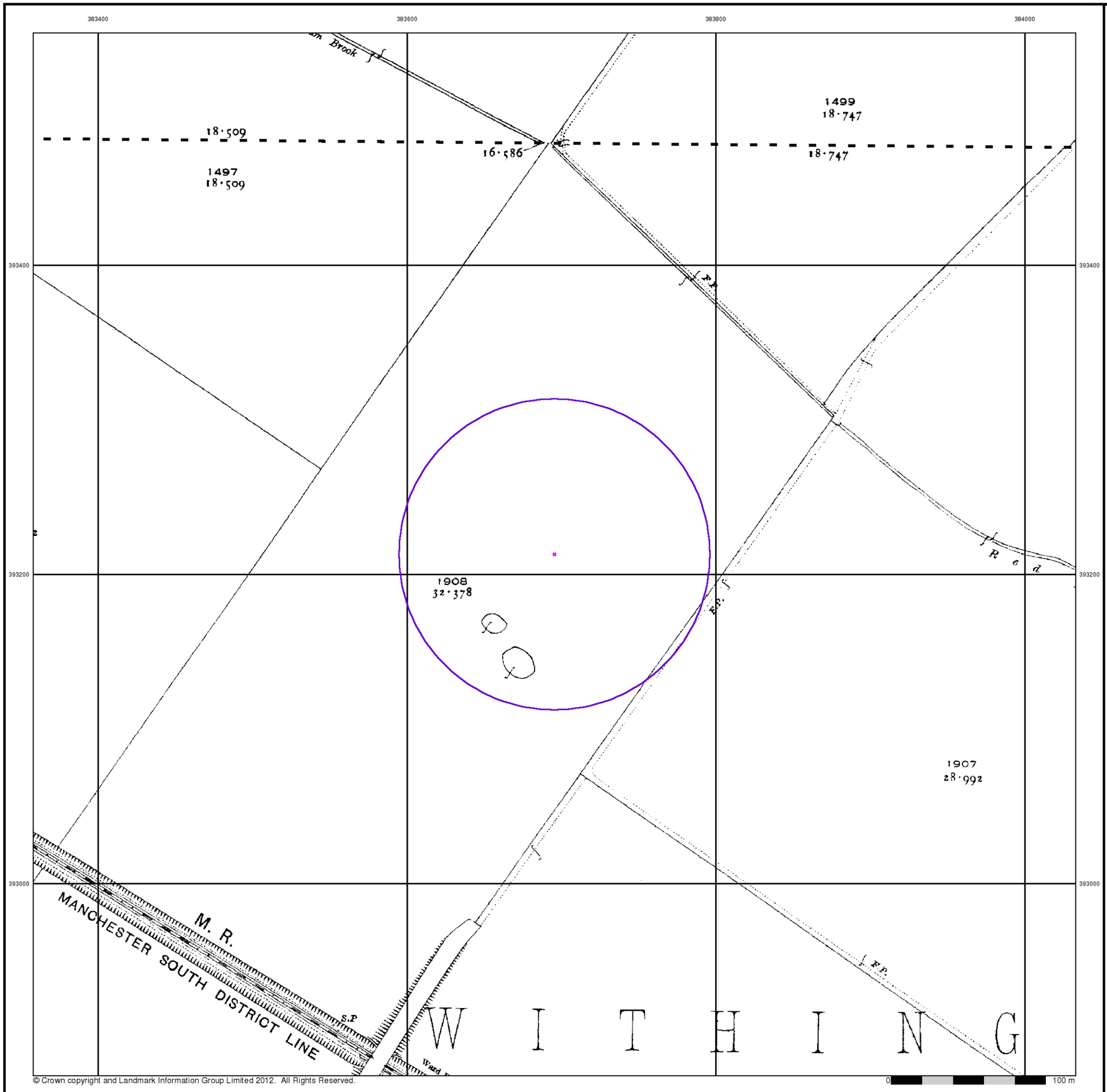
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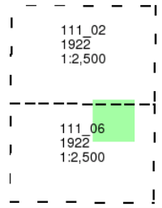
Lancashire And Furness

Published 1922

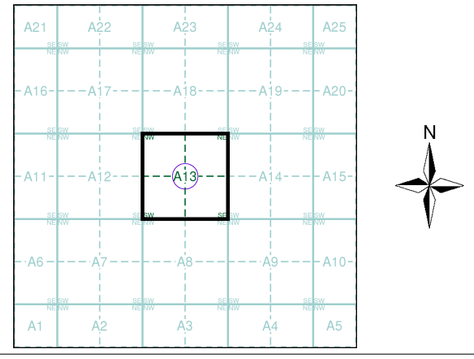
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



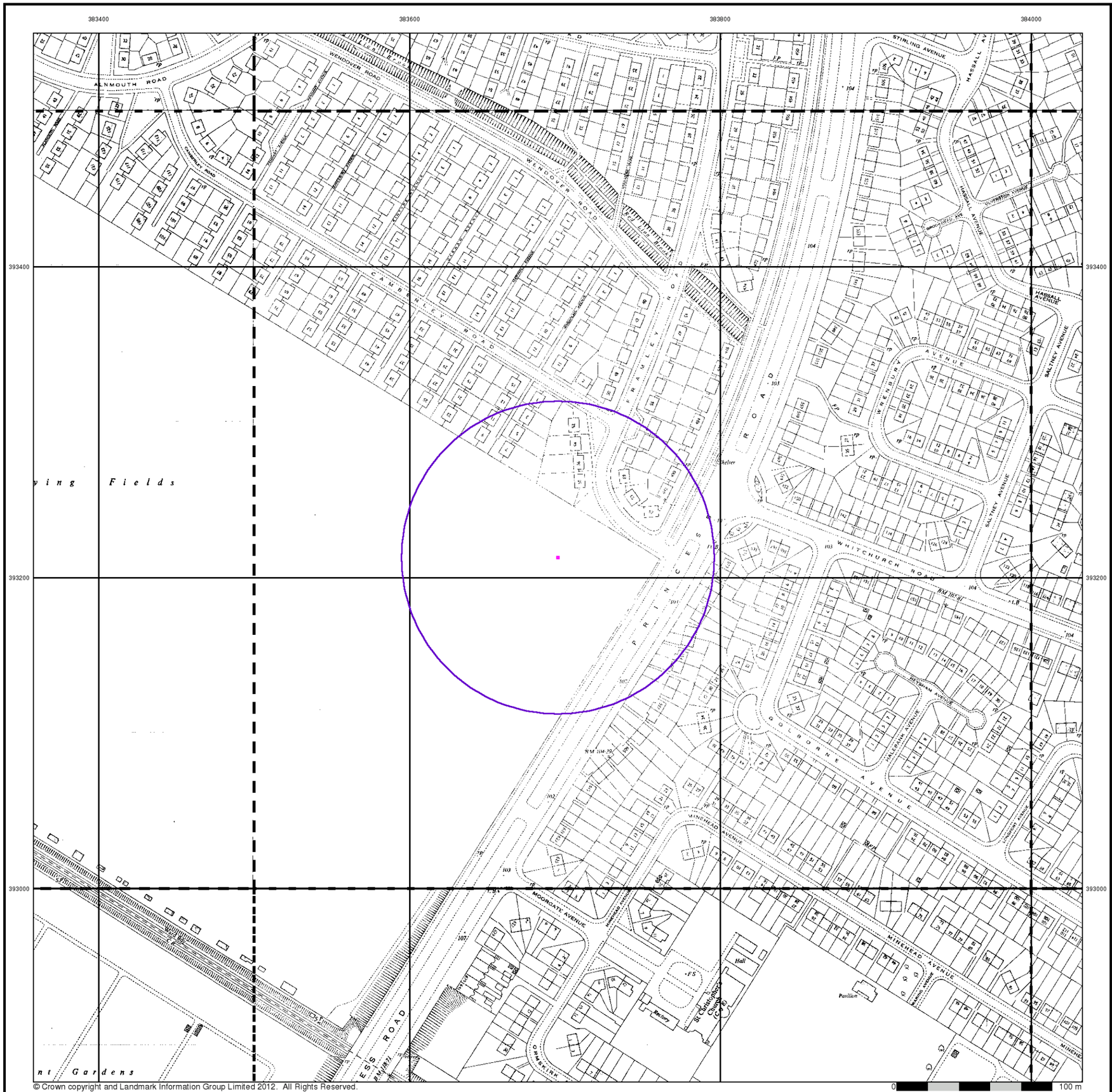
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Ordnance Survey Plan

Published 1951 - 1958

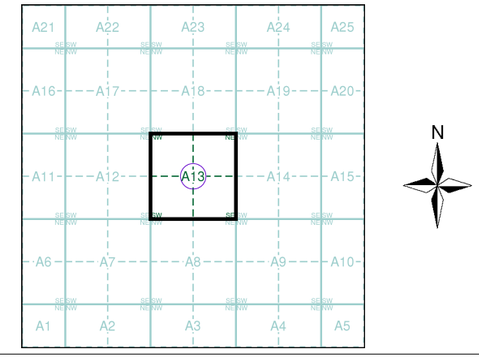
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8393NW	SJ8393NE	SJ8493NW
1951	1951	1958
1:1,250	1:1,250	1:1,250
SJ8393SW	SJ8393SE	SJ8493SW
1951	1951	1958
1:1,250	1:1,250	1:1,250
SJ8392NW	SJ8392NE	SJ8492NW
1956	1956	1958
1:1,250	1:1,250	1:1,250

Historical Map - Segment A13



Order Details

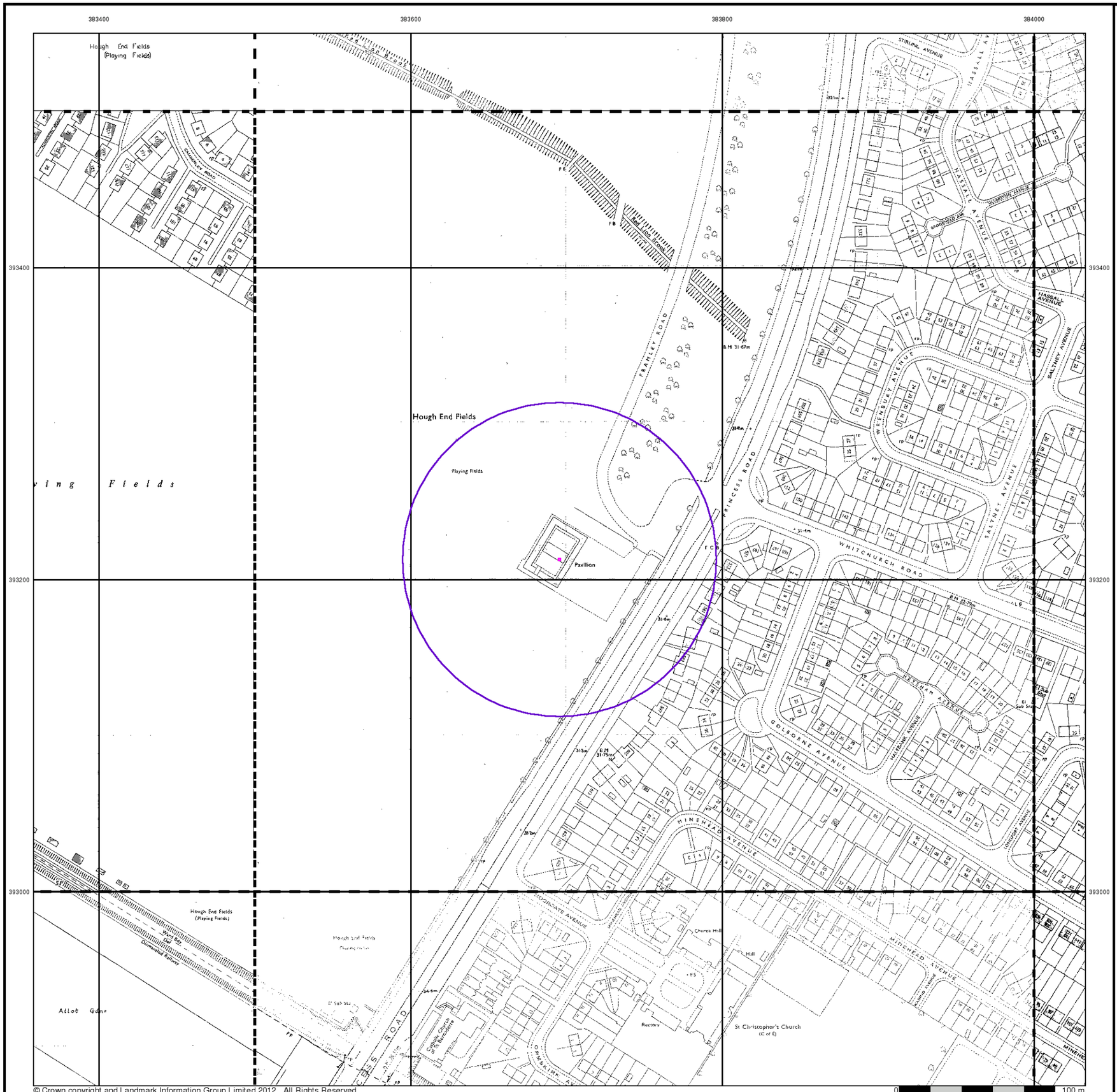
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Additional SIMs

Published 1951 - 1986

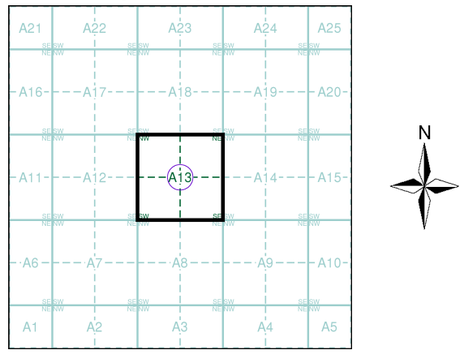
Source map scale - 1:1,250

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Map Name(s) and Date(s)

SJ8393NW 1982 1:1,250	SJ8393NE 1983 1:1,250	SJ8493NW 1977 1:1,250
SJ8393SW 1951 1:1,250	SJ8393SE 1983 1:1,250	SJ8493SW 1986 1:1,250
SJ8392NW 1982 1:1,250	SJ8392NE 1983 1:1,250	SJ8492NW 1980 1:1,250

Historical Map - Segment A13



Order Details

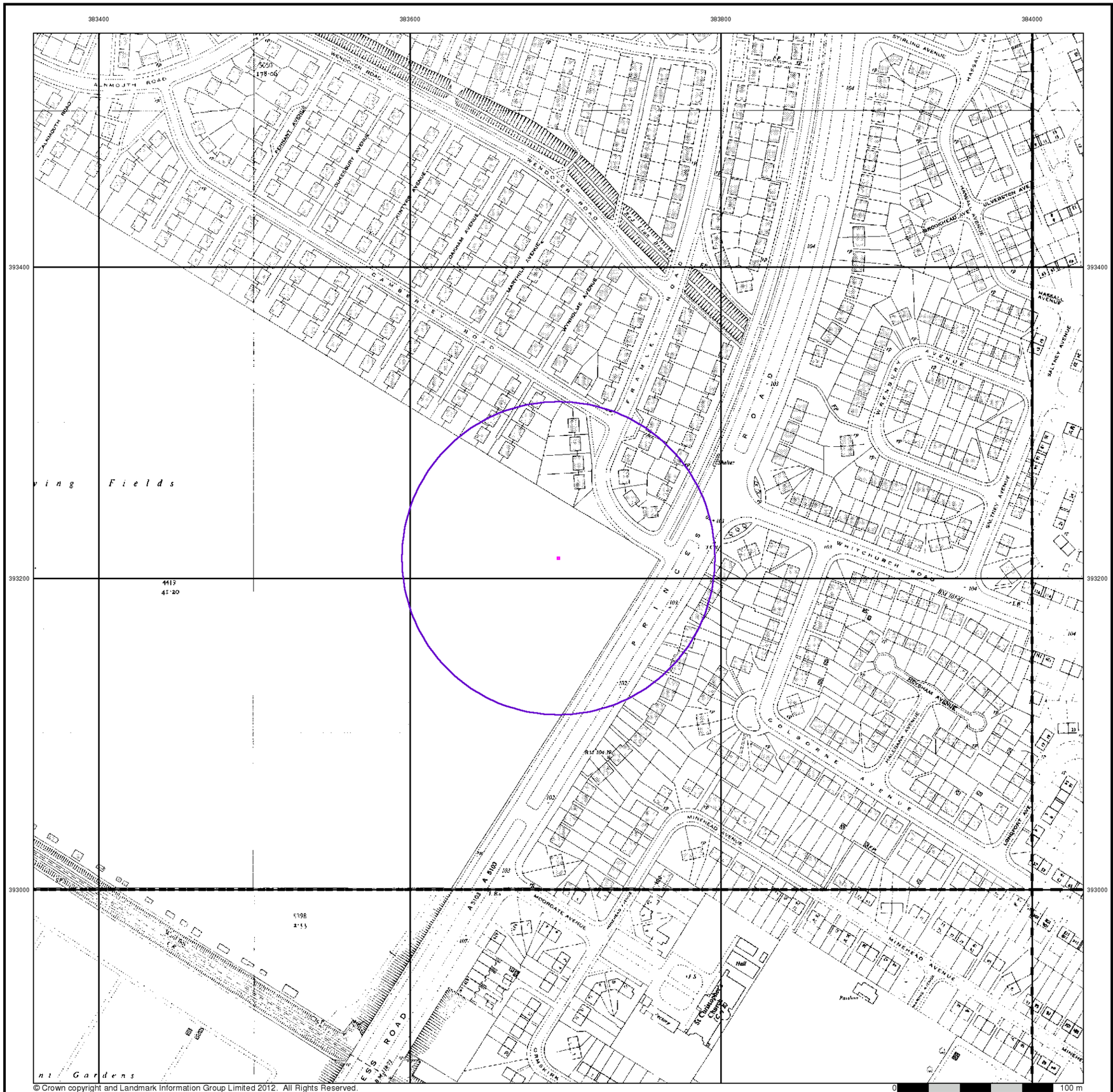
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National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

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Ordnance Survey Plan

Published 1952 - 1958

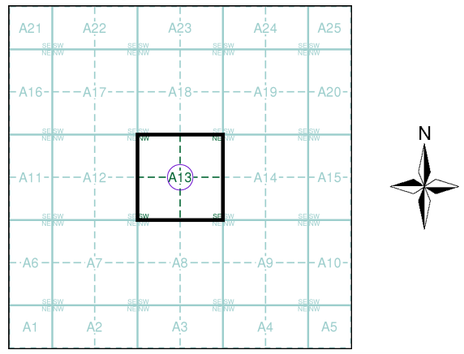
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8393 1952 1:2,500	SJ8493 1958 1:2,500
SJ8392 1956 1:2,500	SJ8492 1958 1:2,500

Historical Map - Segment A13



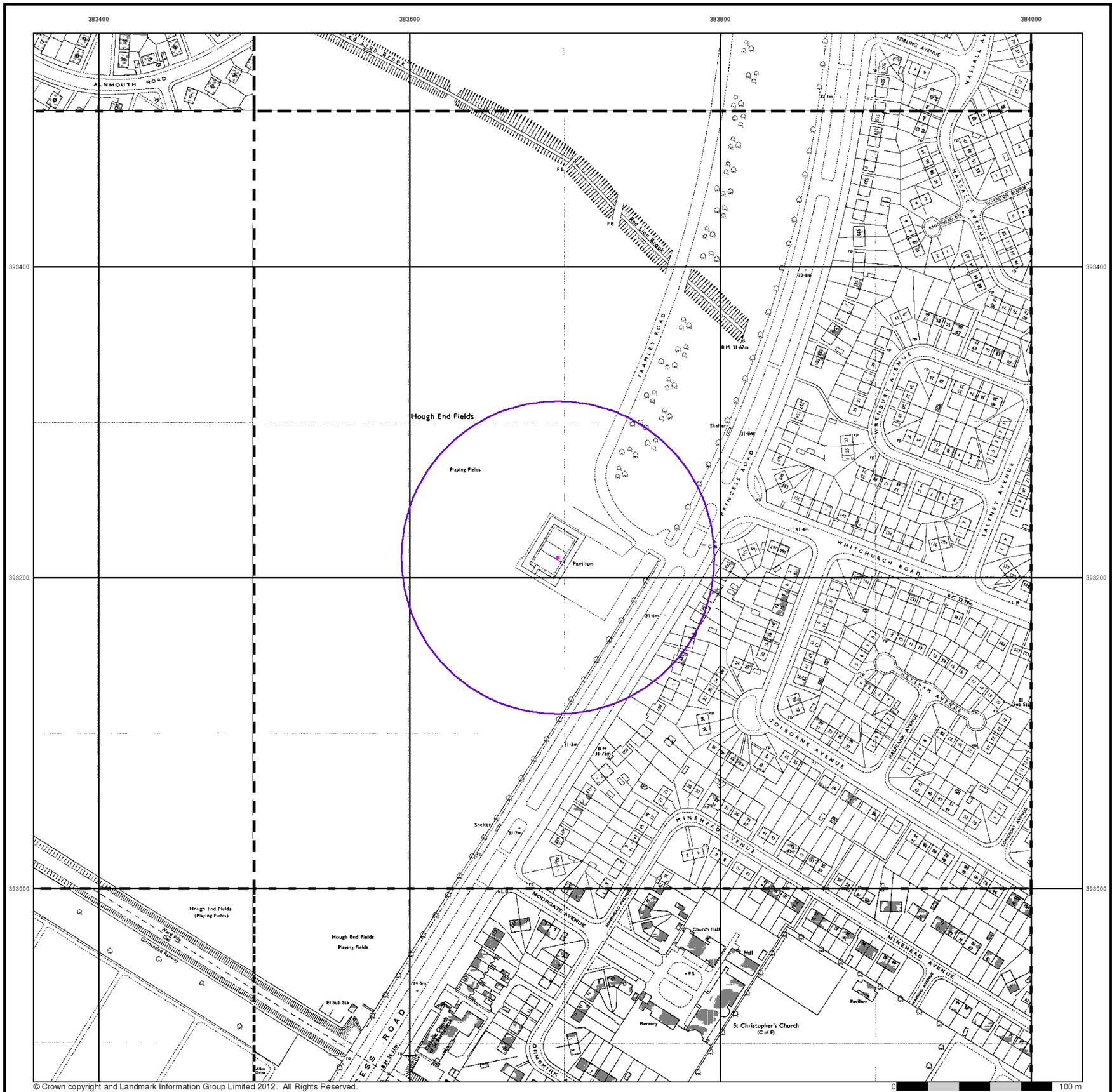
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Ordnance Survey Plan

Published 1961 - 1983

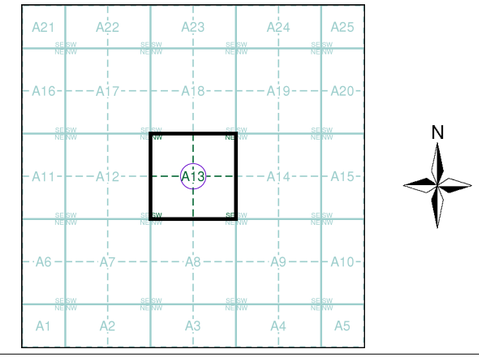
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8393NW 1961 1:1,250	SJ8393NE 1973 1:1,250
SJ8393SW 1983 1:1,250	SJ8393SE 1973 1:1,250
SJ8392NW 1975 1:1,250	SJ8392NE 1974 1:1,250

Historical Map - Segment A13



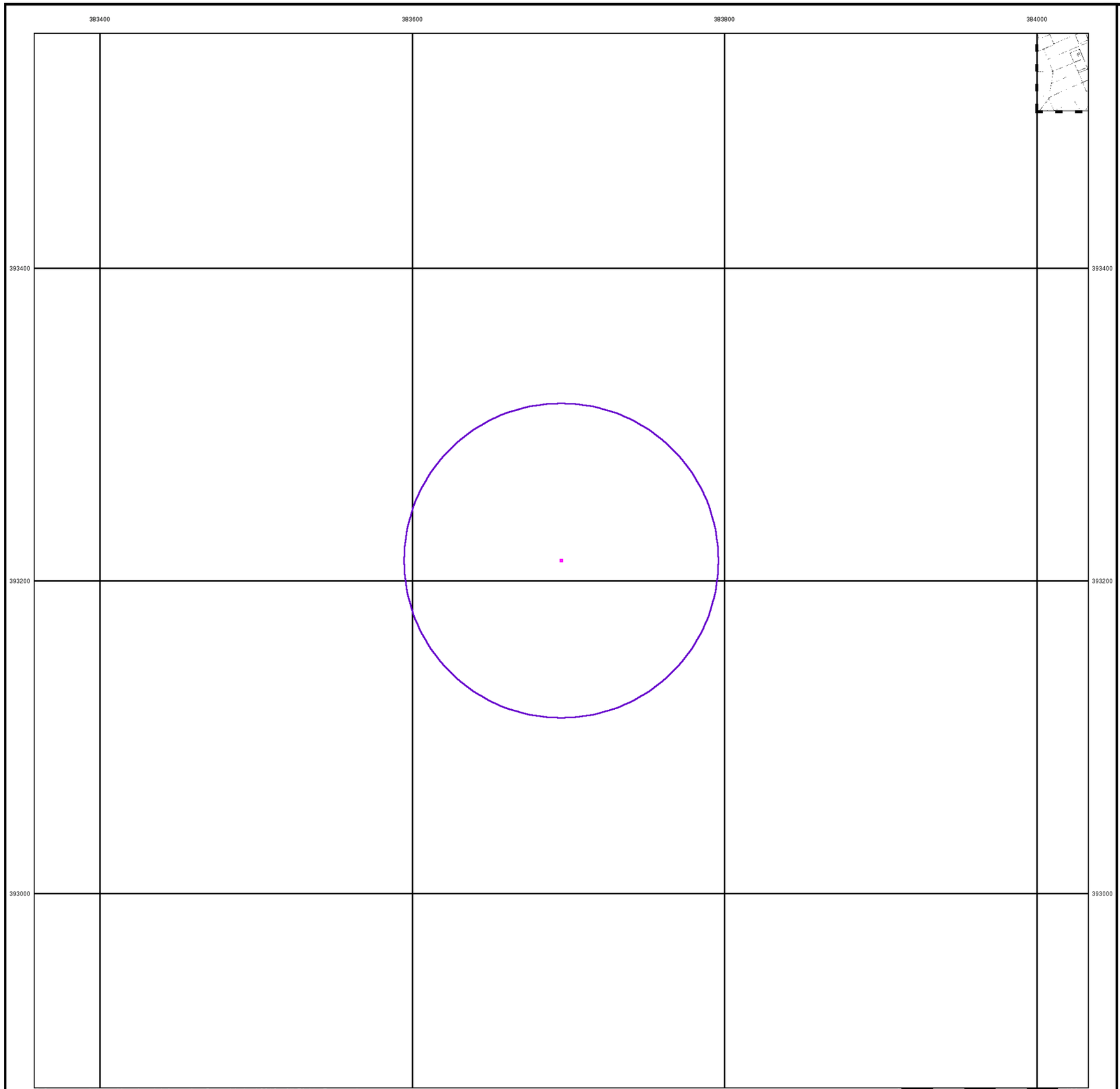
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Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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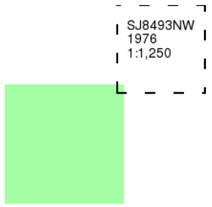
Supply of Unpublished Survey Information

Published 1976

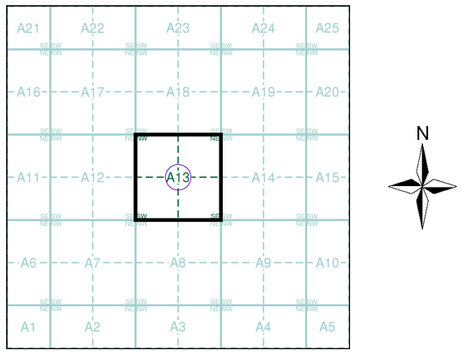
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

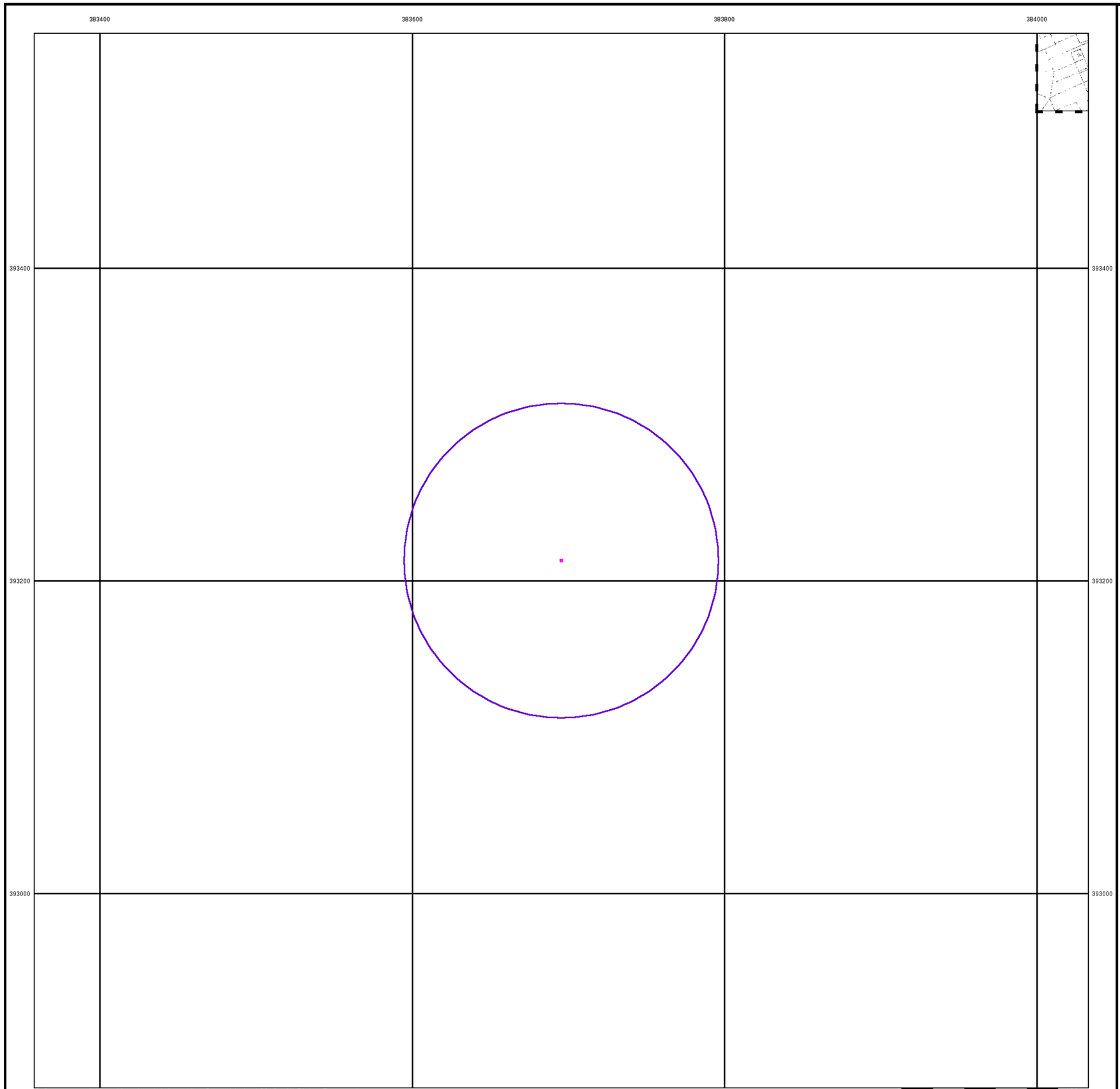
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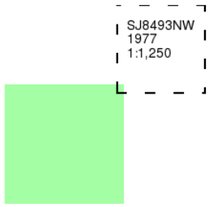
Supply of Unpublished Survey Information

Published 1977

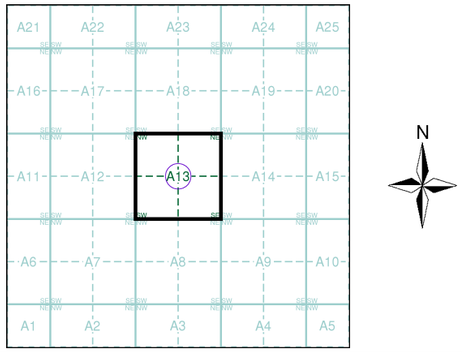
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



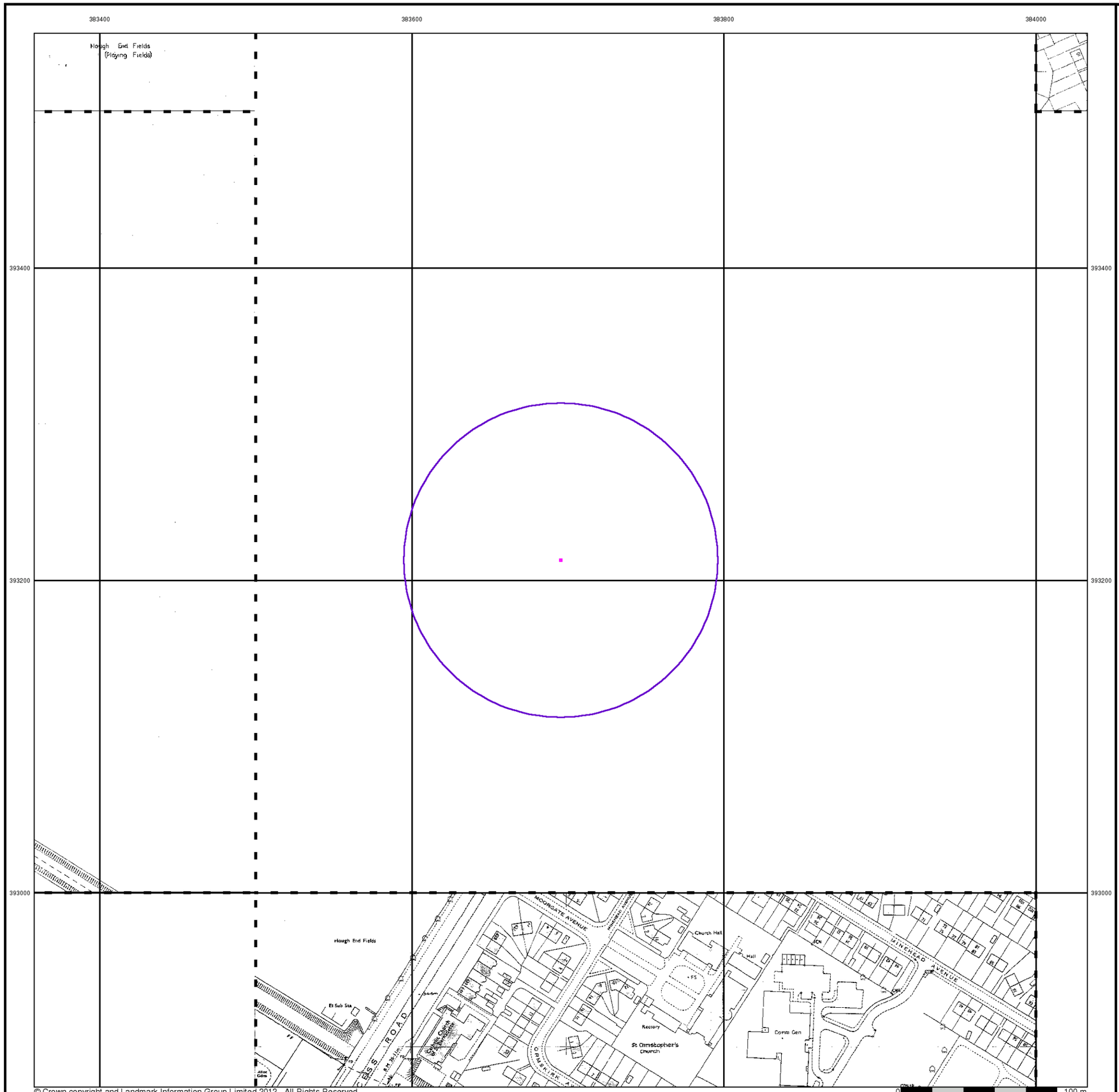
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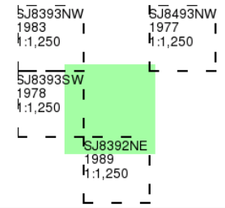
Additional SIMs

Published 1977 - 1989

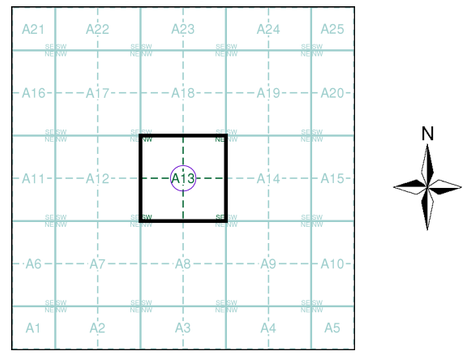
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

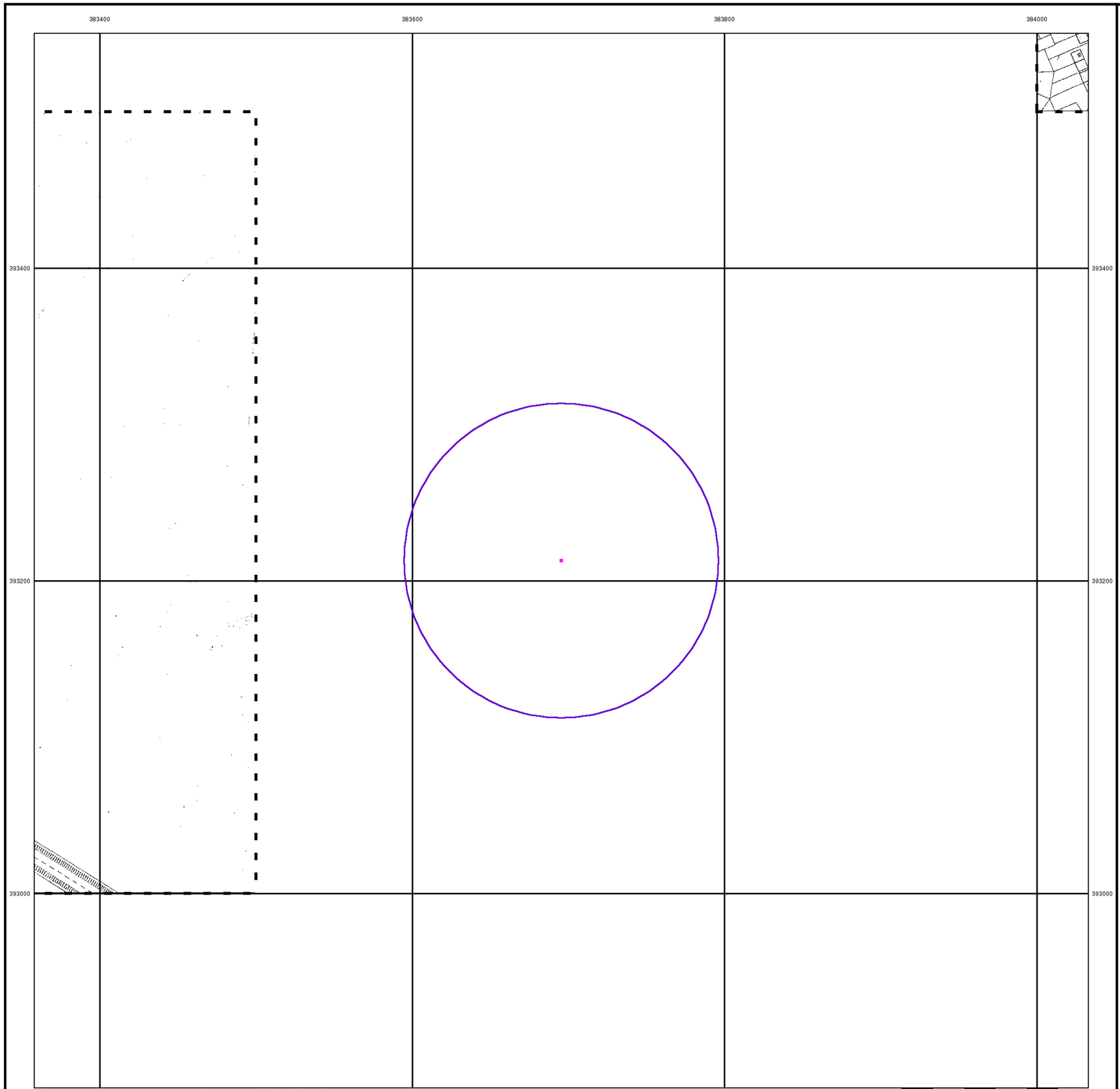
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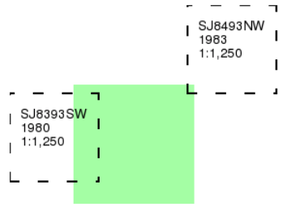
Additional SIMs

Published 1980 - 1983

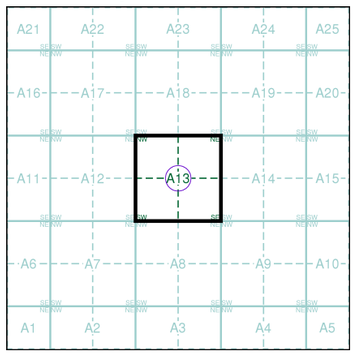
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



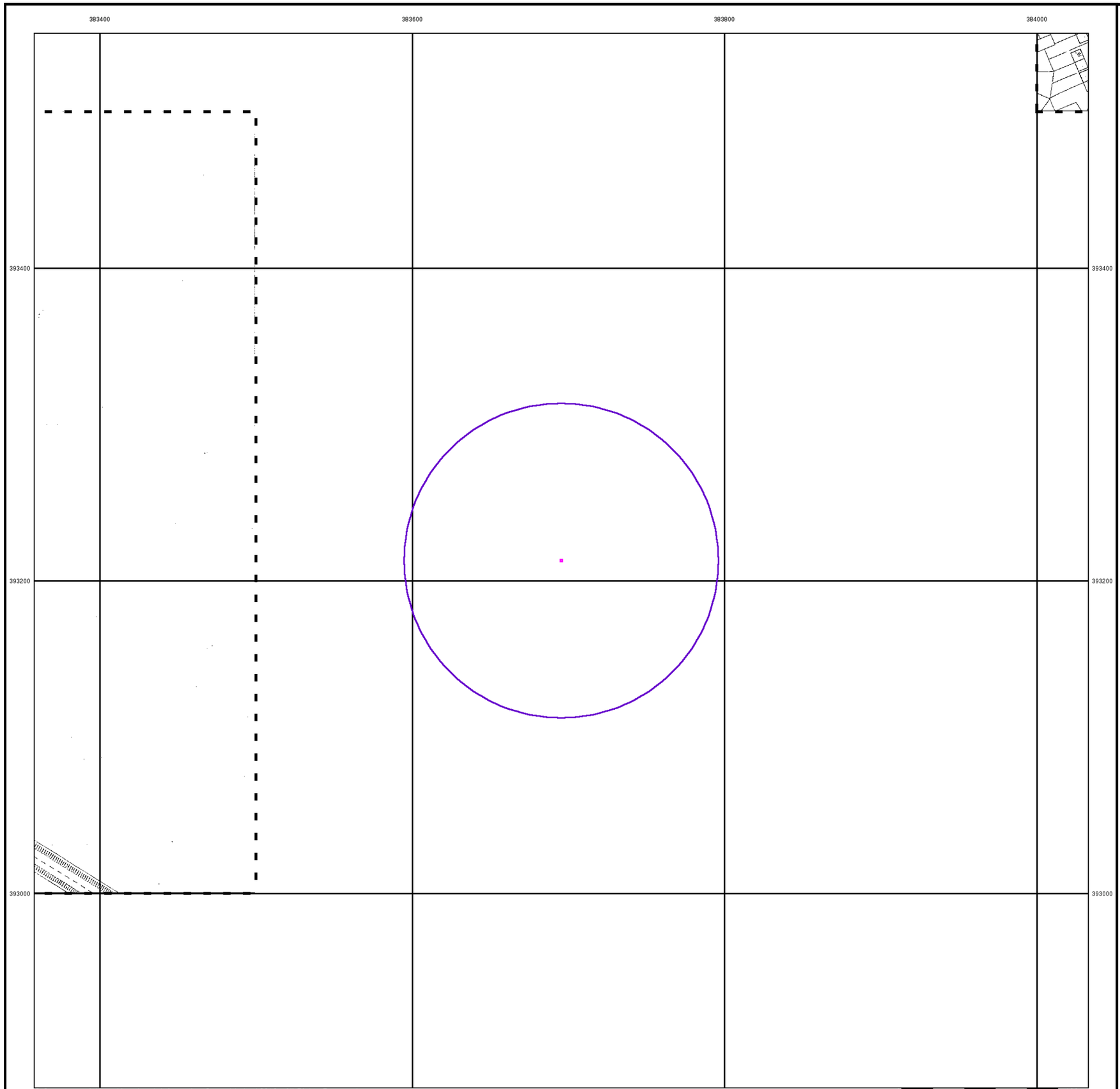
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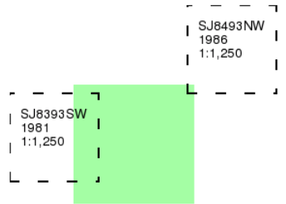
Additional SIMs

Published 1981 - 1986

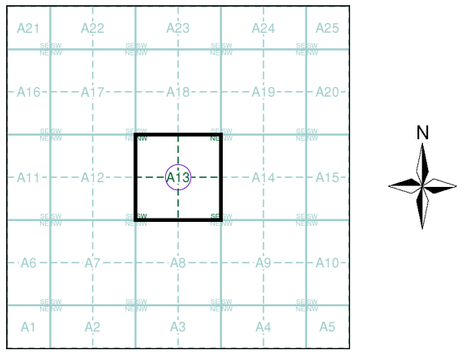
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

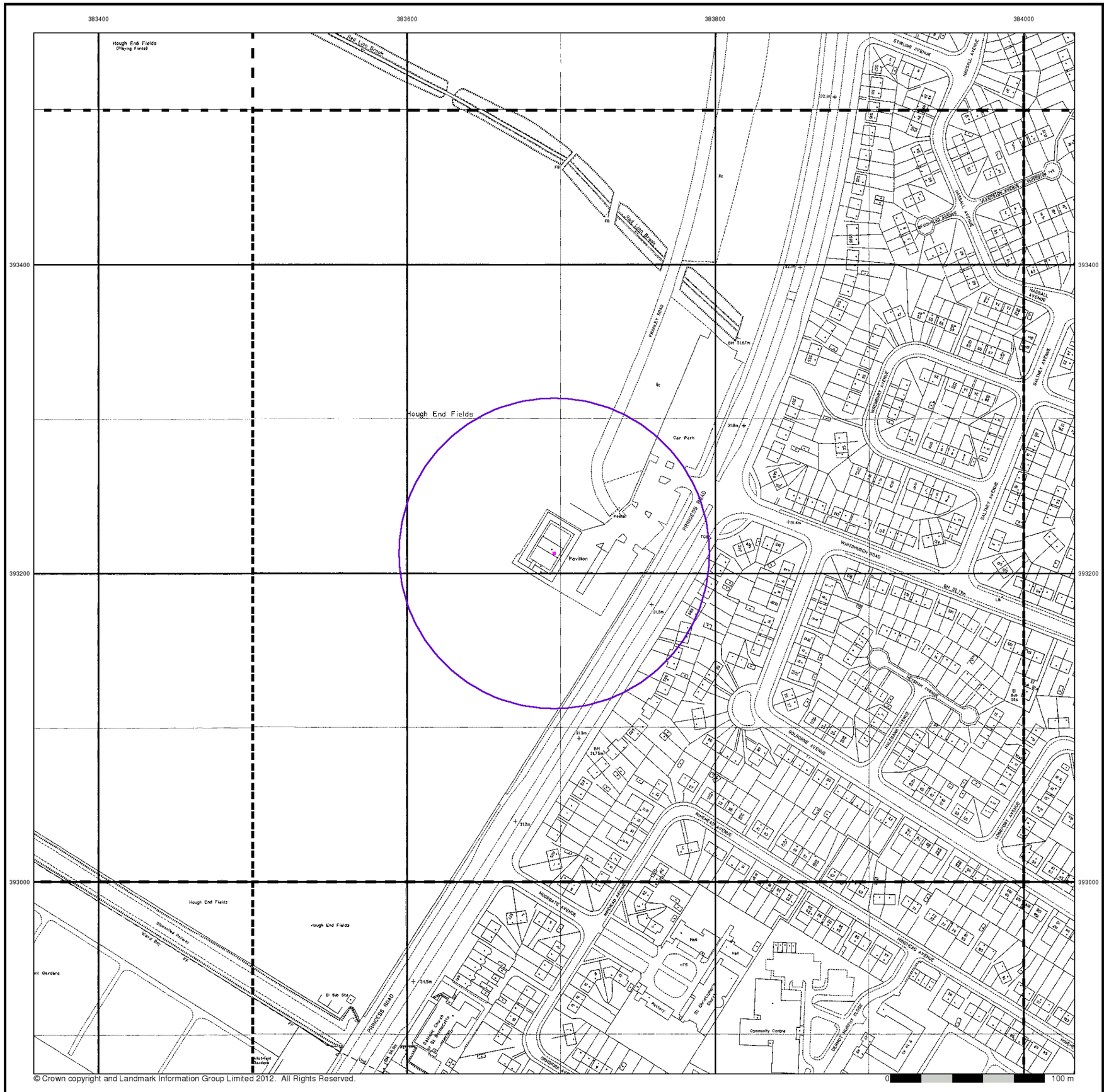
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National Grid Reference:	383700, 393210
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Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Landmark® Information Group

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



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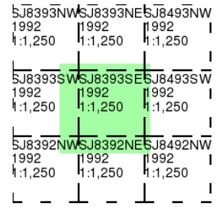
Large-Scale National Grid Data

Published 1992

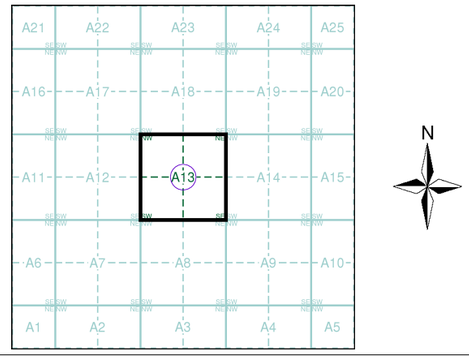
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

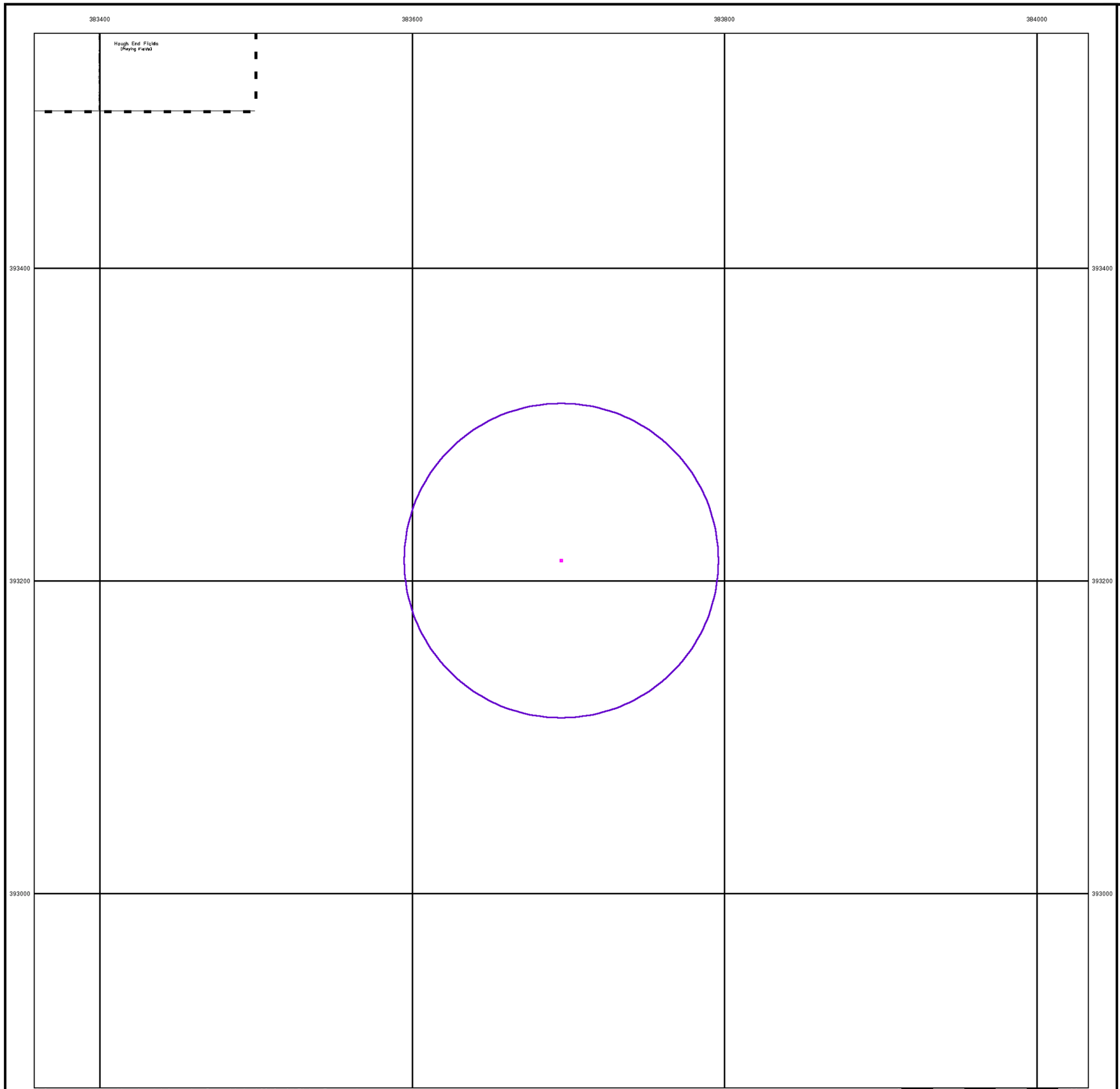
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Slice:	A
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Search Buffer (m):	100

Site Details

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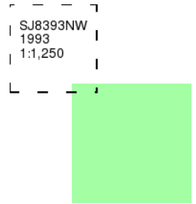
Large-Scale National Grid Data

Published 1993

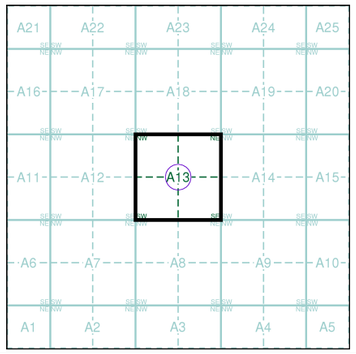
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



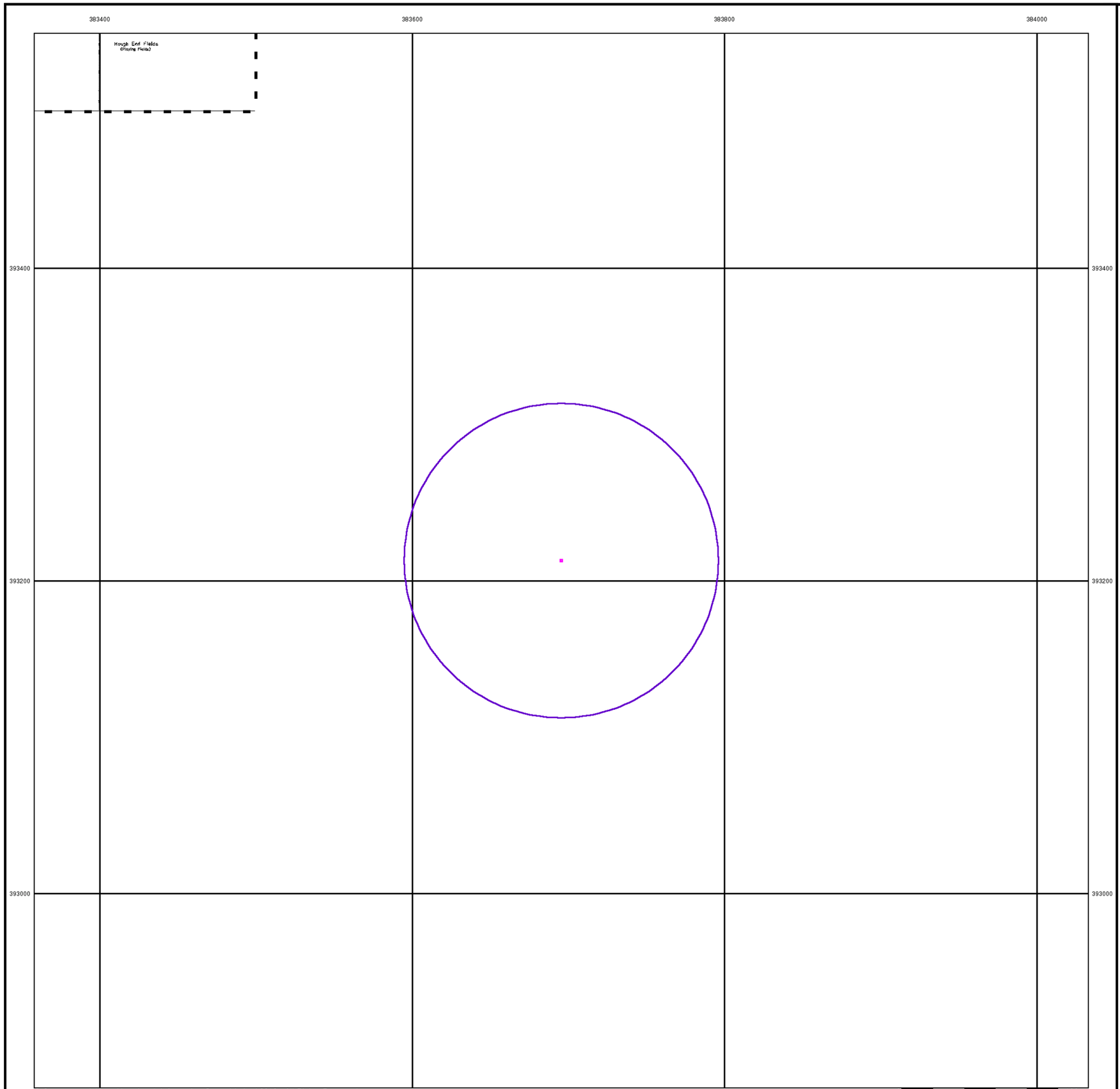
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Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

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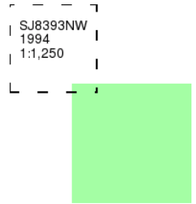
Large-Scale National Grid Data

Published 1994

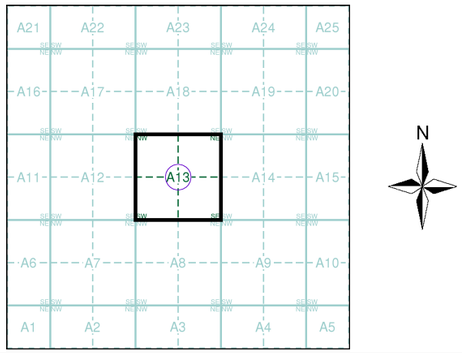
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'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	48987548_1_1
Customer Ref:	TLL/AW/P2005641
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Appendix C

Geology Data Sheets (Envirocheck)

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	GFSDD	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel	Devensian - Devensian
	SSA	Shirdley Hill Sand Formation	Sand	Flandrian - Devensian
	TILLD	Till, Devensian	Diamicton	Devensian - Devensian
	RTDU	River Terrace Deposits (Undifferentiated)	Sand and Gravel	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TPSF	Tarporley Siltstone Formation	Siltstone and Sandstone	Anisian - Olenekian
	WLSF	Wilmslow Sandstone Formation	Sandstone	Scythian - Scythian
	CPB	Chester Pebble Beds Formation	Pebbly (Gravelly) Sandstone	Scythian - Scythian
	HEY	Helsby Sandstone Formation	Pebbly (Gravelly) Sandstone	Anisian - Scythian
	SSG	Sherwood Sandstone Group	Sandstone	Ladinian - Late Permian
	MM	Manchester Marls Formation	Mudstone	Late Permian - Late Permian
		Faults		

Envirocheck® Geology

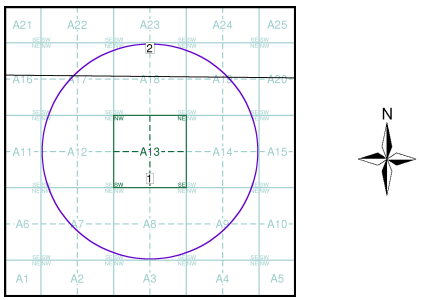
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	**2**	**Map ID:**	**1**
Map Sheet No:	**085**	**Map Sheet No:**	**098**
Map Name:	**Manchester**	**Map Name:**	**Stockport**
Map Date:	**1975**	**Map Date:**	**1977**
Bedrock Geology:	**Available**	**Bedrock Geology:**	**Available**
Superficial Geology:	**Available**	**Superficial Geology:**	**Available**
Artificial Geology:	**Not Available**	**Artificial Geology:**	**Not Available**
Faults:	**Available**	**Faults:**	**Available**
Landslip:	**Not Available**	**Landslip:**	**Available**
Rock Segments:	**Available**	**Rock Segments:**	**Available**

Geology 1:50,000 Maps - Slice A



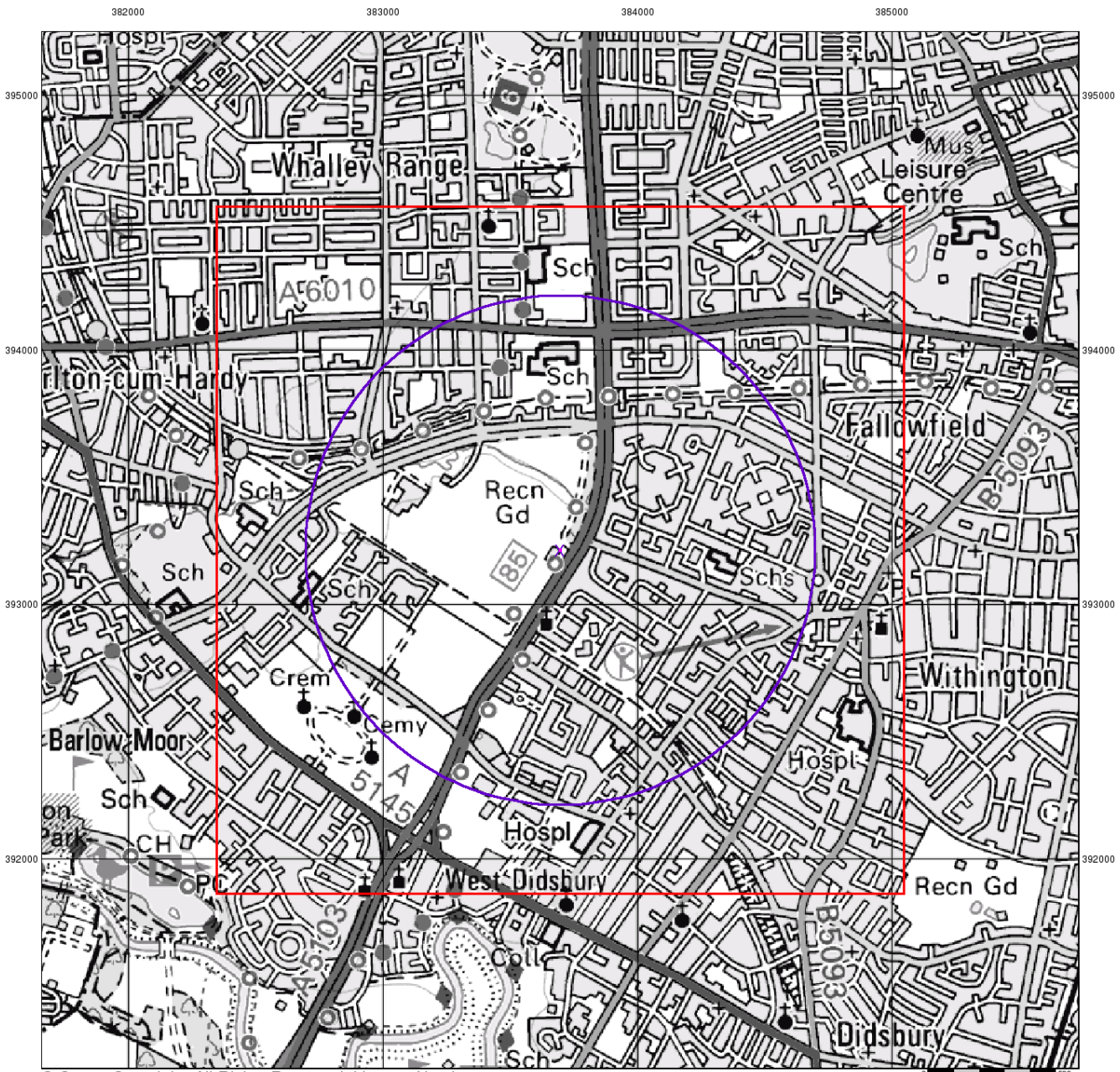
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Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details:

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Envirocheck® Geology

Artificial Ground and Landslip

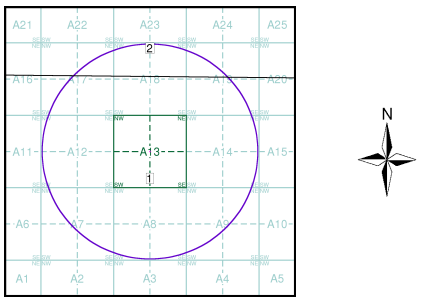
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



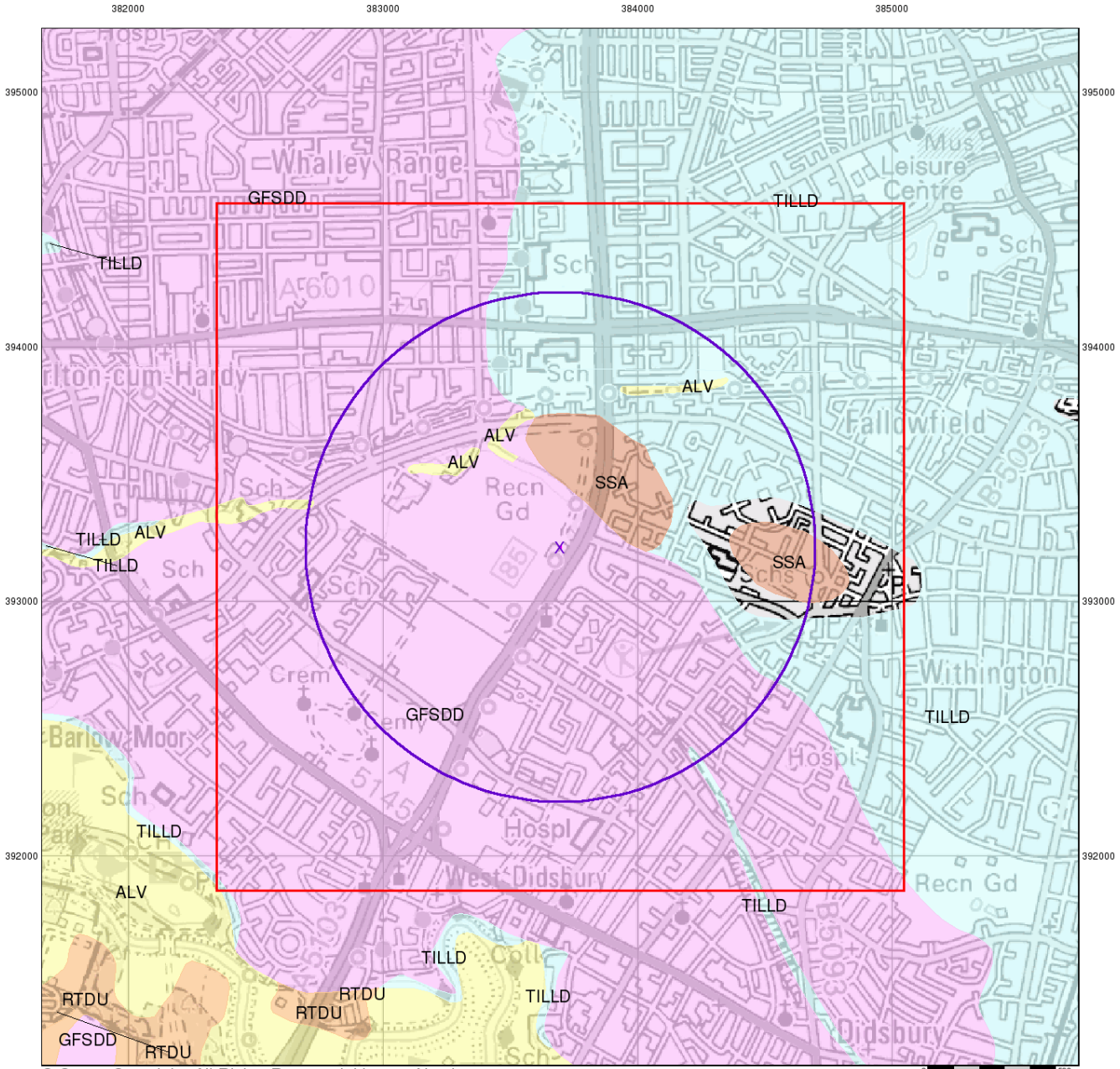
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Envirocheck® Geology

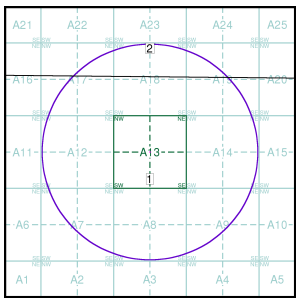
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



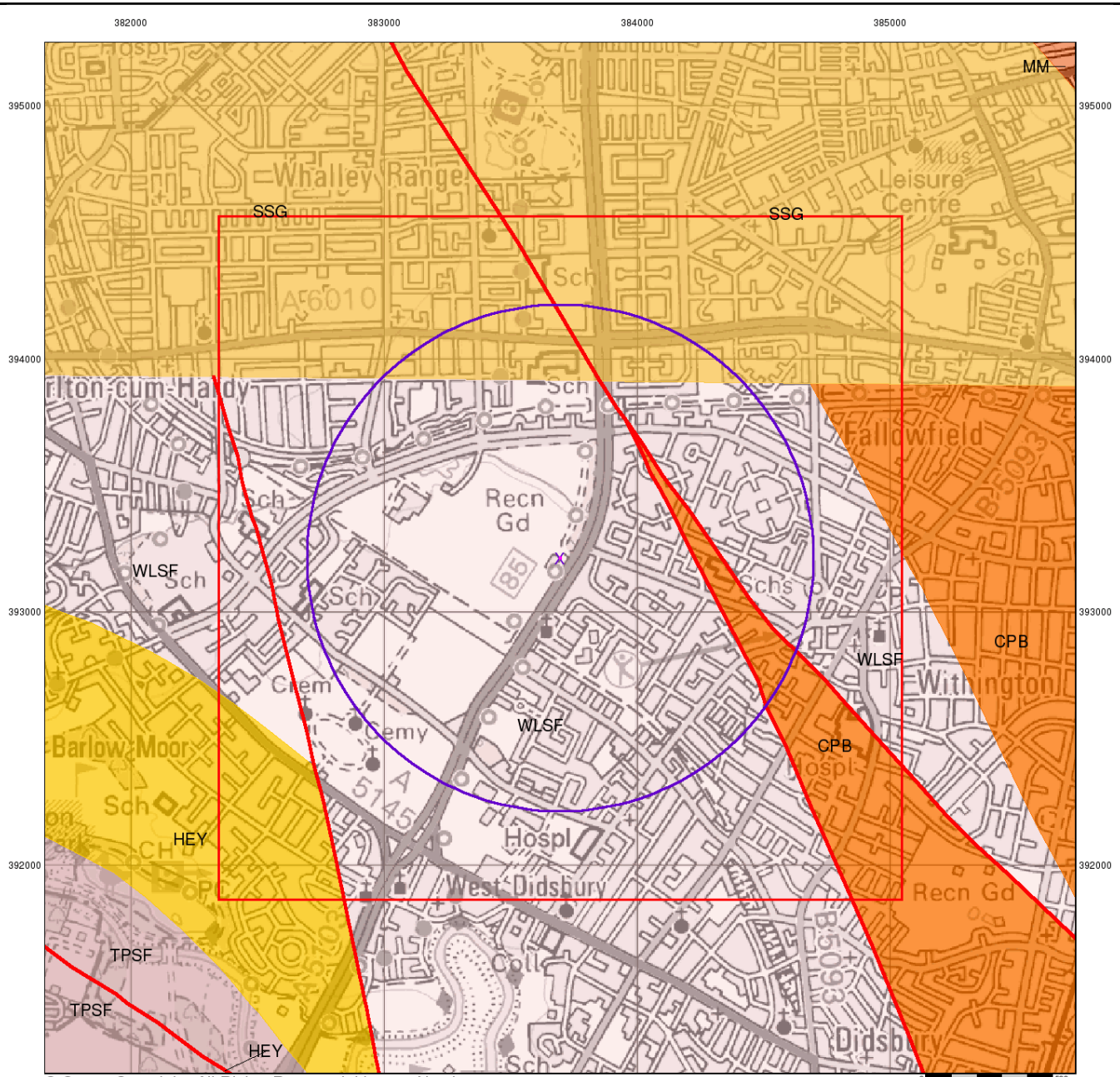
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Search Buffer (m):	1000

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Bedrock and Faults

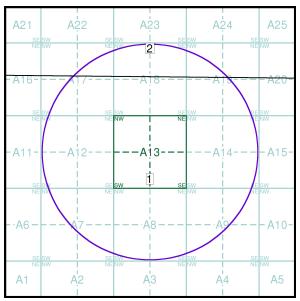
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



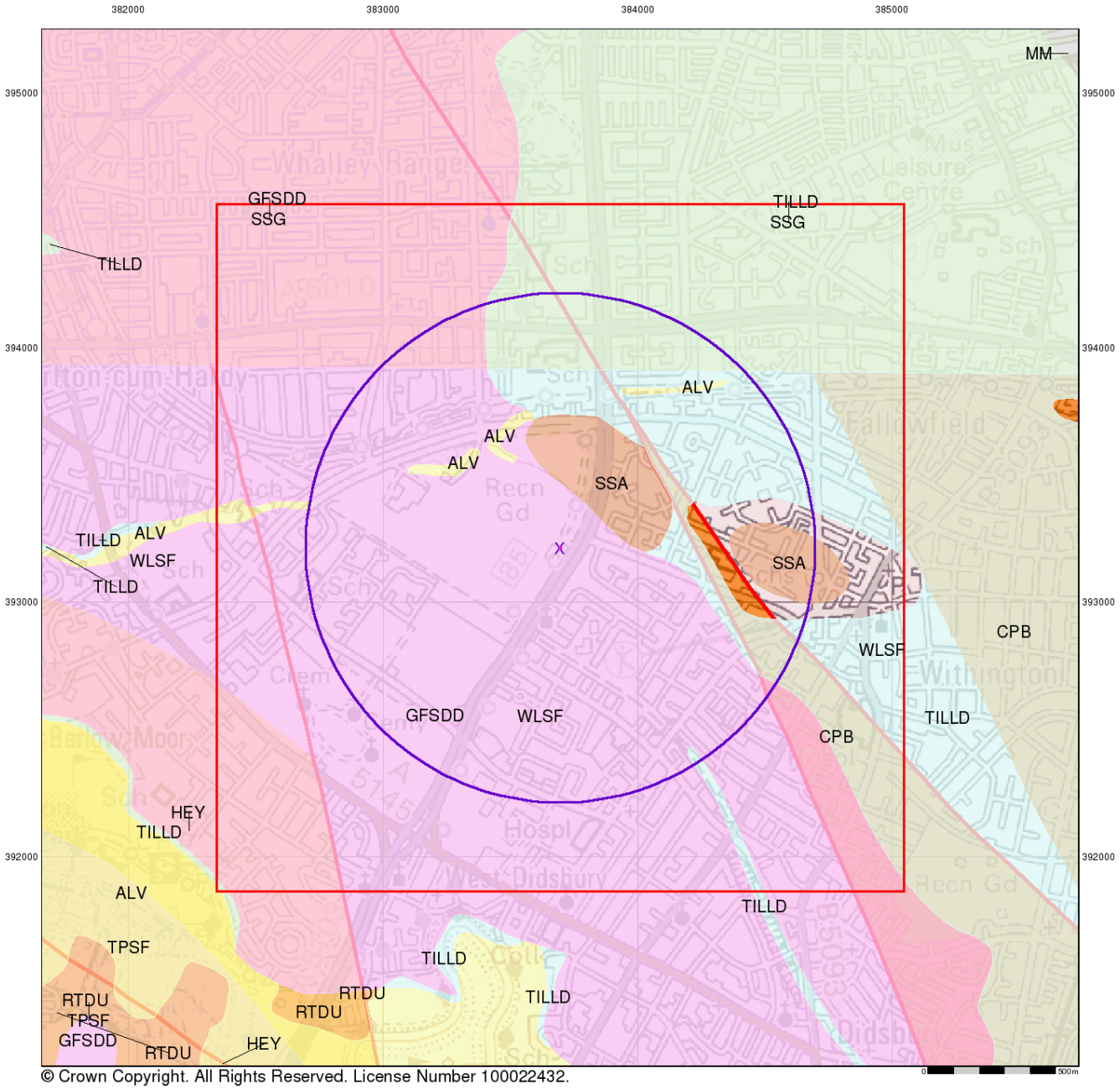
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Site Area (Ha):	0.01
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Envirocheck® Geology

Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

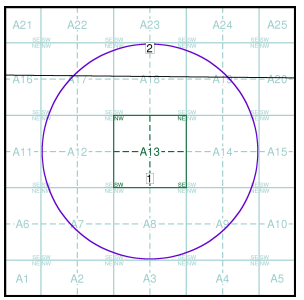
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	48987548_1_1
Customer Reference:	TLL/AW/P2005641
National Grid Reference:	383700, 393210
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details:

Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, MANCHESTER, M21 7SX

Appendix D

BGS Borehole Logs

Envirocheck® Report:

BGS Boreholes Datasheet

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48987548_1_1

Customer Reference:
TLL/AW/P2005641

National Grid Reference:
383700, 393210

Slice:
A

Site Area (Ha):
0.01

Borehole Search Buffer (m):
1000

Site Details:

Greater Manchester Police Sports & Social Club Ltd
Mauldeth Road West, Chorlton cum Hardy
MANCHESTER
M21 7SX

Client Details:

Miss T Lunt
Building Design Partnership (Sheffield)
1 North Bank
Sheffield
S3 8JY

BGS Boreholes Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
BGS Boreholes	pg 1	None	None	20	65

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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

Report Version v47.0

BGS Boreholes Detail

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
52	**BGS Boreholes** BGS Reference: Sj89sw476 Drilled Length (m): Not Supplied Borehole Name: 24 Wrenbury Avenue 1 Link to Borehole Scan: Not Available	A13NE (NE)	254	3	383924 393322
52	**BGS Boreholes** BGS Reference: Sj89sw477 Drilled Length (m): Not Supplied Borehole Name: 24 Wrenbury Avenue 2 Link to Borehole Scan: Not Available	A13NE (NE)	254	3	383924 393322
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53	**BGS Boreholes** BGS Reference: Sj89sw709 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp4 Link to Borehole Scan: Not Available	A13SE (SE)	381	3	383880 392880
53	**BGS Boreholes** BGS Reference: Sj89sw712 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp7 Link to Borehole Scan: Not Available	A8NE (SE)	399	3	383880 392860
53	**BGS Boreholes** BGS Reference: Sj89sw716 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp11 Link to Borehole Scan: Not Available	A8NE (SE)	409	3	383900 392860
53	**BGS Boreholes** BGS Reference: Sj89sw715 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp10 Link to Borehole Scan: Not Available	A8NE (SE)	421	3	383890 392840
54	**BGS Boreholes** BGS Reference: Sj89sw708 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp3 Link to Borehole Scan: Not Available	A8NE (SE)	390	3	383860 392860
54	**BGS Boreholes** BGS Reference: Sj89sw707 Drilled Length (m): Not Supplied Borehole Name: Minehead Avenue Tp2 Link to Borehole Scan: Not Available	A8NE (S)	404	3	383850 392840

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
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55	**BGS Boreholes** BGS Reference: Sj89sw704 Drilled Length (m): 12.19 Borehole Name: Barlow Moor Road West Didsbury 13 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865583/	A8NW (SW)	481	3	383510 392770
56	**BGS Boreholes** BGS Reference: Sj89sw703 Drilled Length (m): 12.19 Borehole Name: Barlow Moor Road West Didsbury 12 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865582/	A8NW (SW)	484	3	383480 392780
56	**BGS Boreholes** BGS Reference: Sj89sw702 Drilled Length (m): 12.19 Borehole Name: Barlow Moor Road West Didsbury 11 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865581/	A8NW (SW)	490	3	383450 392790
57	**BGS Boreholes** BGS Reference: Sj89sw564 Drilled Length (m): Not Supplied Borehole Name: Disley Avenue Withington 3 Link to Borehole Scan: Not Available	A8NE (S)	503	3	383790 392720
58	**BGS Boreholes** BGS Reference: Sj89sw44 Drilled Length (m): 200 Borehole Name: Houghend Clough Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/864927/	A12NE (NW)	505	3	383280 393500
59	**BGS Boreholes** BGS Reference: Sj89sw449 Drilled Length (m): Not Supplied Borehole Name: 76 Whitchurch Road Chorlton Cum Hardy 1 Link to Borehole Scan: Not Available	A14SW (E)	507	3	384193 393120
59	**BGS Boreholes** BGS Reference: Sj89sw450 Drilled Length (m): Not Supplied Borehole Name: 76 Whitchurch Road Chorlton Cum Hardy 2 Link to Borehole Scan: Not Available	A14SW (E)	507	3	384193 393120

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
59	**BGS Boreholes** BGS Reference: Sj89sw451 Drilled Length (m): Not Supplied Borehole Name: 76 Whitchurch Road Chorlton Cum Hardy 3 Link to Borehole Scan: Not Available	A14SW (E)	507	3	384193 393120
59	**BGS Boreholes** BGS Reference: Sj89sw452 Drilled Length (m): Not Supplied Borehole Name: 76 Whitchurch Road Chorlton Cum Hardy 4 Link to Borehole Scan: Not Available	A14SW (E)	507	3	384193 393120
60	**BGS Boreholes** BGS Reference: Sj89sw657 Drilled Length (m): Not Supplied Borehole Name: 17 Hassall Avenue Withington 1 Link to Borehole Scan: Not Available	A19SW (NE)	511	3	384050 393580
60	**BGS Boreholes** BGS Reference: Sj89sw659 Drilled Length (m): Not Supplied Borehole Name: 17 Hassall Avenue Withington Th3 Link to Borehole Scan: Not Available	A19SW (NE)	511	3	384050 393580
60	**BGS Boreholes** BGS Reference: Sj89sw658 Drilled Length (m): Not Supplied Borehole Name: 17 Hassall Avenue Withington Th2 Link to Borehole Scan: Not Available	A19SW (NE)	511	3	384050 393580
60	**BGS Boreholes** BGS Reference: Sj89sw680 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue 1 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw681 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue 2 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw683 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue 4 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw684 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue Tp1 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw685 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue Tp2 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw686 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue Tp3 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
60	**BGS Boreholes** BGS Reference: Sj89sw682 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue 3 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
60	**BGS Boreholes** BGS Reference: Sj89sw687 Drilled Length (m): Not Supplied Borehole Name: 16-18 Hassall Avenue Tp4 Link to Borehole Scan: Not Available	A19SW (NE)	526	3	384040 393610
61	**BGS Boreholes** BGS Reference: Sj89sw649 Drilled Length (m): 2 Borehole Name: 47 Rudheath Avenue Withington Th/B1 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865528/	A14NW (E)	516	3	384180 393390
61	**BGS Boreholes** BGS Reference: Sj89sw650 Drilled Length (m): 1.7 Borehole Name: 47 Rudheath Avenue Withington Th/B2 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865529/	A14NW (E)	516	3	384180 393390
61	**BGS Boreholes** BGS Reference: Sj89sw651 Drilled Length (m): 2 Borehole Name: 47 Rudheath Avenue Withington Th/B3 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865530/	A14NW (E)	516	3	384180 393390
61	**BGS Boreholes** BGS Reference: Sj89sw652 Drilled Length (m): 1.7 Borehole Name: 47 Rudheath Avenue Withington Th/B4 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865531/	A14NW (E)	516	3	384180 393390
62	**BGS Boreholes** BGS Reference: Sj89sw811 Drilled Length (m): 7.6 Borehole Name: Disley Avenue Withington B1 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/15636565/	A8NE (S)	552	3	383778 392668
62	**BGS Boreholes** BGS Reference: Sj89sw812 Drilled Length (m): 6.1 Borehole Name: Disley Avenue Withington B2 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/15636568/	A8NE (S)	562	3	383766 392656
63	**BGS Boreholes** BGS Reference: Sj89sw453 Drilled Length (m): Not Supplied Borehole Name: 67 Whitchurch Road Withington 1 Link to Borehole Scan: Not Available	A14SW (E)	581	3	384254 393056
63	**BGS Boreholes** BGS Reference: Sj89sw454 Drilled Length (m): Not Supplied Borehole Name: 67 Whitchurch Road Withington 2 Link to Borehole Scan: Not Available	A14SW (E)	581	3	384254 393056
63	**BGS Boreholes** BGS Reference: Sj89sw455 Drilled Length (m): Not Supplied Borehole Name: 67 Whitchurch Road Withington 3 Link to Borehole Scan: Not Available	A14SW (E)	581	3	384254 393056
64	**BGS Boreholes** BGS Reference: Sj89sw740 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpf Link to Borehole Scan: Not Available	A14NW (E)	591	3	384270 393350
64	**BGS Boreholes** BGS Reference: Sj89sw734 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester 2 Link to Borehole Scan: Not Available	A14NW (E)	594	3	384270 393360

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
64	**BGS Boreholes** BGS Reference: Sj89sw737 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpc Link to Borehole Scan: Not Available	A14NW (E)	596	3	384270 393370
64	**BGS Boreholes** BGS Reference: Sj89sw733 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester 1 Link to Borehole Scan: Not Available	A14NW (E)	608	3	384280 393380
64	**BGS Boreholes** BGS Reference: Sj89sw735 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpa Link to Borehole Scan: Not Available	A14NW (E)	611	3	384280 393390
64	**BGS Boreholes** BGS Reference: Sj89sw738 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpd Link to Borehole Scan: Not Available	A14NW (E)	613	3	384290 393360
64	**BGS Boreholes** BGS Reference: Sj89sw739 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpe Link to Borehole Scan: Not Available	A14NW (E)	623	3	384300 393360
64	**BGS Boreholes** BGS Reference: Sj89sw736 Drilled Length (m): Not Supplied Borehole Name: Old Moat Lane Manchester Tpb Link to Borehole Scan: Not Available	A14NW (E)	628	3	384300 393380
65	**BGS Boreholes** BGS Reference: Sj89sw387 Drilled Length (m): 1.87 Borehole Name: Chorlton Brook 6 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865270/	A18SW (N)	596	3	383550 393790
65	**BGS Boreholes** BGS Reference: Sj89sw388 Drilled Length (m): 2.55 Borehole Name: Chorlton Brook 7 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865271/	A18SW (N)	615	3	383550 393810
66	**BGS Boreholes** BGS Reference: Sj89sw394 Drilled Length (m): 7 Borehole Name: Chorlton Brook 32 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865277/	A12NE (NW)	657	3	383120 393530
66	**BGS Boreholes** BGS Reference: Sj89sw385 Drilled Length (m): 2.8 Borehole Name: Chorlton Brook 4 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865268/	A12NE (NW)	666	3	383110 393530
66	**BGS Boreholes** BGS Reference: Sj89sw386 Drilled Length (m): 7 Borehole Name: Chorlton Brook 5 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865269/	A12NE (NW)	671	3	383110 393540
67	**BGS Boreholes** BGS Reference: Sj89sw402 Drilled Length (m): .8 Borehole Name: Chorlton Brook Tp 119 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865285/	A18SE (N)	668	3	383950 393830

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
68	**BGS Boreholes** BGS Reference: Sj89sw390 Drilled Length (m): 3 Borehole Name: Chorlton Brook 9 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865273/	A18SE (NE)	720	3	384030 393850
69	**BGS Boreholes** BGS Reference: Sj89sw401 Drilled Length (m): .6 Borehole Name: Chorlton Brook Tp 118 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865284/	A19SW (NE)	763	3	384130 393840
70	**BGS Boreholes** BGS Reference: Sj89sw729 Drilled Length (m): Not Supplied Borehole Name: 23 Elsmore Road Wilbrahim 1 Link to Borehole Scan: Not Available	A19NW (NE)	778	3	384060 393900
70	**BGS Boreholes** BGS Reference: Sj89sw730 Drilled Length (m): Not Supplied Borehole Name: 23 Elsmore Road Wilbrahim 2 Link to Borehole Scan: Not Available	A19NW (NE)	778	3	384060 393900
70	**BGS Boreholes** BGS Reference: Sj89sw732 Drilled Length (m): Not Supplied Borehole Name: 23 Elsmore Road Wilbrahim Tha Link to Borehole Scan: Not Available	A19NW (NE)	778	3	384060 393900
70	**BGS Boreholes** BGS Reference: Sj89sw731 Drilled Length (m): Not Supplied Borehole Name: 23 Elsmore Road Wilbrahim 3 Link to Borehole Scan: Not Available	A19NW (NE)	778	3	384060 393900
71	**BGS Boreholes** BGS Reference: Sj89sw389 Drilled Length (m): 3 Borehole Name: Chorlton Brook 8 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865272/	A19SW (NE)	819	3	384210 393850
72	**BGS Boreholes** BGS Reference: Sj89sw750 Drilled Length (m): Not Supplied Borehole Name: Cavendish Road Primary School 2 Link to Borehole Scan: Not Available	A8SE (S)	876	3	384020 392400
72	**BGS Boreholes** BGS Reference: Sj89sw749 Drilled Length (m): Not Supplied Borehole Name: Cavendish Road Primary School 1 Link to Borehole Scan: Not Available	A8SE (S)	882	3	384010 392390
72	**BGS Boreholes** BGS Reference: Sj89sw751 Drilled Length (m): Not Supplied Borehole Name: Cavendish Road Primary School 3 Link to Borehole Scan: Not Available	A8SE (S)	891	3	384010 392380
73	**BGS Boreholes** BGS Reference: Sj89sw701 Drilled Length (m): 12.19 Borehole Name: Barlow Moor Road West Didsbury 10 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865580/	A7SE (SW)	882	3	383310 392420
73	**BGS Boreholes** BGS Reference: Sj89sw700 Drilled Length (m): 12.19 Borehole Name: Barlow Moor Road West Didsbury 9 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865579/	A7SE (SW)	909	3	383290 392400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
74	**BGS Boreholes** BGS Reference: Sj89sw745 Drilled Length (m): 2 Borehole Name: Bethnall Drive Manchester Tp5 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865624/	A19SW (NE)	894	3	384290 393880
75	**BGS Boreholes** BGS Reference: Sj89sw744 Drilled Length (m): 1.75 Borehole Name: Bethnall Drive Manchester Tp4 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865623/	A19SW (NE)	914	3	384350 393850
76	**BGS Boreholes** BGS Reference: Sj89sw743 Drilled Length (m): 2.5 Borehole Name: Bethnall Drive Manchester Tp3 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865622/	A19NW (NE)	956	3	384370 393890
76	**BGS Boreholes** BGS Reference: Sj89sw747 Drilled Length (m): 2 Borehole Name: Bethnall Drive Manchester Tp7 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865626/	A19NE (NE)	970	3	384380 393900
76	**BGS Boreholes** BGS Reference: Sj89sw742 Drilled Length (m): 2 Borehole Name: Bethnall Drive Manchester Tp2 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865621/	A19SE (NE)	978	3	384410 393880
76	**BGS Boreholes** BGS Reference: Sj89sw748 Drilled Length (m): 2 Borehole Name: Bethnall Drive Manchester Tp8 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865627/	A19NE (NE)	992	3	384400 393910
77	**BGS Boreholes** BGS Reference: Sj89sw746 Drilled Length (m): 3 Borehole Name: Bethnall Drive Manchester Tp6 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/865625/	A19NW (NE)	958	3	384330 393930
78	**BGS Boreholes** BGS Reference: Sj89sw456 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 1 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130
78	**BGS Boreholes** BGS Reference: Sj89sw457 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 2 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130
78	**BGS Boreholes** BGS Reference: Sj89sw458 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 3 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130
78	**BGS Boreholes** BGS Reference: Sj89sw459 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 4 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130
78	**BGS Boreholes** BGS Reference: Sj89sw460 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 5 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130

BGS Boreholes Detail

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
78	**BGS Boreholes** BGS Reference: Sj89sw461 Drilled Length (m): Not Supplied Borehole Name: 29-31 Winsford Road Fallowfield 6 Link to Borehole Scan: Not Available	A19NW (N)	987	3	384059 394130

Data Currency and Contact Details

BGS Boreholes	Version	Update Cycle
BGS Boreholes British Geological Survey - National Geoscience Information Service	July 2013	Quarterly

Contact Details	Contact Logo
3 **British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
- **Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk	LANDMARK Information Group

Central.

N.W.W.A

RECORD OF WELL

At HOUGHEND CLOUGH

OBSERVATION HOLE

Town or Village MANCHESTER

County LANCS

For Institute use only Licence No.

N .....

SJ89/229

98. SJ89SW

EXACT SITE OF WELL

Six-inch National Grid sheet and reference 1:50,000 OS SHEET 109 SJ 8328 9350

For NORTH WEST WATER AUTHORITY

State whether owner, tenant, builder, contractor, consultant, etc.: MAINTAINING AUTHORITY.

Address (if different from above) PLANNING & ENGINEERING DIRECTOR, NWWA., HEAD OFFICE, DAWSON HS., G.T. SANKEY, WARRINGTON, WA5 3LW.

Level of ground surface above sea level (O.D.) ....15.0m APPROX.... ft .....m)

*DELETE AS NECESSARY

If well top is not at ground level state how far above:* below: .....—.....ft (.....—.....m)

SHAFT.....—.....ft (.....—.....m); diameter.....ft (.....m);

HEADINGS (please attach details—dimensions and directions)

BORE NOMINAL 200mm BORE (.....m); diameter: at top.....7 5/8.....in (.....mm);

at bottom.....7 5/8.....in (.....mm)

Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.):

+0.6 m — 3.0 ..... 13 3/8 OD .....

3.0 m — 10.0m ..... 12 1/2 OPEN HOLE .....

10.0m — 25.98m ..... 8 5/8 OD (7 5/8 ID.) BUTT WELDED ...

25.98 — 81.0 m ..... 8 1/2 7 5/8 ..... OPEN HOLE .....

TEST CONDITIONS

Water struck at depths of ...SEE NWWA*... ft (.....m) below well top

Rest level of water.....ft (.....m) above* below well top. Suction at..... ft (.....m)

Yield on..... hours'* days' test pumping at.....galls per ..... (..... l/s) with

depression to.....ft (.....m) below well top. Recovery to rest level in ..... mins* hours

Capacity of pump.....g.p.h. (.....l/s)

Date of measurements.....

NORMAL CONDITIONS

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type ..... Motive power.....

Capacity.....galls (.....m³) per hour. Suction at ..... ft (.....m) below well top. Amount pumped.....galls (.....m³) per day. Estimated consumption .....galls (.....m³) per week

Well made by British Drillings Freezing Ltd.. Date of sinking.....

ADDITIONAL NOTES ANALYSIS (please attach copy if available)

LOG OF STRATA OVERLEAF

* FOR FURTHUR INFO, CONTACT NWWA AT ABOVE ADDRESS. AS COMPREHENSIVE TEST RECORDS KEPT BY. THEM.

Received from British Drilling & Freezing Ltd

Date 26.07.89

Observation well.....

Recorder.....

ER log .....

Site marked on

1" map .....

6" map—Grid Sheet.....

(use symbol)

Copy to.....

.....

Date.....

INSTITUTE OF GEOLOGICAL SCIENCES
HYDROGEOLOGY UNIT
EXHIBITION ROAD
LONDON SW7 2DE

For Institute use only

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA *If measurements start below ground surface, state how far.*	THICKNESS Feet	Inches	Metres	DEPTH Feet	Inches	Metres
	Should be Boulder Clay on Wilmslow Sst Formation						
	TRIASSIC						

British Geological Survey

GEO – RESEARCH LTD. B/H No. SJ 89 SW 702 11.

CONTRACT BARLOW MOOR ROAD SHEET No. 1 8345
LOCATION MANCHESTER No. of sheets 2 9279
CLIENT MANCHESTER CORPORATION Ground Level 30.44m
Commenced 15/2/72.
Completed 16/2/72.
Weather RAIN/DRY

Percussion U D SPT B | Rotary Cored runs O/H | Legend 5

CASING Size to. Size to. 0,200 4,870

STRATUM. (Scale: 20mm to 1 metre) 1. Thickness	Depth 2. m	Sample No.	Blow Count (N) LL/PL/PI	M.C % Core Rec. % 6.	Type of Test 7.	Grading % Passing Sieve 8 Results of any other Tests: mm 75 / mm 2.40; μm 600; μm 210; μm 150; μm 75	TRIAXIAL TEST: Bulk Density Kg/m³; Dev. Stress kN/m²; Lat. U.C.T. Pres. Stren. kN/m² kN/m² Shear/∠° kN/m²	WATER REMARKS 10.
TOPSOIL 0,60	0.60							
Compact brown poorly graded medium/coarse SAND with occasional gravel (Fluvio-Glacial Gravel) (iii) 2,97	0.91	P1	4.3.3.5. (15)	11.2	SO3	0,01		
	1.52	B1		14.5		– 100 93 82 79 75 58 11 6 4		
	1.82	P2	3.3.6.5. (17)	11.2				
	2.74	P3	5.4.4.3. (16)	13.7				
	3.04	B2		16.3				Water Added
	3.65	P4	4.4.3.4. (15)	12.4				
	4.57	D1		29.5				
Firm to stiff brown silty CLAY with occasional pebbles and traces of sand (Boulder Clay) (i) 4,57	4.87	U1	(47)	23.6 / 22.6 / 23.7	TAQ		2020 133 100; 2040 161 200; 2010 169 400 77/0°	
	5.79	D2		26.9				
	6.40	U2	(52)	27.7 / 28.4 / 29.4	TAQ		1940 87 100; 1930 104 200; 1910 110 400 50/0°	
	7.31	D3		28.3				
	7.92	U3	(48)	28.4 / 28.2 / 29.9	TAQ		1960 89 100; 1950 111 200; 1900 106 400 51/0°	
	8.53	D4		26.4				
	9.14							

Continued on Sheet 2.

REMARKS:

Sample	Depth	M.C. % D.W.	C. B. R. Air Voids	Type	TOP 0.1	TOP 0.2	BOTTOM 0.1	BOTTOM 0.2	Value	COMPACTION B.S. 1377 No.	Max. Dry Density	Optm. M.C.

For other symbols used see overleaf

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GEO – RESEARCH LTD. B/H No. 11. SJ89SW702

CONTRACT BARLOW MOOR ROAD
LOCATION MANCHESTER
SHEET No. 2
No. of sheets 2

CLIENT MANCHESTER CORPORATION
Percussion U D SPT B
CASING Size 0.200 to. 4.870 Size to.
Ground Level 30.44m
Commenced 15/2/72.
Completed 16/2/72.

Weather RAIN/DRY
Rotary Cored runs O/H

STRATUM. (Scale:20mm to 1 metre) 1. Thickness	Depth 2. m	Sample No.	Blow Count (N) LL/PL/PI	Legend 5	M.C % Core Rec. % 6.	Type of Test 7.	Grading % Passing Sieve 8 Results of any other Tests	TRIAXIAL TEST Bulk Density Kg/m³	Dev. Stress kN/m²	Lat. U.C.T. Pres. Stress kN/m² Shear/ϕ° kN/m²	WATER REMARKS 10.
Firm to stiff brown silty CLAY with occasional pebbles and traces of sand (Boulder Clay) (1)	9.14						mm 75 40 20 10 5 / mm 2.40 600 210 150 75				
	9.75	U4	(55)		27.0	TAQ		1970	111	100	
					27.9			1970	118	200	
	10.06	D5			29.1			1920	101	400	
					27.5					55/0°	
	11.58	U5	(58)		16.4			2130	116	100	
					15.3	TAQ		2160	145	200	
3.05	12.19				14.5			2200	171	400	
										72/0°	
										45/5°	Water Table Not Established
			BOREHOLE		COMPLETE						

REMARKS:

Sample	Depth	M.C. % D.W.	Air Voids	Type	C. B. R. TOP 0.1	TOP 0.2	BOTTOM 0.1	BOTTOM 0.2	Value	COMPACTION B.S. 1377 No.	Max. Dry Density	Optm. M.C.

For other symbols used see overleaf

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GEO – RESEARCH LTD. B/H No. SJ89SW 703 12.

CONTRACT BARLOW MOOR ROAD
LOCATION MANCHESTER
SHEET No. 1 8348
No. of sheets 2 9278

CLIENT MANCHESTER CORPORATION
Ground Level 32.14m
Commenced 16/2/72.
Completed 17/2/72.

Weather DRY

Percussion U D SPT B
Rotary Cored runs O/H
CASING Size 0,200 to. 4,870 Size to.

STRATUM. (Scale:20mm to 1 metre) 1. Thickness	Depth 2. m	Sample No.	Blow Count (N) LL/PL/PI	M.C % Core Rec. % 6.	Type of Test 7.	Grading % Passing Sieve 8 Results of any other Tests	TRIAXIAL TEST Bulk Density Kg/m³	Dev. Stress kN/m²	Lat. U.C.T. Pres. Strength kN/m² Shear/S kN/m²	WATER REMARKS 10.
TOPSOIL 0.45	0.45									
Compact brown poorly graded medium/coarse SAND with occasional gravel (Fluvio-Glacial Gravel) (iii)	0.91	P1	4.3.3.4. (14)	7.6						
	1.52	B1		9.8						
	1.82	P2	3.3.4.6. (16)	7.3						
	2.74	P3	4.3.4.5. (16)	7.5						
	3.04	B2		8.1	SO_3 S	0.01 - - 100 92 91 88 70 13 8 5				Water Added
	3.65	P4	5.4.5.4. (18)	7.2						
4.12	4.57									
Soft to firm brown silty CLAY with occasional pebbles and silt lenses. (Boulder Clay) (i)	4.87	D1		28.6						
	5.18	U1	(47)	27.6			1910	97	100	
				27.1	TAQ		1900	58	200	
				28.1			1920	97	400 42/0°	
	6.09	D2		28.6						
	6.70	U2	(50)	34.7			1820	51	100	
				33.5	TAQ		1860	65	200	
				33.6			1850	83	400 33/0° 17/4°	
	7.62	D3		26.8						
	8.23	U3	(49)	30.3			1910	91	100	
				30.7	TAQ		1900	89	200	
				30.7			1910	94	400 46/0°	
4.57	9.14									

Continued on Sheet 2.

REMARKS:

Sample	Depth	M.C. % D.W.	C. B. R. Air Voids	Type	TOP 0.1	TOP 0.2	BOTTOM 0.1	BOTTOM 0.2	Value	COMPACTION B.S. 1377 No.	Max. Dry Density	Optm. M.C.

For other symbols used see overleaf

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GEO – RESEARCH LTD. B/H No. SJ 89 SW. 703 12.

CONTRACT BARLOW MOOR ROAD
LOCATION MANCHESTER

SHEET No. 2
No. of sheets 2

CLIENT
MANCHESTER CORPORATION

Percussion U O B SPT
Rotary Cored runs O/H

CASING Size to. Size to.
0.200 4.870

Ground Level 32.14m
Commenced 16/2/72.
Completed 17/2/72.

Weather DRY

STRATUM. (Scale:20mm to 1 metre)

1. Thickness	Depth 2.m	Sample No.	Blow Count (N) LL/PL/PI	Legend 5.	M.C % Core Rec. % 6.	Type of Test 7.	Grading % Passing Sieve mm 75 / mm 2.40 / mm 40 / µm 600 / mm 20 / µm 210 / mm 10 / µm 150 / mm 5 / µm 75	TRIAXIAL TEST Bulk Density Kg/m³	Dev. Stress kN/m²	Lat. U.C.T. Pres. Stress kN/m² kN/m² Shear/ϕ° kN/m²	WATER REMARKS 10.
Soft to firm brown silty CLAY with occasional pebbles and silt lenses (Boulder Clay) (1)	9.14	U4			29.8						
	9.75	U4	(53)		19.7			1880	198	100	
					18.2	TAQ		1880	213	200	
					18.4			1880	206	400	
										103/0°	
	10.66	D5			30.4						
	11.58	U5	(58)		29.5			1890	97	100	
					30.0	TAQ		1920	81	200	
					29.1			1940	96	400	
										46/0°	
	3.05 12.19										Water Table Not Established
			BOREHOLE		COMPLETE						

REMARKS:

Sample	Depth	M.C. % D.W.		C. B. R. Air Voids	Type	TOP 0.1	TOP 0.2	BOTTOM 0.1	BOTTOM 0.2	Value	COMPACTION B.S. 1377 No.	Max. Dry Density	Optm. M.C.

For other symbols used see overleaf

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Appendix E

Coal Authority Report

The COAL AUTHORITY

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0845 762 6848 DX 716176 MANSFIELD 5

LANDMARK INFORMATION GROUP LIMITED
SOWTON INDUSTRIAL ESTATE
ABBEY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY

Our reference:	**51000367775001**
Your reference:	**48987548**
Date of your enquiry:	**06 September 2013**
Date we received your enquiry:	**06 September 2013**
Date of issue:	**06 September 2013**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

SITE AT GREATER MANCHESTER POLICE SPORTS & SOCIAL CLUB LTD, MAULDETH ROAD WEST, CHORLTON CUM HARDY, MANCHESTER, GREATER MANCHESTER,

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	No
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

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Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

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Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

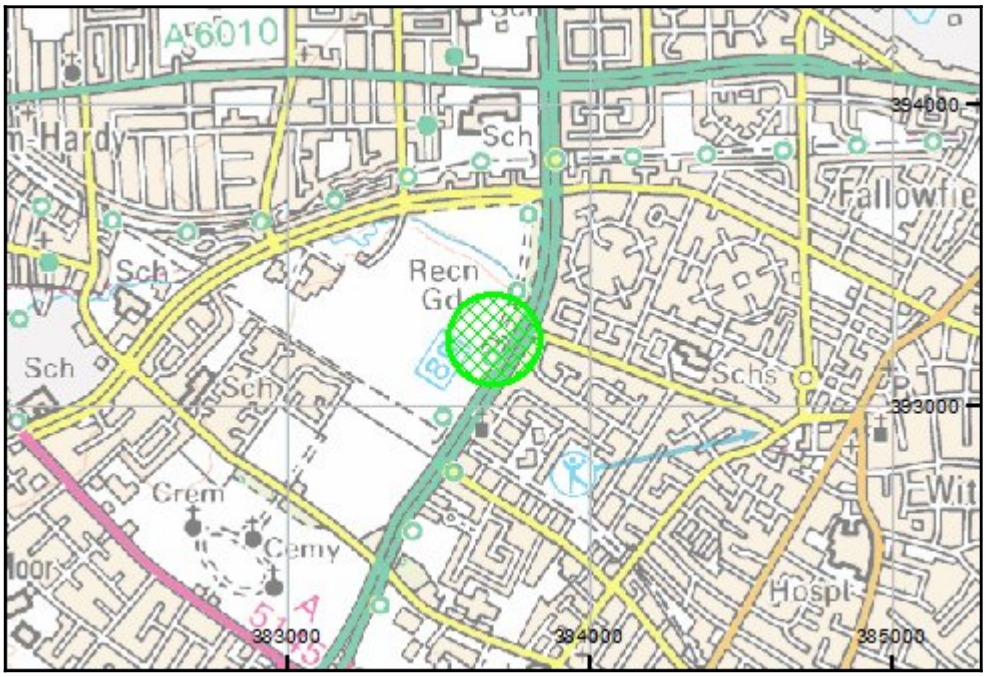
Additional Remarks

This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006.

The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database right. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

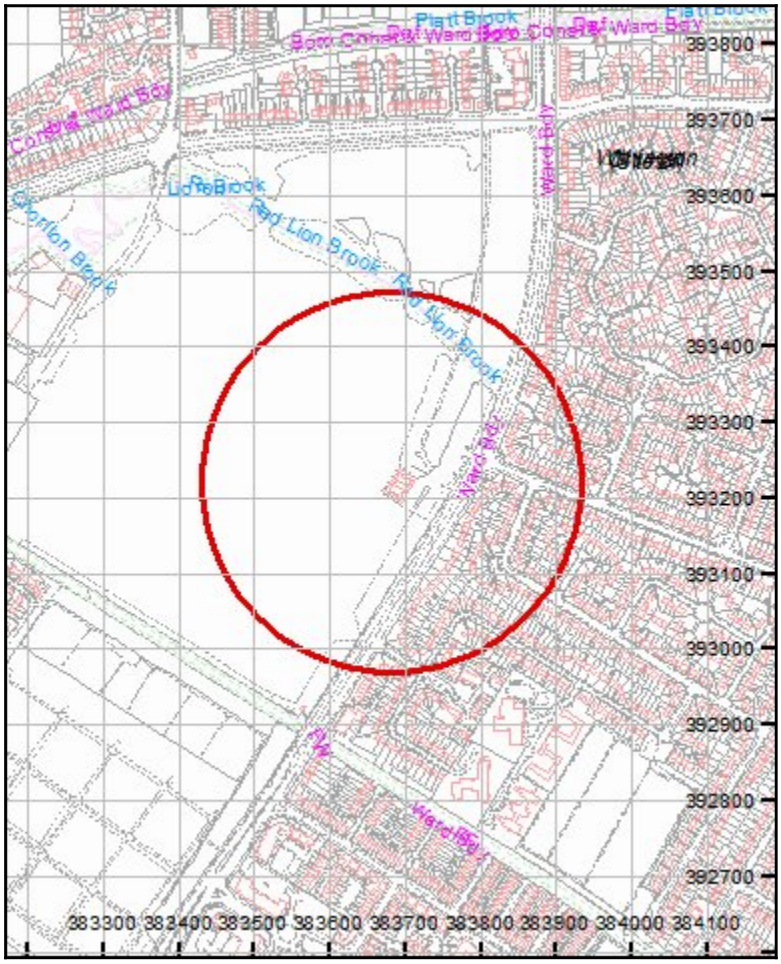
Location map

Approximate position of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey

Appendix F

Preliminary UXO Risk Assessment (Envirocheck)

6 Alpha Associates Limited
Quatro House, Frimley Road
Camberley, Surrey
GU16 7ER

T: +44(0) 203 371 3900
W: www.6alpha.com

Preliminary Unexploded Ordnance (UXO) Risk Assessment

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



6 Alpha Project Number: P3531
Landmark Order Number: 48987548_2
Client Reference: TLL/AW/P2005641
Site: Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, Manchester, M21 7SX

Originator: Chris Fordham (9th September 2013)
Quality Review: Graeme Warden (9th September 2013)
Released By: Lisa Askham (10th September 2013)

Delivered by

Envirocheck®

alpha ASSOCIATES
special risks consultancy

Unexploded Ordnance Probability Assessment

Site Address	The Client has specified the Study Site as "Greater Manchester Police Sports & Social Club Ltd, Mauldeth Road West, Chorlton cum Hardy, Manchester, M21 7SX". According to the mapping provided, this Site is confirmed as being centred on National Grid Reference 383700, 393210.
Using This Report	This Preliminary Assessment is designed to inform environmental and construction professionals of the potential threat of military related explosives and/or ordnance on, or in the vicinity of the Study Site. This assessment should be employed as an initial site-screening tool to meet with the requirement of Phase One of the CIRIA UXO Risk Management Framework; subject to the outcome, further detailed research (under Phase 2 of the same Framework) may then be required to confirm the final risk level. 6 Alpha can provide this service and any additional interpretation, if it is required. Unless otherwise specified, it should be assumed that 6 Alpha has carried out a database search for each of the threat sources detailed in the data findings. 6 Alpha will provide two figures in the report, the *Second World War* (WWII) High Explosive (HE) Bomb Density and the final UXO Probability Assessment. The purpose of this approach is to demonstrate that whilst bomb density statistics set the scene for WWII bombing, they should not be relied upon exclusively to generate a holistic assessment.
Data Findings	The UXO database has been searched to 1,000m from the centre point of the Site. The data has been presented in both geospatial mapping software and tabulated format. For further information, please contact 6 Alpha.

Threat Source	Detail
Records of military facilities	*Spath Road* "Military Camp" was located 515m southwest of the Site.
Ordnance manufacture/ storage	None located on or within 1,000m of the Study Site.
WWII decoy bombing site	None located on or within 1,000m of the Study Site.
WWII defensive feature	A "Heavy Anti-Aircraft (HAA) Gun Site" was recorded 525m to the west-northwest of the Site.
WWII bombing targets	The *Luftwaffe* did not identify any primary targets in the immediate vicinity of the Study Site. "Railway Infrastructure" would have been targeted "opportunistically". This included a "Railway Line" 250m to the southwest, a "Railway Station" 485m to the northwest, a "Goods Yard" 540m to the northwest and a "Railway Station" 960m to the southeast.
WWII bomb strikes	*Air Raid Precaution* (ARP) bomb strike mapping identifies HE and Incendiary Bomb (IB) strikes throughout the local area. IBs were recorded 20m to the east, 45m to the southeast, 55m to the east and 80m to the east. Eleven HE bomb strikes were recorded in a line approximately 420m east of the Site.
WWII bomb damage	The Site consisted of "Open Ground" during WWII and there were no buildings present to evidence potential bomb damage.
WWII bombing density	The Study Site was located within the *Manchester Council Borough*, which sustained 26 HE bomb strikes per 1,000 acres.
Abandoned bomb register	There are no officially recorded abandoned bombs located within 1,000m of the Study Site.

Unexploded Ordnance Probability Assessment

Threat Potential	UXO PROBABILITY ASSESSMENT = 5 RATING, INDICATING A MEDIUM POSSIBILITY OF UXO ENCOUNTER The rating scale can be seen on the final UXO Probability Assessment Map. The data may indicate that there is a varying probability rating across the defined search area. Therefore, the percentage of each category has been calculated and assessed, and whilst lower risk zones have been identified within the locality, the highest risk rating has been determined at the specific site for UXO risk consideration. Therefore, the highest risk rating has been used for the final assessment and recommendations.
Summary and Recommendations	The Study Site was located within the *Manchester Council Borough*, which sustained 26 HE bomb strikes per 1,000 acres; a moderate bombing density. Although there were no primary bombing targets identified in the vicinity of the Site, nearby "Railway Infrastructure" would have been targeted "opportunistically". ARP records identify HE bomb strikes in the vicinity of the Site and IBs very close to the Site's boundary. Given that the Study Site was undeveloped during WWII, it is possible that bomb strikes and Unexploded Bombs (UXBs) could have gone unnoticed. The bomb strikes within 20m of the Site, coupled with the lack of development mean that further investigation into the UXO threat at this Site is required. In light of these findings and in accordance with CIRIA's publication on managing UXO risks, 6 Alpha recommends that further action is warranted to address the level of UXO risk at this particular site. The next stage in the risk management framework is to undertake a Detailed UXO Risk Assessment, which we would be pleased to provide.
Important Notes	1. The term "Preliminary UXO Risk Assessment" has been used to describe this report, to fall inline with the CIRIA publication. Whilst the term "Risk" can be justifiably used at this stage, the reader should note that the "Consequence" function of "Risk" is not considered. Should it be required, this would be addressed in the "Detailed UXO Risk Assessment" (Phase 2). 2. This report is accurate and up to date at the time of writing. 3. The assessment levels have been generated from historical data and third party sources. Where possible 6 Alpha have sought to verify the accuracy of such data, but cannot be held accountable for inherent errors that may be in third party data sets (e.g. National Archive or library sources). 4. 6 Alpha have exercised all reasonable care, skill and due diligence in producing this service. 5. Empirical units may be used in the assessment given the era of the source data. Whilst every effort has been used to identify all potential UXO/explosives threat, there were a number of private facilities commandeered, during both World Wars, to support the war effort in munitions production. It is therefore possible that some of the aforementioned sites may not be included within the database.

POLICE SPORTS & SOCIAL CLUB LTD, MAULDETH ROAD WEST, MANCHESTER, M21 7SX

WWII High Explosive Bomb Density

Figure 1

BRITISH NATIONAL GRID



BOMB SEARCH
WWW.6ALPHA.COM

0 10 20 40 60 80 100 Meters

N

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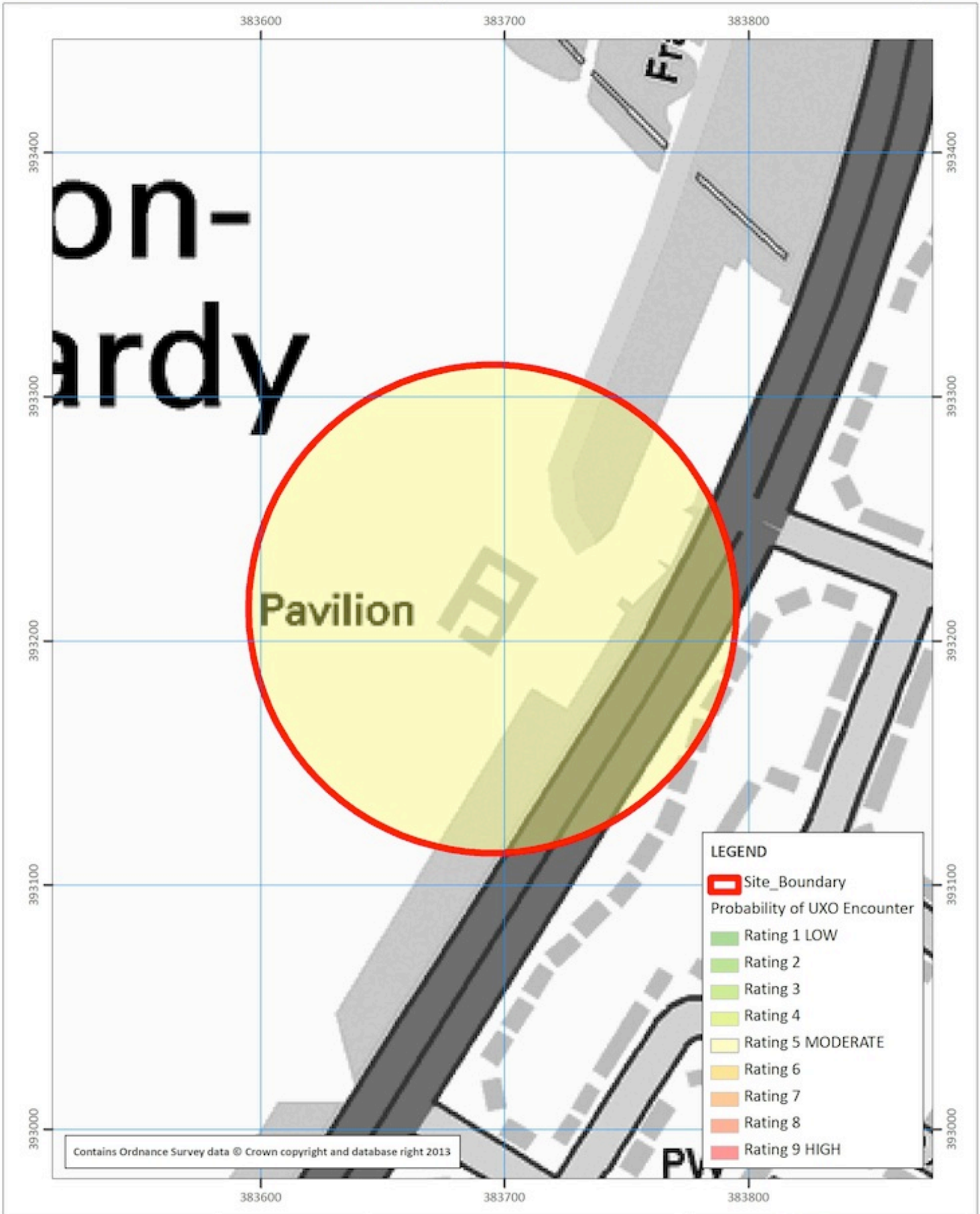
PROJECT NO.	P3531
DRAWN BY	DR
CHECKED BY	GW
DATE	06 September 2013

POLICE SPORTS & SOCIAL CLUB LTD, MAULDETH ROAD WEST, MANCHESTER, M21 7SX

Probability of UXO Encounter

Figure 2

BRITISH NATIONAL GRID



BOMB SEARCH
WWW.6ALPHA.COM



0 10 20 40 60 80 100 Meters

N

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PROJECT NO.	P3531
DRAWN BY	DR
CHECKED BY	GW
DATE	06 September 2013

Appendix G

Service Drawings

ATKINS CHECKED
SNM

Gopalakrishnan, Roshni

From: Somappa, Yashwanth
Sent: 10 September 2013 14:00
To: Bucksley, Peter
Subject: RE: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Attachments: Chorlton cum Hardy.pdf; Data Key + Special Requirements.pdf

This response is made only in respect to electronic communications apparatus forming part of the Vodafone Limited electronic communications network formerly being part of the electronic communications networks of Cable & Wireless UK, Energis Communications Limited, Thus Group Holdings Plc and Your Communications Limited.

Please accept this email as confirmation that Vodafone **does** have apparatus within the vicinity of your proposed works detailed below.

Please see attached network information.

Many thanks.

Plant Enquiries Team
T: 01454 662881
E: osm.enquiries@atkinsglobal.com

ATKINS working on behalf of

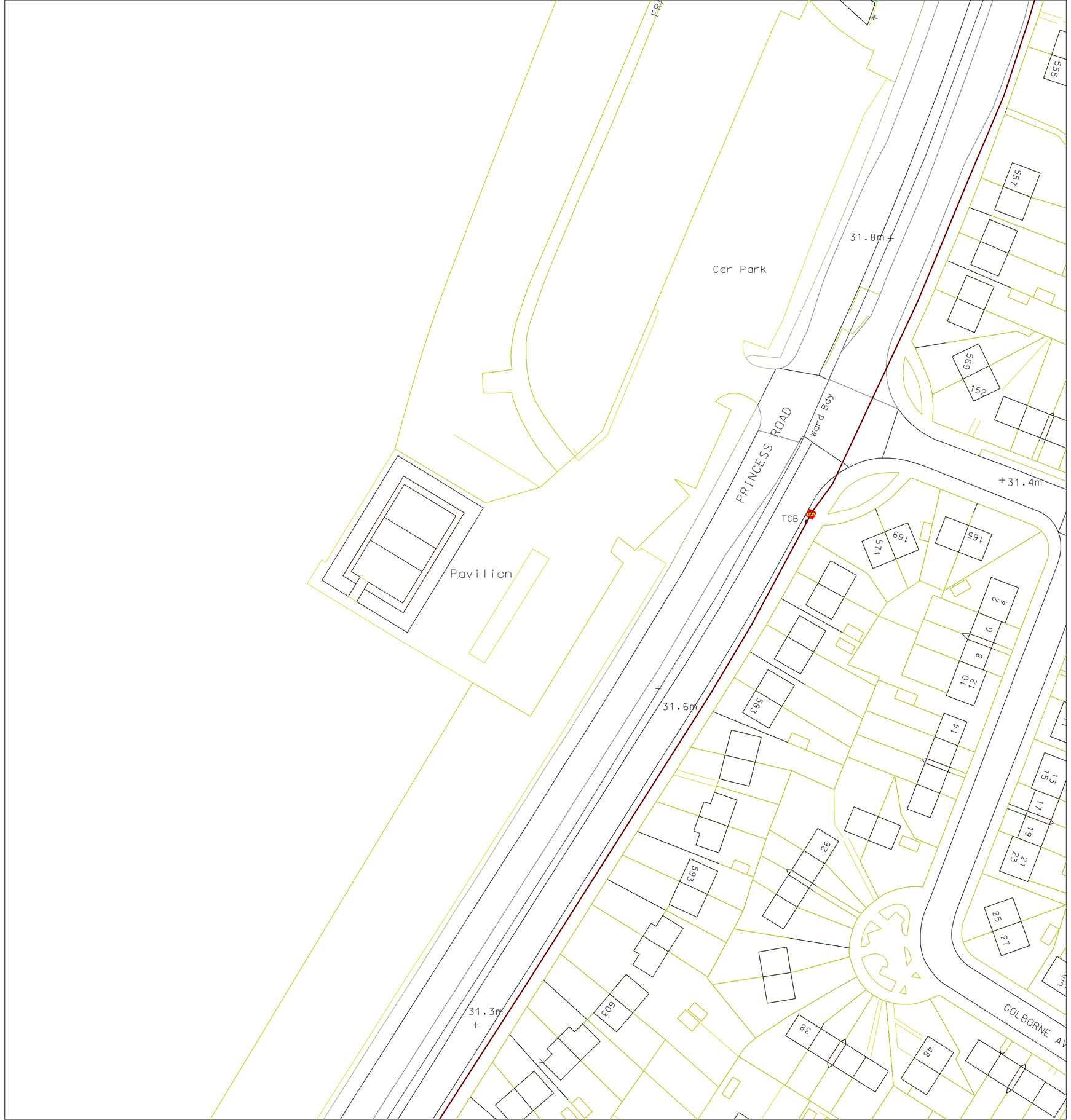
vodafone

PLEASE NOTE:

The information given is indicative only. No warranty is made as to its accuracy. This information must not be solely relied upon in the event of excavation or other works carried out in the vicinity of Vodafone plant. No liability of any kind whatsoever is accepted by Vodafone, its servants, or agents, for any error or omission in respect of information contained on this information. The actual position of underground services must be verified and established on site before any mechanical plant is used. Authorities and contractors will be held liable for the full cost of repairs to Vodafone's apparatus and all claims made against them by Third parties as a result of any interference or damage.

Diversionary works may be necessary if the existing line of the highway/railway or it's levels are altered, where apparatus is affected. Where apparatus is affected and requires diversion, you must submit draft details of the proposed scheme with a written request for a 'C3 Budget Estimate' to the above address. These estimates should be provided normally within 20 working days from receipt of your written request. Please include proof of this C2 response when requesting a C3.

From: Bucksley, Peter
Sent: 09 September 2013 18:13
To: 'nrswa@bskyb.com'; 'plantenquiries@catelecomuk.com'; 'plantenquiries@cityfibreholdings.com'; 'plantenquiries@energetics-uk.com'; 'Enquiries, Unit'; 'nrswa@gtc-uk.co.uk'; 'Plantenquiries'; 'interoute.enquiries@plancast.co.uk'; 'plantenquiries@mcnicholas.co.uk'; 'Telenttelia.Plantenquiries@telent.com'; 'osp-team@uk.verizonbusiness.com'; National Plant Enquiry's; 'OPBuriedServicesEnquiries@networkrail.co.uk'; 'gmutc@tfgm.com'; 'Contact@manchester.gov.uk'; 'karen.whittaker@amey.co.uk'
Subject: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Importance: High


Car Park
Pavilion
PRINCESS ROAD
Ward Bay
GOLBORNE AV
TCB
31.8m
31.6m
31.4m
31.3m
555
557
595
152
583
603
593
769
171
165
2
4
6
8
10
12
14
151
17
19
21
23
25
27
26
38
48

Vodafone Network Colour:

Ex-Cable&Wireless UK Network (now Vodafone)

Planned & Approved Route

Planned Route – Awaiting Approval

Other Licensed Operator (OLO)

Ex-Thus Network (now Vodafone)

Ex-Energis Network (now Vodafone)

OLO

Other:

Overhead Electricity Line (non Vodafone)

Network Rail

Other Licensed Operator (OLO).

= Ex-Cable&Wireless UK, Energis and Thus fibre-optic cable within an OLO duct. Please contact all other operators for further details of their apparatus within that area.

Fibre Services
Special Requirements relating to the External Plant Network of Vodafone

Contents

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2. Purpose of document 1
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4. Vodafone Network and Apparatus 2
5. Plant records 2
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8. Depths of cover 3
9. Separation 3
10. Jointing chambers 5
11. Notification periods 5
12. Excavation and backfill 5
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14. Attendance of Company Representative 6
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16. About this Document 9

1. Introduction

This document sets out the procedure that will apply when Other Parties intend or are undertaking works in the vicinity of Vodafone apparatus.

2. Purpose of document

This document provides a means by which the Vodafone specific special requirements relating to their apparatus, regardless of it being situated in the public highway / road, private street, land or any other areas, is made aware to Other Parties.

3. Scope

This document will be presented to Other Parties or Contractors to encourage those undertaking works within the vicinity of Vodafone apparatus to refer to and comply with. This is in order to protect where necessary the Vodafone apparatus and to avoid damage to the apparatus and loss of service.

A National Joint Utilities Group (NJUG) document NJUG 9 titled "Recommendations for the Exchange of Records of Apparatus between Utilities" provides useful reference material.

It should be noted that, where appropriate, additional information on avoiding danger from underground apparatus is contained within the HSG47 guidance book titled "Avoiding Danger from Underground Services."

4. Vodafone Network and Apparatus

Damage to Vodafone apparatus is extremely disruptive and can be expensive to repair, especially where long lengths of cable have to be replaced.

In order to maintain the network integrity and minimise disruption to service, it is essential that disturbances are absolutely minimal. When working within the vicinity of Vodafone apparatus, extreme care is necessary in order to avoid costly repairs. The Other Parties / Contractor shall make every effort to ensure that disturbance of Vodafone apparatus is no more than is absolutely necessary for the completion of the works in accordance with their contract.

5. Plant records

It is the responsibility of the Other Parties undertaking works which may affect Vodafone apparatus to obtain all relevant Vodafone plant records from our agent Atkins Global prior to works commencing. This may be done by contacting the Atkins Global Plant Enquiries Team listed in Appendix B.

Plant records for such enquiries will generally be provided within 10 working days of receipt and in compliance with the New Roads and Street Works Act 1991 [NRSWA] requirements. If Vodafone plant is affected, the response will contain reference to this document. Other Parties and Contractors are advised to refer to the National Joint Utilities Group [NJUG] 9 Document which outlines recommendations for the exchange of records of apparatus between utilities.

6. Definitions

The following definitions are applicable in this document:

a) **Apparatus** means all electronic communications apparatus above surface, at the surface or sub-surface apparatus, Cable, Jointing Chamber and plant formerly being apparatus owned or used by the Code Operators Cable & Wireless UK, Energis Communications Limited, Thus Group Holdings Plc and Your Communications Limited including any associated cables or ducts owned, leased or rented by the said Code Operators now owned and used by the Code Operator Vodafone Limited ("Vodafone").

b) **Cable** means any polythene or other sheath containing optical fibres or metallic conductors.

c) **Depth of cover** means the depth from the surface to the topmost barrel of the duct nest, in the case of ducts encased in concrete, to the top of the concrete, and in the case of directly buried cable, the top of the cable.

d) **Jointing chamber** means any manhole, surface box or other chamber giving access to Vodafone apparatus or their network.

e) **Utility** means an organisation licensed to provide gas, water, electricity, Cable TV or telecommunications services.

f) **Developer** means an organisation licensed to develop industrial/residential premises or given license to connect to utility apparatus.

g) **Contractor** means the individual, firm or company contracted to undertake the work for a Utility or Other Parties.

h) **Other Parties** means the Utilities, Highway Authorities, Developers, Street Authority (Roads Authority - Scotland).

i) **Site** means the location of, or in the vicinity of, the various works.

7. Requirements

Prior to commencing any work or moving heavy plant or equipment over any portion of the site, the Other Parties or Contractor shall notify Vodafone of their intentions. This may be done by contacting Atkins Global, contact listed in Appendix B.

Upon receipt of this notification, Atkins Global will identify if Vodafone apparatus is affected. If any Vodafone apparatus is affected by the works then Atkins Global will provide necessary records and confirm details of Vodafone apparatus and network operated within the affected area or adjacent to the proposed work site.

7.1 Location of Plant

It is the responsibility of the Other Parties or Contractors to undertake adequate plant location procedures. These may include searches for metallic cables which must be performed by actively inducing a signal in a cable conductor via a transmitter. A passive search is not considered sufficient.

Before applying a tracing signal to the Vodafone apparatus, the Other Parties or Contractors shall seek confirmation from Atkins Global that the Vodafone apparatus will not suffer any disruption to its networks normal workings as a result of the nature of the signal being induced.

7.2 Trial excavations

Optic fibre cables are very susceptible to damage from excavation tools. They are not electrically conductive and cannot be located by radio induction methods. Once an approximate location is known, the exact location must be ascertained by means of hand dug pilot holes. Where the work to be carried out by the Other Party or Contractor involves excavation in the vicinity of our apparatus, the Other Party or Contractor shall, by trial excavation at his own expense, determine the exact location and depth of the Cable& Wireless Worldwide apparatus. All excavations adjacent to the Vodafone apparatus are to be carried out by hand until the extent and /or location of the apparatus is known.

All excavation work shall be executed in accordance with the current issue of Health and Safety series booklet HSG47, Avoiding danger from underground services.

8. Depths of cover

The Other Party or Contractor should note that the minimum depths of cover for Vodafone apparatus shall be maintained together with specified separation requirements. Where the minimum depths of cover specified by Vodafone cannot be maintained, the Other Party or Contractor shall at their own expense, carry out the instructions of Vodafone requirements for the protection or diversion of their apparatus.

The Other Party or Contractor should have particular regard to the possibility of encountering Vodafone apparatus (including ducts and cables), at depths of cover other than that reported.

Surface cables (such as cables on bridges or walls) which are liable to be placed in danger from the Other Parties or Contractors works shall be protected, at the Other Parties expense, as directed by the Vodafone representative.

9. Separation

Reference should be made to HSG47 to ensure that adequate separation is achieved. The following details outline the specific requirements of Vodafone and capture the HSG47 requirements.

9.1 High voltage cables

High voltage single core cables of 1000 V and above shall have a minimum clearance from Company Apparatus of 500 mm.

High voltage multi-core cables of 1000 V and above shall have a minimum clearance from Company Apparatus of 350 mm.

In exceptional circumstances where the above clearances cannot be maintained, the separating distance may be reduced to a minimum of 175 mm. In such circumstances, concrete, of a quality as directed by the Company Representative, must be inserted to completely fill the space between the High Voltage cable and the Company Apparatus, in accordance with the requirements of the Company Representative. Any further services must have a minimum clearance of 250 mm from the concrete.

9.2 Low voltage cables

Low voltage cables of less than 1000 V shall have a minimum clearance from Company Apparatus of 180 mm. In exceptional circumstances where the above clearance cannot be maintained, the separating distance may be reduced to a minimum of 75 mm. In such circumstances, concrete, of a quality as directed by the Company Representative, must be inserted to completely fill the space between the services, in accordance with the requirements of the Company Representative. Any further services must have a minimum clearance of 250 mm from the concrete.

9.3 Ancillary electrical apparatus

Lamp posts, traffic posts and other such ancillary electrical apparatus shall have a minimum clearance of 150 mm from underground Company Apparatus and 600mm clearance from above ground Company Apparatus.

9.4 High pressure gas mains and other Undertakers plant/equipment

High pressure gas mains shall have a minimum clearance of 450 mm from Company Apparatus. All other undertakers' plant and equipment, when running in parallel with Company Apparatus, shall have a minimum clearance of 200mm. Where gas mains cross Company Apparatus, the minimum clearance shall be 200mm. All other undertakers' plant and equipment, when running across Company Apparatus, shall have a minimum clearance of 100 mm.

9.5 Other Undertakers plant

Other undertakers' plant and equipment which runs in parallel with Company Apparatus shall have a minimum clearance of 200mm. All other undertakers' plant and equipment when running across Company Apparatus shall have a minimum clearance of 100mm.

9.6 Tramways

Each separating distance shall be individually agreed with the Company Representative.

10. Jointing chambers

10.1 Protection

Footway type jointing chambers are not designed to withstand carriageway loadings.

Where such chambers are liable to be placed at risk, either temporarily or permanently, from vehicular traffic or from the movement of plant and/or equipment, they will need to be adequately protected. Alternatively, they may have to be demolished and rebuilt to carriageway standards, at the Other Parties or Contractors expense under supervision of Vodafone representative.

All Vodafone jointing chambers and / or other access points shall be kept clear and unobstructed. Access for vehicles, winches, cable drums and / or any further equipment required by Vodafone for the maintenance of its apparatus, must be maintained at all reasonable times.

10.2 Access

The covers to Vodafone jointing chambers and / or apparatus shall only be lifted by means of the appropriate keys and under the direct supervision of a Cable& Wireless Worldwide representative. Other Parties or Contractors shall not enter any Vodafone jointing chamber and / or apparatus unless under the supervision of a Vodafone representative and in any case not before the mandatory gas test has been carried out in the presence of Vodafone representative and such checks have shown it to be safe to enter the Vodafone chamber and / or apparatus. The Other Parties or Contractors shall be given reasonable access to Vodafone apparatus and chambers when required.

11. Notification periods

Where the Other Parties or Contractors works or the movement of plant or equipment may endanger Vodafone apparatus, the Other Party or Contractor shall give the Vodafone agent Atkins Global [as indicated at Appendix B] at least 7 working days notice in writing of the intended date to commence operations.

No excavation should be made without first consulting the relevant Vodafone apparatus layout drawings, which will be made available from the Vodafone agent Atkins Global on request and allowing 28 working days for processing the relevant drawings. However, should this not be possible, direct contact should be made to the Atkins Global Bristol Plant Enquiries Team as soon as possible to assess the situation.

When excavating, moving or backfilling (including use of Foamed Concrete for Reinstatements – FCR) around Vodafone apparatus, Atkins Global (as agent for Vodafone) shall be given adequate prior written notice of the Other Parties or Contractors intentions, in order that the works may be adequately supervised. Such notice shall not be less than 3 working days.

12. Excavation and backfill

All excavations adjacent to Vodafone apparatus are to be carried out by hand until the extent and or location of the Vodafone apparatus is known.

Use of mechanical borers and / or excavators shall not be used without the supervisory presence of a Vodafone representative or a given exemption.

Shuttering of the excavation or support to Vodafone apparatus, at the Other Parties or Contractors expense, shall be used as directed by the Vodafone representative.

At least 7 working days notice must be given to Vodafone in order that any special protective measures which may be required to protect Vodafone apparatus, at the Other Parties or Contractors expense, when equipment such as pile driving, explosives, laser cutting high powered RF equipment or RF test gear, is to be used in conjunction with the works.

Other Parties or Contractors are advised to refer to the National Joint Utilities Group [NJUG] 4 Document which outlines the identification of small buried mains and services.

13. Foam concrete

If foam concrete is being used as the backfill material, it shall not be used either above or within 500 mm of any Company Apparatus. A suitable material in accordance with the specification for the Reinstatement of Openings in Highways shall be substituted.

14. Attendance of Company Representative

If a situation requires the attendance on site of a Vodafone representative for a continuous period of more than 6 hours, suitable facilities shall be provided by the Other Party or Contractor, at their expense, to meet the office and ablution requirements.

15. Damage reports

In the event of any damage whatsoever occurring to Vodafone apparatus, the Other Party or Contractor shall immediately inform Vodafone by contacting Julia Burgoyne, (for contact details please refer to Appendix B).

All relevant costs of any subsequent repair and / or removal of the Vodafone apparatus shall be charged to the Other Party or Contractor, irrespective of who affects the repair.

The above requirements do not relieve the Other Party or Contractor of any of their obligations under their contract.

Appendix A - office address details

Glasgow Office

Vodafone
Pavillion 1
1 – 2 Berkeley Square
99 Berkeley Street
Glasgow
G3 7HR

Bristol Office

Vodafone
Unit 1,
Tamar Road
St Philips
Bristol
BS2 0TY

Manchester Office

Vodafone
Unit M
Atlas Business Park
Wythenshawe
Manchester
M22 5RR

Appendix B – Street Works Team Contacts for Vodafone

Function	Name	Job Title	Address	Phone	Mobile	Fax	Email Address
Co-ordination	Sandra Semple	National Street Works Manager	Glasgow Office (see above)	0141 303 2857	07775 792133	0141 300 9611	sandra.semple@cw.com
Customer Complaints	CMC	Customer Management Centre	n/a	08456 021585	n/a	n/a	n/a
Liability Claims	Julia Burgoyne	Major Incident Resolution Coordinator	Bristol Office (see above)	01454 895114	07803 259857	n/a	julia.burgoyne@cw.com
Diversionary Works	Samantha Wilkinson	C3 Diversionary Works Project Controller	Manchester Office (see above)	0161 423 2740	n/a	n/a	samantha.wilkinson@cw.com
Emergencies (24 Hour)	CMC	Customer Management Centre	n/a	08456 021585	n/a	n/a	n/a
Plant Enquiries- Including Thus Plc, (formerly Scottish Telecom), Your Comms (formerly Norweb), Energis & Mercury Communications	Plant Enquiries Team	n/a	Atkins Global PO Box 290 500 Aztec West, Almondsbury, Bristol, BS32 4RZ	01454 662881	n/a	01454 663330	Osm.Enquiries@atkinsglobal.com

16. About this Document

Content Owner
Price, David J

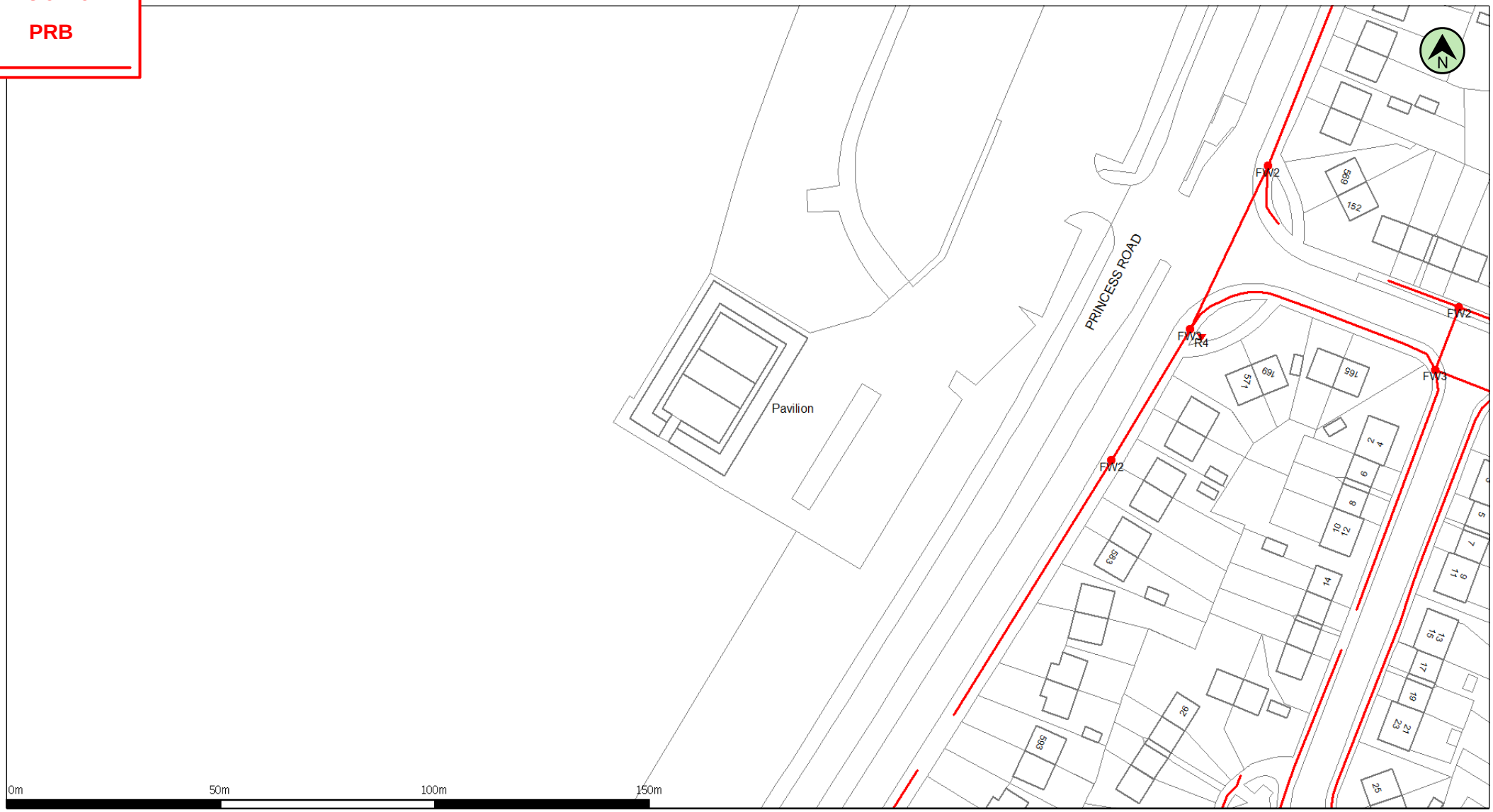
Changes since last version
Reformatted using the current Vodafone template.

End of Document

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Important Information - please read

The purpose of this plan is to identify Virgin Media apparatus. We have tried to make it as accurate as possible but we cannot warrant its accuracy. In addition, we caution that within Virgin Media apparatus there may be instances where mains voltage power cables have been placed inside green, rather than black ducting. Further details can be found using the 'Affected Postcodes.pdf', which can be downloaded from this website.

Therefore, you must not rely solely on this plan if you are carrying out any excavation or other works in the vicinity of Virgin Media apparatus. The actual position of any underground service must be verified by cable detection equipment, etc. and established on site before any mechanical plant is used. Accordingly, unless it is due to the negligence of Virgin Media, its employees or agents, Virgin Media will not have any liability for any omissions or inaccuracies in the plan or for any loss or damage caused or arising from the use of and/or any reliance on this plan.

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Duct, Trench | Chamber | Cabinet

leanne.beake@atkinsglobal.com

27394/PB

Virgin media

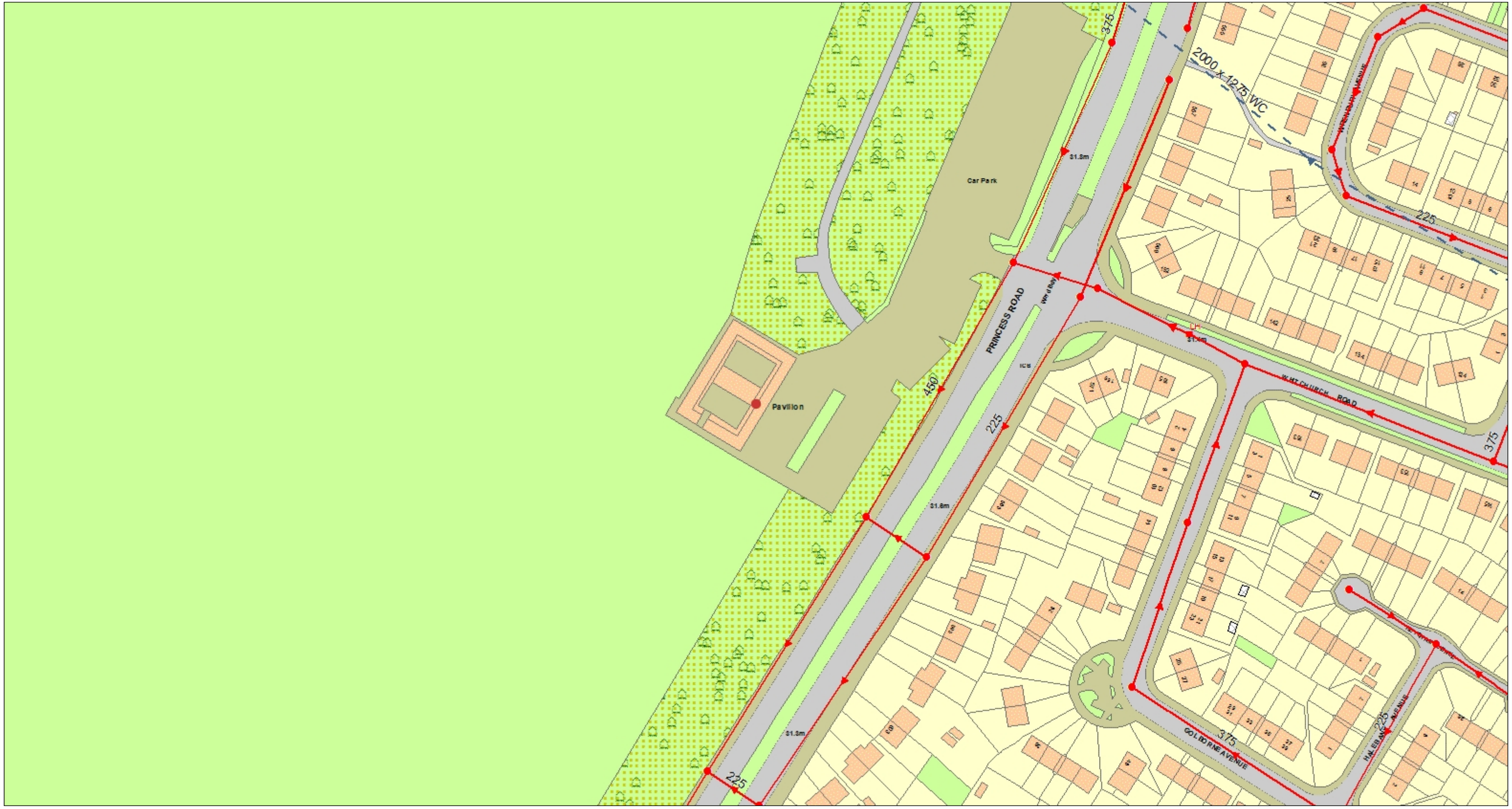
UU Maps for Safe Dig

ATKINS CHECKED
MG

Centre : X : 383700 Y : 393210

Date : 10/09/2013 09:21:36

Scale Approx : 1250.00000000008



Extract from maps of United Utilities' Underground Assets

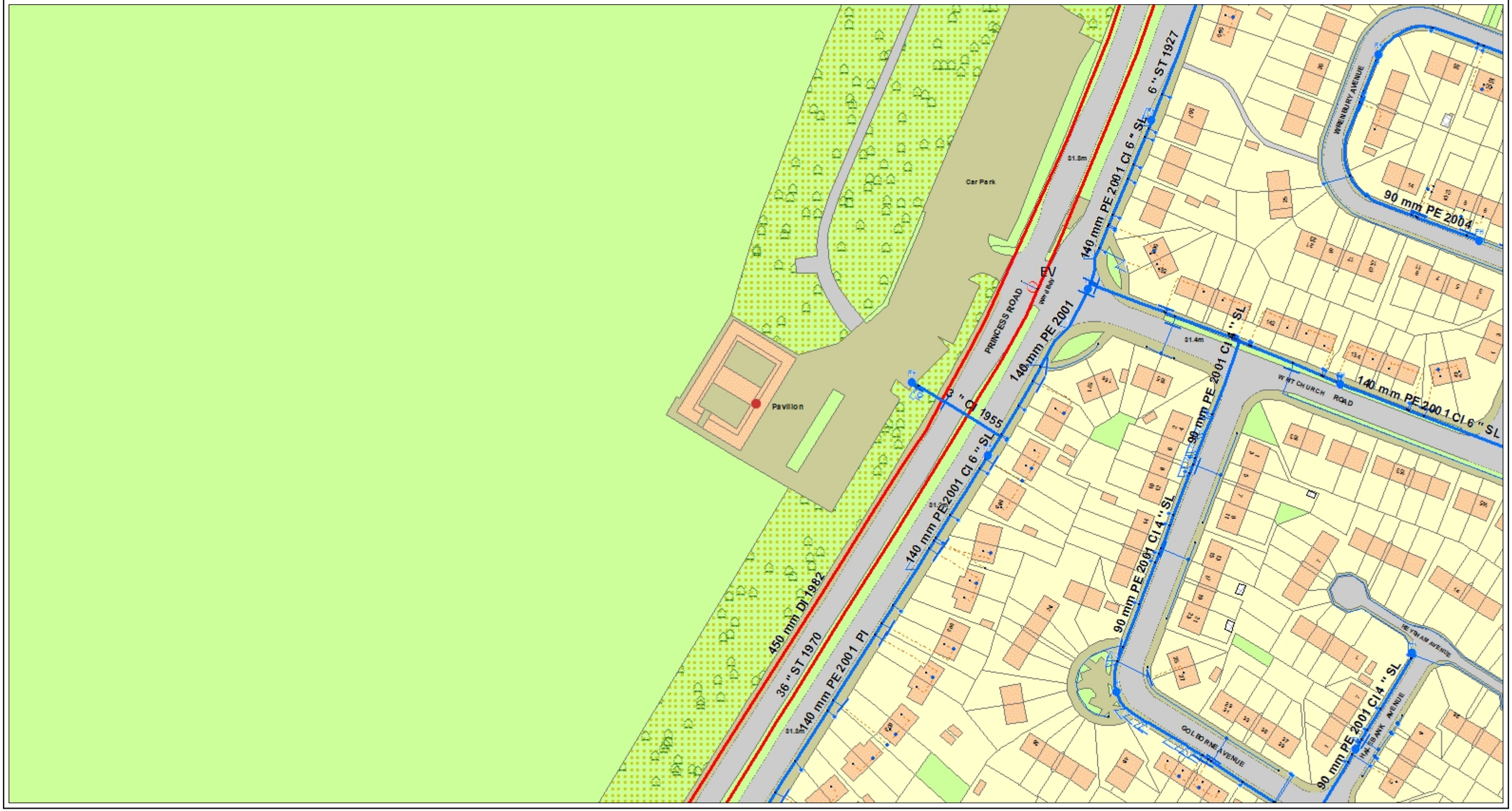
The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities Water will not accept liability for any damage caused by the actual position being different from those shown.

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UU Maps for Safe Dig

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MG

Centre :	X : 383700	Y : 393210	Date : 10/09/2013 09:20:38	Scale Approx : 1250.00000000008



Extract from maps of United Utilities' Underground Assets

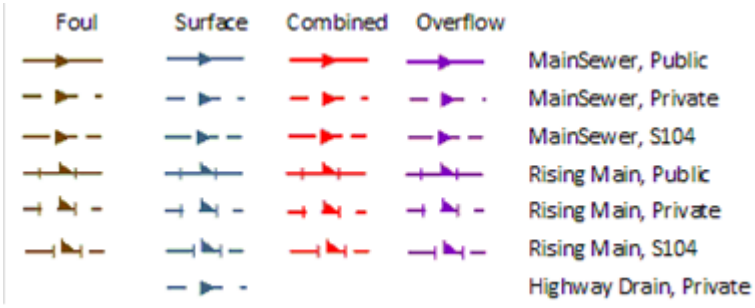
The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities Water will not accept liability for any damage caused by the actual position being different from those shown.

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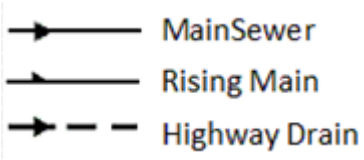
United Utilities

UNITED UTILITIES PLC

Wastewater Legend



Abandoned Wastewater



Clean Water Legend

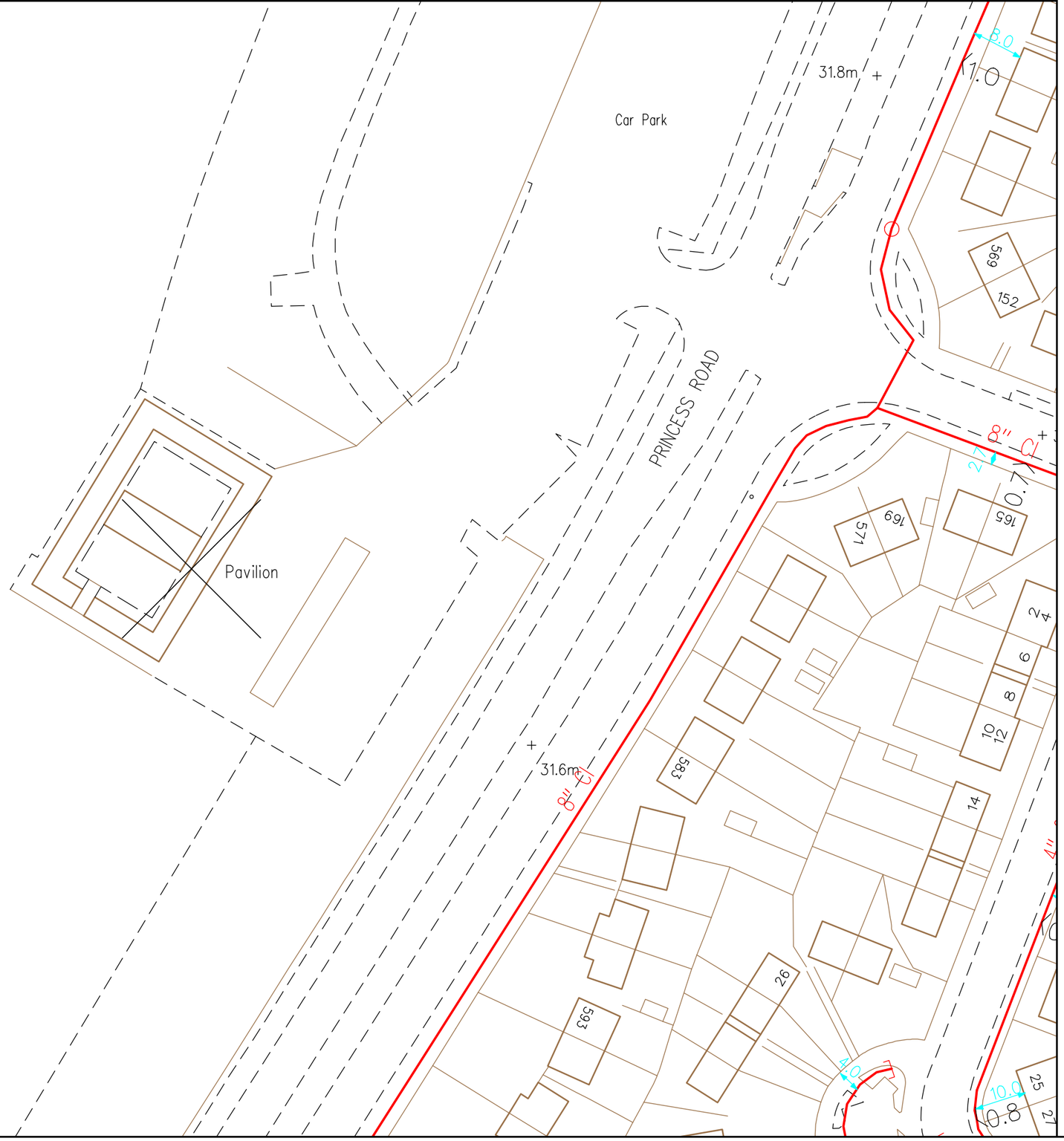


Abandoned Clean Water



ATKINS CHECKED

PRB



SCALE: Not to scale

USER ID: BUCK3491

DATE: 13/09/2013

EXTRACT DATE: 10/06/2013

MAP REF: SJ8393

CENTRE: 383700, 393210

LP MAINS

MP MAINS

IP MAINS

LHP MAINS

NHP MAINS

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change

This plan shows those pipes owned by National Grid Gas plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

MAPS Viewer Version 5.6.7.0

Local Machine

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Gopalakrishnan, Roshni

From: Armstrong, Nicola [Nicola.Armstrong@amey.co.uk]
Sent: 11 September 2013 18:39
To: Bucksley, Peter
Cc: Whittaker, Karen-OLD
Subject: FW: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Attachments: 27394 LM Map.pdf; Princess Road.doc

Importance: High

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SNM

Peter

We can confirm that Amey do not have any Street lights in the area highlighted on the map. However we do maintain lights, signs and bollards on Princess Road.

Regards

Nicola Armstrong
Administrator, Government
Amey

t: 0161 277 6787 **e:** Nicola.armstrong@amey.co.uk
Factory Lane, Harpurhey, Manchester, M98AB

amey INVESTORS IN PEOPLE | Gold INVESTORS IN PEOPLE | Champion

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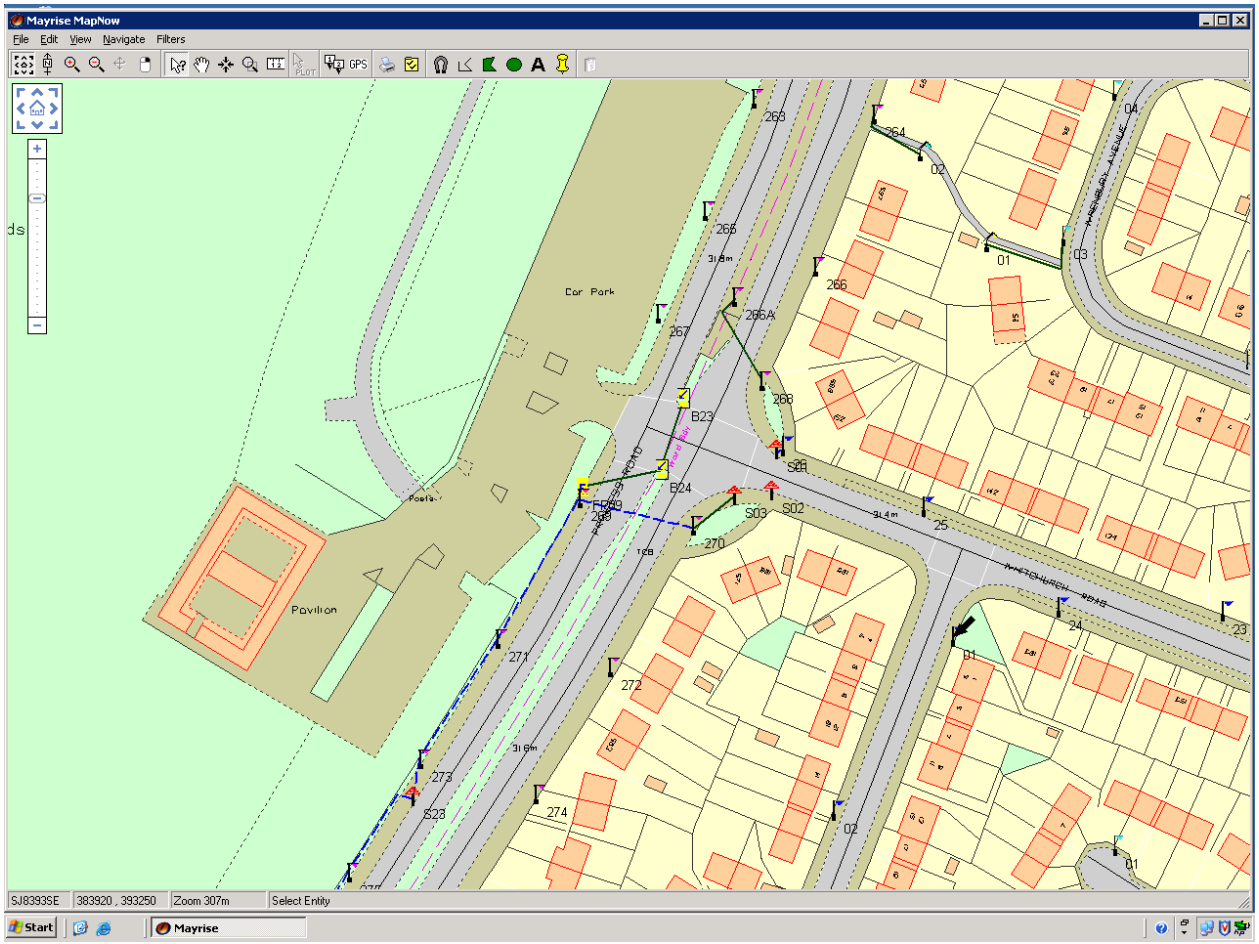
From: Whittaker, Karen
Sent: 11 September 2013 12:12
To: Armstrong, Nicola
Subject: FW: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Importance: High

From: Bucksley, Peter [mailto:Peter.Bucksley@atkinsglobal.com]
Sent: 09 September 2013 13:43
To: 'nrswa@bskyb.com'; 'plantenquiries@catelecomuk.com'; 'plantenquiries@cityfibreholdings.com'; 'plantenquiries@energetics-uk.com'; 'Enquiries, Unit'; 'nrswa@gtc-uk.co.uk'; 'Plantenquiries'; 'interoute.enquiries@plancast.co.uk'; 'plantenquiries@mcnicholas.co.uk'; 'Telenttelia.Plantenquiries@telent.com'; 'osp-team@uk.verizonbusiness.com'; National Plant Enquiry's; 'OPBuriedServicesEnquiries@networkrail.co.uk'; 'gmutc@tfgm.com'; 'Contact@manchester.gov.uk'; Whittaker, Karen
Subject: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Importance: High

If possible please reply by 12/09/2013

To whom it may concern,

McNicholas - Please reply for KPN & TATA.


Mayrise MapNow
File Edit View Navigate Filters
Car Park
Pavilion
Footpath
PRESTBURY ROAD
WYNCHURCH ROAD
WYNCHURCH AVENUE
264
265
266
266A
267
268
269
270
271
272
273
274
B23
B24
S23
S01
S02
S03
01
02
03
04
23
24
25
31.8m
91.4m
SJ8393SE
383920 , 393250
Zoom 307m
Select Entity
Start
Mayrise

Enquiry Confirmation

LSBUD Ref: 1085476

Date of enquiry: 09/09/2013

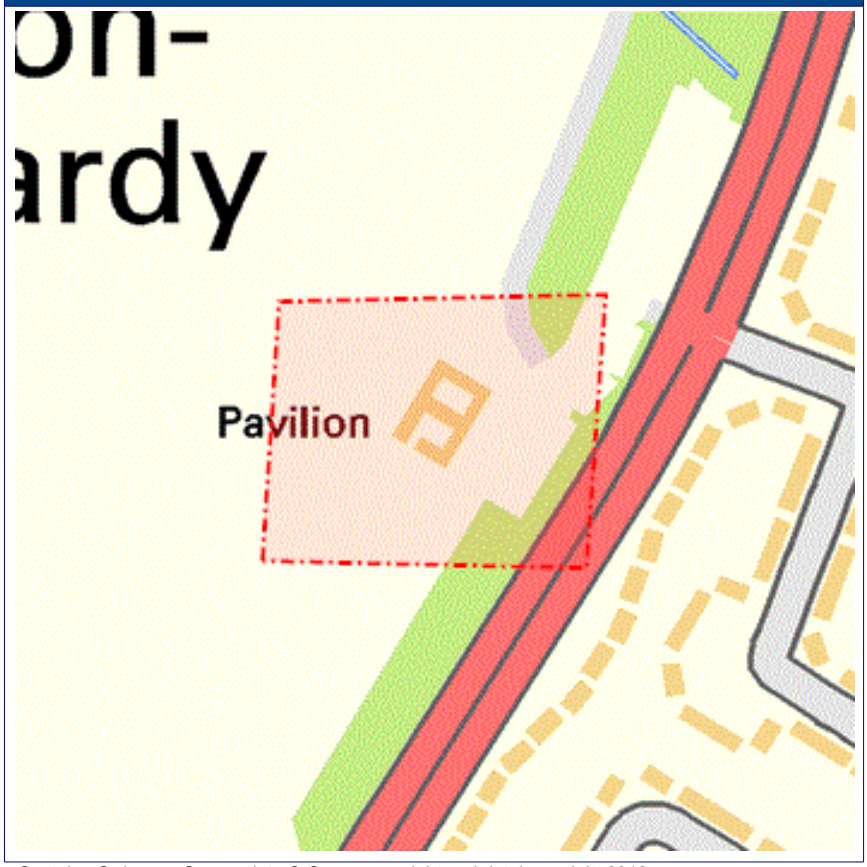
Enquirer

Name	Miss Leanne Stacey	Phone	01454662393
Company	Atkins	Mobile	Not Supplied
		Fax	Not Supplied
Address	500 Park Avenue Aztec West Almondsnury Bristol BS32 4RZ		
Email	stat.enquiries@atkinsglobal.com		
Notes	Asset Owners have been requested to respond to you via these contact details, please ensure they are correct. Where Asset Owners charge for plans they have been requested to send you a quote before proceeding.		

Enquiry Details

Scheme/Reference	27394/PB		
Enquiry type	Initial Enquiry	Work category	Utility Works
Start date	29/09/2013	Work type	Single excavation site
End date	30/09/2013	Site size	15022 metres square
Searched location	XY= 383700, 393210 Easting/Northing	Work type buffer*	25 metres
Confirmed location	383689 393210		

Site Map



V3.2.8

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* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.

Enquiry Confirmation

LSBUD Ref: 1085476

Date of enquiry: 09/09/2013

Asset Owners

Subject always to our standard terms and conditions, this enquiry result is valid for 28 days only from the date of enquiry and is based on the confirmed information you entered. If the location of the work changes then a further enquiry must be made. Should the work not be undertaken within 28 days of the enquiry then a further enquiry must be made.

Where applicable listed below are those registered Asset Owners who have been notified, those to whom you need to send further information and those who have no apparatus within your search area. In addition your response will include other non-registered Asset Owners contact details who have NOT been notified, which may be of interest to you.

Please be aware that the lists below are not exhaustive and that not all Asset Owners are registered with this service. In particular please note that the LinesearchbeforeUdig system only contains information on National Grid's Transmission assets. This does not cover National Grid Gas Distribution assets. Please contact National Grid Plant Protection on plantprotection@nationalgrid.com

If you are required to email additional info please note that we need the following:
Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.

Asset Owners who DO have assets near your proposed work site.

In the Zone of Interest			
Asset Owner	**Phone/Email**	**Emergency Only**	**Status**
Electricity North West Limited	0800 1954141	0800 1954141	Notified

LinesearchbeforeUdig Asset Owners who DO NOT have assets in the immediate vicinity of your proposed work site.

Not in the Zone of Interest		
AWE Pipeline	Gamma	Perenco UK Limited (Purbeck Southampton Pipeline)
BOC Limited (A Member of the Linde Group)	Geo Networks Limited	Phillips 66
BP Midstream Pipelines	Government Pipelines & Storage System	Premier Transmission Ltd (SNIP)
BPA	Humbly Grove Energy	RWEnpower (Little Barford and South Haven)
Centrica Energy	HV Cables	SABIC UK Petrochemicals
Centrica Storage Ltd	IGas Energy	Scottish Power Generation
ConocoPhillips (UK) Ltd	Ineos Enterprises Limited	Sea Fibre Networks
Coryton Energy Co Ltd (Gas Pipeline)	INEOS Manufacturing (Scotland and TSEP)	Seabank Power Ltd
EirGrid	Mainline Pipelines Limited	Shell Pipelines
E-on UK Plc (Gas Pipelines Only)	Manchester Jetline Limited	Total (Finaline, Colnbrook & Colwick Pipelines)
ESP Utilities Group	Marchwood Power Ltd (Gas Pipeline)	Transmission Capital
ESSAR	National Grid Gas and Electricity Transmission	Western Power Distribution
Esso Petroleum Company Limited	NPower CHP Pipelines	Wingas Storage UK Ltd
FibreSpeed Limited	Oikos Storage Limited	York Potash

Bucksley, Peter

From: Enquiries, Unit [enquiries@environment-agency.gov.uk]
Sent: 10 September 2013 18:01
To: Bucksley, Peter
Subject: Ref 130910/KH25: PLANT ENQUIRY - 27394 - Site near Princess Road, Chorlton cum Hardy, MANCHESTER
Attachments: 27394 LM Map.pdf

Dear Pete

Thank you for your plant enquiry.

For your information, I have passed your query to our local Customers & Engagement Team (Environment Planning & Engagement) for advice. They will check whether we hold this information and they will be in touch with you shortly. The Customers & Engagement team have 10 working days from the date we receive your enquiry to provide a response, and they will get this to you as soon as possible.

Should you wish to contact them in the meantime, their details are below. Please quote your Enquiry Ref 130910/KH25 in your correspondence with us.

Customers and Engagement
Environment Planning & Engagement
Environment Agency
North West Region, South Area
Richard Fairclough House
Knutsford Road
Latchford
Warrington
WA4 1HT

Tel: 03708 506506

I hope this meets with your approval but please feel free to contact us if you require any further assistance.

Kind Regards

Kay Hall
Customer Service Advisor
Email Enquiries Unit
National Customer Contact Centre
Part of National Operations
Environment Agency
Tel: 03708 506506
Website: www.environment-agency.gov.uk/

Have your say on the choices shaping the water environment. The Challenges and Choices consultation launched on 22 June 2013.

Follow us on

We would really like to know what you think of our customer service. Please can you spare five minutes to complete our short survey; your feedback will help us identify where we need to improve.

The survey is completely anonymous.

http://feedback.environmentagency.uk.com/s/HZwQiDVgYzGSx3Z

Standard notice *[not for use with Special Data, Personal Data or unlicensed 3rd party rights]*

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ATKINS CHECKED

MG

Electricity North West
Data Management,
Electricity North West
Linley House
Dickinson Street
Manchester, M1 4LF
Phone: 0800 195 4141
Email: planrequest@enwl.co.uk
Web: www.enwl.co.uk

Miss Leanne Stacey
Atkins
500 Park Avenue Aztec West
Almondsnury Bristol
BS32 4RZ

Our Reference: 1085476

Your Reference: 27394/PB

Dear Miss Leanne Stacey

Electricity Network Plans

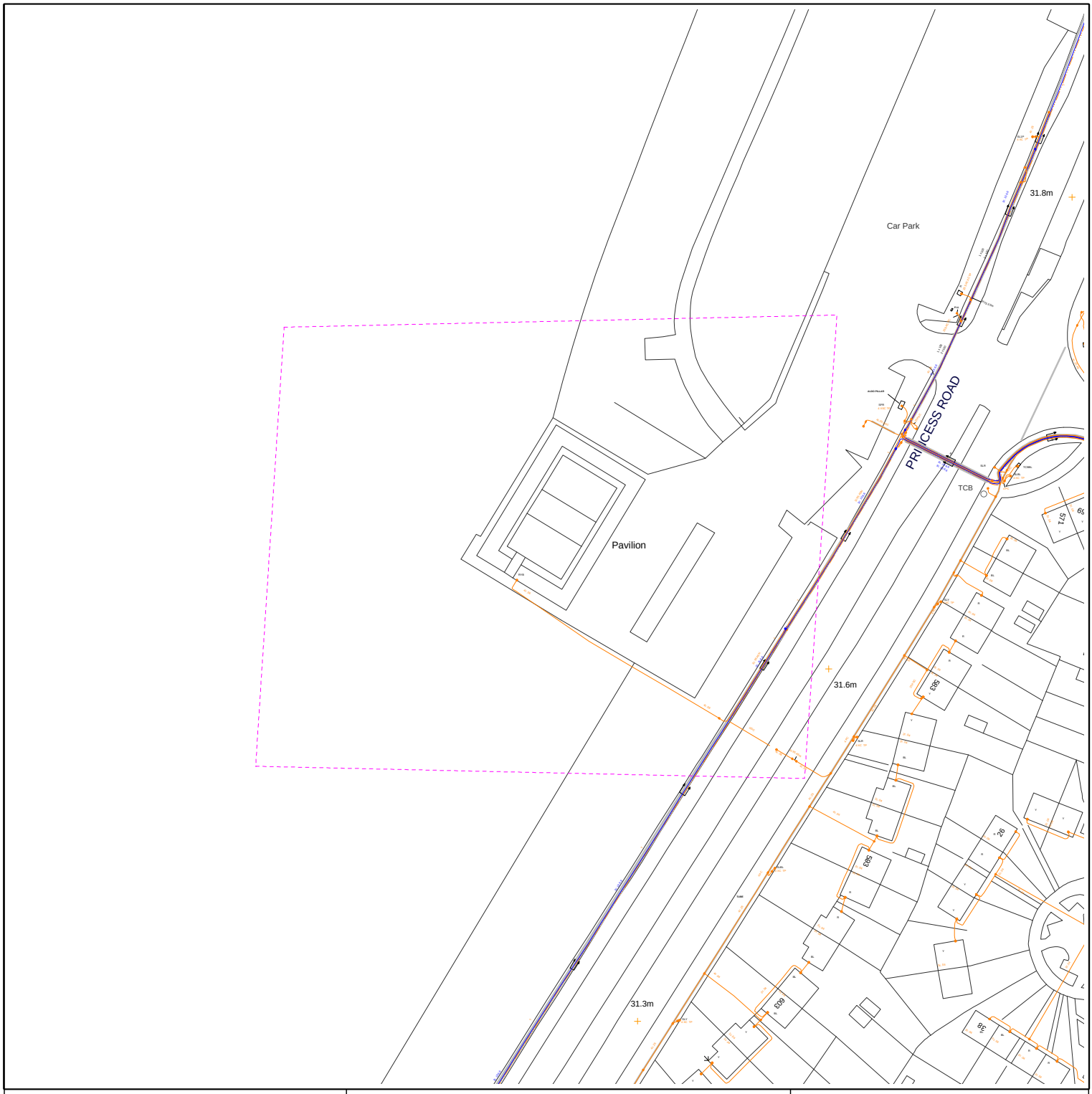
I acknowledge with thanks your request dated 09/09/2013 12:24:09 PM for information on the location of our services.

Please find enclosed plan(s) showing the approximate position of our apparatus known to be in the vicinity of this site.

I attach Conditions and information regarding electricity mains, which details contact numbers for additional services (i.e. new supplies, connections, diversion). In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

Yours sincerely,

Data Management



Requested by: Leanne Stacey

Company: Atkins

Date Requested: 09/09/2013

Job Reference: 1085476

Your Scheme/Reference: 27394/PB

Dig Sites:

Area Line Point

Operating Voltage	Colour Code	Line Colour
132kV	Black	
33kV	Green	
22kV-25kV	Yellow	
11kV	Red	
6kV-6.6kV	Blue	
1kV-6kV	Violet	
LV	Orange	
Unknown Voltage	Brown	

electricity north west

Data Management
Electricity North West
Linley House
Dickinson Street
Manchester, M1 4LF
Phone: 0800 195 4141
Email: planrequest@enwl.co.uk

Scales on A4 paper:
1:1250 Area dig site
1:500 Line dig site
1:250 Point dig site

Unless otherwise indicated the depth of Electricity North West Limited cables are in accordance with NJUG (450mm for Low Voltage & 600mm for 11kV cables) 33kV and 132kV cables are laid at depths as marked. The depth and positions of Electricity North West Limited equipment was accurate as shown when the equipment was installed. However third parties may have altered the level & other reference data. Therefore Electricity North West Limited accept no responsibility for the position of Electricity North West Limited equipment being different from shown. No person, body or company, shall be relieved from liability for damage caused to Electricity North West Limited equipment by reason of being located differently to the indications on this drawing. Service cables are not necessarily shown but must be assumed to exist to all premises, streetlights and signs. There may be other Electricity North West Limited apparatus in the vicinity which is not indicated on the cable records. Other apparatus may also be present which is owned by a third party other than Electricity North West Limited.

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Reference should be made to HSE Guidance, HS(G)47 "Avoiding Danger from Underground Services" and GS6 "Avoidance of Danger from Overhead Power Lines".

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Conditions and information regarding electricity mains

These general conditions and precautions apply to the electricity distribution system of Electricity North West Limited.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. There may be other Electricity North West Limited apparatus in the vicinity, which is not indicated on the cable records. Other apparatus may also be present which a third party owns other than Electricity North West Limited.

2. Before any machines are used all of Electricity North West Limited's underground apparatus should be located by manual excavation taking the appropriate safety precautions in accordance with the **Health and Safety Executive Guidance note HS(G)47 "Avoiding danger from underground services".** This contains advice to site personnel when working near underground services.

Underground services, particularly electricity and gas, can be dangerous. Damage to electricity cables can cause a dangerous flash, leading to severe burns or even death. Gas leaks can cause fire or explosion.

Damage can result from excavation or penetration of the ground, e.g. by a road pin.

Underground services may be found in roads, footpaths and on sites. Always assume that they are present. Treat any services found anywhere as live.

Accidents have happened because people have mistaken one service for another. e.g. black plastic covered electricity cables look like black plastic water pipes and cast iron gas and water mains look alike. Check before you act.

3. Before starting work you must:

- Make sure you have plans of the underground services in the area. This may not always be possible for emergency or unforeseen works. **Remember that service connection cables and pipes from the main to building or streetlight may not be shown.**
- Use a cable and pipe locator to trace electricity cables and metal pipes.
- Look for signs of service connection cables or pipes, e.g. a gas meter or service connection entry into a house or a streetlight.
- Hand dig trial holes (as many as necessary) to confirm the position of services in close proximity to the area of your work.

4. When you start work:

- Hand dig near buried services whenever possible. Spades and shovels are safer than picks pins or forks.
- Remember that cables may be embedded in concrete. Electricity cables embedded in concrete **must** either be made dead before the concrete is broken out or another safe way of working agreed with the cable owner.
- Watch out for signs of services as work continues.
- **Report any damage to a cable, pipe or pipe coating however slight.**
- **Do not use hand-held power tools within 0.5m of the marked position of an electricity cable,** unless this is impracticable and the line of the cable has been identified by plans and positively confirmed by a locator.
- **Do not use hand-held powers tools directly over the marked line of a cable unless:**

(a) You have already found the cable at that position by careful hand digging beneath the surface and it is at a safe depth (at least 300mm) below the bottom of the surface to be broken, or

(b) Physical means have been used to prevent the tool striking it.

- If an excavator is used near an electricity cable keep everyone clear of the bucket while it is digging. **Bucket should not be used near cable - hand dig.**
- Do not use exposed services as a convenient step or handhold.
- Do not handle or attempt to alter the position of an exposed service.
- Do not install plant close to an existing service.
- Do not build existing services into a manhole or other structure or encase them in concrete.

Would you also ensure that all site operators have this information and if any electrical apparatus is damaged, they/you should contact Electricity North West Limited fault desk on **0800 195 4141.**

5. Overhead lines are not necessarily shown on the Electricity North West Limited cable records but may be present. In the event of work being carried out adjacent to overhead lines (including access, storage etc) please always ensure strict adherance to the requirements of the **Health and Safety Executive's Document GS6 "Avoidance of Danger from Overhead Electric Lines".**

Extreme personal danger can result from contact, or near contact, with live conductors of overhead lines.

Treat all overhead lines and other electrical apparatus as live. If in doubt get advice.

6. Electricity North West Limited must be consulted if work is to take place within 15 metres of overhead lines on steel towers or 9 metres of overhead lines on wood, concrete or steel pylons. (All distances should be measured at ground level from a position estimated by eye to be vertically under the outermost conductor at a tower or pole position.) Any person involved in work in the vicinity of overhead lines should:

- Understand and follow the instructions given on safe working areas and methods of work.
- Make sure that warning notices are in the cabs of machines working in the vicinity of an overhead line.
- Make sure that barriers and warning notices are erected as required.
- Not tip soil or stack material underneath overhead lines as this may reduce the clearance to an unsafe distance.
- Make sure when handling or using platforms scaffold poles, piping, ladders, hand tools etc, that they are kept at a safe distance from overhead lines.
- Not steady a suspended load, skip, hoist wire, slings etc., unless satisfied that there isn't any danger from overhead lines.
- Remember that, when mobile plant such as a crane or excavator is operating near overhead lines, the raising or slewing of the jib may introduce danger.
- Always keep overhead lines in view when manoeuvring mobile plant.
- Never operate a machine unless carefully guided by an experienced banksman.
- Not approach or touch any broken or fallen conductors or any plant in contact with an overhead line before United Utilities confirms that conditions are safe. Warn others to keep well clear.

Machine operators should note that: if a machine comes into contact with an overhead line and cannot be disentangled by backing off, remain seated in the cab and warn others to keep clear of the machine until Electricity North West Limited confirms that conditions are safe. If it is essential to leave the machine while it is in contact with the overhead line, for example if it catches fire, jump well clear - and **do not** attempt to climb down in the normal way nor touch any part of the machine when on the ground.

7 Electricity North West Limited provides approximate locations of its electricity mains or apparatus according to its records but these records are not necessarily accurate or complete and do not always show the position of private cables from the mains to properties. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated.

8 Care should be taken when excavating near cables. Known road crossings are highlighted on the enclosed plans. Should any cable, or Electricity North West Limited apparatus indicated on the attached plans, be affected by your proposals please contact us as follows:

Data Management
Linley House
Dickinson St
Manchester
M1 4LF

Telephone: **0871 687 0501**

Details of diversion costs, if any, will be provided on request once your firm proposals have been submitted.

9 Please note that service cables may be affected by some of the works being carried out on site. If any services do require temporary disconnection, please phone **0800 195 0101** for domestic disconnection or **0800 195 2425** for commercial disconnection, so that arrangement can be made to disconnect before work commences on site.

10 For information regarding new supplies please contact us on **0871 687 0501.**

11 Please note that cable records supplied may not be up to date, or may be incomplete, if the area concerned is a new site.

12 For information regarding wayleave or easement agreements contact:

Manchester	**0161 604 1354**
Preston	**01772 848639**
Kendal	**01539 796082**

13 The latest cable records are always available for inspection during normal working hours and you should satisfy yourself that the information you have is up to date at the time you commence work. This service is consistent with the requirement of Regulation 36 of the Electricity Supply Regulations and paragraph 79 of the New Road
and Street Works Act. Please contact Data Management on **0800 195 4749** to arrange an appointment to view the records.

304 Bridgewater Place
Birchwood Park
Warrington
WA3 6XG

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ATKINS CHECKED

MG

Openreach Plant Maps Requested

NewSite Office (addresses can be located from here)
National Freephone: 0800 616 866

Dear Sir/Madam,

Thank you for your request to: www.openreach.co.uk/networkinfo/

You have downloaded copies of our drawings marked up to show the approximate location of Openreach apparatus, which is present in the immediate vicinity of your works. It is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works made near to Openreach apparatus, which may, exist at various depths and may deviate, from the marked route.

To avoid damage it is recommended that mechanical excavators or borers are not used within 600mm of Openreach plant. Please ensure that our equipment is not enclosed, blocked, covered or otherwise obstructed by your plant. In the event of clearance not being adequate we anticipate that your plant is either resited, or an order is placed with Openreach for rearrangements of its plant. If there are any difficulties with the Map please ring 0800 616866.

Please contact our Network Protection Service if required by dialling 0800 917 3993 or by Email on DBYD@openreach.co.uk giving seven days notice of your commencement date. This will provide you with on-site advice and a check of location for any Openreach apparatus.

Further to this, I hope the following points will assist you at the new development: -

Openreach has a licence obligation to provide service to any end customer requiring a connection. A Developer would not normally be charged for provision of service, our standard connection charges would apply to the end user when orders are placed with the communication provider of choice. However, should a Developer insist on an underground service in an area where Openreach plant is provided overhead, charges may be incurred.

When the Developer has obtained contract and planning permission Openreach would request a 'Clean', scaled Site Layout, Location Map and a covering letter be sent to the relevant newSite Office. We would particularly request that you give details of your programmed site start date and likely first occupancy date where possible. To obtain contact details of the newSite office covering the development area click on the URL below.

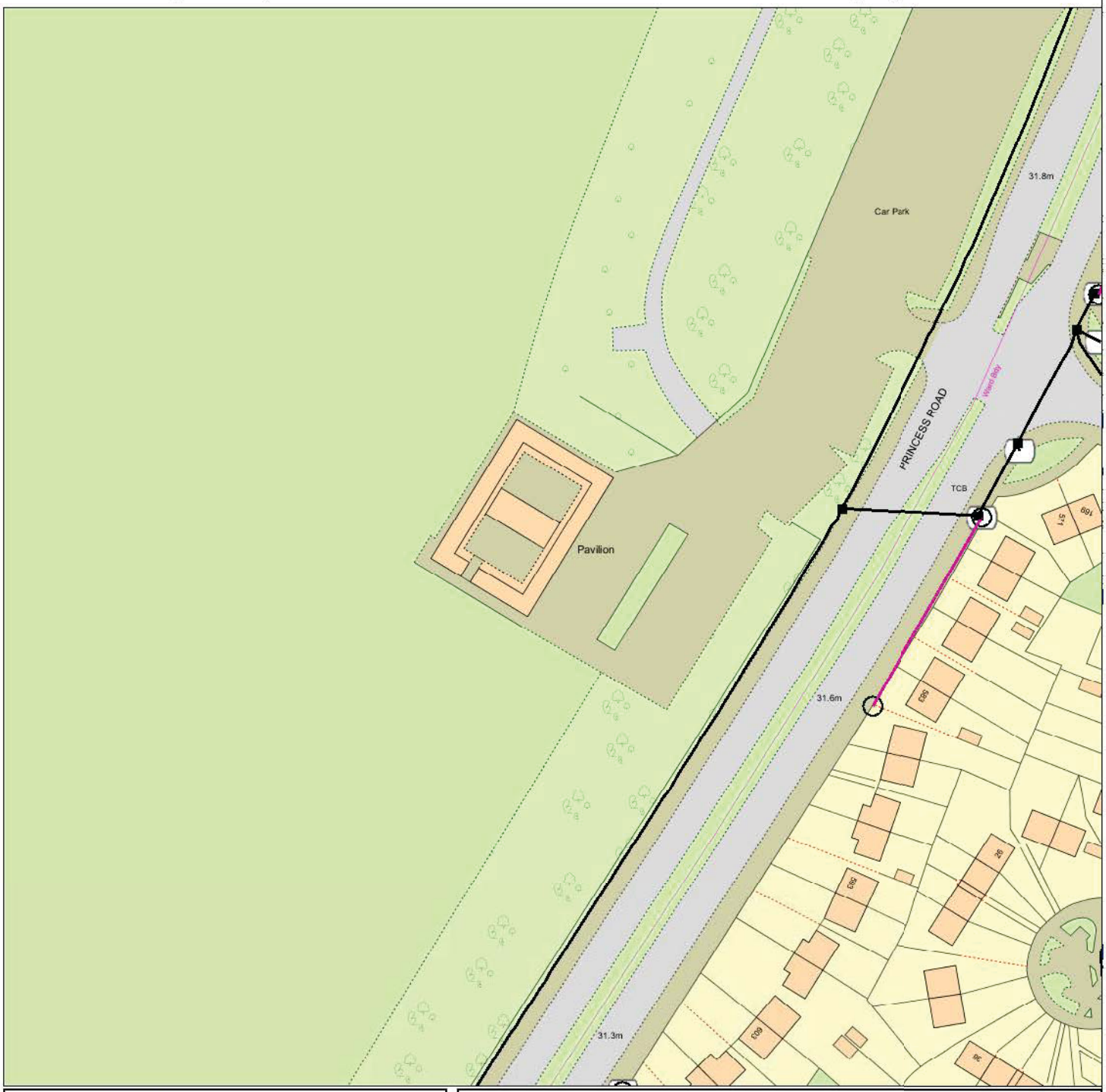
http://www.openreach.co.uk/orpg/networkinfo/developnetwork/regionalcontacts.do

Where a development affects existing Openreach apparatus in the public highway, the cost of any necessary protection or diversionary works must be borne by the Developer. In this case where a budget estimate is required a Site Plan, Location Map and a covering letter should be forwarded to the Repayments Project Office. Please visit http://www.openreach.co.uk/orpg/networkinfo/alternetwork/alterationcontacts.do for contact details of the Repayments Office covering the development area.

Yours faithfully,

Openreach newSites

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

DIAL BEFORE YOU DIG

FOR PROFESSIONAL ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS

ADVANCE NOTICE REQUIRED
(Office hours: Monday-Friday 08.00 to 17.00)

Tel: 0800 9173993
E-mail: dbyd@openreach.co.uk
Website: www.dialbeforeyoudig.com

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KEY TO BT SYMBOLS

UNDERGROUND PLANT	POLE
A/C, D/W or W OVERHEAD PLANT	CABINET
JOINT BOX	BURIED JOINT
456 OR 456 DISTRIBUTION POINT	J JOINTING POST
MANHOLE OR 72	PROPOSED U/G
DP BOUNDARY	A/C, D/W or W PROPOSED O/H
OR OTHER BT BOUNDARY	PROPOSED BOX

Other proposed plant is shown using dashed lines. BT symbols not listed above may be disregarded. Existing BT plant may not be recorded. Information valid at the time of preparation.

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BT Ref : NCA09145R
Map Reference : (centre) SJ8370093210
Easting/Northing : (centre) 383700,393210
Issued : 10/09/2013 09:14:27

FOOTNOTE: WARNING IT IS ESSENTIAL THAT YOU CONTACT NATIONAL NETWORK HANDLING CENTRE BY EMAIL nnhc@openreach.co.uk BEFORE PROCEEDING WITH ANY WORK IN THE HATCHED AREA

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

FINAL GROUND INVESTIGATION REPORT

BDP Limited
Hough End Leisure Centre, Manchester

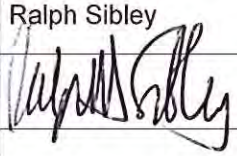
02108AA_R_003A_RS-FinalGIReport
November 2013

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Figure 1: Site Location Plan

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Appendix A: Exploratory Hole Location Plan

Appendix B: Exploratory Hole Records

Appendix C: In-situ Testing Results

Appendix D: Gas and Groundwater Monitoring Results

Appendix E: Laboratory Geotechnical Test Results

Appendix F: Laboratory Chemical Test Results

Appendix G: Soil and Leachate Screening Tables

1 INTRODUCTION

1.1 Background

This report relates to the proposed construction of a new Leisure Centre development, at Hough End Fields, off Princess Road to the south of Manchester. The location of the site is shown on Figure 1.

Coffey Geotechnics Ltd (Coffey) was appointed by BDP Limited by email dated 9th September 2013, following a proposal by Coffey dated 1st August 2013, to carry out a desk study and ground investigation at for the proposed Hough End Leisure Centre. This document comprises the Final Ground Investigation Report for the service provision.

The proposed new development is to comprise a new two-storey building with a swimming pool, changing village, plant area, squash courts, and reception at ground floor, and with fitness suite, dance hall, and dry changing facilities at 1st floor level.

The ground investigation is for the new building and car park, and therefore these are the areas which are considered in this report. Details of the proposed development were obtained from the Site Investigation Brief (Ref. 1) provided by BDP.

1.2 Site Location and Description

The site is located in the Chorlton-cum-Hardy district of Manchester, centred on National Grid Reference SJ 837 932. The site is roughly rectangular square, measuring about 1.5 hectares in plan area and accessed from off Princess Road to the southeast. Figure 1 shows the site location. The layout of the proposed development is yet to be finalised.

The site is currently occupied by a single-storey sports pavilion (changing facilities) together with an adjoining car park, access roads/paths and landscaped grounds.

Service plans show there to be underground on-site services, which may interfere with the location of the proposed development.

1.3 Report Context

This (final) report presents the findings of the ground investigation following completion of all proposed works, namely: exploratory hole formation, the programme of groundwater/ground gas monitoring and laboratory geotechnical and chemical (contamination) testing. It builds upon information obtained and presented in a Desk Study report (Ref. 2), which comprised a review of the available geological, hydrogeological, hydrological, historical and environmental information for the site. It also supersedes, and therefore replaces an Interim report (Ref. 3) which was issued on completion of exploratory hole formation for initial (mainly geotechnical) guidance.

It presents a detailed summary of the ground conditions encountered and provides geotechnical advice relating to foundations, floor slabs and pavement design for the new development. It also includes a geoenvironmental appraisal, based on a Tier 1 generic soil and groundwater risk assessment using published industry guidance and generic quantitative risk assessment criteria (GQRA), in relation to the existing site and proposed development. The findings of the risk assessment are then reviewed with reference to the Conceptual Site Model (CSM) which is duly reviewed and updated.

The report concludes by providing comments on the contaminative potential of the site, any unacceptable risks presented to receptors identified in the CSM and includes recommendations for further work/remediation as required.

2 SITE SETTING – SUMMARY OF DESK STUDY

2.1 Introduction

The following section comprises a summary of the site setting, as presented in the Desk Study report (Ref 2), to which reference should be made.

2.2 Historical Summary

In summary, the site was undeveloped land (which included two field ponds in/near the south western margin) in the mid to late 19th Century. In the early 20th Century the site area formed part of the Alexandra Park Aerodrome; this was reportedly operational between 1918 and 1924 (with the main aerodrome buildings located some distance to the northwest). By 1934 the aerodrome became Hough End Playing Fields, the ponds were in-filled and Princess Road was established to the southeast of the site. Residential development occurred in the north eastern part of the site by 1955, but was subsequently demolished and cleared by 1975, by which date the current pavilion was built. The car park was constructed and the site's current configuration was attained by 1982. Since that date no further significant changes at or adjacent to the site are indicated.

2.3 Geology and Environmental Setting

Given the developed nature of the site, deposits of Made Ground are inferred to exist, overlying the natural geology.

The site is recorded as being underlain by drift deposits comprising granular Glaciofluvial Sheet Deposits, beneath which is cohesive Till. The underlying solid strata are of the Wilmslow Sandstone Formation. No known/recorded geological faults or similar have been identified at or close to the subject site. However, the possibility of minor geological faulting cannot be totally discounted.

The underlying Sandstone bedrock is designated as a Principal Aquifer, while the overlying superficial deposits are designated as a Secondary A Aquifer. The site is not within or close to (within 500m of) any currently-defined Environment Agency (EA) Source Protection Zone. No known/recorded licensed groundwater abstractions have been identified within 1000m of the subject site.

The nearest known/recorded surface watercourse to the site is the west-flowing Red Lion Brook, which is located approximately 180m north of the site, and becomes the Chorlton Brook to the north west of the site. The latest reported EA river quality results (2000-2009) show it has a biological grade of D (Fair) and a chemical quality grade of B (Very Good). The site is not indicated to lie within or close to any Environment Agency Indicative Flood Zones. Several Zone 2 areas are indicated some 400m west of the site.

No known/recorded currently-operational or non-operational landfill sites have been identified within 1000m of the site. No known/recorded Environment Agency waste treatment, transfer or disposal sites have been identified within 1000m of the site. However, the former ponds identified on historical plans in close proximity could include localised contaminants, and could also represent potential sources of hazardous ground gas.

No known/recorded on-site pollution incidents have been identified. One recorded pollution incident (to controlled waters) has been identified within a 250m radius, and relates to "*Chemicals - Other Organic*" at the Chorlton Brook, 190m to the north. It is classified as Category 3 (minor impact).

No known/recorded fuel stations have been identified within 500m of the site. No potentially contaminative industrial sites have been identified within 250m of the site, but two (both inactive) are within 500m; these related to servicing/repair of washing machines (265m southeast) and carpet, curtain and upholstery cleaners (495m southeast).

No known/recorded environmentally sensitive sites (e.g. sites of special scientific interest) have been identified within 1000m of the site.

2.4 Ordnance Risk Assessment

The risk of encountering unexploded ordnance (UXO) at the subject site during the ground investigation and/or subsequently during construction of the development cannot be discounted, and a detailed UXO Risk Assessment should be instigated. During site works, the ground investigation contractor was aware of the risk relating to potential UXO at the subject site, and took appropriate precautions to mitigate risks, with the full-time attendance of an ordnance expert.

2.5 Mineral Extraction

From the Desk Study consultations, risks to development at the site of ground movements/subsidence relating to coal or brine extraction activities can be discounted.

2.6 Radon

According the BRE publication BR211: Guidance on Protective Measures for New Dwellings (England and Wales) 2007, the site does not lie in an area where protective measures against radon gas are required.

2.7 Preliminary Identification of Risks

From the initial CSM developed and presented Desk Study, the overall risk to human health, with the exception of construction site workers, was considered to be low. Once the development is complete it is assumed that the surfacing will be predominantly hard-standing (with limited soft landscaping areas) and will therefore prevent direct contact with the underlying ground.

The risk to site workers from toxic/phytotoxic elements and hydrocarbons may be higher than that quoted above due to the closer proximity of staff to potentially contaminated ground conditions during site works. It is likely that these risks may be controlled by appropriate PPE during ground works' activities. However, further assessment after site-specific testing was recommended (addressed later in this report).

The in-filled former ponds could include localised contaminants and represent potential sources of hazardous ground gas, and the proposed building may require measures to protect from such ground gas.

On the basis of the site history, current features and observations made during the site inspection, gross/site-wide mobile ground contamination sources were considered unlikely to exist. Therefore, the site is considered unlikely to pose a significant pollution risk to controlled waters (either groundwater or surface water). Accordingly, groundwater remediation was not anticipated to be required for the proposed development. This was to be confirmed by further assessment following the ground investigation (addressed later in this report).

Excavation and removal of existing foundations and site clearance will also present risks to site workers. Care should be taken during development to ensure that all excavations are adequately supported and drained. Removal and disposal of what could be contaminated ground materials will need consideration. The contractor to be appointed should make their own assessment of risks and develop appropriate management controls; it is anticipated that such an assessment will be informed by the Desk Study Report (Ref. 2) and this/subsequent geoenvironmental/geotechnical reports.

3 GROUND INVESTIGATION

3.1 General

The intrusive investigation was designed and undertaken (in accordance with BS10175:2011 (Ref. 4) by Geotechnics Ltd., with part time supervision by Coffey. The scope of work undertaken is summarised in the following paragraphs.

3.2 Site Work

Site work (exploratory hole formation) was undertaken between 30th September and 4th October 2013 inclusive and comprised the following scope:

- Four (cable tool) boreholes (BH01-BH04) were formed to depths of between 3.10m and 5.50m below ground level (bgl), with in-situ standard penetration testing (SPTs) and representative soil sampling during hole formation;
- Groundwater and gas monitoring installations were constructed in all four boreholes on their completion;
- Seven trial pits (TP01-TP07) were excavated (using mechanical plant) to depths of between 2.40m and 3.10m bgl, with representative soil sampling during hole formation;
- At an early stage in trial pit excavation, soakaway tests were undertaken at two of the locations (TP04 and TP07) to enable assessment of the near-surface soil infiltration characteristics;
- "Falling head" permeability tests were undertaken in three of the boreholes (BH01-BH03) during their formation;
- In addition, in-situ plate bearing tests were undertaken at relatively shallow depths (typically 0.45m bgl) at four locations (TP01, TP02, TP05 and TP06) to provide information to assist with foundation and pavement design; and,
- Following hole formation, a programme of ground gas and groundwater level monitoring was instigated during the week commencing 7th October 2013, in relation to the borehole installations; this is programmed to comprise 4 visits at weekly intervals.

An exploratory hole location plan is presented in Appendix A, with the exploratory hole records in Appendix B and in-situ test results (plate bearing tests, permeability tests and soakaway trials), in Appendix C. Results from the programme of ground gas and groundwater monitoring (four visits) are presented in Appendix D.

3.3 Laboratory Testing

3.3.1 Geotechnical testing

Geotechnical laboratory testing was scheduled on recovered soil samples and included:

- Moisture content and Atterberg Limit determinations
- Particle size distribution (PSD) tests;

- BRE SD-1 suite for assessment of concrete in aggressive ground (Water soluble sulphate, Acid soluble sulphate, Total sulphur, pH);
- "Oedometer" tests to determine compressibility properties;
- Undrained shear strength triaxial tests;
- California Bearing Ratio (CBR) tests on re-compacted samples.

Geotechnical laboratory test results are presented in full in Appendix E.

3.3.2 Chemical testing

Chemical laboratory testing was schedules on 10 no. soil samples and included some or all of the following suites:

- Metals suite (As, Ca, Cu, Cr, Pb, Hg, Ni, Se, Zn)
- Polyaromatic Hydrocarbons (16 speciated)
- Petroleum Hydrocarbons (gasoline range organics – GRO; benzene, toluene, ethyl benzene, xylenes – BTEX; MTBE and EPH)
- Total Phenol
- Water soluble sulphate
- pH
- Organic matter content

Several samples were also subjected to leachate screening for concentrations of metals, pH and sulphate content after preparation by the NRA leachate method.

Groundwater samples, recovered from boreholes BH01, BH02 and BH03 were tested for dissolved sulphate content and pH conditions.

Laboratory test results are presented in full in Appendix F.

Waste Acceptance Criteria (WAC) testing was not commissioned at this stage, but may be required, at a later stage, if materials are to be removed off site for disposal at landfill.

4 INDICATIVE GROUND CONDITIONS AND GROUND MODEL

4.1 Preamble

Information on the ground conditions at the site has been obtained from a review of the information presented on the exploratory hole records provided by Geotechnics Ltd, copies of which are presented in Appendix B.

The geotechnical test results from the Geotechnics exploratory holes in Appendix B are presented (in tabulated form, where appropriate) using the following abbreviations: SPT = Standard Penetration Test N value; c_u = undrained shear strength; c' = effective shear strength; φ_u = undrained angle of frictional resistance; φ' = effective angle of frictional resistance; γ = unit weight.

Generally, equivalent c_u may be calculated from a SPT N value by the expression: $c_u = N * f$, where f is a correlation coefficient derived from plasticity data based on the curve proposed by Stroud (Ref. 5).

4.2 Updated Ground Model

A summary of the information on the near-surface ground conditions is shown in Table 4-1, based on the exploratory hole records in Appendix B.

Table 4-1: Summary of ground conditions' information

Lithology	Description	Depth to Base (m)		Thickness (m)	
		Min.	Max.	Min.	Max.
Topsoil	Topsoil only encountered in the landscaped areas	0.10	0.40	0.00	0.40
Made Ground	Made Ground encountered from surface or beneath Topsoil in landscaped areas; found to be both granular and cohesive in nature	0.40	1.00	0.00	0.90
Glaciofluvial Sheet Deposits	Typically loose/medium dense grey brown/yellowish brown variably gravelly SAND, varying sandy silt in parts.	1.10	>2.40	0.80	>2.00
Glacial Till	Firm and stiff (locally soft) reddish brown variably sandy/ gravelly CLAY	1.30	2.70	0.00	1.20
Wilmslow Sandstone Formation	Dense/very dense reddish brown gravelly sand, varying with depth to weakly cemented sandstone	Not encountered		>0.30	>3.30

4.3 Description of Ground Materials

The Made Ground across most of the site was found to be variable, both granular (clayey/sandy gravel) and to a lesser extent cohesive (sandy gravelly clay). The granular horizons in hardstanding areas were inferred to be sub-base type materials. The Made Ground included fragments of ash, clinker, concrete, brick, glass, tarmac, metal and wood. This is consistent with the historical use of ash and clinker (and

demolition-type materials) as fill. A unit weight for this material of 18kN/m^3 has been adopted for the foundation design. Due to the limited thickness of Made Ground encountered, no in-situ penetration testing was undertaken within the lithology, and hence no SPT N values have been derived for it. Topsoil was found in landscaped areas of the site, and in parts was directly overlying natural soils (without intervening Made Ground). No exploratory holes were formed in the areas of the in-filled former ponds, as these were outside (south west) of the currently-defined footprint of the proposed new development.

Glaciofluvial Sheet Deposits (GSD) were encountered beneath the Topsoil/Made Ground and consist of "loose" and "medium dense" variably gravelly sand, locally varying (near-surface, in TP2, TP4 and TP6) to sandy silt. A soft organic silt encountered in TP5 directly beneath Made Ground is inferred to represent a former Topsoil horizon. The GSD were found to extend to greater depths towards the south west of the site. A single SPT within this lithology gave an N value of 14. A conservative design SPT N value of 12 has been selected for the preliminary foundation design. Due to the granular nature of this lithology it has been assumed that, under loading, it will behave in a drained manner. Selected preliminary design parameters for this lithology are; unit weight, γ = 20kN/m^3; effective angle of frictional resistance, φ' = 30˚; and zero cohesion (i.e. c' = 0kN/m^2).

The Glacial Till was generally described as firm, locally soft or stiff, brown variably sandy/gravelly clay. This lithology was encountered in most of the exploratory holes, but was found to be absent in the north eastern section of the site (e.g. BH04 TP05) where the GSD were found to be directly underlain by weathered sandstone strata. SPT N values in the Glacial Till were found to vary between 3 and 17, with the lower values inferred to relate to water-softening of the clays near the interface with the overlying, granular, GSD. For the purpose of the preliminary design the lithology has been assumed to behave as a (low-permeability) cohesive soil. Assumed design parameters for this layer are γ = 18kN/m^3, c_u = 40 kN/m^2 and φ_u = 0˚. A c_u value of 40 kN/m^2 is consistent with "soft to firm clay" which is appropriate for this lithology based on the given descriptions and determined SPT N values.

The weathered Wilmslow Sandstone Formation (WSF) was generally encountered/described as a very dense gravelly sand, with gravel of sandstone, varying with depth to a weakly cemented sandstone (recovered as gravel-sized fragments). This lithology was encountered in all the exploratory holes except TP1 and TP3 in the south western end of the site, in which the natural Drift deposits were found to extend to greater depths than penetrated in these trial pits. (Extrapolated) SPT N-values in the weathered Wilmslow Sandstone were found to range between 77 and >250, but were greater than 200 within 1-2m below the upper surface of the lithology. Selected design parameters for this (weathered sandstone) layer are; unit weight, γ = 22kN/m^3; effective angle of frictional resistance, φ' = 40˚; and zero cohesion (i.e. c' = 0kN/m^2). Consideration was given to designating an unconfined compressive strength for this formation; however, based on the (weathered) nature of the lithology as encountered in exploratory holes, we consider it to be more appropriate to give soil parameters to the strata than rock strength characteristics.

In-situ testing was undertaken at relatively shallow depths (0.45m bgl) at several locations (TP01, TP02, TP05 and TP06). This consisted of plate bearing tests (using 450mm diameter plates), the results of which are summarised in Table 4.2.

Table 4-2: Results of Plate Bearing Tests

Location	Lithology at test depth	Recorded plate settlement at 100 kN/m^2 (mm)	Equivalent CBR Value (%)
TP01	Glaciofluvial Sheet Deposits	0.8	16.8
TP02	Glaciofluvial Sheet Deposits	1.6	6.2
TP05	Glaciofluvial Sheet Deposits	2.6	2.4
TP06	Made Ground	2.1	3.9

The results of laboratory geotechnical testing are summarised in Table 4-3 (based on results presented in full in Appendices E and F).

Table 4-3: Summary of Laboratory Geotechnical Test Results

Parameter		Topsoil/ Made Ground	Glaciofluvial Sheet Deposits	Glacial Till	Wilmslow Sandstone
Natural moisture content (%)		9.2 - 18	16 - 17	11 – 18	No data
Plasticity Index (%)		20	No data	11 - 19	No data
Atterberg Classification		CI (intermediate plasticity clays)	No data	CL/CI (low/intermediate plasticity clays)	No data
PSDs (%)	Cobbles +	No data	0	No data	0
	Gravel		7 – 15		0 – 1
	Sand		57 – 86		61 – 90
	Silt/Clay		5 – 10		10 – 38
Undrained shear strength (kN/m^2)		No data	No data	74	No data
Mv value; at overburden + 100kPa (m^2/MN)		No data	No data	0.10	No data
Lab CBR value (%)		3.9 – 52	5.5 – 5.9	No data	No data
Sulphate content (mg/l)		3 – 69	2 – 16	14 – 19	14 – 22
pH value		7.2 – 8.7	6.6 – 8.5	8.2	8.2 – 8.3

The parameters selected for foundation design are summarised in Table 4-4.

Table 4-4: Summary of Ground Parameters

Lithology	Ground Parameters				
	Unit Weight, γ (kN/m^3)	Assumed SPT N Value (blows/300mm)	φ' (°)	c' ($kN/m^{2)}$	c_u (kN/m^2)
Made Ground	18	N/A	N/A	N/A	N/A
Glaciofluvial Sheet Deposits	20	12	30	0	N/A
Till	18	N/A	N/A	N/A	40
Wilmslow Sandstone Formation	22	200	40	0	N/A

4.4 Groundwater

Groundwater entries were occasionally recorded in the exploratory holes during hole formation, although water was added (to assist hole formation) within the granular strata, and may have obscured minor/slow entries. Where identified, groundwater entries were recorded at depths of between 0.70m bgl (within the GSD) and 5.00m bgl (within the Wilmslow Sandstone Formation).

Groundwater levels recorded during the subsequent programme of ground gas/groundwater monitoring are summarised in Table, 4.5 (based on results presented in full in Appendix D).

Table 4-5: Summary of Groundwater Monitoring Results (in metres below ground level)

Borehole	Response zone	Stratum	09/10/13 (Round 1)	18/10/13 (Round 2)	22/10/13 (Round 3)	31/10/13 (Round 4)
BH1	1.00 – 4.00m	GSD, Till and WSF	2.71	2.70	2.70	2.42
BH2	2.20 – 5.00m	WSF	2.79	2.81	2.83	2.64
BH3	1.00 – 3.70m	GSD, Till and WSF	2.60	2.63	2.57	2.37
BH4	1.00 – 3.00m	GSD and WSF	2.24	2.23	2.18	1.92

From the monitoring of the borehole installations (4 rounds) groundwater was recorded at depths of between 1.92m and 2.83m bgl. This equates to reduced levels of between 28.36m and 28.87m AOD.

The results of the in-situ permeability tests (in boreholes) and infiltration tests (in trial pits) can be summarised as follows. The Made Ground and/or Glaciofluvial Sheet Deposits at shallow depths were found to have infiltration rates in the range of 1.7 $x10^{-5}$ to 6.1 $x10^{-5}$ m/sec. The weathered Wilmslow Sandstone was found to have permeability values in the range of 1.6 $x10^{-6}$ to 1.3 $x10^{-5}$ m/sec.

4.5 Visual evidence of potential ground contamination

From observations made around the site, and from visual inspection of the ground conditions encountered in the exploratory holes, the site does not appear to be grossly contaminated. Limited depths of Made Ground were encountered, and no significant odours, staining or discoloration of strata or groundwater were observed, such as can often be associated with contaminated ground/ groundwater conditions.

However, it should be noted that the Made Ground was found to contain ash/clinker type materials, which can often be associated with elevated concentrations of contaminants, such as toxic/phytotoxic elements, PAHs, sulphates and extreme pH conditions.

No evidence of ground or groundwater impacted with other hydrocarbons was encountered during the investigation. However, as indicated in the Desk Study report, ground impacted with hydrocarbons/ similar could exist locally at the site, if the sports pavilion has or had some form of on-site fuel-powered heating system, and/or resulting from accidental spillages/leakage of hydrocarbons from vehicles in the parking areas.

An assessment of contamination is presented in subsequent Sections 6 to 11 of this report.

5 GEOTECHNICAL CONSIDERATIONS

5.1 General

Geotechnical advice is required for the design of the foundations of the new development at Hough End Leisure Centre. The proposed development includes a two-storey building with swimming pools and (presumably) relatively widely-spaced structural elements to create large open-plan areas. From the indicated ground conditions, it is anticipated that shallow spread foundations should be feasible. Foundation design recommendations are given below.

Further considerations include temporary excavations and site drainage, together with pavement design and soakaway viability.

5.2 Proposed Development

For the purpose of this Report the proposed development comprises the construction of a leisure centre building and new car parking areas.

At this stage, loads for the proposed development have not been provided. However, to accommodate the swimming pools/basement, it has been indicated that excavations to depths in the order of 2.50m below ground level will be required.

5.3 Foundation Design Recommendations

Foundation design has been undertaken based on the ground model described in Section 4.

Made Ground is likely to be unsuitable for the support of any major structure, owing to the risk of excessive total and/or differential consolidation settlements resulting from the loading of such strata. From the plate bearing test results and the (single) SPT N value, the GSD should be capable of providing an allowable bearing capacity of 100 kN/m^2. However, the presence of localised underlying, relatively low-strength Glacial Till, of varying thickness and competence (N values ranging from 3 to 17) is a concern, due to the potential for excessive differential settlement of foundations above/within this lithology. Therefore, it is recommended that spread foundations should be taken through the GSD and Till, into the underlying weathered Wilmslow Sandstone Formation, and could be conservatively designed on the basis of a presumed net bearing pressure of at least 300 kN/m^2. Within or close to the footprint of the proposed building, the upper surface of the weathered Wilmslow Sandstone Formation was encountered at depths in the order of 1.50-2.50m bgl. Once more information is available regarding the loading requirements of the building the foundation details can be refined to provide an optimum design solution.

As has been previously indicated, within the areas of the in-filled former ponds, the depths to “competent” natural bearing strata are likely to be greater, possibly in the order of 3-4m below ground level. However, these former ponds are located outside of the (currently-proposed) area of the new development, and hence, at this stage, these features do not need to be accurately determined, delineated, or investigated further.

An alternative foundation solution for the support of the proposed building could comprise vibro-treatment, with stone columns installed (by bottom-feed vibro-techniques) to improve the near-surface strata (particularly the low-competence/variable thickness Glacial Till). Such pre-treatment would enable the construction of foundations at shallower depths (say 1.0m bgl) and with higher net bearing pressures (125-150 kN/m^2 should be feasible). If a vibro-treatment ground improvement solution were

to be adopted for the development, due consideration would need to be given to the following potential limitations/impact of such treatment:

- The depth of treatment would be relatively shallow, as refusal of the vibro-poker is anticipated in the competent Wilmslow Sandstone at depths in the order of 2-3m bgl;
- The impact (in terms of noise and vibration) of such treatment on the site's environment, and particularly existing nearby residential developments;
- There are understood to be limiting distances the order of 2-6m from vibro-treatment within which damage may occur to existing structures/underground services or similar.

Piled foundations would also be feasible for the support of the proposed building, but are not considered in detail, at this stage, as they are unlikely to be as cost-effective as the foundation options described above.

5.4 Ground Floor Slab

From the information obtained regarding site ground conditions, it should be feasible to utilise a lightly-loaded ground-bearing floor slab for the leisure centre building. Prior to construction of the floor slab, the formation level (particularly where Made Ground is not fully removed) should be thoroughly proof-rolled, with any soft/hard zones or buried obstructions excavated out and removed, to be replaced with suitable engineered granular fill.

5.5 Swimming Pools / Basement

With regard to the proposed swimming pools/basement, if the base is set at a depth in the order of 2.50m below ground level, this is indicated to be predominantly within the (weathered) Wilmslow Sandstone Formation. However, towards the south western section of the site, the Till/sandstone interface increases in depth and Glacial Till may be exposed at/above a depth of 2.50m bgl. In this case it may be sensible to over-excavate and remove the Glacial Till, bringing levels back up to the underside of the pools/basement with engineered granular fill, to avoid any potential for differential settlement beneath the pools.

From the trial pit excavations it was possible to dig within the weathered Wilmslow Sandstone to depths in the order of 2.65-3.10m bgl, using a conventional mechanical excavator, without the need for hydraulic breaker to penetrate more competent strata.

From the monitoring results (4 rounds) groundwater was recorded at depths of between 1.92m and 2.83m bgl. This relates to reduced levels of between 28.36m and 28.87m AOD. Therefore, the design and construction of the swimming pools/basement will need to take into account groundwater conditions, both during construction and in relation to long-term performance. Groundwater control measures (dewatering) are likely to be required during the excavation to build the swimming pools/basement, and to construct deep foundations. The pools/basement will also need to be suitably tanked/waterproof, both to contain water, and also to keep out groundwater. Furthermore, the design and construction should give consideration of the need for measures to counter uplift groundwater forces (buoyancy), particularly when the pools are emptied for cleaning/maintenance.

5.6 Aggressivity towards Concrete

Testing to determine the aggressivity of the ground towards concrete was undertaken on soil samples in accordance with the Building Research Establishment Special Digest 1 (Ref. 6).

Sulphates present in the ground can attack and degrade concrete. Additional sulphates can be formed by disturbance of certain minerals, such as pyrite, during construction. Concrete can be designed to prevent this in accordance with the guidance in BRE Special Digest 1:2005 'Concrete in Aggressive Ground'. Disturbance of the ground would include activities such as near surface excavation, as proposed at this site for basement/pool or foundation construction.

Table 5.1 gives a summary of test results. The site was assessed on the basis of being a 'brownfield location' in accordance with BRE guidelines. Groundwater was considered to be mobile for this assessment due to the granular nature of the near surface strata (including Made Ground, GSD and weathered sandstone) and groundwater regime at the site.

Table 5.1: Summary of concentrations measured in soils for materials assessment

Determinand	Soil (up to 17 results)		Characteristic Value
	Min Value	Max Value	
pH	6.6	8.7	7.0*
Water Soluble Sulphate	<1.5 mg/l	69 mg/l	45 mg/l **
Acid Soluble Sulphate (AS)	0.03%	0.06%	0.06%
Total Sulphur (TS)	0.03%	0.04%	0.04%
Total Potential Sulphate (TPS = TS x 3)	0.09%	0.12%	0.12%
Oxidisable Sulphides (OS = TPS – AS)	0.06%	0.08%	0.08%
Water Soluble Chloride	2 mg/l	8 mg/l	8 mg/l
Water Soluble Nitrate	3 mg/l	4 mg/l	4 mg/l
Water Soluble Magnesium	9 mg/l	15 mg/l	15 mg/l

* Mean of lowest 20% of results

** Mean of highest 20% of results

Soil samples tested were taken from depths of between 0.25m and 2.5m below ground level.

BRE SD-1 states that if the value of Oxidisable Sulphides is greater than 0.3% then pyrite is likely to be present. The characteristic value of Oxidisable Sulphides here is 0.08%, so it is unlikely that there are sulphide minerals within the soil with the potential to oxidise during disturbance of the soil.

Groundwater samples from BH01, BH02 and BH03, contained soluble sulphate concentrations in the range of 30 to 53 mg/l and pH values of 7.3 to 7.4

The results correspond with a Design Sulphate Class and ACEC Class of DS-1 and AC-1 respectively, assuming ground disturbance will occur during construction, e.g. during excavation for construction of foundations and the pools' basement.

5.7 New Hardstanding Pavement Construction

The design and construction of new roads/external hardstanding will need to be based upon an appropriate equilibrium CBR value for the formation strata. Table 5.1 of IAN 73/06 Revision 1 (2009) gives estimated values for long-term CBR depending on soil type, particularly for clay sub-grades where moisture and plasticity index are significant issues. These CBR values assume a high water table and that the foundations may be wetted by groundwater during their life.

In consideration of the ground conditions encountered, in relation to the likely final site levels, the strata considered most likely to be exposed at formation level beneath areas of new hardstanding comprise: Made Ground, and/or GSD. From the investigation, relevant parameters to assist with selection of pavement design are summarised on the following table.

Table 5.2: Summary of data relevant to pavement design

Lithology	CBR values (%) from in situ tests	CBR values (%) from laboratory tests	Plasticity Indices (%)
Made Ground	3.9	3.9 - 52	20 *
GSD	2.4 – 16.8	5.5 – 5.9	(non-plastic)

* Result from testing of cohesive soil sample

From these results and with reference to Table 5.1 of IAN 73/06 Revision 1 (2009) new pavement for the development can be designed on the basis of an equilibrium CBR value of 4.0%.

The recommended design CBR value should be confirmed by further in situ testing prior to construction. IAN 73/06 gives guidance of suitable methods for such in situ testing.

Formation surface levels should be thoroughly inspected and proof-rolled prior to construction of the sub-base, and any soft/weak/ deleterious spots excavated out and replaced with inert, uncontaminated, engineered, granular fill.

5.8 Permeability and Infiltration Characteristics

As indicated in Section 4.4, the Made Ground and/or GSD at shallow depths were found to have infiltration rates in the range of 1.7 $x10^{-5}$ to 6.1 $x10^{-5}$ m/sec; the permeability of these soils is inferred to be matrix dominated. The weathered Wilmslow Sandstone was found to have permeability values in the range of 1.6 $x10^{-6}$ to 1.3 $x10^{-5}$ m/sec. The permeability of weathered horizons of this lithology is also inferred to be matrix dominated. However, the permeability of un-weathered horizons of the Wilmslow Sandstone (not penetrated during this investigation) is more likely to be dominated by fracture flow.

Based on the foregoing information, and taking account of the ground conditions (and relatively shallow groundwater levels) encountered at the site, on site soakaways for the attenuation of surface should be feasible. The Wilmslow Sandstone Formation is indicated to have a slightly lower permeability than the GSD, is overlain by cohesive Glacial Till, and is fully saturated with groundwater below depths in the order of 1.9-2.8m bgl (28.4-28.9 m AOD).

The feasibility of on-site soakaways for the redevelopment can be assessed further when more details of the requirements for water attenuation are made available.

6 GENERIC ASSESSMENT CRITERIA

6.1 Background

Where land has been affected by contamination it may present a risk to a range of receptors including humans, ecosystems, water quality and property. The Environment Agency Report 'Model Procedures for the Management of Land Contamination, CLR11' provides the technical framework for applying a risk management process when dealing with contaminated land risk. The process involves identifying, making decisions on, and taking appropriate actions to deal with land contamination in a way that is consistent with UK government policies and legislation. The technical approach in CLR11 is designed to be applicable to a range of non-regulatory and regulatory contexts including the redevelopment of land under the planning regime.

The model procedures include a tiered approach to deal with risk. The first tier includes an evaluation of pollutant linkages using generic assessment criteria in order to assess whether contamination presents an unacceptable level of risk.

Published Generic Assessment Criteria (GACs) are available from a number of sources. The Environment Agency has published generic assessment criteria in the form of Soil Guideline Values for eleven contaminants. For derivation of generic assessment criteria for other contaminants, the Environment Agency has made available the modelling software 'CLEA version 1.06'. The software is based on the CLEA model. The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model for site condition and human behaviour to estimate exposure thresholds.

The CLEA software, (including previous versions of the programme), has been used by the Chartered Institute of Environmental Health (CIEH) in partnership with Land Quality Management (LQM) to derive generic assessment criteria for a range of compounds for which Soil Guideline Values do not exist. This information has been complimented by derivation of further generic assessment criteria by the Environmental Industries Commission (EIC) in collaboration with CL:AIRE and the Association of Geotechnical and Geoenvironmental Specialists (AGS).

The Human Health Risk Assessment presented in this report compares contamination concentrations with published generic assessment criteria.

6.2 CLEA Model (Soil)

The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model for site conditions and human behaviour to estimate child and adult exposures to soil contaminants for those potentially living, working, and/or playing on contaminated sites over long time periods. These modelled exposure limits are compared to established Health Criteria Values (HCVs). DEFRA state that the HCVs are set levels of minimal or tolerable risk for long-term human exposure to chemicals in soil. They represent a baseline and health protective position to minimise risks of significant harm.

The aim of the CLEA model is to estimate human exposure to chemicals in soil in terms comparable with relevant HCVs including the Tolerable Daily Intake and the Index Dose. Exposure is defined as contact between a chemical and the external surfaces of the human body (IPCS, 2005).

The CLEA model estimates the Average Daily Exposure (ADE) to a contaminant in soil via the following pathways:

- By ingestion through the mouth (as intake);
- By inhalation through the nose and mouth (as intake);
- By absorption through the skin (as uptake).

6.2.1 Environment Agency Soil Guideline Values

The Environment Agency Soil Guideline Values are set at the soil concentration where the Average Daily Exposure from soil sources by a particular pathway equals the Health Criteria Value.

For many substances, exposure by all pathways may contribute to the same toxic effect and therefore the overall exposure could be more than the Health Criteria Value. To combat this, the SGV is set so that the total risk from exposure via all pathways is mathematically no greater than the risk by any single pathway.

The Soil Guideline Values have been calculated by the Environment Agency as 'trigger values' which indicate that soil concentrations above this level may pose a possibility of significant harm to human health. However, they do not automatically represent an unacceptable intake in the context of part 2A of the Environmental Protection Act 1990. They can only be used for human receptors and to assess risks from long term exposure to chemical contamination in soil.

Where a representative contaminant concentration in the soil is at or below the SGV it can be assumed that it is very unlikely that a significant possibility of significant harm exists (Defra, 2008).

Where a representative contaminant concentration in the soil exceeds the SGV, there are three possibilities in terms of determining significant possibility of significant harm under Part 2A (Defra, 2008):

- There may be no possibility of significant harm.
- There may be a non-significant possibility of significant harm.
- There may be a significant possibility of significant harm.

If the concentration is above the SGV then a more detailed evaluation of human health risks will usually need to be conducted.

6.2.2 LQM/CIEH Generic Assessment Criteria Second Edition

The LQM/CIEH Generic Assessment Criteria (GAC) have been derived using the CLEA v1.06 model released in 2011 for soil contaminants for which there are no Environment Agency Soil Guideline Values. Input parameters have been drawn from Environment Agency documents or where none exist, from other reliable sources in accordance with relevant Environment Agency guidance.

6.2.3 EIC/AGS/CL:AIRE Generic Assessment Criteria

The EIC/AGS/CL:AIRE GAC have been derived using CLEA version 1.06 for a number of land use scenarios: residential with consumption of home-grown produce; residential without consumption of home-grown produce; allotments and commercial land use. Each scenario has GAC derived for three soil organic matter (SOM) contents; 1%, 2.5% and 6%.

6.2.4 US EPA Regional Screening Level Generic Assessment Criteria

Where UK published GACs are not available, reference may be made to the US Environmental Protection Agency (EPA) Regional Screening Levels (RSLs). It is noted that the US EPA values have no standing in the UK. However, if required for reference purposes Coffey compare US EPA RSLs against the individual laboratory results. Where recorded concentrations are less than one order of magnitude below the US EPA RSL, Coffey considers the determinand is unlikely to present a significant risk to human health.

Where the chemical concentrations encountered on site have not exceeded the laboratory method detection limit (LOD), GACs have not been calculated.

6.3 Leachate and Groundwater

The available leachate and groundwater results have been directly compared to the UK Drinking Water Standards (UK DWS) initially. Where UK DWs are not available, the groundwater and leachate concentrations have been compared to the Environment Agency's Environmental Quality Standards (EQS), which are derived for the protection of aquatic life.

Comparison is also made with the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010.

Where a determinand is present at a concentration below the criteria, the determinand is considered not to represent a risk to controlled waters. Where a determinand is present at a concentration above the corresponding criteria, the determinand may represent a risk to controlled waters. This screening process informs the Generic Quantitative Risk Assessment (GQRA) for groundwater.

7 SOIL: GEOENVIRONMENTAL ASSESSMENT

7.1 Soil GQRA

A comparison of soil chemical concentrations with published guidance levels has been undertaken to give an indication of the contamination potential of the Made Ground and natural soils encountered on the site. Details on laboratory testing suites are provided in Section 3.3.

The proposed end use of the site is for a leisure centre development with areas of car park and surface yard hardstanding, and also zones of landscaping and surface water drainage. The data has been compared against Generic Assessment Criteria (GAC) derived for a commercial land use scenario to provide a conservative initial assessment of the data to establish what determinands exceed their respective GAC.

The concentrations of contaminants present at the site are shown in Appendix G for determinands with relevant GAC concentrations.

7.2 Soil Organic Matter Content

10 No samples were tested to determine the Soil Organic Matter content across the site. The SOM content was recorded as a minimum of <0.2% and a maximum of 219%. The average SOM content across the site is 6.9%. Only 4 of the 10 samples recorded values below 2.5%.

The average SOM has been calculated to allow the determination of the appropriate GAC thresholds to use in the risk assessment. (NOTE: 6% SOM is the highest SOM content available for any GAC, other bands are 2.5% and 1%). Lower SOM values are more conservative, and it has been determined that the value of 6% SOM be used as the most representative when selecting the GAC thresholds for all the material obtained from the site based on the results available, as in the majority of the samples, SOM > 2.5% and the average SOM was 6.9%.

7.3 Asbestos

4 No samples were screened for the presence of asbestos from boreholes and trial pits. Asbestos was positively identified in one sample from TP07 at 0.3m depth (asbestos type: Chrysotile).

This positive result is not unexpected based on the known history of the site. Previous use of the site and the existence of demolished former buildings suggest that it is possible that asbestos is present on site in other places, although it was not detected in more than one of the samples tested. It is recommended that the potential presence of asbestos within the Made Ground at the site should be documented within any envisaged Health & Safety (CDM or contractor's) risk assessments associated with construction work, given the varied historical use of the site and former buildings. The risk of chronic exposure to asbestos could be reduced by the adoption of good general working practices (during any groundwork) such as dust suppression, use of standard PPE and good standards of hygiene, together with guidance and direction from a suitably qualified and experienced asbestos specialist.

In terms of post-construction site use, near-surface soils in landscaped/soft-standing parts of the site need to be devoid of asbestos. This can be addressed by ensuring that all such areas are "capped" with a suitable thickness of uncontaminated cover soils (Topsoil over sub-soil) that do not contain asbestos.

7.4 Made Ground

9 no. samples of Made Ground (including Topsoil) were tested from boreholes and trial pits. The testing carried out has identified the following:

- Concentrations of the following were below the limits of detection in all samples tested:
    - Selenium
    - Aliphatics (GRO) in the range C4-12
    - Aromatics (GRO) in the range C4-12
    - MTBE
    - BTEX (benzene, toluene, ethylbenzene, m-xylene, o-xylene).
- Concentrations of the following were above the limit of detection but below their respective GACs:
    - Arsenic, Cadmium, Chromium III, Copper, Lead, Mercury (elemental), Nickel, Zinc.
    - Aliphatics (EPH) in the range C8-40
    - Aromatics (EPH) in the range C8-40
    - Napthalene, Acenaphthalene, Acenapthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(123,cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene.
- Concentrations of the following were above the limit of detection but no GACs were available:
    - Magnesium
    - Sulphur
    - Total Phenols.
- Contaminants present above the respective GAC for commercial end use were not identified in any of the (Made Ground) samples tested.

7.5 Natural ground

2 no. samples of natural ground (from shallow depths) were tested from boreholes and trial pits. The testing carried out has identified the following:

- Concentrations of the following in all samples tested were below the limit of detection:
    - Cadmium, Mercury, Selenium
- Concentrations of the following were above the limit of detection but below their respective GACs:
    - Arsenic, Chromium III, Copper, Lead, Nickel, Zinc.
- There were no contaminants present above the respective GAC for commercial end use.

8 WATER: GEOENVIRONMENTAL ASSESSMENT

8.1 Leachate GQRA

The available leachate test results have been directly compared to the UK Drinking Water Standards (UK DWS) initially. Where UK DWs are not available, the groundwater and leachate concentrations have been compared to the Environment Agency's Environmental Quality Standards (EQS), which are derived for the protection of aquatic life.

Exceedences have been compared against the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 as requested by the Environment Agency.

Screening tables are presented in Appendix G, for determinands with threshold values.

8.2 Hardness

Some EQS values are hardness dependent (see below).

Table 8.1: Environmental Quality Standards (EQS) for hardness related List 2 dangerous substances

Environmental Quality Standards (EQS) for hardness related List 2 dangerous substances, EC Dangerous Substances Directive (76/464/EEC) values given in µg/l							
Substance	EQS Type	Hardness (mg/l CaCO3)					
		0-50	>50-100	>100-150	>150-200	>200-250	>250
Copper (dissolved)	Annual average	1	6	10	10	10	28
Copper (dissolved)	95th percentile	5	22	40	40	40	112
Nickel (dissolved)	Annual average	50	100	150	150	200	200
Vanadium (dissolved)	Annual average	20	20	20	20	60	60
Chromium (dissolved)	Annual average	5	10	20	20	50	50
Lead (dissolved)	Annual average	4	10	10	20	20	20
Zinc (total)	Annual average	8	50	75	75	75	125
Zinc (total)	95th percentile	30	200	300	300	300	500

As no hardness results are available for groundwater in the site area, a (relatively conservative) hardness range of 0-50 mg/l CaCO3 has been adopted to determine environmental quality standards for the subject site, with reference to the table above.

8.3 Leachate samples – Ground Investigation

3 no. leachate samples were derived from selected (borehole and trial pit) soil samples and tested for suites of eluate concentrations. The testing carried out has identified the following:

- Concentrations of the following in all samples tested were below the limits of detection:
    - Nickel, cadmium, mercury and selenium

- Concentrations of the following were above the limit of detection but below their respective GACs:
    - Arsenic, Copper and Zinc.
- Contaminants present above the respective GAC were:
    - Chromium and lead.

8.4 Water samples – Monitoring Round 1

Groundwater monitoring round 1 was undertaken on 9th October 2013. Groundwater samples were taken from boreholes BH01, BH02 and BH03. In BH04, insufficient groundwater recharge occurred, after purging to permit sampling. The testing carried out has identified the following:

Groundwater samples from BH01, BH02 and BH03, contained soluble sulphate concentrations in the range of 30 to 53 mg/l and pH values of 7.3 to 7.4.

From the apparent absence of contaminated ground conditions encountered in the exploratory holes formed, consideration of the results of chemical testing on soil samples, and with reference to the preliminary CSM (Ref. 2), it was not considered necessary to test groundwater samples for other potential contaminants.

8.5 Review of the leachate and groundwater test results

The leachate results in which GACs have been exceeded are considered below:

- Apparent exceedences for Chromium were indicated in all three leachate samples (from TP07 at 0.30m, BH04 at 0.60m and TP03 at 0.30m); however in two of these, the results were below the detection limit (1.5 ug/l) and in the third one (TP03 at 0.30m) the result of 1.8 µg/l, was just above the detection limit; the drinking water standard for chromium is 0.1 µg /l.
- An exceedence for Lead was detected in one of the leachate samples; from TP03 at 0.30m in which 20 µg /l lead was detected compared with a drinking water standard of 10 µg /l.

The sample from TP03 at 0.30m is of Made Ground, and was described as containing inclusions of (inter alia) “clinker”; this is thought to be the source of the leachable chromium and lead detected in that sample.

Exceedences have also been compared against the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 as requested by the Environment Agency. No additional exceedences were recorded in comparison to these threshold values.

8.6 Recommendations

The significance of the exceedences described above is considered low for the following reasons:

- The leachate preparation method is considered relatively aggressive, and indicates the maximum potential concentration in leachate that can be generated, but does not necessarily take into account time and dispersal factors.
- The soil sample from TP03 at 0.30m was not found to contain substantially elevated (total) concentrations of either lead or chromium.

- The exceedences identified are only marginally above environmental quality standards or of the drinking water standards which are considered conservative for this site.
- When the leachable chromium results are compared with environmental quality standards for freshwater, the concentrations are below the relevant GAC.

Coffey considers that the leachate test results do not indicate a significant risk to controlled waters, and the further risk assessment is not necessary for this development.

9 GROUND GAS RISK ASSESSMENT

9.1 General – Assessment Criteria

The ground gas risk assessment undertaken in this report has essentially been undertaken in accordance with guidance presented in CIRIA, C665, Assessing Risks Posed by Hazardous Ground Gases to Buildings, 2007 (Ref. 7) together with BS8485:2007, Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments (Ref. 8).

In accordance with CIRIA C665, a Gas Screening Value (GSV) is obtained by multiplying the maximum flow recorded in a gas monitoring instrument by the maximum concentration of the gas.

Furthermore, with regard to concentrations of carbon monoxide and hydrogen sulphide, reference has been made to guidance given in HSE, EH40/2005 Occupational Exposure Limits 2005 (Ref. 9).

On this basis, the ground gas risk assessment for the site has been undertaken.

9.2 Monitoring

Four rounds of ground gas monitoring were undertaken on 9th, 18th, 22nd and 31st October, 2013 in boreholes BH01, BH02, BH03 and BH04.

Hydrogen sulphide (H_2S) was found to be below the detection limit of 1ppm throughout the monitoring. This is below the Health and Safety Executive's short term and long term occupational exposure limits (10 and 15 ppm respectively) in their document EH40/2005 and is therefore considered negligible risk (Ref. 9).

Methane (CH4) was found not to exceed its detection limit (0.1% volume per volume – v/v) in all four boreholes throughout the monitoring programme. This value is below the threshold value for methane given in CIRIA, C665 (Ref. 7).

Carbon dioxide (CO2) was generally found to be at or below 5.0% v/v in all four boreholes, with one exception; during the fourth round 6.3% v/v CO2 was detected in BH01.

The maximum recorded ground gas flow was 2.0 l/hr (in BH01; first round). From these results, the maximum individual Qhg value (as defined in BS8485:2007) for the site is 0.052 l/hr carbon dioxide (BH01, first round).

These results have been considered with reference to BS8485:2007 (Ref. 8). From this appraisal, and with reference to Table 1 of the above document, the site is indicated to classify as Characteristic gas situation (CGS) 2, "low risk", in terms of its hazardous ground gas regime, based on the "worst case" carbon dioxide concentration of 6.4% v/v in BH01 during the fourth round.

The development is considered to be a "public building" as defined on Table 2 of BS8485:2007. For a CGS 2 classification, ground gas protection measures would be required for the development, to provide protection with a score of 3.0 in accordance with Table 2. Table 3 of BS8485:2007 provides options for such protection measures. Typical measures could comprise some or all of the following:

- Passive under-slab venting
- Reinforced concrete ground-bearing floor slab, with limited service penetrations (e.g. top-hat seals) that are cast into the slab

- Gas-proof membranes in floor slab and basement construction, with independent validation and/or integrity testing.

However, these measures would be rather costly to design and construct. Given that the CGS 2 classification is a result of a single elevated carbon dioxide concentration at one location on one monitoring visit, it is possible that further ground gas monitoring visits may indicate typical carbon dioxide concentrations to be at or below 5.0% v/v in which case the CGS for the site could be reduced to 1, for which no specific protection measures would be required.

10 CONCEPTUAL SITE MODEL

The Conceptual Site Model has been updated based on the ground investigation and gas and groundwater monitoring results. Sources identified are based on the results of this investigation and earlier reports (Ref. 1 to 3). In summary, sources include:

- Contamination in Made Ground (e.g. asbestos-containing matter in Made Ground; hydrocarbons associated with heating systems of the current pavilion building)
- Contamination in natural ground (e.g. mobile hydrocarbons originating from the above source)
- Contamination in groundwater (e.g. mobile hydrocarbons originating from the above source)

The potential pathways at the site include:

- Air and gas flow
- Dermal contact, ingestion and inhalation
- Infiltration and runoff
- Groundwater flow
- Pathways via buried pipes such as redundant drainage.

Receptors considered include:

- Construction and maintenance workers
- Current and future site users
- Groundwater and surface water

11 GEOENVIRONMENTAL RISK ASSESSMENT

11.1 Summary of Risk Assessment

A geoenvironmental risk assessment for the site is outlined below in the context of the findings of the investigation and the potential pollutant linkages identified in the CSM.

In brief, a geoenvironmental risk assessment considers the various potential pollutant linkages identified in the CSM and determines a level of risk (based on the classification of the magnitude of the potential consequence of the risk occurring and the magnitude of the probability of the risk occurring). The risk assessment highlights areas which warrant either further investigation to prove and validate the level of risk, or remedial action. Where information is of insufficient detail or incomplete, risks may be identified as moderate/high and then reduced as necessary after further information is gathered.

Table 11.1 below provides a description of the resultant risk levels.

Table 11.1 – Summary of Risk Levels

Risk Term	Description
VERY HIGH	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action.
HIGH	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.
MODERATE	It is possible that without appropriate remediation action harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.
LOW	It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at worst if any harm was realised any effects would be mild.
VERY LOW	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor

Taken from 'Guidance for the Safe Development of Housing on Land Affected by Contamination (R&D 66:2008 Vol 1 (NHBC Environment Agency/CIEH))'.

The outcome of the risk assessment below, considering the site in its present state to the environment and human health would be LOW.

11.2 Risk Assessment

The following risks have been identified in relation to the proposed end use and are summarised below.

Human health (construction and maintenance workers) via direct contact in areas of open ground:

Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	LOW RISK
Asbestos	LOW RISK

Human health (construction and maintenance workers) via ingestion in areas of open ground:	
Toxic/phytotoxic elements	LOW RISK
Hydrocarbons	LOW RISK
Asbestos	LOW RISK
Human health (construction and maintenance workers) via inhalation of gases/vapours/dusts:	
Toxic/phytotoxic elements	LOW RISK
Hydrocarbons	LOW RISK
Asbestos	MODERATE RISK
Human health (end users) via direct contact in areas of open ground:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	VERY LOW RISK
Asbestos	VERY LOW RISK
Human health (end users) via ingestion in areas of open ground:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	VERY LOW RISK
Asbestos	LOW RISK
Human health (end users) via inhalation of gases/vapours/dusts:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	VERY LOW RISK
Asbestos	LOW RISK
Groundwater via leaching and/or rainfall percolation:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	LOW RISK
Groundwater via migration of contaminants from Made Ground:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	LOW RISK
Surface water via migration of contaminants in Made Ground:	
Toxic/phytotoxic elements	VERY LOW RISK
Hydrocarbons	VERY LOW RISK

Impact of hazardous ground gas

From on-site	VERY LOW RISK
From off-site	VERY LOW RISK

The risks above are generally considered VERY LOW to LOW as the potential (known/suspected) on-site contaminants relate to: localised asbestos within Made Ground; possible hydrocarbons associated with the current building heating systems and marginal exceedences (in leachate samples) of environmental quality standards or drinking water standards, which are considered conservative for this site.

While risks are considered to be VERY LOW to LOW based on the information available, more detailed risk assessment would be required to enable risks to be entirely discounted. Coffey considers that this is not necessary for this development, but the opinion of regulators should be sought in this respect.

Risks to construction workers from ingestion and direct contact are considered moderate due to the requirements for them to be in contact with the soil and potentially groundwater during construction. The presence of asbestos in Made Ground, as discussed in Section 7, and the potential for localised ground impacted with hydrocarbons relating to heating systems of the current pavilion must be taken into account during construction of the new development and addressed by contractor's method statements during construction.

12 CONCLUSIONS

The following conclusions are presented, based on the ground conditions encountered and described in the exploratory holes together with the in-situ and laboratory test results and the monitoring programme.

1. A ground investigation was undertaken at the subject site between 30th September and 4th October 2013. This comprised four boreholes (to depths of 3.10-5.50m bgl) and seven trial pits (to depths of 2.40-3.10m bgl), together with in-situ testing.

2. The investigation encountered ground conditions which differ to those inferred and described in the Desk Study (Ref. 1), which was based on publicly available borehole records located some distance from the site.

3. Ground conditions encountered during the ground investigation comprised Made Ground over (sequentially): Glaciofluvial Sheet Deposits (GSD), Glacial Till and (weathered strata of the) Wilmslow Sandstone Formation.

4. Groundwater entries were recorded at depths of between 0.70m and 5.00m during hole formation. During subsequent monitoring, groundwater levels were recorded at depths of between 1.92m and 2.83m bgl (28.36 – 28.87m AOD).

5. The cohesive Glacial Till, underlying the GSD, is indicated to be laterally variable beneath the site, being absent beneath the north eastern section and increasing in thickness to the southwest. Additionally, the depth to the Drift/Wilmslow Sandstone Formation interface is indicated to increase across the site from northeast to southwest.

6. Spread foundations, taking foundation loads into the Wilmslow Sandstone Formation (encountered in the area of the proposed buildings at depths in the order of 1.50 – 2.50m bgl) should be suitable for this development. Foundations at shallower depths may be feasible, but may necessitate some form of ground improvement (e.g. vibro-treatment) to reduce the risks of differential settlement resulting from the variability in depth and competence of Glacial Till, as encountered. A lightly-loaded ground bearing floor slab should be feasible for the development.

7. Recommended bearing capacities for the different strata are presented in Section 5.3 of this report. It is anticipated that detailed foundation design will need to be undertaken in accordance with EC7, and taking account of the required structural loading, foundation dimensions and settlement limitations.

8. Design and construction of the swimming pools/basement will need to take into account groundwater conditions, during construction and in relation to long-term performance. The pools/basement will also need to be suitably tanked/waterproof, to contain water, and also to keep out groundwater. Furthermore, the design and construction should include consideration of the need for measures to counter uplift groundwater forces (buoyancy), particularly when the pools are emptied for cleaning/maintenance.

9. Groundwater control may be required in excavations that extend below groundwater levels, which are likely to undergo seasonal variations. All excavations that required groundwater control should be appropriately designed such that piping or failure of the base of excavation due to water pressure does not occur.

10. The assessment of concrete in aggressive ground indicated that for disturbed ground, i.e. concrete for excavations such as foundations and the pools' basement, a Design Sulphate class of DS-1 and an ACEC class of AC-1 is appropriate.

11. From the in-situ and laboratory geotechnical test results, an equilibrium CBR value of 4.0% is indicated to be appropriate for the design of new pavement hardstanding.

12. From the ground and relatively shallow groundwater conditions encountered and the results of in-situ permeability/infiltration testing, on site soakaways may be viable for the attenuation of surface water in the development. The feasibility of on-site soakaways for the redevelopment can be assessed further when more details of the requirements for water attenuation are made available.

13. Asbestos (Chrysotile) was positively identified in one sample of Made Ground, taken from TP7 at 0.3m depth. The risk of chronic exposure to asbestos should be reduced by the adoption of good general working practices (during any groundwork) such as dust suppression, use of standard PPE and good standards of hygiene, with advice from a suitably qualified and experienced asbestos specialist. Near-surface soils in landscaped/soft-standing parts of the development need to be devoid of asbestos.

14. The results of a screen against the GQRA criteria in soils indicated concentrations of all tested determinands in samples of Made Ground to be below their respective screening values. No values exceeding the GQRA were found in natural ground in the samples tested.

15. Testing of leachate prepared from several Made Ground samples indicated marginal exceedences for chromium and lead with reference to UK drinking water standards.

16. A Tier 1 risk assessment based on the results of the screen against GQRA criteria indicates that the risks to site users and groundwater are very low to low, based on the information available, Coffey considers that further risk assessment is not necessary for this development.

17. Appropriate assessment of risk and protection of construction workers will be required, and landscaped areas may require capping with uncontaminated cover soils. Site-won soils may be suitably uncontaminated in this regard. Specific remediation to protect controlled waters is not indicated to be necessary.

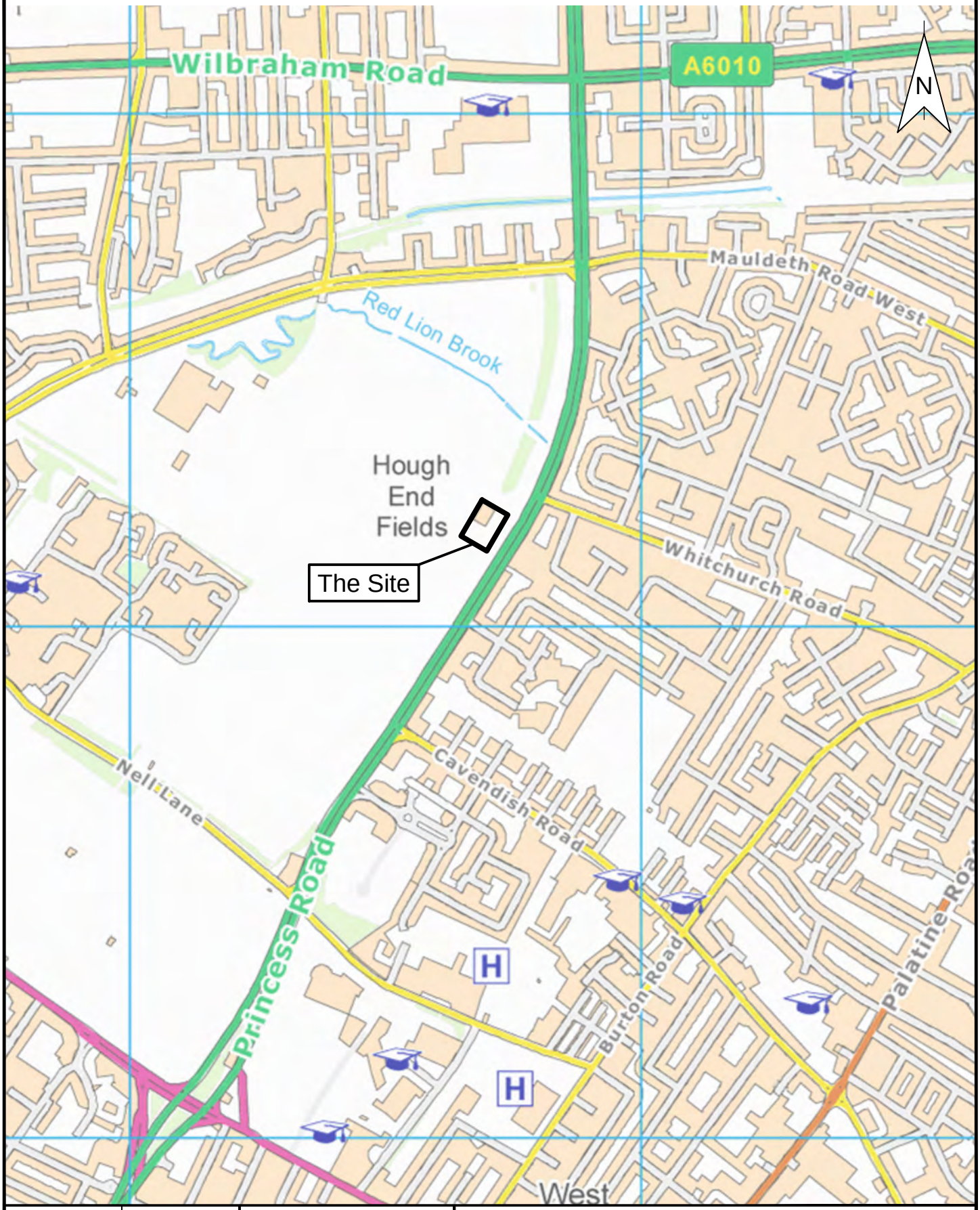
18. From the ground gas monitoring the site is indicated to classify as CGS 2, in accordance with BS8485:2007, based on the worst-case carbon dioxide concentrations detected. Therefore, ground gas protection measures are indicated to be required to provide protection to the building with a score of 3.0 in accordance with Table 2 of BS8485:2007. Table 3 gives guidance on such possible protection measures. However, further monitoring should be considered; if this proves typical carbon dioxide concentrations to be no great than 5.0% v/v then no specific ground gas protection measures would be required.

REFERENCES

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5. CIRIA Report 143, 1995, The Standard Penetration Test (SPT): Methods and Use, CIRIA
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Figures

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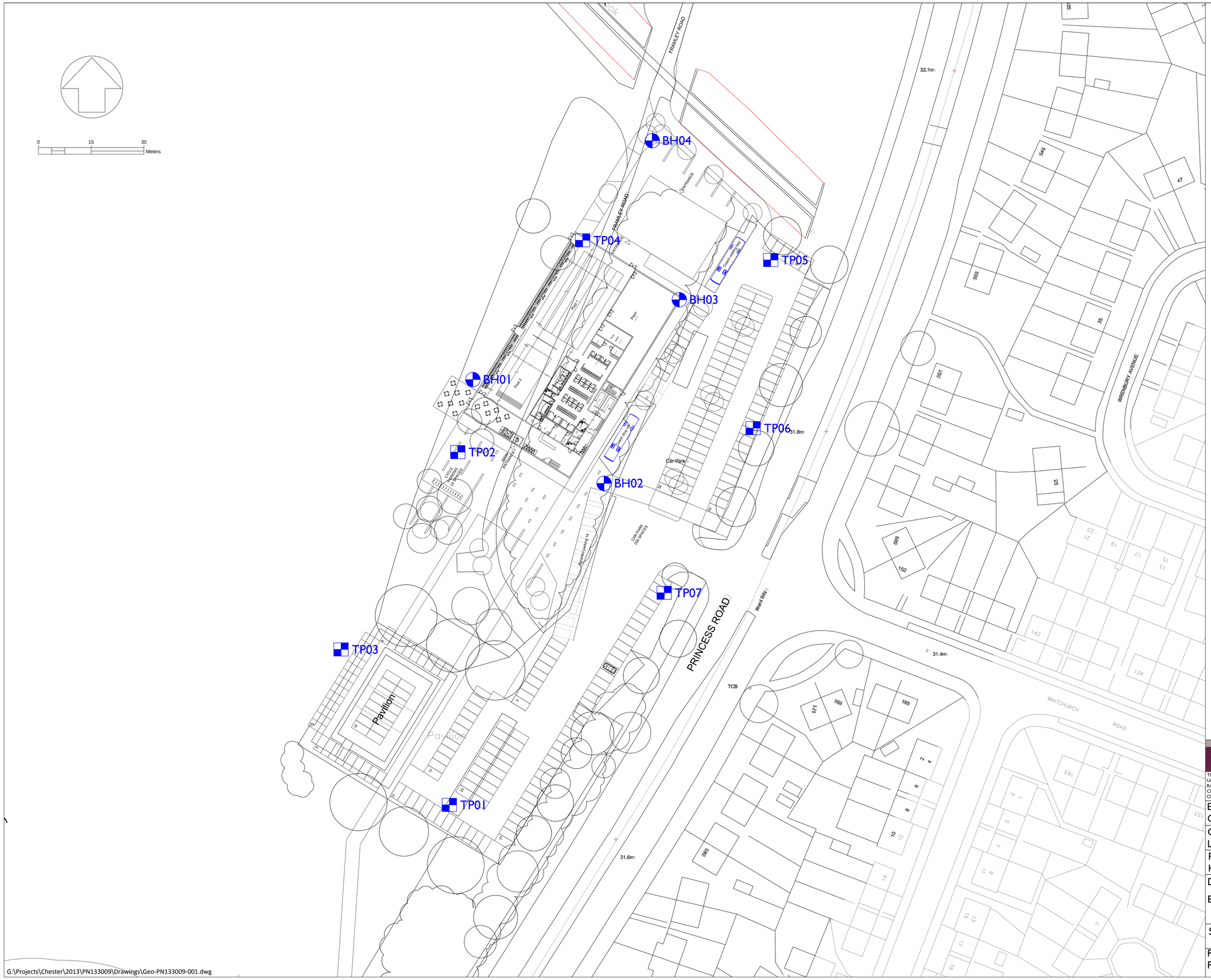


drawn	SN	coffey	client:	BDP
date	SEP. 2013		project:	HOUGH END LEISURE CENTRE
scale	NTS		title:	SITE LOCATION PLAN
original size	A4		project no: 02108AA	fig no: Figure 1

E-file Ref : F:\GEOT\Current Server Data\Server_2100.Done\02108AA Hough End Leisure Centre G\Drawings\1 - CWD\02108AA-D1.02-SN-PLAN.dwg

Appendix A

Exploratory Hole Location Plan



Key

- Borehole
- Trial Pit

Hole ID	Easting (mE)	Northing (mN)	Level (m OD)
BH01	383718.338	393310.179	31.066
BH02	383755.587	393280.697	31.205
BH03	383777.003	393332.862	31.175
BH04	383769.317	393378.085	30.793
TP01	383711.623	393189.294	30.973
TP02	383713.993	393289.565	31.211
TP03	383680.796	393233.501	30.931
TP04	383749.489	393349.751	31.073
TP05	383802.98	393344.178	31.405
TP06	383797.997	393296.392	31.659
TP07	383772.693	393249.621	31.579

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Engineer:
Coffey Limited

Client:
Laing O'Rourke Limited

Project:
Hough End Leisure Centre

Drawing Title:
Exploratory Hole Location Plan

Scale: 1:500@A1

Date:
October 2013

Project No:
PN133009

File Name:
Geo-PN133009-001(1)

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Appendix B

Exploratory Hole Records

BOREHOLE RECORD – Cable Percussion

Project **HOUGH END LEISURE CENTRE**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH1**
Project No **PN133009**

Client **LAING O'ROURKE (BESWICK)**
National Grid Coordinates **383718.338**E **393310.179**N
Ground Level **31.07** m OD

Scale 1:50

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		31.07
0.25	ES					Grass over TOPSOIL.			
							0.30		30.77
0.50- 1.20	B					Stone setts (sandstone).	0.50		30.57
0.50	ES					MADE GROUND: Black slightly clayey sandy fine to coarse angular to subangular gravel of ash.			
1.00	ES						1.00		30.07
1.20- 1.65	#				S5	Loose yellowish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular to			
1.20- 1.65	B					rounded of various lithologies.	1.40		29.67
						Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded of various lithologies.			
1.80	D								
1.80	D			18		At 2.00m, medium strength			
2.00	ES								
2.00- 2.45	U		74	11					
2.00- 2.45	UF						2.30		28.77
2.00- 2.45	UF								
2.00- 2.45	UT49	1.80				Very dense reddish brown slightly gravelly silty fine to medium SAND. Gravel is fine to coarse subangular to sandstone. Weathered Sandstone.			
2.50	D								
2.50	D								
2.80	D					Between 3.00-3.45m: Gravel absent.			
3.00- 3.45	B								
3.00- 3.09	B	3.00 (2.30)			C50/38				
3.80	D								
4.00- 4.08	B	4.00 (2.70)			C50/36				
							4.50		26.57
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.30	Inspection Pit	SL/AR
4.50	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			01/10/13	08:00
4.50	4.00	2.70	01/10/13	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.30 and 4.00m.
A 50mm standpipe was installed to 4.00m with a geowrapped slotted section from 1.00m to 4.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 4.00m, gravel filter up to 1.00m, bentonite seal up to 0.30m, concrete up to ground level.
Chiselling: 3.50-4.00m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **AJ**
Checked by **JONH**
Figure **1 of 1**
31/10/2013

geotechnics

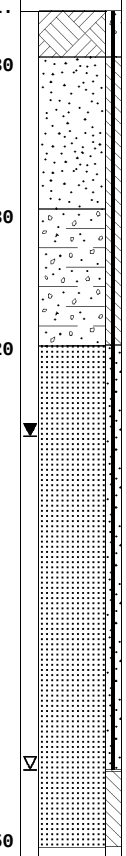
BOREHOLE RECORD – Cable Percussion

Project **HOUGH END LEISURE CENTRE** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH2A** | Project No **PN133009**

Client **LAING O'ROURKE (BESWICK)** | National Grid Coordinates **383755.587**E **393280.697**N | Ground Level **31.21** m OD

Scale 1:50

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		31.21
0.25	ES					Grass over TOPSOIL.			
0.50- 1.20	B					Loose greyish brown fine to coarse SAND.	0.30		30.91
0.50- 1.20	B								
0.50	ES								
1.00	ES					Below 1.00m, gravelly.			
1.20- 1.65	#				S3				
1.20- 1.65	B					Soft reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to rounded of various lithologies.	1.30		29.91
1.80	D								
1.80	D			11					
2.00- 2.45	U			11					
2.00- 2.45	UF								
2.00- 2.45	UT53	1.80				Very dense reddish brown mottled yellowish brown silty fine to coarse SAND. Weathered Sandstone.	2.20		29.01
2.50	D								
2.80	D								
3.00- 3.10	B	3.00 (2.60)			C50/43				
3.80	D								
4.00- 4.09	B	3.00 (3.40)			C50/39				
4.80	D								
5.00- 5.07	B	3.00 (2.80)			C50/23				
						End of Borehole	5.50		25.71



Boring

Depth	Hole Dia	Technique	Crew
1.20	0.30	Inspection Pit	SL/AR
5.50	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			30/09/13	08:00
5.50	3.00	2.80	30/09/13	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
5.00	3.00	2.80	20	NO	Fast inflow

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.40 and 5.00m.
A 50mm standpipe was installed to 5.00m with a geowrapped slotted section from 2.20m to 5.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 5.00m, gravel filter up to 2.20m, bentonite seal up to 0.30m, concrete up to ground level.
Chiselling: 2.70-3.00m for 45 minutes and 3.70-3.90m for 40 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **AJ**
Checked by **JONH**
Figure **1 of 1**
31/10/2013

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Borehole	BH3
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383777.003E 393332.862N	Ground Level	31.18 m OD

Scale 1:50

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		31.18
0.20- 0.40	B					Grass over TOPSOIL: Dark brown slightly gravelly sandy silt with occasional rootlets. Gravel is fine to coarse subangular to rounded of various lithologies.	0.40		30.78
0.50- 1.00	B								
0.50	ES					Yellowish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies.			
1.00	ES								
1.20- 1.65	B						1.20		29.98
1.20- 1.65	D	(DRY)			S17	Stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded of various lithologies.	1.60		29.58
1.80	B					Very dense reddish brown slightly gravelly fine to medium SAND. Weathered Sandstone.			
1.80	D								
2.10- 2.55	B								
2.10- 2.45	D	2.00 (DRY)			S50/ 195				
3.00- 3.45	B								
3.00- 3.12	D	3.00 (2.80)			S50/55				
3.70- 3.76	B	3.60			C50/15		3.76		27.42
3.70	D	(2.20)				End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.30	Inspection Pit	LC/DM
3.76	0.15	Cable Percussion	LC/DM

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			30/09/13	08:00
3.76	3.60	2.20	30/09/13	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.10 and 3.70m.
A 50mm standpipe was installed to 3.70m with a geowrapped slotted section from 1.00m to 3.70m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.00m, bentonite seal up to 0.30m, concrete up to ground level.
Chiselling: 2.60-3.00m for 60 minutes and 3.40-3.70m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
31/10/2013

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **HOUGH END LEISURE CENTRE** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH4** | Project No **PN133009**

Client **LAING O'ROURKE (BESWICK)** | National Grid Coordinates **383769.317**E **393378.085**N | Ground Level **30.79** m OD

Scale 1:50

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		30.79
0.20- 0.40	B					Grass over TOPSOIL: Dark brown slightly gravelly sandy silt with occasional rootlets. Gravel is fine to coarse subangular to rounded of various lithologies.	0.10		30.69
0.20- 0.40	B			11					
0.50	ES								
0.60	D						0.60		30.19
0.80	D					MADE GROUND: Dark brown mottled orangish brown slightly sandy gravelly clay. Gravel is fine to coarse angular to subrounded including concrete, clinker, sandstone and brick fragments.	0.75		30.04
1.00	ES								
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S14	MADE GROUND: Black sandy fine to coarse angular to subangular gravel of ash.			
2.00	ES					Medium dense yellowish brown slightly gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded of various lithologies.	1.80		28.99
2.20- 2.65	B								
2.20- 2.46	D	2.10 (2.00)			S50/ 105	Very dense reddish brown slightly gravelly silty fine to coarse SAND. Gravel is fine to coarse subangular of sandstone. Weathered Sandstone.			
3.00- 3.10	B	3.00 (1.60)			C50/6				
						End of Borehole	3.10		27.69

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.30	Inspection Pit	LC/DM
3.10	0.15	Cable Percussion	LC/DM

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			01/10/13	08:00
3.10	3.00	1.60	01/10/13	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 1.20 and 3.00m.
A 50mm standpipe was installed to 3.00m with a geowrapped slotted section from 1.00m to 3.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.00m, bentonite seal up to 0.20m, concrete up to ground level.
Chiselling: 2.40-3.00m for 120 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **AJ** | Checked by **JONH** | Figure **1 of 1** | 31/10/2013

geotechnics

TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP01
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383711.623E 393189.294N	Ground Level	30.97 m OD

Scale 1:50

Depth	Type	Stratum No	Results	Description	Depth	Legend	Level m OD
					G.L.		30.97
				Grass over TOPSOIL.	0.10		30.87
0.30	ES			MADE GROUND: Black slightly sandy fine to coarse subangular to angular gravel of ash.	0.40		30.57
0.40- 0.70	B						
0.40- 0.70	B		mc=16%				
0.50	D			Yellowish brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to rounded of various lithologies.	0.70		30.27
1.00	ES						
				Greyish brown fine to coarse SAND (wet).			
1.70- 1.90	B						
1.80	D						
				**Reddish brown sandy CLAY.	2.30		28.67
				At 2.40m, Pit collapsed.	2.40		28.57
				End of Excavation			

Excavation

Plant	5 Tonne excavator	Width (B)	1.40
Date	03/10/2013	Length (C)	2.70
Shoring	None.	Date Backfilled	03/10/2013
Stability	Spalling during excavation		

Groundwater

Depth Observed	Depth of Pit	Details
0.70		Wet strata.

Remarks

ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Pit collapsed at 2.40m due to wet sand.
**Sample not recovered due to pit collapse.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
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geotechnics

TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP02
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383713.993E 393289.565N	Ground Level	31.21 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Type	Stratum No	Results	Description	Depth	Legend	Level m OD
				Grass over TOPSOIL.	G.L.		31.21
				Light grey sandy SILT.	0.40		30.81
0.70- 1.00	B			Yellowish brown silty gravelly fine to medium SAND. Gravel is fine to coarse subrounded to rounded of various lithologies.	0.60		30.61
0.70- 1.00	B						
0.70	D				1.00		30.21
0.70	ES						
1.20	D			Light grey slightly silty fine to coarse SAND.			
				Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded of various lithologies.	1.50		29.71
1.80- 2.20	B						
1.80	D						
1.80	D		mc=18%				
2.40	D						
2.40	D						
2.70- 3.00	B			Reddish brown mottled yellowish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular of sandstone. (Weathered Sandstone).	2.70		28.51
2.80	D						
3.10	D				3.10		28.11
				End of Excavation			

Excavation

Plant	5 Tonne excavator	Width (B)	1.80
Date	03/10/2013	Length (C)	2.00
Shoring	None.	Date Backfilled	03/10/2013
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered.

Remarks AGS ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
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geotechnics

TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP03
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383680.796E 393233.501N	Ground Level	30.93 m OD

Scale 1:50

Samples and Tests: Depth	Type	Stratum No	Results	Strata: Description	Depth	Legend	Level m OD
					G.L.		30.93
				Grass over TOPSOIL.	0.10		30.83
0.30	D			MADE GROUND: Dark brown slightly sandy gravelly clay. Gravel is fine to coarse angular to subangular including glass, clinker, tarmac, metal, concrete and brick fragments.	0.40		30.53
0.40	ES						
0.50	D						
					0.80		30.13
1.00	ES			Yellowish brown fine to medium gravelly SAND. Gravel is fine to coarse subrounded to rounded of various lithologies.			
1.50- 2.00	B			Greyish brown fine to coarse SAND.			
1.50	D						
2.00- 2.40	B			At 1.90m, slightly gravelly.	2.00		28.93
2.20	D			Reddish brown very clayey fine to medium SAND.			
2.40	D			At 2.40m, pit collapse.	2.40		28.53
				End of Excavation			

Excavation

Plant	5 Tonne excavator	Width (B)	1.80
Date	03/10/2013	Length (C)	2.70
Shoring	None.	Date Backfilled	03/10/2013
Stability	Spalling from 1.90m		

Groundwater

Depth Observed	Depth of Pit	Details
1.90		Seepage.

Remarks

ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
The Trial Pit was terminated at a depth of 2.40m due to groundwater inflow and associated instability.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
31/10/2013

geotechnics

TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP04
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383749.489E 393349.751N	Ground Level	31.07 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Type	Stratum No	Results	Description	Depth	Legend	Level m OD
					G.L.		31.07
0.20	D			Grass over TOPSOIL: Light brown slightly gravelly silt with rootlets. Gravel is fine to coarse subangular to rounded of various lithologies.	0.30		30.77
0.40	ES			Light grey sandy SILT with occasional rootlets.	0.70		30.37
0.50	D			Greyish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies.	1.10		29.97
0.90- 1.20	B			Firm reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded of various lithologies.	1.30		29.77
0.90	D			Reddish brown slightly gravelly fine to medium SAND. Gravel is fine to medium subangular of sandstone. (Weathered Sandstone).			
1.30	D						
1.50- 1.80	B						
2.20	D						
2.40	D						
2.60	D			Below 2.50m, Sandstone weakly cemented and recovered as gravel.	2.65		28.42
				End of Excavation			

Excavation

Plant: 5 Tonne excavator
Date: 03/10/2013
Shoring: None.
Stability: Stable during excavation.
Width (B): 1.30
Length (C): 2.60
Date Backfilled: 03/10/2013

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered.

Remarks: ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
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geotechnics

TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP05
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383802.980E 393344.178N	Ground Level	31.41 m OD

Scale 1:50

Samples and Tests: Depth	Type	Stratum No	Results
0.30	D		
0.50- 0.80	B		
0.50- 0.80	D		
0.50	ES		
0.60	D		
1.20- 1.40	B		
1.20	ES		
1.30	D		
1.80	D		
2.10- 2.60	B		
2.10- 2.60	B		
2.30	D		
2.80	D		

Strata: Description	Depth	Legend	Level m OD
	G.L.		31.41
MADE GROUND: Grey coarse angular gravel of limestone. (Sub Base).	0.10		31.31
MADE GROUND: Black sandy fine to coarse angular to subangular gravel of ash.	0.40		31.01
Soft to firm dark grey SILT with an organic odour.	0.80		30.61
Yellowish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subrounded to rounded of various lithologies.	1.40		30.01
Light greyish brown fine to coarse SAND.			
Reddish brown slightly gravelly silty fine to coarse SAND. Gravel is fine to coarse subangular of sandstone (Weathered Sandstone).	1.90		29.51
Below 2.70m, Sandstone is weakly cemented and recovered as gravel.	2.90		28.51
End of Excavation			

Excavation

Plant: 5 Tonne excavator
Date: 02/10/2013
Shoring: None.
Stability: Stable during excavation.
Width (B): 1.40
Length (C): 2.70
Date Backfilled: 02/10/2013

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered.

Remarks: ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
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TRIAL PIT RECORD — Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP06
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383797.997E 393296.392N	Ground Level	31.66 m OD

Samples and Tests

Depth	Type	Stratum No	Results
0.10- 0.30	B		
0.30	D		
0.50	ES		
0.60	D		mc=14%
0.70- 0.90	B		
0.80	D		
1.00	ES		
1.40- 1.60	B		
1.50	D		
1.50	ES		
1.70	D		
1.90- 2.10	B		
2.20	D		
2.80	D		

Strata

Scale 1:50

Description	Depth	Legend	Level m OD
	G.L.		31.66
MADE GROUND: Grey coarse angular gravel of limestone (sub base).	0.10		31.56
MADE GROUND: Black slightly sandy fine to coarse subangular gravel of ash.	0.30		31.36
MADE GROUND: Dark brown slightly sandy gravelly clay. Gravel is fine to coarse angular to subrounded of timber, clinker, concrete and brick fragments.	0.70		30.96
Firm light brown sandy SILT.	0.90		30.76
Yellowish brown silty gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded of various lithologies.	1.60		30.06
Firm reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded of various lithologies.	1.80		29.86
Reddish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular of sandstone. (Weathered Sandstone).	2.90		28.76
End of Excavation			

Excavation

Plant: 5 Tonne excavator
Date: 02/10/2013
Shoring: None.
Stability: Stable during excavation.
Width (B): 2.40
Length (C): 1.30
Date Backfilled: 02/10/2013

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered.

Remarks: ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
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geotechnics

TRIAL PIT RECORD

Trial Pit

Project	HOUGH END LEISURE CENTRE	Engineer	COFFEY GEOTECHNICS	Trial Pit	TP07
				Project No	PN133009
Client	LAING O'ROURKE (BESWICK)	National Grid Coordinates	383772.693E 393249.621N	Ground Level	31.58 m OD

Scale 1:50

Depth	Type	Stratum No	Results	Description	Depth	Legend	Level m OD
					G.L.		31.58
				MADE GROUND: Grey coarse angular gravel of limestone. (Sub Base).	0.10		31.48
0.30	D				0.30		31.28
0.40- 0.80	B			MADE GROUND: Black sandy fine to coarse gravel of ash.			
0.40- 0.80	B		mc=18%				
0.50	ES						
0.70	D			MADE GROUND: Dark reddish brown slightly sandy gravelly clay. Gravel is fine to coarse angular to subrounded of clinker, metal, concrete and brick fragments.	0.90		30.68
1.00	ES						
1.10- 1.50	B						
1.20	D						
				Yellowish brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subrounded to rounded of various lithologies.	1.50		30.08
1.60	D						
					1.90		29.68
2.00- 2.50	B			Greyish brown fine to coarse SAND.			
2.20	D			Firm reddish brown slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded of various lithologies.			
2.70- 3.00	B				2.70		28.88
2.80	D			Reddish brown occasionally yellowish brown fine to medium SAND. (Weathered Sandstone).			
3.00	D				3.00		28.58
				End of Excavation			

Excavation

Plant: 5 Tonne excavator
Date: 03/10/2013
Shoring: None.
Stability: Stable during excavation.
Width (B): 1.30
Length (C): 2.50
Date Backfilled: 03/10/2013

Groundwater

Depth Observed	Depth of Pit	Details
		None encountered.

Remarks: ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by AJ
Checked by JONH
Figure 1 of 1
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Appendix C

In-situ Test Results

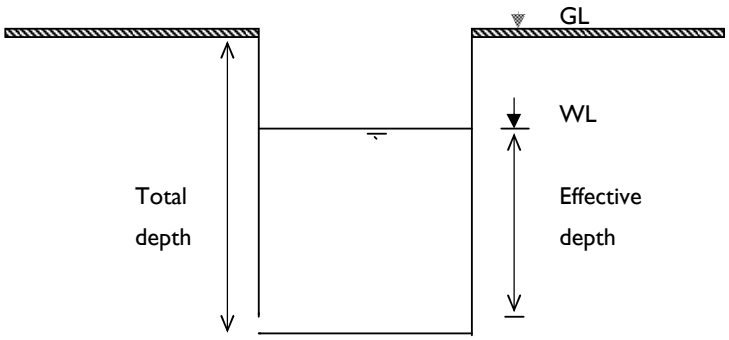
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)
0.00	0.33	0.670	100.0
1.00	0.34	0.660	98.5
2.00	0.42	0.580	86.6
3.00	0.44	0.560	83.6
4.00	0.46	0.540	80.6
5.00	0.49	0.510	76.1
10.00	0.58	0.420	62.7
15.00	0.65	0.350	52.2
20.00	0.67	0.330	49.3
30.00	0.72	0.280	41.8
35.00	0.83	0.170	25.4
40.00	0.85	0.150	22.4

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.670	m

Initial depth from GL	=	0.330m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.503	0.498	10.00
25%	0.168	0.833	35.00
Vp75-25	=	0.084	m3
ap50	=	0.920	m2
tp75-25	=	25.000	min
Soil Infiltration, f	=	**6.07E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

Remarks

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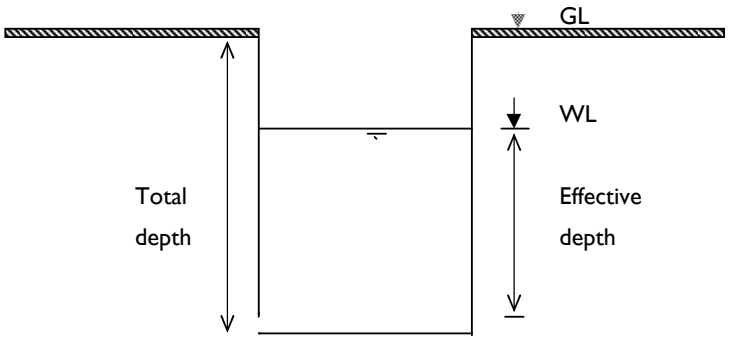
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.670	m

Initial depth from GL	=	0.330m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.503	0.498	10.00
25%	0.168	0.833	35.00
Vp75-25	=	0.084	m3
ap50	=	0.920	m2
tp75-25	=	0.000	min
Soil Infiltration, f	=	**6.07E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

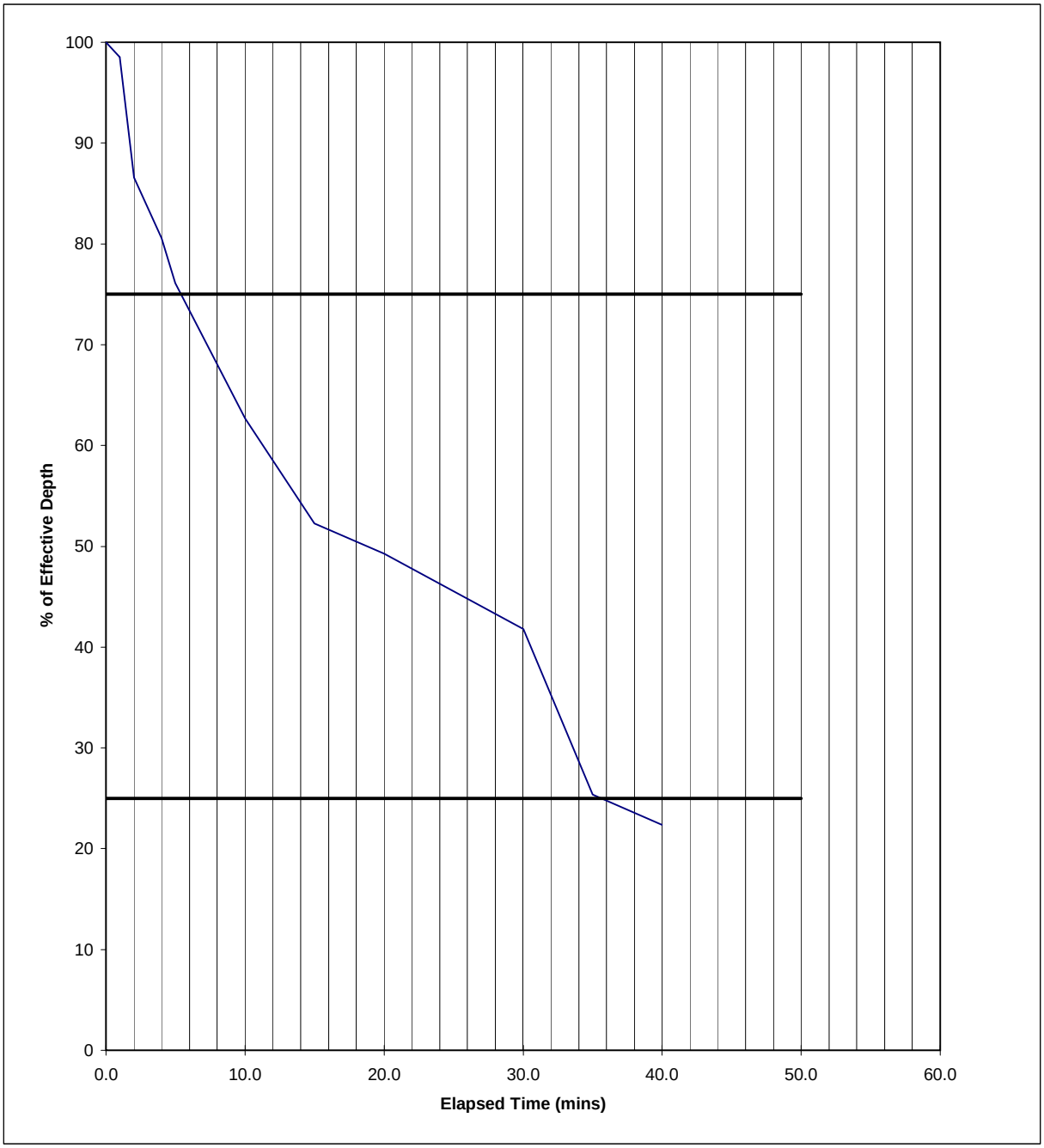
Remarks

geotechnics

INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	



tp75	=	10.00
tp25	=	35.00

Remarks

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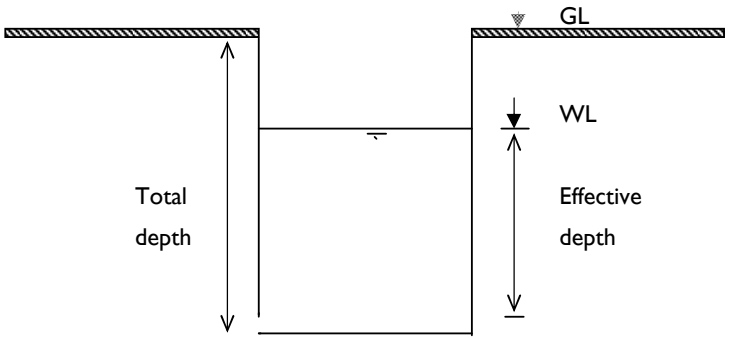
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	2
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)
0.00	0.44	0.560	103.7
0.16	0.45	0.550	101.9
0.33	0.47	0.530	98.1
0.50	0.48	0.520	96.3
1.00	0.49	0.510	94.4
2.00	0.50	0.500	92.6
3.00	0.53	0.470	87.0
4.00	0.54	0.460	85.2
5.00	0.54	0.460	85.2
10.00	0.60	0.400	74.1
15.00	0.63	0.370	68.5
30.00	0.71	0.290	53.7
45.00	0.77	0.230	42.6
60.00	0.83	0.170	31.5
70.00	0.87	0.130	24.1

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.540	m

Initial depth from GL	=	0.440m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.405	0.595	10.00
25%	0.135	0.865	70.00
Vp75-25	=	0.068	m3
ap50	=	0.790	m2
tp75-25	=	60.000	min
Soil Infiltration, f	=	**2.37E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

Remarks

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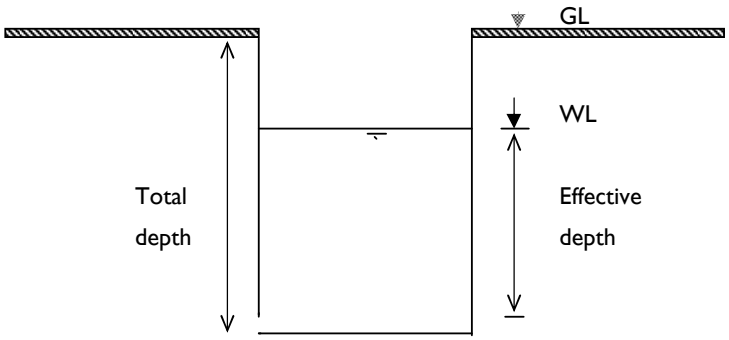
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	2
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.540	m

Initial depth from GL	=	0.440m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.405	0.595	10.00
25%	0.135	0.865	70.00
Vp75-25	=	0.068	m3
ap50	=	0.790	m2
tp75-25	=	0.000	min
Soil Infiltration, f	=	**2.37E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

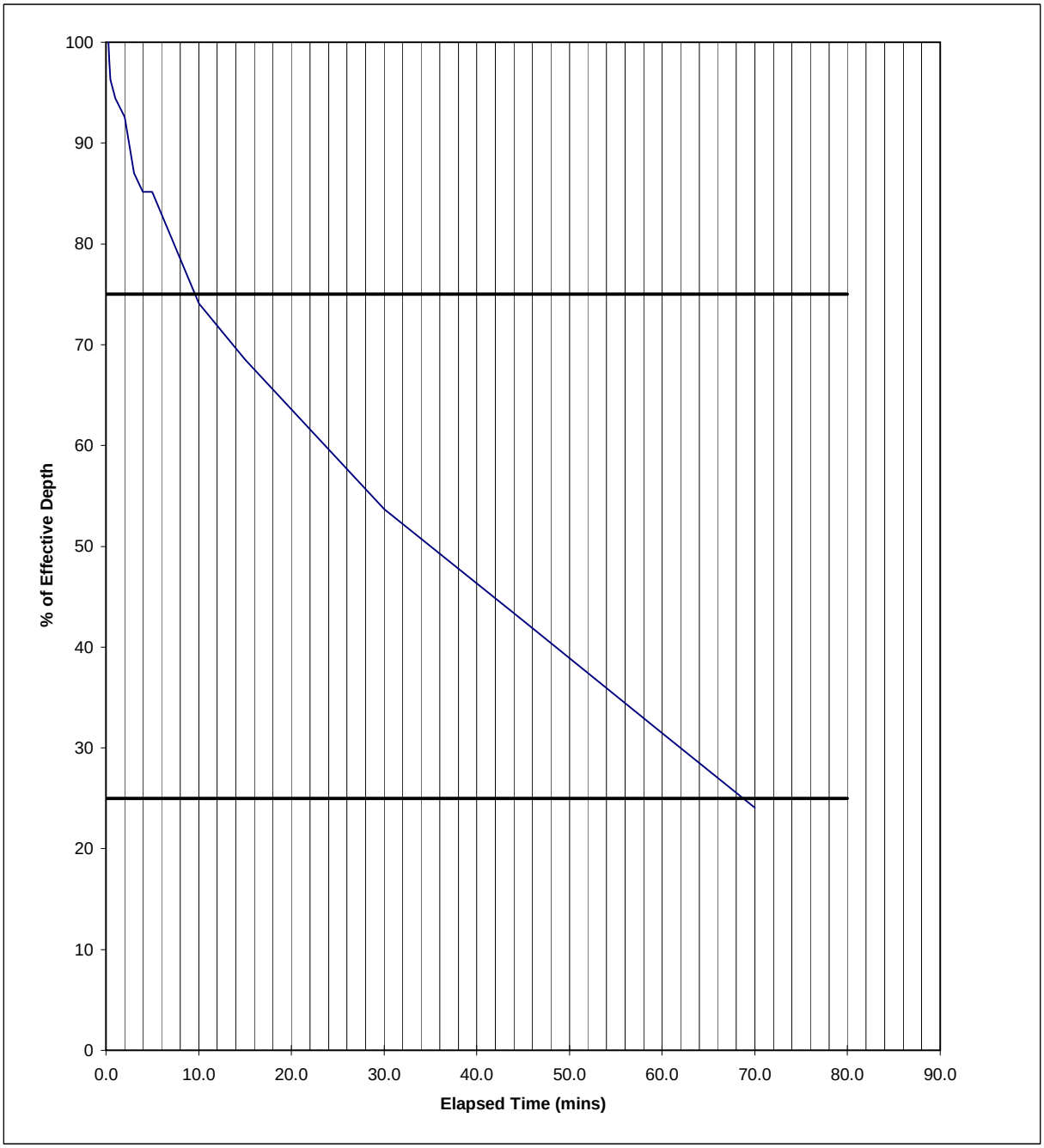
Remarks

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INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP04
		Test No	2
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013



tp75	=	10.00
tp25	=	70.00

Remarks

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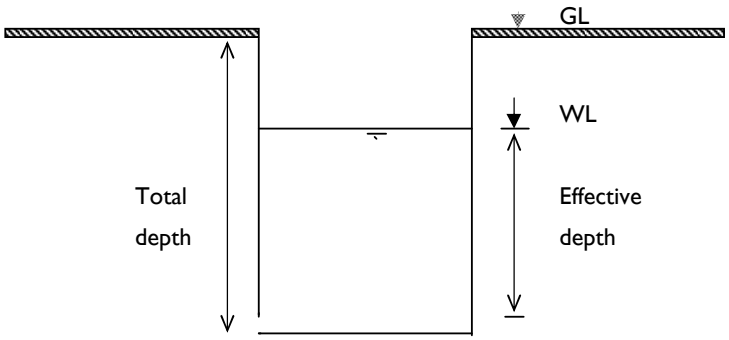
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP07
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)
0.00	0.43	0.570	100.0
0.25	0.44	0.560	98.2
1.25	0.44	0.560	98.2
2.00	0.44	0.560	98.2
3.00	0.44	0.560	98.2
4.00	0.45	0.550	96.5
5.00	0.45	0.550	96.5
10.00	0.49	0.510	89.5
15.00	0.53	0.470	82.5
20.00	0.57	0.430	75.4
30.00	0.62	0.380	66.7
45.00	0.67	0.330	57.9
60.00	0.72	0.280	49.1
75.00	0.76	0.240	42.1
90.00	0.80	0.200	35.1
105.00	0.85	0.150	26.3
120.00	0.89	0.110	19.3

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.570	m

Initial depth from GL	=	0.430m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.428	0.573	24.00
25%	0.143	0.858	108.00
Vp75-25	=	0.071	m3
ap50	=	0.820	m2
tp75-25	=	84.000	min
Soil Infiltration, f	=	**1.72E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

Remarks

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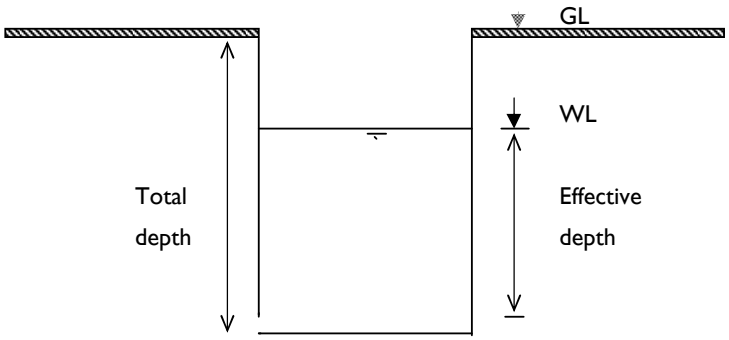
INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP07
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013

ELAPSED TIME (mins)	DEPTH of water below ground level (m)	HEAD (m)	HEAD (%)

TRIAL PIT SOAKAWAY



Trial pit length	=	0.500	m
Trial pit width	=	0.500	m
Trial pit depth	=	1.000	m
Effective depth (Head of Water)	=	0.570	m

Initial depth from GL	=	0.430m	
% of effective depth	Head (m)	Depth from GL (m)	Time (mins)
75%	0.428	0.573	24.00
25%	0.143	0.858	108.00
Vp75-25	=	0.071	m3
ap50	=	0.820	m2
tp75-25	=	0.000	min
Soil Infiltration, f	=	**1.72E-05**	m/sec

Depth to top of Granular Fill if used (m b x
Porosity of Gravel Fill if used (%) = x

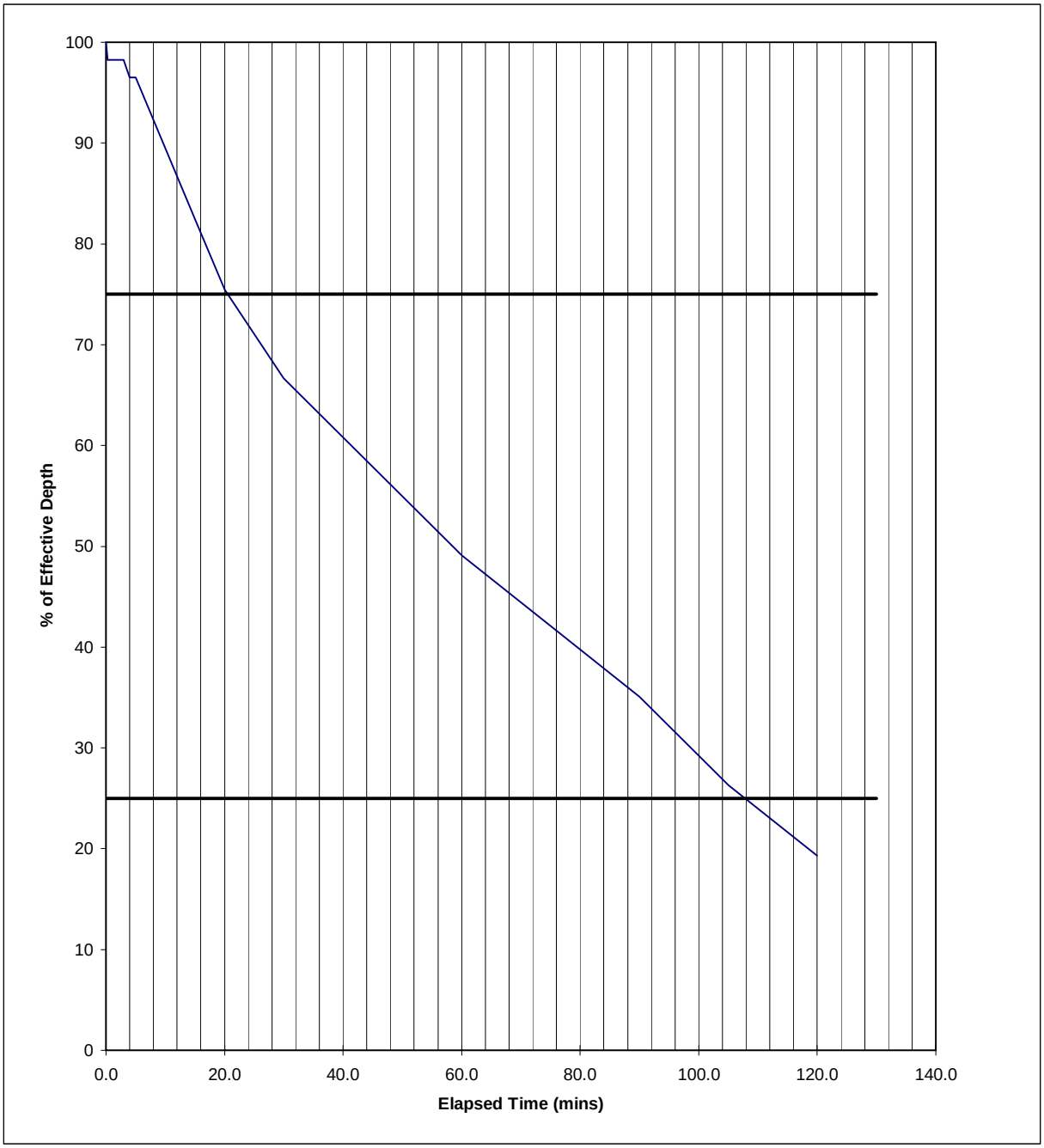
Remarks

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INSITU TESTING - Soakaway Test

Form INS009 Rev 4

Project	Hough End Leisure Centre	Trial Pit	TP07
		Test No	1
		Project No	PN133009
Client	Laing o'Rourke Limited	Date	01.10.2013



tp75	=	24.00
tp25	=	108.00

Remarks

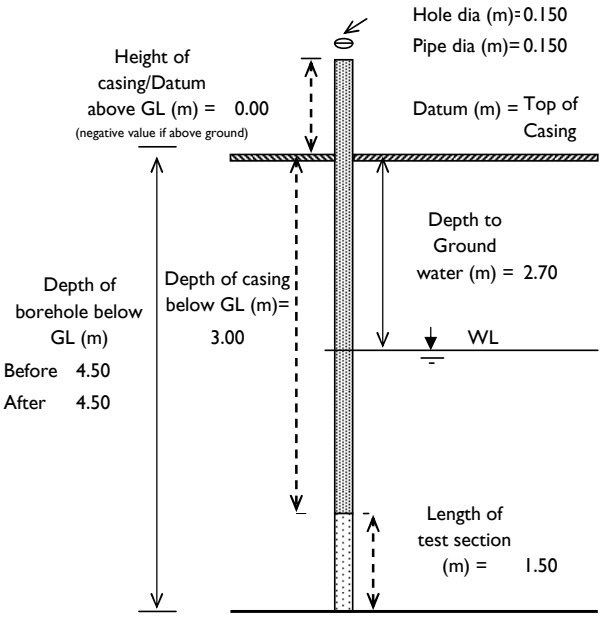
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INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH1
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	02/10/2013

ELAPSED TIME (minutes)	Depth of water below Top of Casing (m)
0.0	0.000
0.5	0.363
1.0	0.512
2.0	0.593
3.0	0.687
4.0	0.766
5.0	0.839
6.0	0.918
7.0	0.989
8.0	1.052
9.0	1.100
10.0	1.164
15.0	1.403
20.0	1.584
25.0	1.703
30.0	1.836
40.0	2.039
50.0	2.160
60.0	2.179

ELAPSED TIME (Continued) (minutes)	Depth of water below Top of Casing (continued) (m)



Type of Test	Falling Head	
Depth to Standing Water Level	2.700	m
Depth to Induced Water Level	0.000	m
Differential head at start ($H_{o)}$)	2.700	m
Diameter for shape factor (D_s)	0.150	m
Diameter for flow (D_f)	0.150	m
Test Length (L)	1.500	m
Area of borehole (A)	1.77E-02	m^2
Head at end of Test (H_f)	2.320	m
Time Elapsed at end of test (t_f)	60.0	mins
Persons present during test:	Steve Lowry	

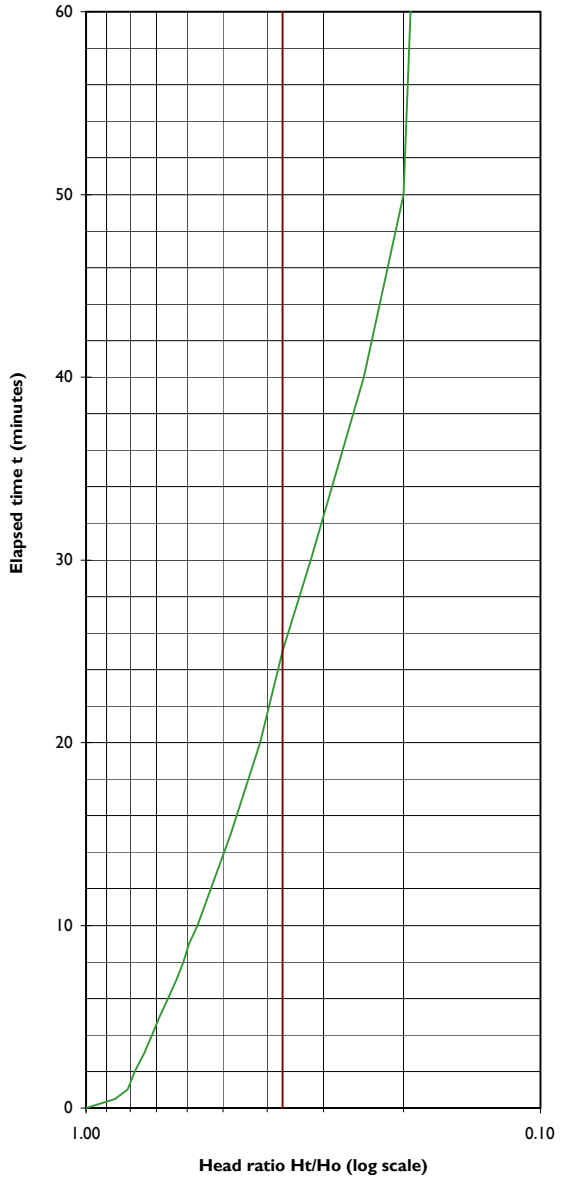
VARIABLE HEAD TEST	**(BASIC TIME LAG APPROACH)**	
Intake factor (F)	3.143	
Time Lag (T)	25.000	mins
Permeability (K) = A/FT	**3.75E-06**	**m/sec**

Remarks Shape factor derived from BS5930: 1999: Section 4

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INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH1
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	02/10/2013



Time (mins)	Measured Depth (m)	Relative Depth from Ground Level (m)	Ht (m)	Ht/Ho
		0.00	2.70	1.00
0.50	0.36	0.36	2.34	0.87
1.00	0.51	0.51	2.19	0.81
2.00	0.59	0.59	2.11	0.78
3.00	0.69	0.69	2.01	0.75
4.00	0.77	0.77	1.93	0.72
5.00	0.84	0.84	1.86	0.69
6.00	0.92	0.92	1.78	0.66
7.00	0.99	0.99	1.71	0.63
8.00	1.05	1.05	1.65	0.61
9.00	1.10	1.10	1.60	0.59
10.00	1.16	1.16	1.54	0.57
15.00	1.40	1.40	1.30	0.48
20.00	1.58	1.58	1.12	0.41
25.00	1.70	1.70	1.00	0.37
30.00	1.84	1.84	0.86	0.32
40.00	2.04	2.04	0.66	0.24
50.00	2.16	2.16	0.54	0.20
60.00	2.18	2.18	0.52	0.19

Time at ratio H/Ho=.37 : 25.0

Remarks Shape factor derived from BS5930: 1999: Section 4

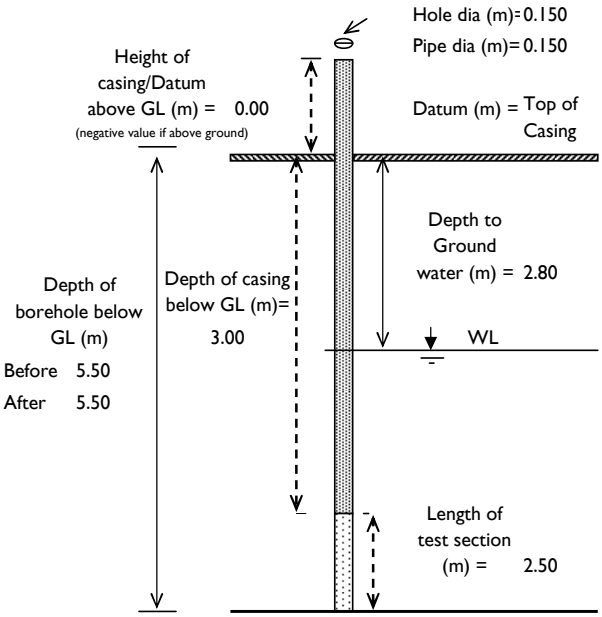
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INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH2
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	01/10/2013

ELAPSED TIME (minutes)	Depth of water below Top of Casing (m)
0.0	0.000
0.5	0.533
1.0	0.740
2.0	1.173
3.0	1.462
4.0	1.649
5.0	1.812
6.0	1.995
7.0	2.107
8.0	2.196
9.0	2.243
10.0	2.267
15.0	2.419
20.0	2.550
25.0	2.629
30.0	2.693
40.0	2.757
50.0	2.783
60.0	2.791

ELAPSED TIME (Continued) (minutes)	Depth of water below Top of Casing (continued) (m)



Type of Test	Falling Head	
Depth to Standing Water Level	2.800	m
Depth to Induced Water Level	0.000	m
Differential head at start ($H_{o)}$)	2.800	m
Diameter for shape factor (D_s)	0.150	m
Diameter for flow (D_f)	0.150	m
Test Length (L)	2.500	m
Area of borehole (A)	1.77E-02	m^2
Head at end of Test (H_f)	0.010	m
Time Elapsed at end of test (t_f)	60.0	mins
Persons present during test:	Steve Lowry	

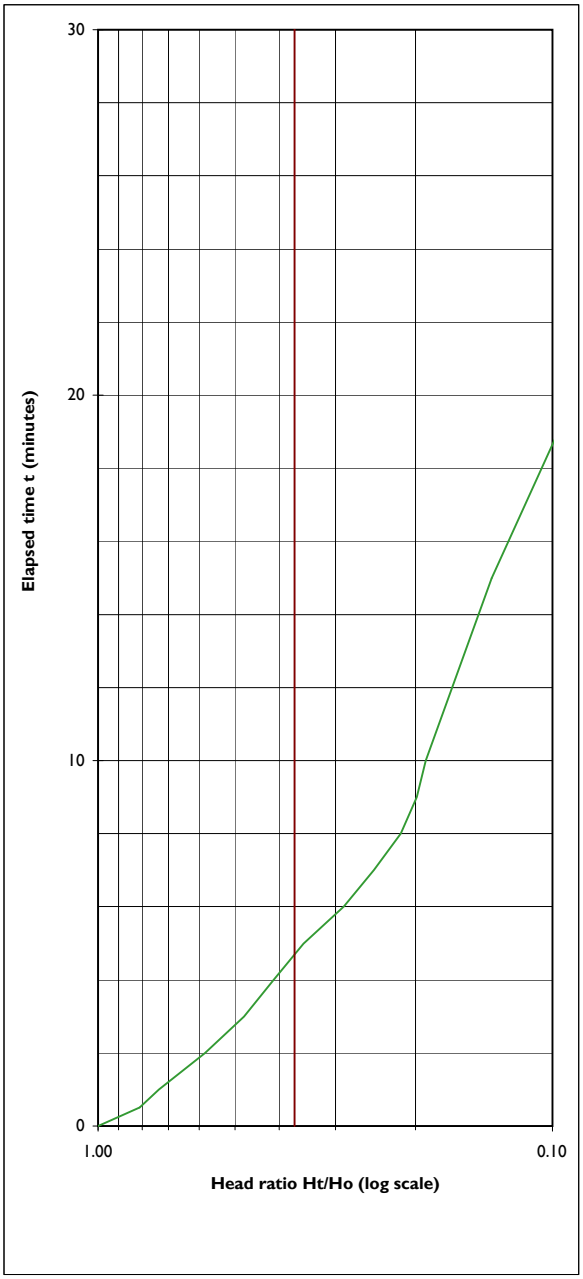
VARIABLE HEAD TEST	**(BASIC TIME LAG APPROACH)**	
Intake factor (F)	4.478	
Time Lag (T)	5.000	mins
Permeability (K) = A/FT	**1.32E-05**	**m/sec**

Remarks Shape factor derived from BS5930: 1999: Section 4

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INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH2
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	01/10/2013



Time (mins)	Measured Depth (m)	Relative Depth from Ground Level (m)	Ht (m)	Ht/Ho
		0.00	2.80	1.00
0.50	0.53	0.53	2.27	0.81
1.00	0.74	0.74	2.06	0.74
2.00	1.17	1.17	1.63	0.58
3.00	1.46	1.46	1.34	0.48
4.00	1.65	1.65	1.15	0.41
5.00	1.81	1.81	0.99	0.35
6.00	2.00	2.00	0.81	0.29
7.00	2.11	2.11	0.69	0.25
8.00	2.20	2.20	0.60	0.22
9.00	2.24	2.24	0.56	0.20
10.00	2.27	2.27	0.53	0.19
15.00	2.42	2.42	0.38	0.14
20.00	2.55	2.55	0.25	0.09
25.00	2.63	2.63	0.17	0.06
30.00	2.69	2.69	0.11	0.04
40.00	2.76	2.76	0.04	0.02
50.00	2.78	2.78	0.02	0.01
60.00	2.79	2.79	0.01	0.00

Time at ratio H/Ho=.37 : 5.0

Remarks Shape factor derived from BS5930: 1999: Section 4

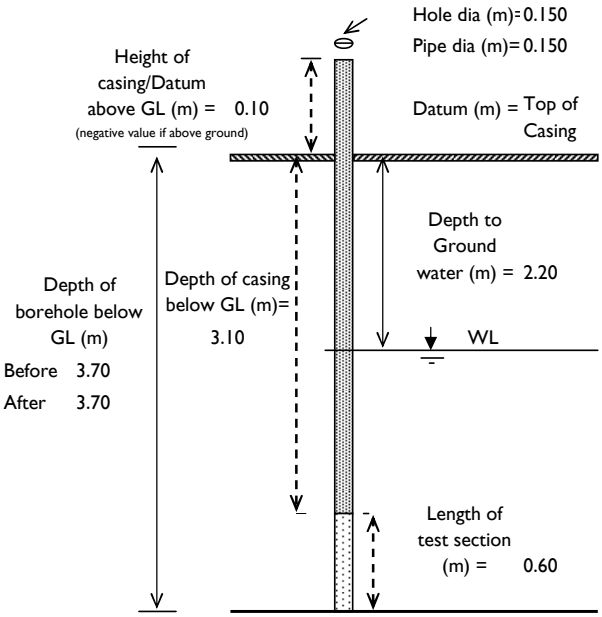
geotechnics

INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH3
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	01/10/2013

ELAPSED TIME (minutes)	Depth of water below Top of Casing (m)
0.0	0.000
0.5	0.160
1.0	0.190
2.0	0.235
3.0	0.275
4.0	0.290
5.0	0.336
6.0	0.387
7.0	0.437
8.0	0.465
9.0	0.494
10.0	0.513
15.0	0.615
20.0	0.670
25.0	0.733
30.0	0.788
40.0	0.882
50.0	0.893
60.0	0.907

ELAPSED TIME (Continued) (minutes)	Depth of water below Top of Casing (continued) (m)



Type of Test	Falling Head	
Depth to Standing Water Level	2.100	m
Depth to Induced Water Level	0.000	m
Differential head at start ($H_{o)}$)	2.100	m
Diameter for shape factor (D_s)	0.150	m
Diameter for flow (D_f)	0.150	m
Test Length (L)	0.600	m
Area of borehole (A)	1.77E-02	m^2
Head at end of Test (H_f)	1.190	m
Time Elapsed at end of test (t_f)	60.0	mins
Persons present during test:	Lee Cullshaw	

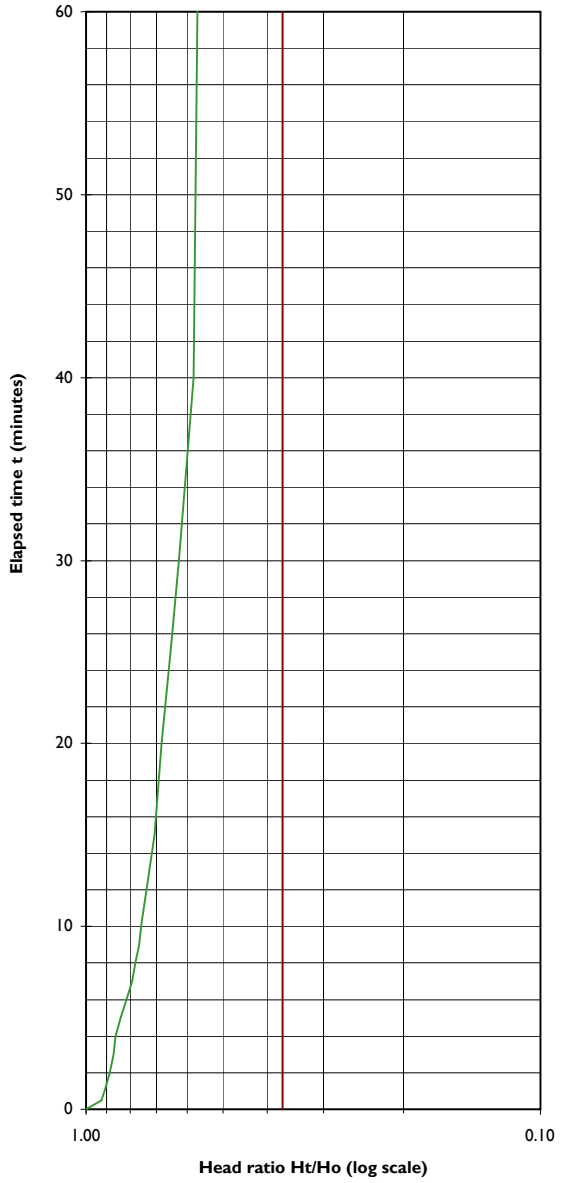
VARIABLE HEAD TEST	**(GENERAL APPROACH)**	
Intake factor (F)	1.800	
Time (t1)	0.000	mins
Time (t2)	60.000	mins
Head at Time t1 (H1)	2.100	
Head at Time t2 (H2)	1.190	
Permeability (K)=A/(F[t2-t1])*loge(H1/H2)	**1.55E-06**	**m/sec**

Remarks Shape factor derived from BS5930: 1999: Section 4

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INSITU TESTING - *Permeability (Borehole)*

Project	Hough End Leisure Centre	Borehole	BH3
		Test No	1
		Project No	PN133009
Client	Laing O'Rourke Limited	Date	01/10/2013



Time (mins)	Measured Depth (m)	Relative Depth from Ground Level (m)	Ht (m)	Ht/Ho
		0.10	2.10	1.00
0.50	0.16	0.26	1.94	0.92
1.00	0.19	0.29	1.91	0.91
2.00	0.24	0.34	1.87	0.89
3.00	0.28	0.38	1.83	0.87
4.00	0.29	0.39	1.81	0.86
5.00	0.34	0.44	1.76	0.84
6.00	0.39	0.49	1.71	0.82
7.00	0.44	0.54	1.66	0.79
8.00	0.47	0.57	1.64	0.78
9.00	0.49	0.59	1.61	0.76
10.00	0.51	0.61	1.59	0.76
15.00	0.62	0.72	1.49	0.71
20.00	0.67	0.77	1.43	0.68
25.00	0.73	0.83	1.37	0.65
30.00	0.79	0.89	1.31	0.62
40.00	0.88	0.98	1.22	0.58
50.00	0.89	0.99	1.21	0.57
60.00	0.91	1.01	1.19	0.57

Time at ratio H/Ho=.37 :

Remarks Shape factor derived from BS5930: 1999: Section 4

geotechnics

In-Situ Plate Bearing
Incremental Plate Load Test
Test Results

Hough End Playing Fields
Princess Road
Manchester

FACTUAL REPORT

Prepared for:

Geotechnics Limited
The Geotechnical Centre
Unit 1 - Borders Industrial Park
River Lane, Saltney
Chester
CH4 8RJ

Report Reference: TR 380690

ISSUE REF: 1

Issue Date: 3rd October 2013

Prepared by:

celtest limited
cyttir lane
BANGOR
Gwynedd, LL57 4DA
- 01248 355 269

TR 380690

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2.0	Location Plan		Page 2
3.0	Test Results		Page 3
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3.3	Test 3:	Location 3 – TP05	Page 5
3.4	Test 4:	Location 4 – TP01	Page 6

TR 380690

1.0 Introduction

Following your instructions four (4) plate-bearing tests were carried out in accordance with BS 1377-9: 1990.

Loads were applied to a 450mm∅ plate at various increments. Settlement was recorded for each increment at one-minute intervals until movement ceased (<0.05mm after one minute). The results are presented in tabular and graphical form showing load versus settlement.

NOTE: Material directly beneath the plate is not sampled unless specifically requested by the client

Site Address: Hough End Playing Fields, Manchester.

Date of Test: 02/10/2013

Materials Tested: Soil

Weather Conditions: Overcast

Tested By: Mr Rod Rodgers & Mr Calvin Thomas

This report was prepared by: _____
Mrs. Lisa Jane Roberts

This report is issued on behalf of Celtest Limited by: _____

( ) ***Mr. Hefin Hughes – Site Support Manager***
(✓) ***Mr. Irfon Ll. Owen – Site Testing Manager***

Date of issue: 3rd October 2013

2.0 Location Plan

* Not Provided

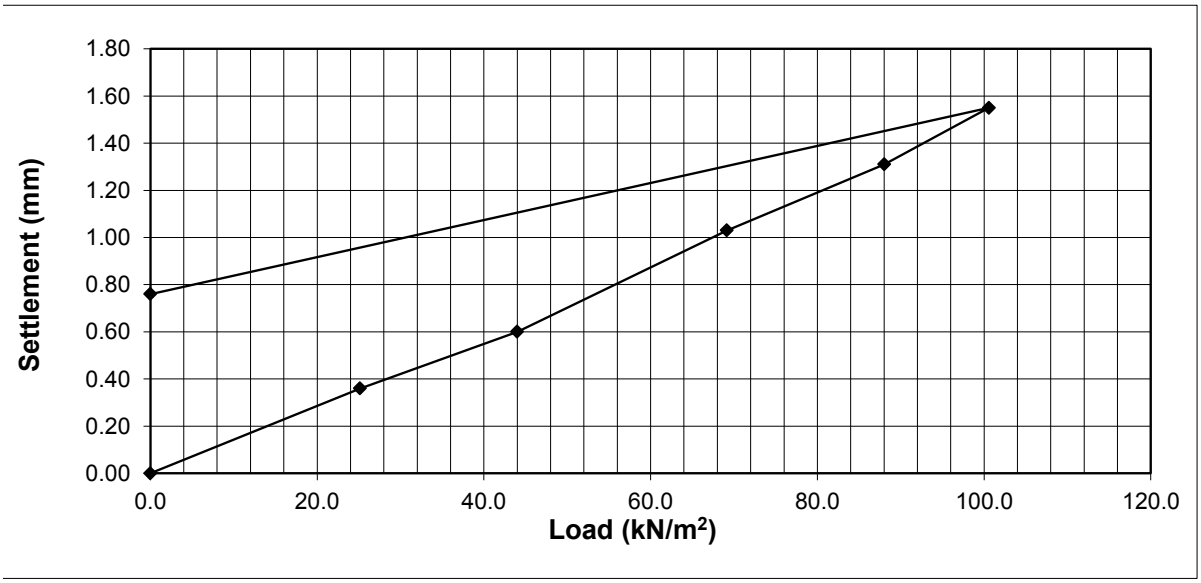
TR 380690

3.0 Test Results

3.1 – Location 1 – TP02

Test Location:	Location 1
Plate Size:	450 mm
Material:	Soil
Reaction Load:	7T Excavator
Initial Temp:	15°C
Final Temp:	15°C
Maximum Load:	16kN
Depth of Test level from Ground Level:	450mm
Distance Between Edge of Loaded Plate and Wall of Excavation:	300mm

Load (Tonne)	Load (kN)	Pressure (kN/m2)	Cumulative Settlement (mm)	Time Taken To Achieve Settlement (min)
0.0	0.0	0.00	0.00	0
0.4	4.0	25.15	0.36	3
0.7	7.0	44.01	0.60	3
1.1	11.0	69.15	1.03	3
1.4	14.0	88.02	1.31	3
1.6	16.0	100.59	1.55	3
0.0	0.0	0.00	0.76	3



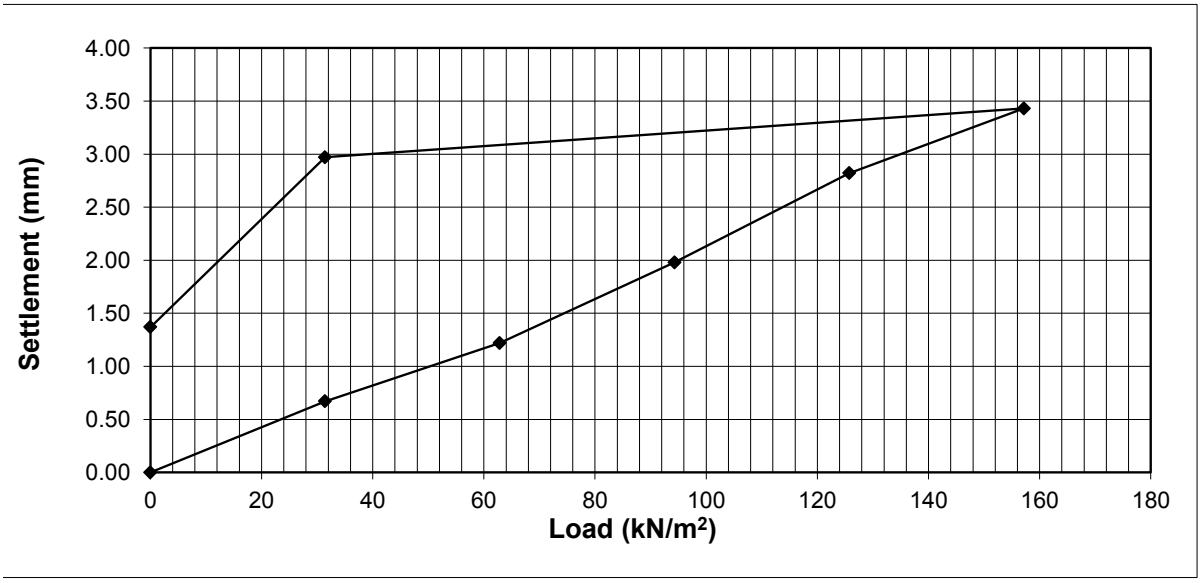
TR 380690

3.0 Test Results

3.2 – Location 2 – TP06

Test Location:	Location 2
Plate Size:	450 mm
Material:	Soil
Reaction Load:	7T Excavator
Initial Temp:	15°C
Final Temp:	15°C
Maximum Load:	25kN
Depth of Test level from Ground Level:	450mm
Distance Between Edge of Loaded Plate and Wall of Excavation:	300mm

Load (Tonne)	Load (kN)	Pressure (kN/m2)	Cumulative Settlement (mm)	Time Taken To Achieve Settlement (min)
0.0	0.0	0.00	0.00	0
0.5	5.0	31.43	0.67	3
1.0	10.0	62.87	1.22	3
1.5	15.0	94.30	1.98	3
2.0	20.0	125.74	2.82	4
2.5	25.0	157.17	3.43	4
0.5	5.0	31.43	2.97	3
0.0	0.0	0.00	1.37	3



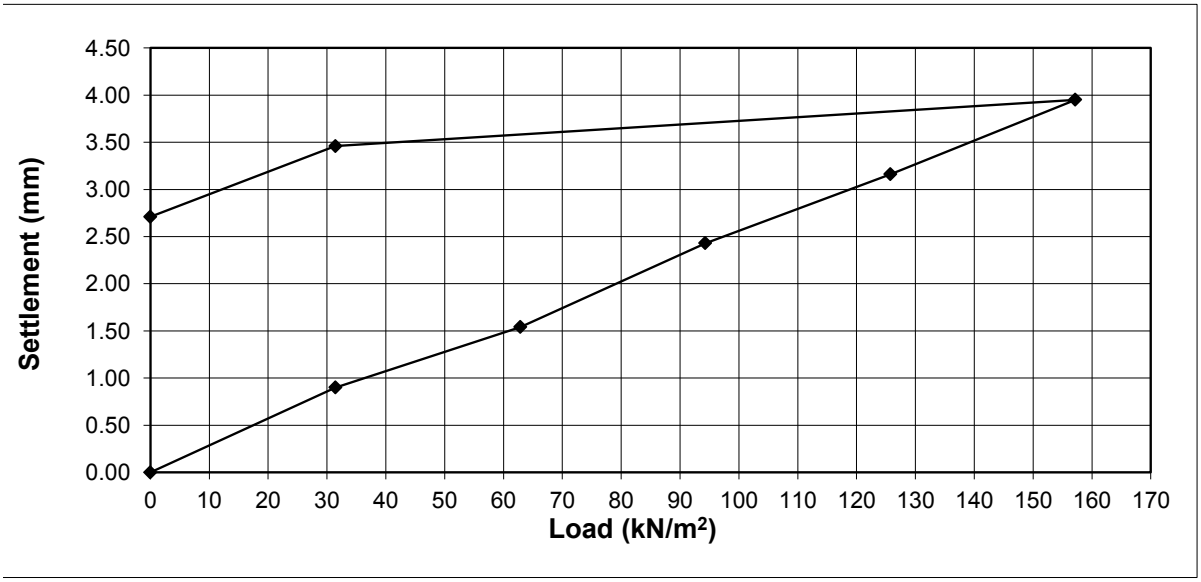
TR 380690

3.0 Test Results

3.3 – Location 3 – TP05

Test Location:	Location 3
Plate Size:	450 mm
Material:	Soil
Reaction Load:	7T Excavator
Initial Temp:	16°C
Final Temp:	16°C
Maximum Load:	25kN
Depth of Test level from Ground Level:	450mm
Distance Between Edge of Loaded Plate and Wall of Excavation:	300mm

Load (Tonne)	Load (kN)	Pressure (kN/m2)	Cumulative Settlement (mm)	Time Taken To Achieve Settlement (min)
0.0	0.0	0.00	0.00	0
0.5	5.0	31.43	0.90	3
1.0	10.0	62.87	1.54	3
1.5	15.0	94.30	2.43	4
2.0	20.0	125.74	3.16	4
2.5	25.0	157.17	3.95	3
0.5	5.0	31.43	3.46	3
0.0	0.0	0.00	2.71	4



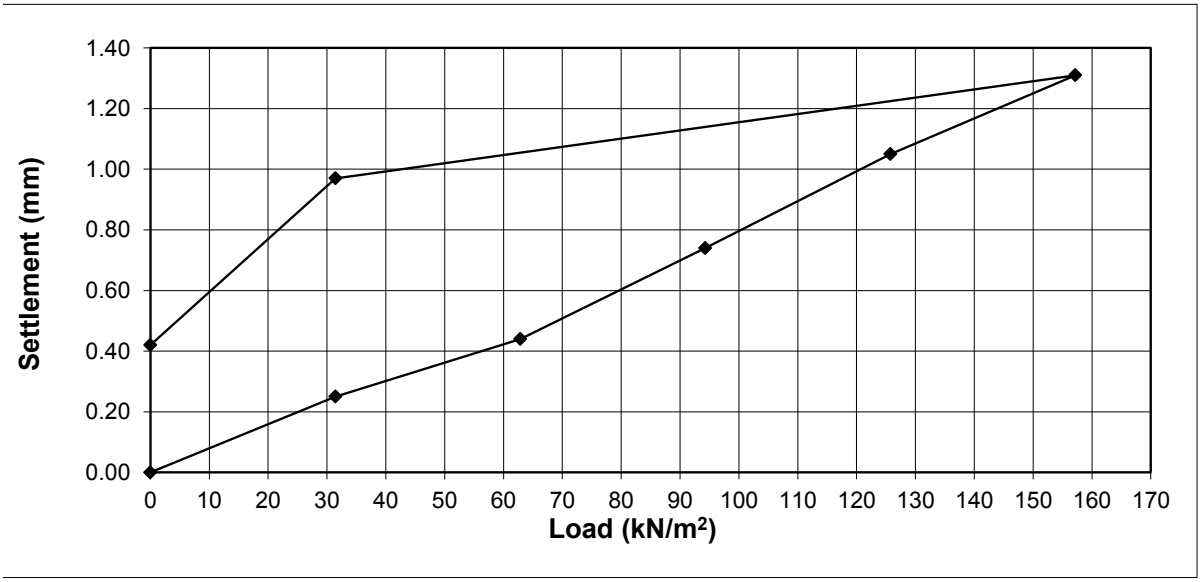
TR 380690

3.0 Test Results

3.4 – Location 4 – TP01

Test Location:	Location 4
Plate Size:	450 mm
Material:	Soil
Reaction Load:	7T Excavator
Initial Temp:	16°C
Final Temp:	16°C
Maximum Load:	25kN
Depth of Test level from Ground Level:	450mm
Distance Between Edge of Loaded Plate and Wall of Excavation:	300mm

Load (Tonne)	Load (kN)	Pressure (kN/m2)	Cumulative Settlement (mm)	Time Taken To Achieve Settlement (min)
0.0	0.0	0.00	0.00	0
0.5	5.0	31.43	0.25	3
1.0	10.0	62.87	0.44	3
1.5	15.0	94.30	0.74	3
2.0	20.0	125.74	1.05	3
2.5	25.0	157.17	1.31	3
0.5	5.0	31.43	0.97	3
0.0	0.0	0.00	0.42	3



Appendix D

Gas and Groundwater Monitoring Results

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH1**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**4.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 4.00m**	Ground Level	**31.07 m OD**
Date Installed	**2 October 2013**		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Water Sample Taken (Yes/No)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Remarks
9-Oct-2013		**2.71**	**3.96**	**YES**	**0.0**	**0.0**	**2.6**	**11.6**	

Remarks

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FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH1**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**4.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 4.00m**	Ground Level	**31.07 m OD**
Date Installed	**2 October 2013**		

Date	Time	Nitrogen N2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Flow Rate (Peak) (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
9-Oct-2013		**85.7**	**0.0**	**0.0**	**2.0**	**0.9**	

Remarks

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Form 003/1

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH2A**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.20 - 5.00m**	Ground Level	**31.21 m OD**
Date Installed	**1 October 2013**		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Water Sample Taken (Yes/No)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Remarks
9-Oct-2013		**2.79**	**4.94**	**YES**	**0.0**	**0.0**	**1.4**	**12.1**	

Remarks

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FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH2A**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.20 - 5.00m**	Ground Level	**31.21 m OD**
Date Installed	**1 October 2013**		

Date	Time	Nitrogen N2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Flow Rate (Peak) (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
9-Oct-2013		**86.4**	**0.0**	**0.0**	**1.5**	**0.8**	

Remarks

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Form 003/1

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH3**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**3.70m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 3.70m**	Ground Level	**31.18 m OD**
Date Installed	**1 October 2013**		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Water Sample Taken (Yes/No)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Remarks
9-Oct-2013		**2.60**	**3.79**	**YES**	**0.0**	**0.0**	**0.8**	**20.3**	

Remarks

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Form 003/1

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH3**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**3.70m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 3.70m**	Ground Level	**31.18 m OD**
Date Installed	**1 October 2013**		

Date	Time	Nitrogen N2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Flow Rate (Peak) (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
9-Oct-2013		**78.8**	**0.0**	**0.0**	**0.0**	**0.0**	

Remarks

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Form 003/1

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH4**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**3.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 3.00m**	Ground Level	**30.79 m OD**
Date Installed	**2 October 2013**		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Water Sample Taken (Yes/No)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Remarks
9-Oct-2013		**2.24**	**3.00**	**YES**	**0.0**	**0.0**	**4.3**	**14.7**	

Remarks

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Form 003/1

FIELDWORK- *Insitu Gas Monitoring - Instrument Record*

Project **HOUGH END LEISURE CENTRE**

Project No **PN133009**

Borehole **BH4**

Client **LAING O'ROURKE (BESWICK)**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**3.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 3.00m**	Ground Level	**30.79 m OD**
Date Installed	**2 October 2013**		

Date	Time	Nitrogen N2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Flow Rate (Peak) (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
9-Oct-2013		**80.9**	**0.0**	**0.0**	**0.5**	**0.0**	

Remarks

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Form 003/1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Job No: 02108AA
Date: 18/10/13
Visit No: 2 (1st visit c

Site: Hough End Leisure Centre

Operator: K. Azimi
Time: 14:00
Weather Conditions: Light rain
Pressure at start of monitoring: mb
Surface Conditions: wet
Pressure at end of monitoring: mb
Method: GA 2000
24Hr Atmoshperic Pressure Trend:
Last Calibrated: Jun-13
Temperature: °C

BH ID	Peak Flow (l/hr)	S/S Flow (l/hr)	Peak Conc^{n}. (% v/v) CH_4	Peak Conc^{n}. (% v/v) CO_2	Lowest O_2 (% v/v)	Steady Conc^{n}. (% v/v) CH_4	Steady Conc^{n}. (% v/v) CO_2	Steady Conc^{n}. (% v/v) O_2	H_2S (ppm)	Atmos. Pressure (mb)	GWL (m bgl)	Base of hole (m bgl)	Vol of gas in BH (m^3)
BH1	0.0	0.0	0.1	2.0	17.2	0.1	1.8	18.2	0	1008	2.70	3.94	
BH2	0.0	0.0	0.0	1.9	17.0	0.0	1.9	17.4	0	1007	2.81	4.95	
BH3	0.0	0.0	0.0	1.7	20.0	0.0	1.6	20.1	0	1007	2.63	3.77	
BH4	0.0	0.0	0.1	4.1	16.4	0.1	4.1	16.9	0	1007	2.23	3.00	

ND = Not Detected
NM = Not Measured
NGW = No Groundwater Encountered

In accordance with NHBC Guidance, Report Edition No. 04 (2007) and CIRIA C665 2007

GA94A Infrared Gas Analyser Typical Accuracy:

Concentration	CH4	CO2
0-5% (LEL CH4)	+/- 0.5%	+/- 0.5%
5-15% (UEL CH4)	+/- 1.0%	+/- 1.0%
>15% (21% max O2 50% max CO2)	+/- 3.0%	+/- 3.0%
Temperature Range (°C)	-10°C to +40°C onl	

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Site: Hough End Leisure Centre

Job No: 02108AA
Date: 22/10/13
Visit No: 3 (2nd visit

Operator: K. Azimi
Time: 15:00
Weather Conditions: Cloudy and breezy
Pressure at start of monitoring: 987 mb
Surface Conditions: wet
Pressure at end of monitoring: 986 mb
Method: GA 2000
24Hr Atmoshperic Pressure Trend:
Last Calibrated: Jun-13
Temperature: 16 °C

	Peak Flow	S/S Flow	Peak Conc^{n}. (% v/v)		Lowest O_2	Steady Conc^{n}. (% v/v)			H_2S	Atmos. Pressure	GWL	Base of hole	Vol of gas in BH
BH ID	(l/hr)	(l/hr)	CH_4	CO_2	(% v/v)	CH_4	CO_2	O_2	(ppm)	(mb)	(m bgl)	(m bgl)	(m^3)
BH1	0.0	0.0	0.1	5.0	7.9	0.1	4.9	9.3	0	986	2.70	3.94	
BH2	0.0	0.0	0.1	2.8	10.5	0.1	2.8	11.9	0	987	2.83	4.90	
BH3	0.0	0.0	0.1	2.0	19.3	0.1	2.0	19.5	0	987	2.57	3.88	
BH4	0.0	0.0	0.1	4.6	15.7	0.1	4.6	15.9	0	987	2.18	3.02	

ND = Not Detected
NM = Not Measured
NGW = No Groundwater Encountered

In accordance with NHBC Guidance, Report Edition No. 04 (2007) and CIRIA C665 2007

GA94A Infrared Gas Analyser Typical Accuracy:

Concentration	CH4	CO2
0-5% (LEL CH4)	+/- 0.5%	+/- 0.5%
5-15% (UEL CH4)	+/- 1.0%	+/- 1.0%
>15% (21% max O2 50% max CO2)	+/- 3.0%	+/- 3.0%
Temperature Range (°C)	-10°C to +40°C onl	

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Site: Hough End Leisure Centre

Job No: 02108AA
Date: 31/10/13
Visit No: 4 (3rd gas r

Operator: K. Azimi
Time: 10:30
Weather Conditions: Cloudy and breezy
Pressure at start of monitoring: 1008 mb
Surface Conditions: wet
Pressure at end of monitoring: 1008 mb
Method: GA 2000
24Hr Atmoshperic Pressure Trend:
Last Calibrated: Jun-13
Temperature: 13 °C

	Peak Flow	S/S Flow	Peak Conc^{n}. (% v/v)		Lowest O_2	Steady Conc^{n}. (% v/v)			H_2S	Atmos. Pressure	GWL	Base of hole	Vol of gas in BH
BH ID	(l/hr)	(l/hr)	CH_4	CO_2	(% v/v)	CH_4	CO_2	O_2	(ppm)	(mb)	(m bgl)	(m bgl)	(m^3)
BH1	0.1	0.0	0.1	6.3	4.5	0.1	6.3	6.2	0	1008	2.42	3.85	
BH2	1.1	1.1	0.1	3.6	4.4	0.1	3.6	6.1	0	1008	2.64	4.80	
BH3	0.0	0.0	0.1	2.4	18.4	0.1	2.4	18.6	0	1008	2.37	3.80	
BH4	0.3	0.0	0.1	4.4	15.5	0.1	4.4	16.0	0	1008	1.92	3.00	

ND = Not Detected
NM = Not Measured
NGW = No Groundwater Encountered

In accordance with NHBC Guidance, Report Edition No. 04 (2007) and CIRIA C665 2007

GA94A Infrared Gas Analyser Typical Accuracy:

Concentration	CH4	CO2
0-5% (LEL CH4)	+/- 0.5%	+/- 0.5%
5-15% (UEL CH4)	+/- 1.0%	+/- 1.0%
>15% (21% max O2 50% max CO2)	+/- 3.0%	+/- 3.0%
Temperature Range (°C)	-10°C to +40°C onl	

Appendix E

Laboratory Geotechnical Test Results

LABORATORY RESULTS - Classification and Strength

Project HOUGH END LEISURE CENTRE **Project No:** PN133009

Sample					Classification					Strength					
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	$_b$ ($_d$) Mg/m^3	$_3$ kN/m^2	$_1$ − $_3$ kN/m^2	c_u kN/m^2	c_{Avg} kN/m^2
BH1	1.80 (0.00)	D	N40468	Reddish brown slightly sandy slightly gravelly CLAY.	CI	18 (11%)	35	17	18						
BH1	2.00-2.45 (2.00)	U	N41407	Medium strength reddish brown slightly gravelly sandy CLAY changing to reddish brown fine to coarse SAND.					11	SS	1.84	50	149	74	74
BH2A	1.80 (0.00)	D	N40471	Reddish brown slightly gravelly sandy CLAY.	CL	11 (34%)	25	14	11						
BH2A	2.00-2.45 (2.00)	U	N41408	Reddish brown slightly sandy slightly gravelly CLAY changing to reddish brown fine to coarse SAND. (See Test Remarks Sheet for further information)					11	SS	NST	50	NST		
BH4	0.20-0.40 (0.00)	B	N40473	MADE GROUND: Dark brown slightly sandy gravelly clay.					11						
TP01	0.40-0.70 (0.00)	B	N40474	Yellowish brown slightly gravelly silty fine to medium SAND.					16						
TP02	1.80 (0.00)	D	N40476	Stiff reddish brown slightly sandy slightly gravelly CLAY.	CI	19 (11%)	36	17	18						
TP06	0.60 (0.60)	D	N40480	MADE GROUND: Dark brown slightly sandy gravelly clay.	CI	20 (25%)	38	18	14						
TP07	0.40-0.80 (0.00)	B	N40482	MADE GROUND: Dark brown slightly sandy gravelly clay.					18						

Remarks Tests performed in accordance with BS 1377: 1990
NST - Not suitable for Test

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LABORATORY RESULTS - Particle Size Distribution

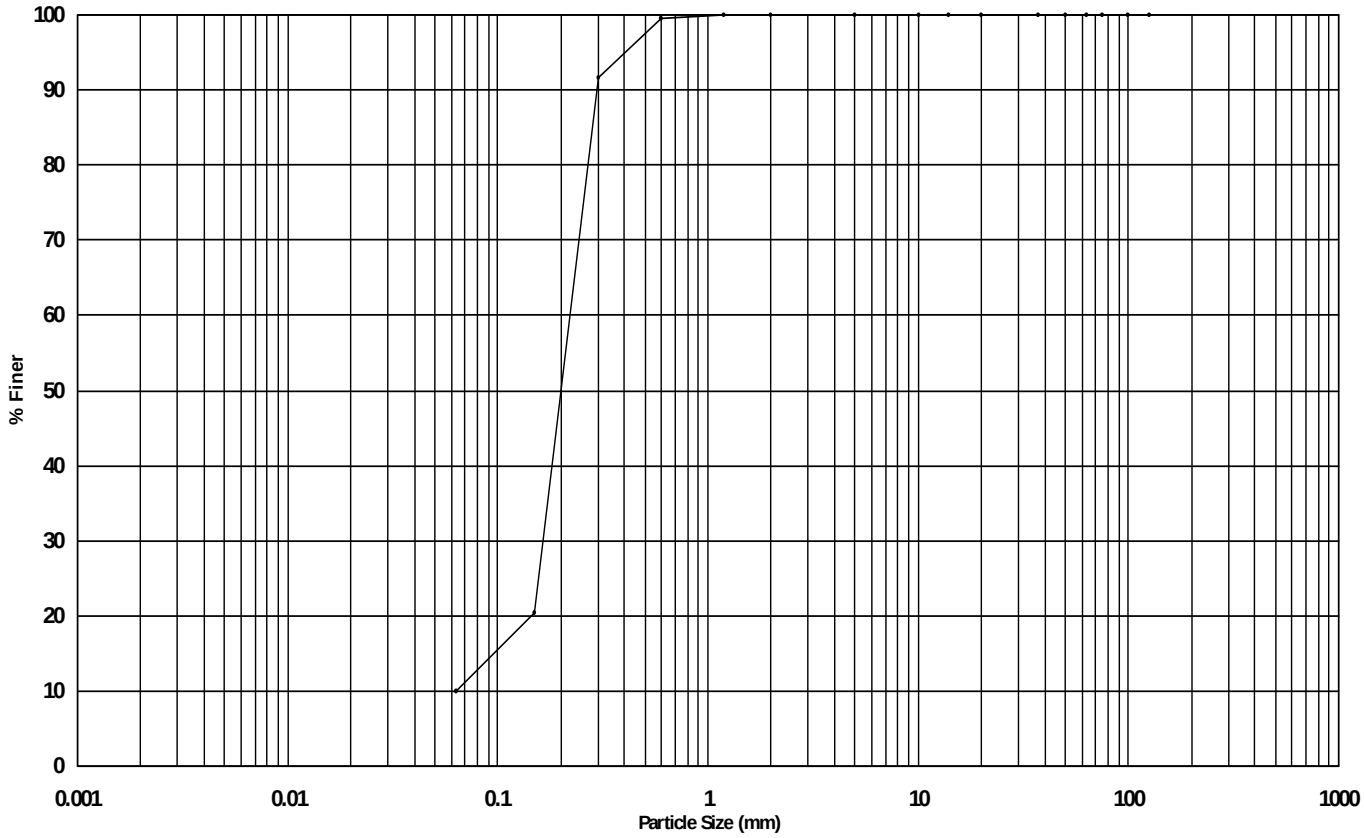
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole BH1
Sample Depth 3.00-3.45m
Sample Type B
Sample Ref N40467

Sample Description

Reddish brown silty fine to coarse SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	10
SAND	90
GRAVEL	0
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2 mm	100
1.18 mm	100
600 µm	100
300 µm	92
150 µm	21
63 µm	10

Size	% Finer

Uniformity Coefficient
3.50
Sieving Method
Wet sieve
Fine Particle Analysis

Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks Test performed in accordance with BS 1377:Part 2:1990

31/10/2013

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LABORATORY RESULTS - Particle Size Distribution

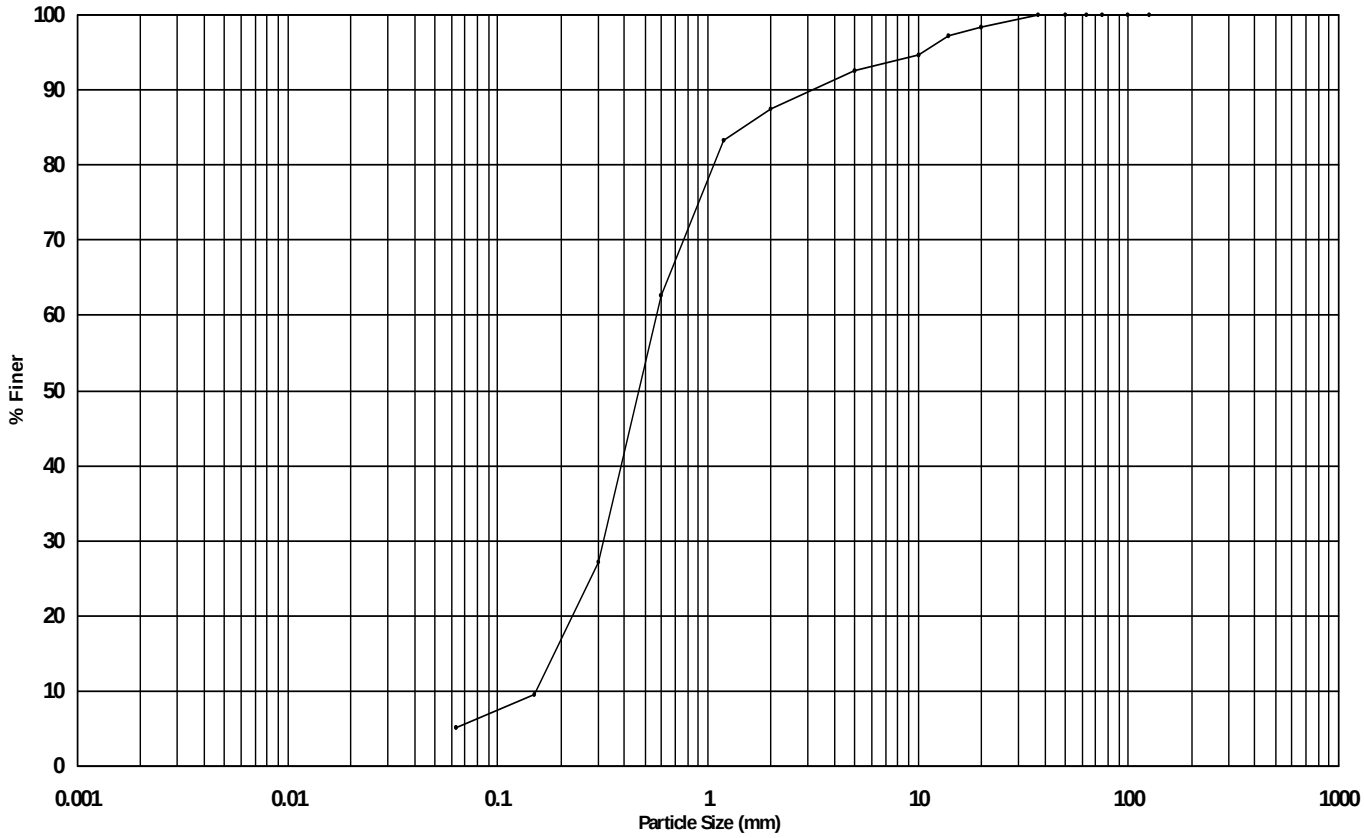
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole BH2A
Sample Depth 0.50-1.20m
Sample Type B
Sample Ref N40470

Sample Description

Reddish slightly silty gravelly fine to coarse SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	5
SAND	82
GRAVEL	13
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	98
14 mm	97
10 mm	95
5 mm	93
2 mm	87
1.18 mm	83
600 µm	63
300 µm	27
150 µm	10
63 µm	5

Size	% Finer

Uniformity Coefficient
3.74
Sieving Method
Wet sieve
Fine Particle Analysis

Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks AGS Test performed in accordance with BS 1377:Part 2:1990

31/10/2013

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LABORATORY RESULTS - Particle Size Distribution

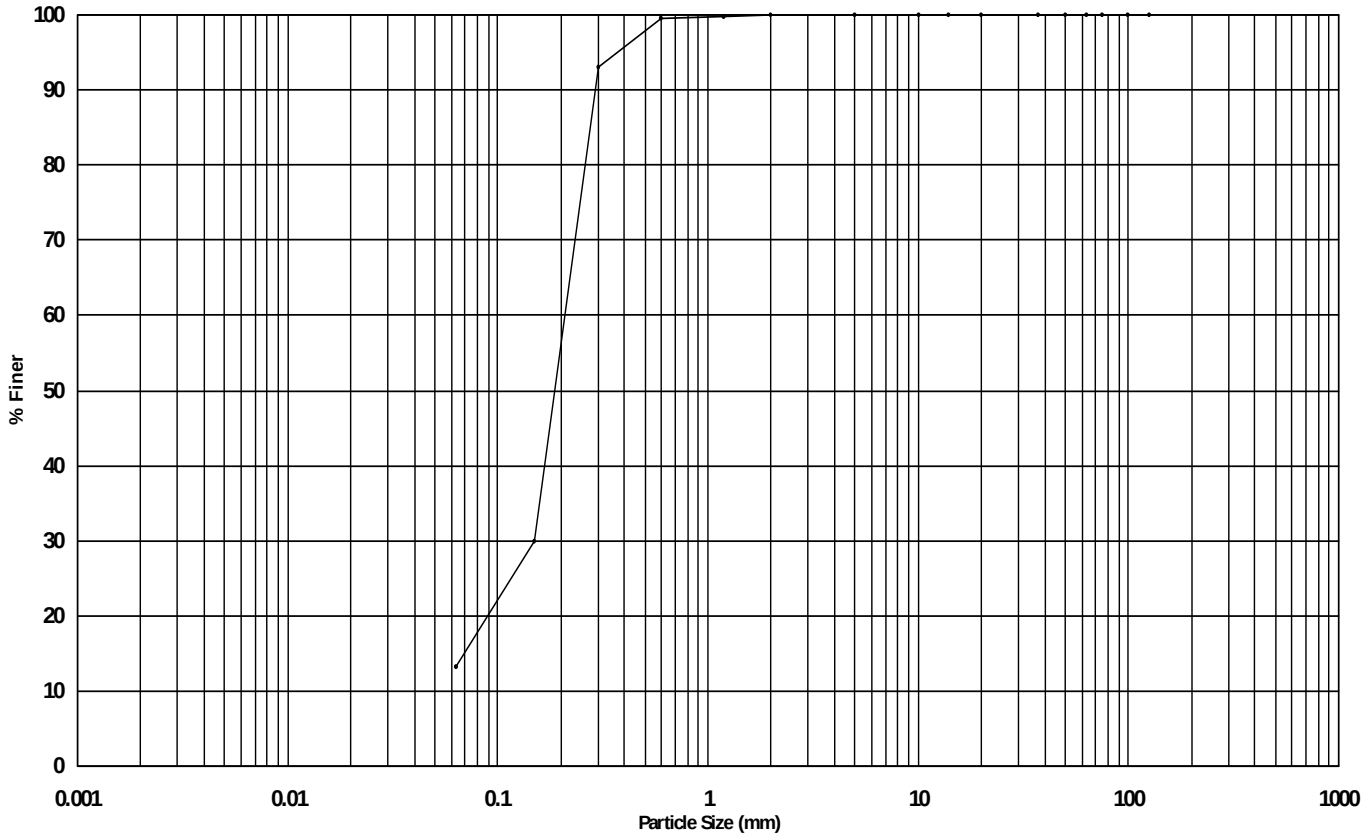
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole BH4
Sample Depth 2.20-2.65m
Sample Type B
Sample Ref N40609

Sample Description

Reddish brown silty fine to coarse SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	13
SAND	87
GRAVEL	0
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2 mm	100
1.18 mm	100
600 µm	100
300 µm	93
150 µm	30
63 µm	13

Size	% Finer

Uniformity Coefficient
Not Available
Sieving Method
Wet sieve
Fine Particle Analysis

Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks AGS Test performed in accordance with BS 1377:Part 2:1990

31/10/2013

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LABORATORY RESULTS - Particle Size Distribution

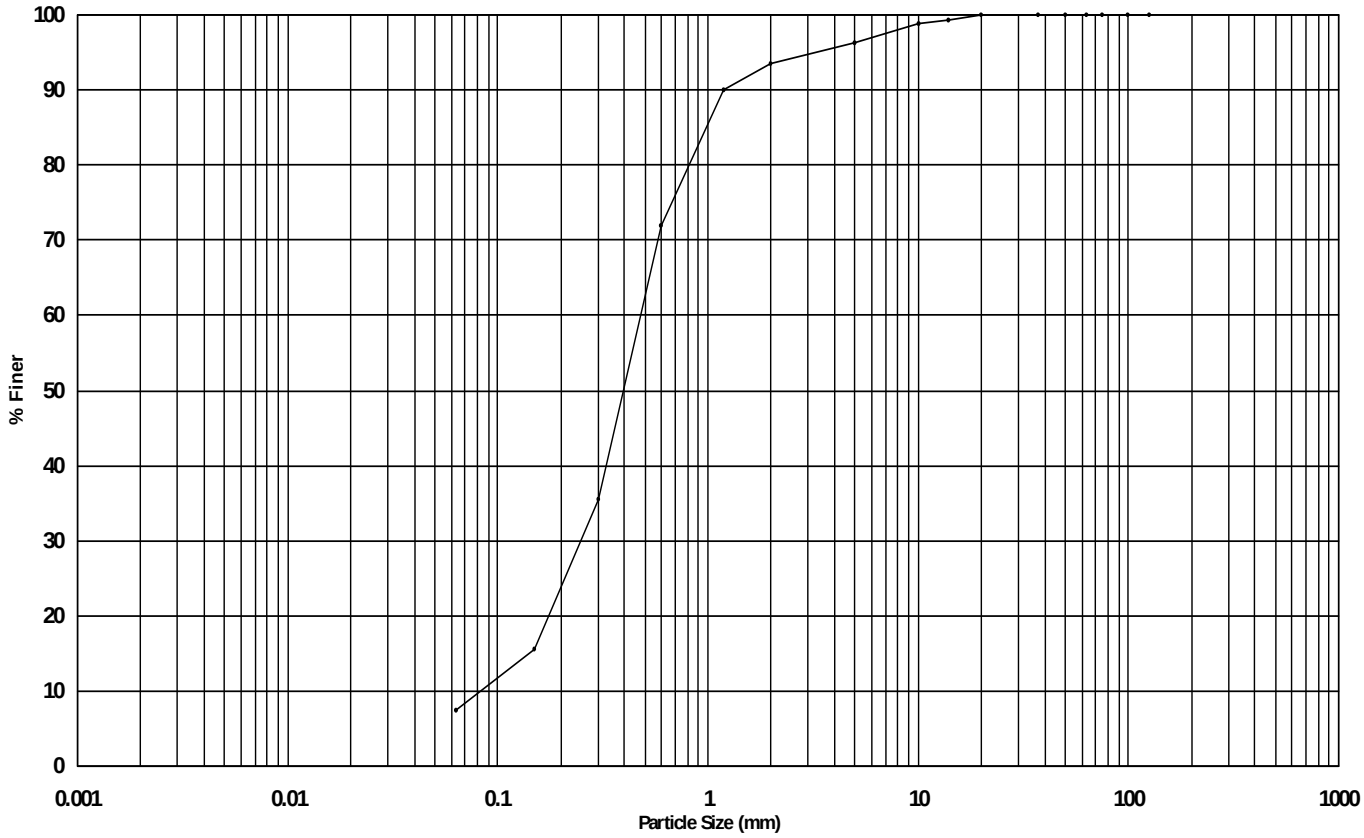
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole TP02
Sample Depth 0.70-1.00m
Sample Type B
Sample Ref N40475

Sample Description

Yellowish brown silty gravelly SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	7
SAND	86
GRAVEL	7
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	99
10 mm	99
5 mm	96
2 mm	93
1.18 mm	90
600 µm	72
300 µm	35
150 µm	16
63 µm	7

Size	% Finer

Uniformity Coefficient
5.80

Sieving Method
Wet sieve

Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks Test performed in accordance with BS 1377:Part 2:1990

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LABORATORY RESULTS - Particle Size Distribution

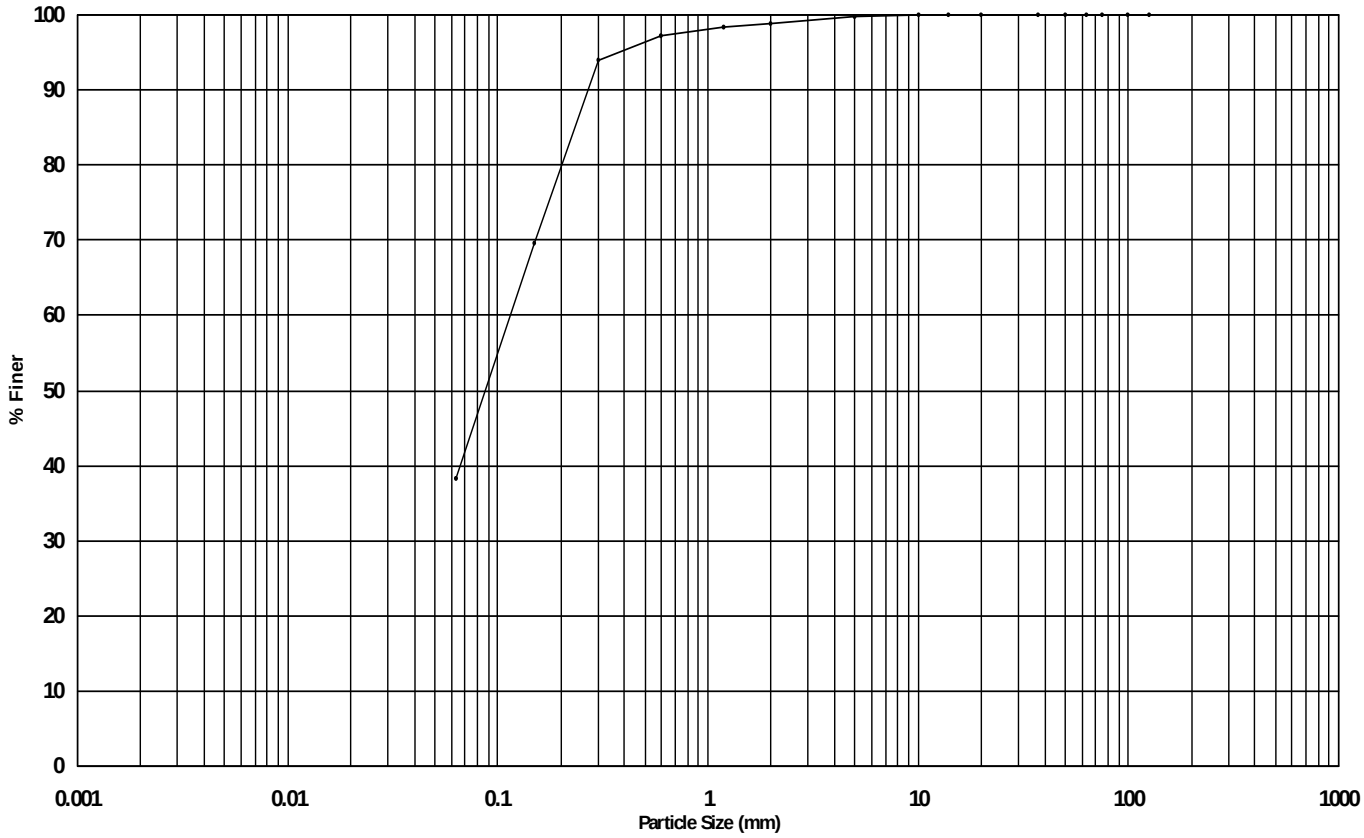
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole TP05
Sample Depth 2.10-2.60m
Sample Type B
Sample Ref N40479

Sample Description

Reddish brown slightly gravelly silty fine to coarse SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	38
SAND	61
GRAVEL	1
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2 mm	99
1.18 mm	98
600 µm	97
300 µm	94
150 µm	70
63 µm	38

Size	% Finer

Uniformity Coefficient
Not Available
Sieving Method
Wet sieve
Fine Particle Analysis

Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks AGS Test performed in accordance with BS 1377:Part 2:1990

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LABORATORY RESULTS - Particle Size Distribution

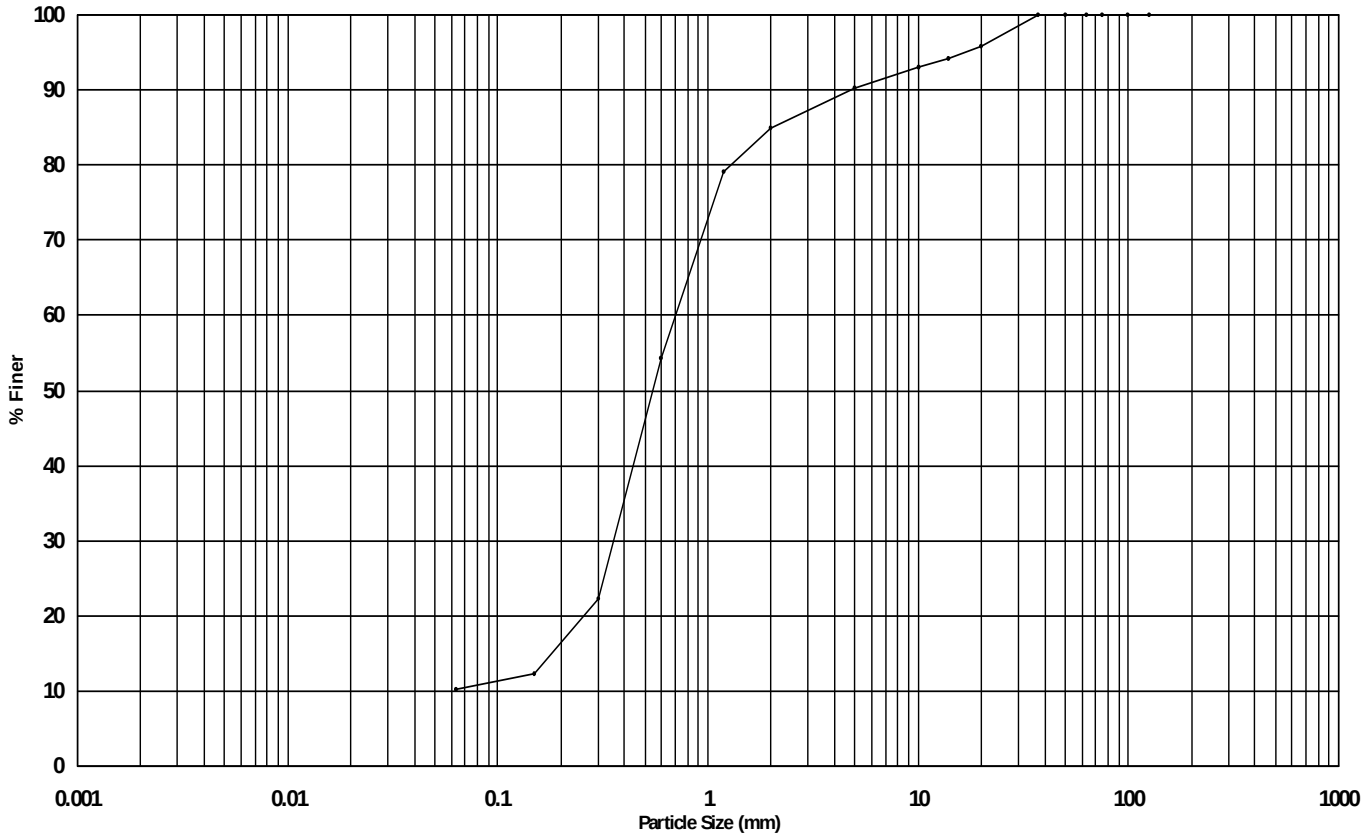
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole TP06
Sample Depth 1.40-1.60m
Sample Type B
Sample Ref N40481

Sample Description

Yellowish brown silty gravelly fine to coarse SAND.



Classification		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
	CLAY	SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	10
SAND	75
GRAVEL	15
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	96
14 mm	94
10 mm	93
5 mm	90
2 mm	85
1.18 mm	79
600 µm	54
300 µm	22
150 µm	12
63 µm	10

Size	% Finer

Uniformity Coefficient
Not Available
Sieving Method
Wet sieve
Fine Particle Analysis

Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks AGS Test performed in accordance with BS 1377:Part 2:1990

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LABORATORY RESULTS - *Consolidation e/logp Plot*

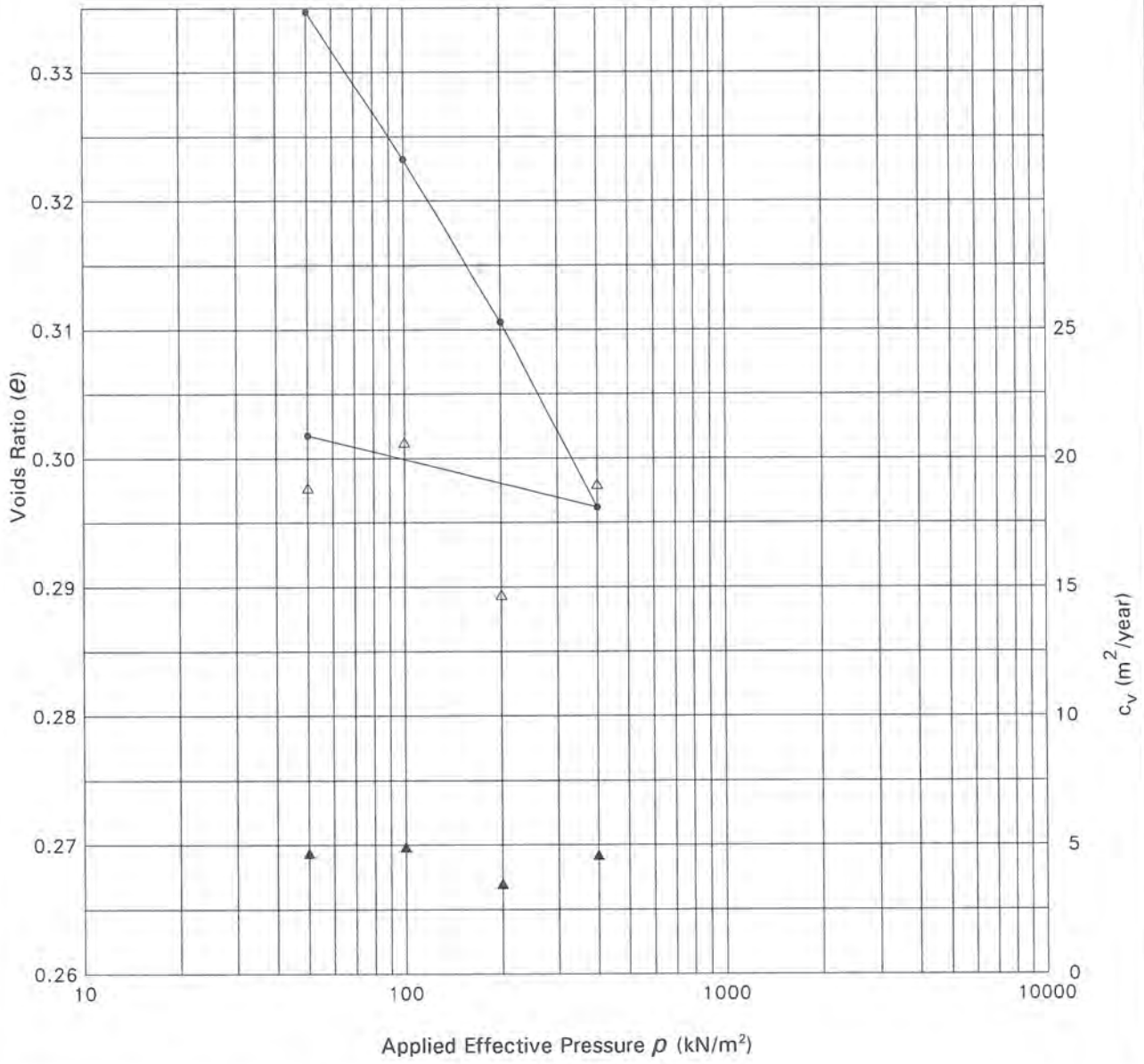
Project Hough End Leisure Centre

Client Coffey Geotechnics

Project No PN133009
Borehole BH1
Sample Depth 2.00 - 2.45 m
Sample Type U

The determination of one dimensional consolidation properties in accordance with Clause 3 of BS1377: Part 5: 1990

Symbols: Voids Ratio •, c_{v50} ▲, c_{v90} △



Applied Pressure kN/m²	0-50	50-100	100-200	200-400	400-50					
m_v m²/MN	0.55	0.17	0.10	0.05	0.01					
c_{v50} Log Time m²/yr	-	4.91	3.48	4.59	4.67					
c_{v90} Root Time m²/yr	-	20.62	14.70	18.99	18.86					
Voids Ratio	0.335	0.323	0.311	0.296	0.302					

Description
N41407 Soft brown sandy CLAY with fine to medium gravel

Specimen Diameter	74.970	mm
Initial Height	18.880	mm
Particle Density	2.65 Assumed	
Initial Voids Ratio	0.372	

Initial Water Content	11.38	%
Final Water Content	12.64	%
Initial Saturation	81.01	%
Initial Bulk Density	2.15	Mg/m³
Initial Dry Density	1.93	Mg/m³

Remarks Laboratory temperature 20°C ± 4°C
Specimen cut vertically from base of sample

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LABORATORY RESULTS - *Consolidation e/logp Plot*

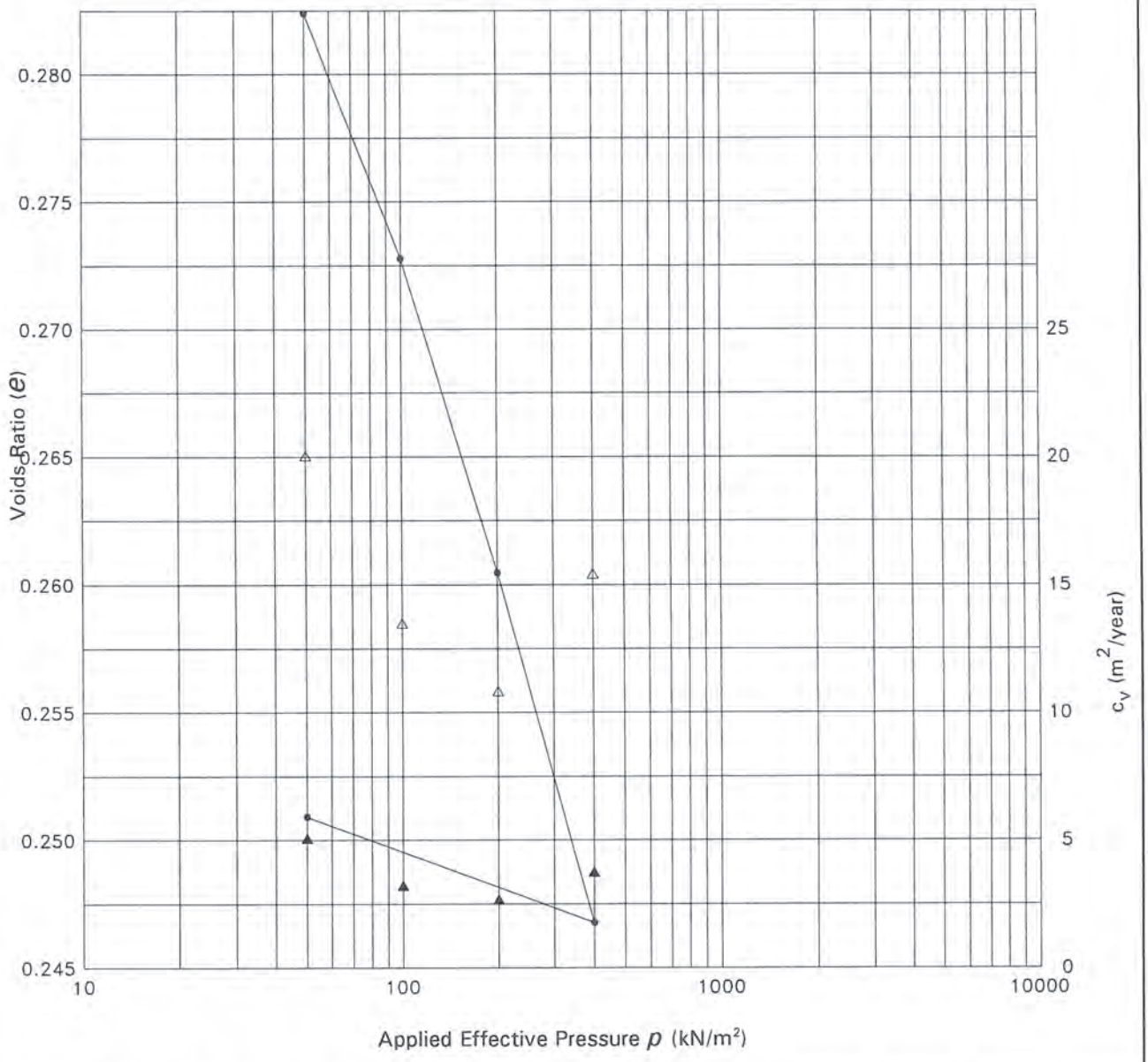
Project Hough End Leisure Centre

Client Coffey Geotechnics

Project No PN133009
Borehole BH2A
Sample Depth 2.00 - 2.45 m
Sample Type U

The determination of one dimensional consolidation properties in accordance with Clause 3 of BS1377: Part 5: 1990

Symbols: Voids Ratio •, c_{v50} ▲, c_{v90} △



Applied Pressure kN/m²	0-50	50-100	100-200	200-400	400-50					
m_v m^2/MN	0.64	0.15	0.10	0.05	0.01					
c_{v50} Log Time m^2/yr	-	3.22	2.67	3.74	5.07					
c_{v90} Root Time m^2/yr	-	13.49	10.83	15.43	20.04					
Voids Ratio	0.282	0.273	0.260	0.247	0.251					

Description
N41408 Firm grey brown sandy CLAY changing to red brown SAND.

Specimen Diameter	75.070	mm
Initial Height	18.850	mm
Particle Density	2.65 Assumed	
Initial Voids Ratio	0.324	

Initial Water Content	11.66	%
Final Water Content	11.27	%
Initial Saturation	95.21	%
Initial Bulk Density	2.23	Mg/m^3
Initial Dry Density	2.00	Mg/m^3

Remarks Laboratory temperature 20°C ± 4°C
Specimen cut vertically from base of sample

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LABORATORY RESULTS - MCV, Compaction, CBR

Project HOUGH END LEISURE CENTRE **Project No:** PN133009

Sample					MCV		Compaction					CBR				
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	MCV	w %	Type	w (Opt) %	d Mg/m³	b Mg/m³	d (Max) Mg/m³	Type	Top CBR %	Top w %	Bottom CBR %	Bottom w %
BH4	0.20-0.40 (0.00-0.40)	B	N40473	MADE GROUND: Dark brown slightly sandy gravelly clay.						2.11	1.92	2.5kg	34	10	52	9.2
TP01	0.40-0.70 (0.00-0.70)	B	N40474	Yellowish brown slightly gravelly silty fine to medium SAND.						2.07	1.78	2.5kg	5.5	17	5.9	17
TP07	0.40-0.80 (0.00-0.80)	B	N40482	MADE GROUND: Dark brown slightly sandy gravelly clay.						2.04	1.73	2.5kg	3.9	18	5.4	17

Remarks Particle Density - a=assumed, m=measured
* = at natural moisture content
Tests performed in accordance with BS 1377: 1990

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LABORATORY RESULTS - CBR Force Penetration

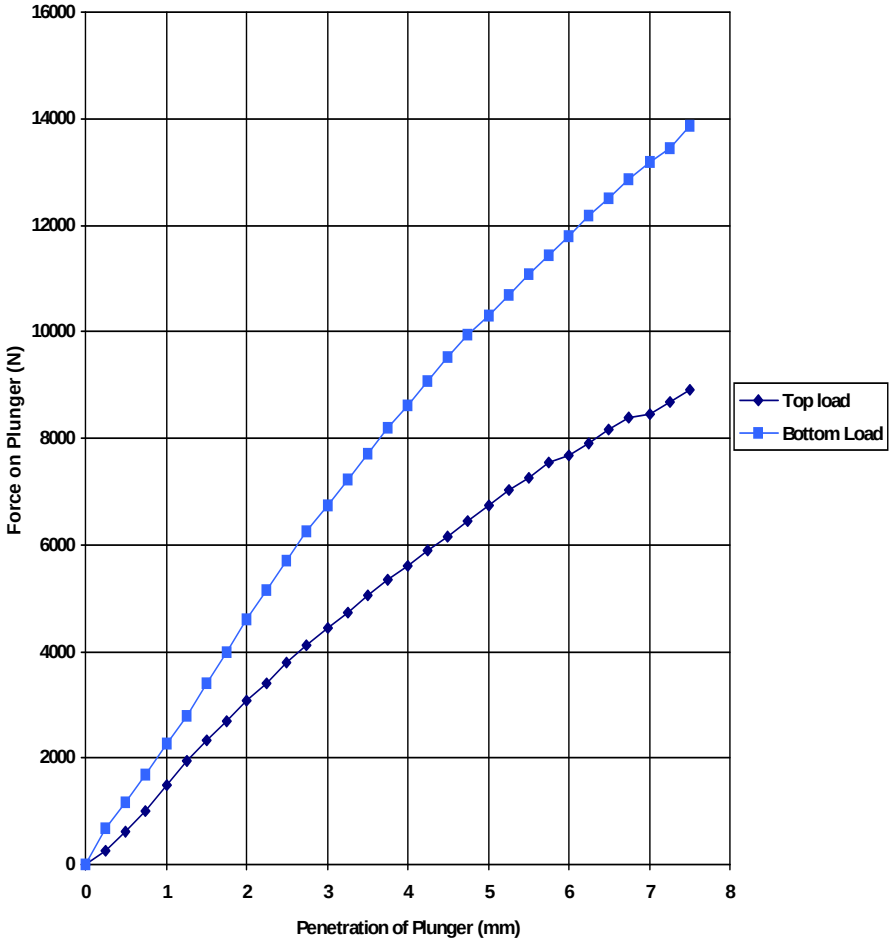
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole	BH4
Sample Depth	0.20-0.40m
Sample Type	B
Sample Ref	N40473

Sample Description

MADE GROUND: Dark brown slightly sandy gravelly CLAY.



Penetration	Top (N)	Bottom (N)
0.25mm	273	689
0.50mm	618	1162
0.75mm	1018	1699
1.00mm	1480	2257
1.25mm	1929	2792
1.50mm	2319	3394
1.75mm	2698	3996
2.00mm	3077	4597
2.25mm	3399	5153
2.50mm	3774	5715
2.75mm	4122	6248
3.00mm	4434	6728
3.25mm	4738	7213
3.50mm	5046	7704
3.75mm	5352	8192

Penetration	Top (N)	Bottom (N)
4.00mm	5614	8600
4.25mm	5901	9065
4.50mm	6167	9510
4.75mm	6458	9935
5.00mm	6735	10311
5.25mm	7024	10688
5.50mm	7271	11066
5.75mm	7539	11433
6.00mm	7682	11802
6.25mm	7909	12177
6.50mm	8157	12503
6.75mm	8386	12863
7.00mm	8468	13197
7.25mm	8684	13434
7.50mm	8911	13855

Test Details

Test Type	2.5kg	
Method	BS1377 Part 4 1990 : Clause 7.0	
Surcharge	13.60	**kg**
Retained 20mm sieve	35.7	**%**
Bulk Density	2.11	**Mg/m^3**
Dry Density	1.92	**Mg/m^3**
Hand Calculation	No	

CBR	Top	Bottom
Value	34	52
w%	10	9.2

Remarks AGS BS1377 Part 4 1990 : Clause 7.0

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LABORATORY RESULTS - CBR Force Penetration

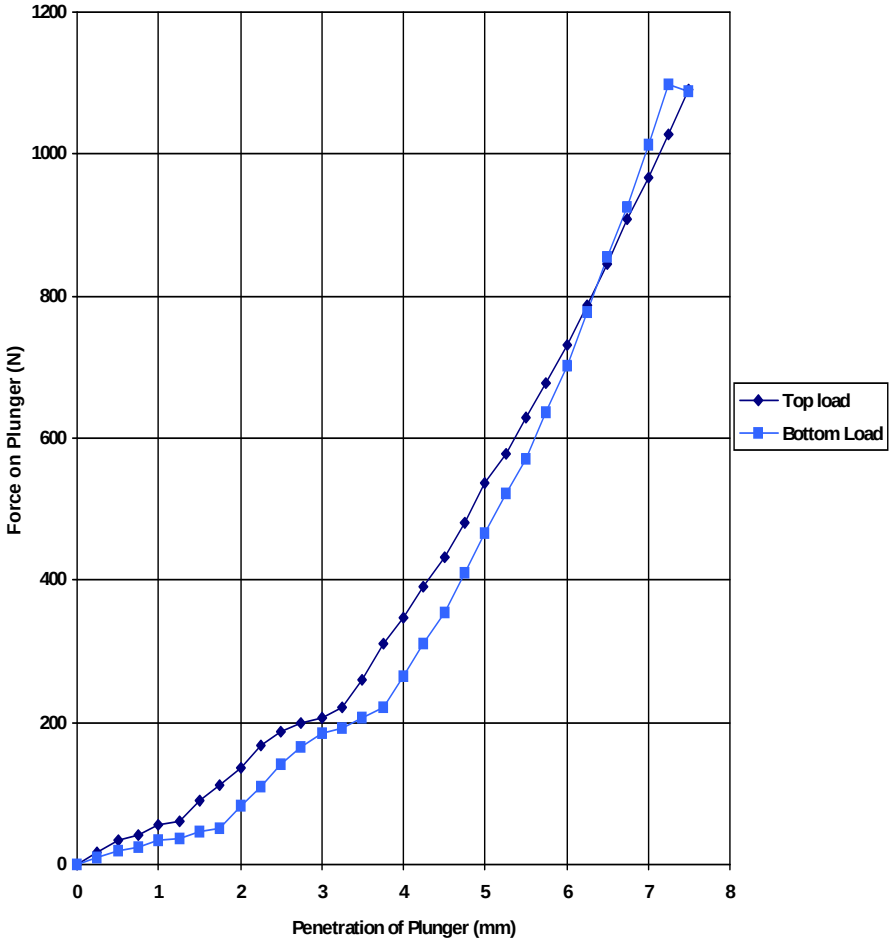
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole	TP01
Sample Depth	0.40-0.70m
Sample Type	B
Sample Ref	N40474

Sample Description

Yellowish brown slightly gravelly silty fine to medium SAND.



Penetration	Top (N)	Bottom (N)
0.25mm	17	10
0.50mm	34	20
0.75mm	42	25
1.00mm	55	33
1.25mm	61	37
1.50mm	89	46
1.75mm	111	52
2.00mm	136	83
2.25mm	167	110
2.50mm	188	142
2.75mm	200	164
3.00mm	206	184
3.25mm	221	192
3.50mm	259	206
3.75mm	311	222

Penetration	Top (N)	Bottom (N)
4.00mm	348	264
4.25mm	390	312
4.50mm	432	355
4.75mm	482	411
5.00mm	538	466
5.25mm	577	523
5.50mm	630	570
5.75mm	678	637
6.00mm	731	703
6.25mm	787	777
6.50mm	846	855
6.75mm	909	926
7.00mm	968	1014
7.25mm	1028	1097
7.50mm	1090	1089

Test Details

Test Type	2.5kg	
Method	BS1377 Part 4 1990 : Clause 7.0	
Surcharge	13.60	**kg**
Retained 20mm sieve	0.7	**%**
Bulk Density	2.07	**Mg/m^3**
Dry Density	1.78	**Mg/m^3**
Hand Calculation	Yes	

CBR	Top	Bottom
Value	**5.5**	**5.9**
w%	**17**	**17**

Remarks AGS BS1377 Part 4 1990 : Clause 7.0

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LABORATORY RESULTS - CBR Force Penetration

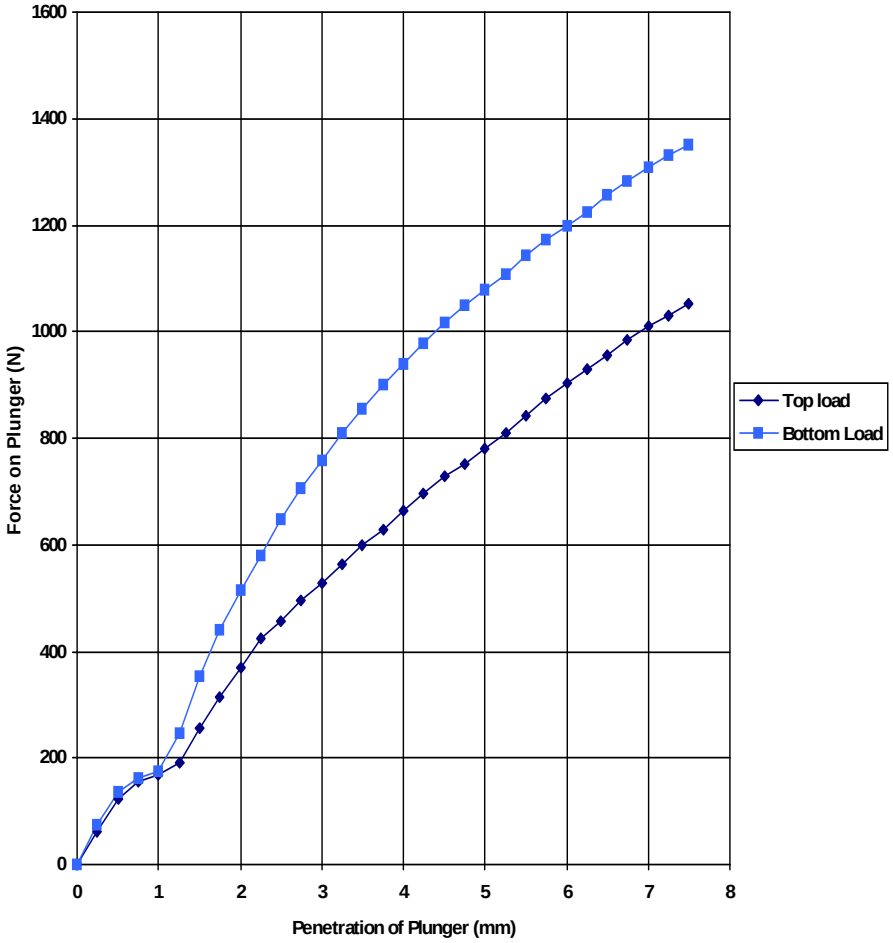
Project: HOUGH END LEISURE CENTRE

Project No: PN133009

Hole	TP07
Sample Depth	0.40-0.80m
Sample Type	B
Sample Ref	N40482

Sample Description

MADE GROUND: Dark brown slightly sandy gravelly CLAY.



Penetration	Top (N)	Bottom (N)
0.25mm	63	74
0.50mm	123	135
0.75mm	156	163
1.00mm	168	175
1.25mm	192	245
1.50mm	256	354
1.75mm	315	441
2.00mm	369	515
2.25mm	423	580
2.50mm	457	649
2.75mm	494	705
3.00mm	527	758
3.25mm	565	809
3.50mm	599	855
3.75mm	628	899

Penetration	Top (N)	Bottom (N)
4.00mm	664	939
4.25mm	695	977
4.50mm	728	1016
4.75mm	753	1049
5.00mm	782	1079
5.25mm	811	1109
5.50mm	842	1143
5.75mm	873	1172
6.00mm	903	1199
6.25mm	930	1225
6.50mm	957	1257
6.75mm	984	1284
7.00mm	1011	1309
7.25mm	1030	1330
7.50mm	1052	1351

Test Details

Test Type	2.5kg	
Method	BS1377 Part 4 1990 : Clause 7.0	
Surcharge	13.60	**kg**
Retained 20mm sieve	1.3	**%**
Bulk Density	2.04	**Mg/m^3**
Dry Density	1.73	**Mg/m^3**
Hand Calculation	No	

CBR	Top	Bottom
Value	**3.9**	**5.4**
w%	**18**	**17**

Remarks AGS BS1377 Part 4 1990 : Clause 7.0

31/10/2013

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LABORATORY RESULTS - Chemical Analysis

Project HOUGH END LEISURE CENTRE **Project No:** PN133009

Sample					Sulphate			pH	Organic Content	Loss on Ignition	Chloride		
					In Soil						In Soil		
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Acid Soluble %	Water Soluble g/l	In Water g/l		%	%	Acid Soluble %	Water Soluble g/l	In Water g/l
BH1	2.50 (0.00)	D	N40469	Reddish brown slightly gravelly fine to medium SAND.		0.022 (0.03)		8.30					
BH2A	1.80 (0.00)	D	N40471	Reddish brown slightly gravelly sandy CLAY.		0.019 (0.02)		8.22					
BH3	1.80 (0.00)	B	N40472	Reddish brown slightly gravelly SAND.		0.014 (0.02)		8.22					
TP02	2.40 (0.00)	D	N40477	Reddish slightly sandy slightly gravelly CLAY.		0.014 (0.02)		8.14					
TP05	0.50-0.80 (0.00-0.80)	D	N40478	Dark grey slightly gravelly SILT.					2.00				

Remarks Tests performed in accordance with BS 1377: Part 3: 1990
Sulphate reported as SO3, results in brackets reported as SO4

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Appendix F

Laboratory Chemical Test Results

Jones Environmental Laboratory

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

Geotechnics
Unit 1B
Borders Industrial Park
River Lane
Chester
Cheshire
CH4 8RJ

Attention :	Chris Jones
Date :	23rd October, 2013
Your reference :	PN133009
Our reference :	Test Report 13/9273 Batch 1
Location :	Hough End
Date samples received :	8th October, 2013
Status :	Final report
Issue :	1

Twenty four samples were received for analysis on 8th October, 2013. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	37-39	49-51	61-63	67-69	1-3	4-6	7-9	22-24	31-33		LOD	Units	Method No.
Sample ID	BH1	BH2A	BH3	BH4	TP01	TP01	TP02	TP06	TP07				
Depth	0.25	0.25	1.0	1.0	0.3	1.0	0.7	0.5	0.3				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013				
Arsenic #M	11.1	12.1	1.7	-	23.9	-	3.3	3.6	NDP		<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	3.5		<0.5	mg/kg	TM30/PM62
Cadmium #M	0.2	0.2	<0.1	-	0.3	-	<0.1	0.2	NDP		<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	-	-	-	-	-	0.6		<0.1	mg/kg	TM30/PM62
Chromium #M	34.6	10.4	14.7	-	11.3	-	14.7	23.4	NDP		<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	-	-	-	-	-	10.8		<0.5	mg/kg	TM30/PM62
Copper #M	29	26	4	-	89	-	2	21	NDP		<1	mg/kg	TM30/PM15
Copper	-	-	-	-	-	-	-	-	30		<1	mg/kg	TM30/PM62
Lead #M	44	62	8	-	149	-	10	17	NDP		<5	mg/kg	TM30/PM15
Lead	-	-	-	-	-	-	-	-	72		<5	mg/kg	TM30/PM62
Mercury #M	<0.1	0.1	<0.1	-	0.1	-	<0.1	<0.1	NDP		<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	-	-	-	-	-	<0.1		<0.1	mg/kg	TM30/PM62
Nickel #M	18.6	13.7	15.5	-	25.6	-	6.0	28.2	NDP		<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	-	-	-	-	-	22.0		<0.7	mg/kg	TM30/PM62
Selenium #M	<1	<1	<1	-	<1	-	<1	<1	NDP		<1	mg/kg	TM30/PM15
Selenium	-	-	-	-	-	-	-	-	<1		<1	mg/kg	TM30/PM62
Sulphur	-	-	-	-	-	-	-	0.03	NDP		<0.01	%	TM30/PM15
Sulphur	-	-	-	-	-	-	-	-	0.04		<0.01	%	TM30/PM62
Total Sulphate BRE	-	-	-	-	-	-	-	0.03	NDP		<0.01	%	TM50/PM15
Total Sulphate BRE	-	-	-	-	-	-	-	-	0.03		<0.01	%	TM50/PM62
Zinc #M	59	120	39	-	81	-	15	55	NDP		<5	mg/kg	TM30/PM15
Zinc	-	-	-	-	-	-	-	-	105		<5	mg/kg	TM30/PM62
Magnesium	-	-	-	-	-	-	-	0.0015	NDP		<0.0001	g/l	TM30/PM20
Magnesium	-	-	-	-	-	-	-	-	0.0009		<0.0001	g/l	TM30/PM60

Please see attached notes for all abbreviations and acronyms

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	37-39	49-51	61-63	67-69	1-3	4-6	7-9	22-24	31-33		LOD	Units	Method No.
Sample ID	BH1	BH2A	BH3	BH4	TP01	TP01	TP02	TP06	TP07				
Depth	0.25	0.25	1.0	1.0	0.3	1.0	0.7	0.5	0.3				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013				
PAH MS													
Naphthalene #M	-	-	-	-	0.23	-	-	-	-		<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	-	-	0.69	-	-	-	-		<0.03	mg/kg	TM4/PM8
Acenaphthene #M	-	-	-	-	0.21	-	-	-	-		<0.05	mg/kg	TM4/PM8
Fluorene #M	-	-	-	-	0.26	-	-	-	-		<0.04	mg/kg	TM4/PM8
Phenanthrene #M	-	-	-	-	3.49	-	-	-	-		<0.03	mg/kg	TM4/PM8
Anthracene #	-	-	-	-	1.29	-	-	-	-		<0.04	mg/kg	TM4/PM8
Fluoranthene #M	-	-	-	-	10.30	-	-	-	-		<0.03	mg/kg	TM4/PM8
Pyrene #	-	-	-	-	9.27	-	-	-	-		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	-	-	-	5.48	-	-	-	-		<0.06	mg/kg	TM4/PM8
Chrysene #M	-	-	-	-	5.34	-	-	-	-		<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	-	-	-	-	9.24	-	-	-	-		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	-	-	-	5.95	-	-	-	-		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	-	-	-	-	3.49	-	-	-	-		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	-	-	-	1.18	-	-	-	-		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	-	-	-	4.04	-	-	-	-		<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	-	-	60.5	-	-	-	-		<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	-	-	6.65	-	-	-	-		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	-	-	2.59	-	-	-	-		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	-	-	96	-	-	-	-		<0	%	TM4/PM8
EPH (C8-C40) #M	-	-	-	-	3606	-	-	-	-		<30	mg/kg	TM5/PM8
GRO (>C4-C8) #M	-	-	-	-	<100	-	-	-	-		<100	ug/kg	TM36/PM12
GRO (>C8-C12) #M	-	-	-	-	<100	-	-	-	-		<100	ug/kg	TM36/PM12
GRO (>C4-12) #M	-	-	-	-	<100	-	-	-	-		<100	ug/kg	TM36/PM12
MTBE #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
Benzene #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
Toluene #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
o-Xylene #	-	-	-	-	<5	-	-	-	-		<5	ug/kg	TM31/PM12
Total Phenols HPLC	-	-	-	-	0.21	-	-	-	-		<0.15	mg/kg	TM26/PM21
Chloride (2:1 Ext BRE) #M	-	-	-	-	-	-	-	0.007	NDP		<0.002	g/l	TM38/PM20
Chloride (2:1 Ext BRE) #M	-	-	-	-	-	-	-	-	<0.002		<0.002	g/l	TM38/PM60
Nitrate as NO3 #M	-	-	-	-	-	-	-	-	<2.5		<2.5	mg/kg	TM38/PM60
Nitrate as NO3 (2:1 Ext BRE) #M	-	-	-	-	-	-	-	<0.0025	NDP		<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0685	<0.0015	0.0037	<0.0015	0.0117	0.0157	<0.0015	0.0137	NDP		<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	-	-	-	-	-	-	-	-	0.0032		<0.0015	g/l	TM38/PM60
Organic Matter	6.9	6.0	<0.2	-	17.2	-	0.7	2.2	NDP		<0.2	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	37-39	49-51	61-63	67-69	1-3	4-6	7-9	22-24	31-33		LOD	Units	Method No.
Sample ID	BH1	BH2A	BH3	BH4	TP01	TP01	TP02	TP06	TP07				
Depth	0.25	0.25	1.0	1.0	0.3	1.0	0.7	0.5	0.3				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013	08/10/2013				
pH #M	7.18	7.27	6.56	8.09	8.46	8.49	7.28	7.88	8.67		<0.01	pH units	TM73/PM11
Sample Type	Loam	Sandy Loam	Clayey Sand	Sand	Clayey Sand	Sand	Clayey Sand	Clay	Loamy Sand			None	PM13/PM0
Sample Colour	Medium Brown	Medium Brown	Light Brown	Medium Brown	Medium Brown	Light Brown	Light Brown	Medium Brown	Medium Brown			None	PM13/PM0
Other Items	stones	stones	stones	none	stones	none	none	none	stones			None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : NRA Leachate

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33												
Sample ID	TP07												
Depth	0.3										Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J T												
Sample Date	<>												
Sample Type	Soil												
Batch Number	1										LOD	Units	Method No.
Date of Receipt	08/10/2013												
Dissolved Arsenic	4.2										<2.5	ug/l	TM30/PM14
Dissolved Cadmium	<0.5										<0.5	ug/l	TM30/PM14
Dissolved Chromium	<1.5										<1.5	ug/l	TM30/PM14
Dissolved Copper	<7										<7	ug/l	TM30/PM14
Dissolved Lead	<5										<5	ug/l	TM30/PM14
Dissolved Mercury	<1										<1	ug/l	TM30/PM14
Dissolved Nickel	<2										<2	ug/l	TM30/PM14
Dissolved Selenium	<3										<3	ug/l	TM30/PM14
Dissolved Zinc	4										<3	ug/l	TM30/PM14
Sulphate	1.04										<0.05	mg/l	TM38/PM0
pH	8.40										<0.01	pH units	TM73/PM0

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
13/9273	1	TP01	0.3	1-3	PAH's & Possible tarmac

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:



Gemma Newsome
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Description	Asbestos Results	Asbestos Level
13/9273	1	TP01	0.3	2	18/10/13	soil/stones	NAD	NAD
13/9273	1	TP06	0.5	23	18/10/13	soil	NAD	NAD
13/9273	1	TP07	0.3	32	18/10/13	soil	Chrysotile	Quantifiable

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	NDP Reason
13/9273	1	TP07	0.3	31-33	Asbestos detected in sample

Client Name: Geotechnics

Reference: PN133009

Location: Hough End

Contact: Chris Jones

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
13/9273	1	TP01	0.3	1-3	All analyses	No sampling date given
13/9273	1	TP01	1.0	4-6	All analyses	No sampling date given
13/9273	1	TP02	0.7	7-9	All analyses	No sampling date given
13/9273	1	TP06	0.5	22-24	All analyses	No sampling date given
13/9273	1	TP07	0.3	31-33	All analyses	No sampling date given
13/9273	1	BH1	0.25	37-39	All analyses	No sampling date given
13/9273	1	BH2A	0.25	49-51	All analyses	No sampling date given
13/9273	1	BH3	1.0	61-63	All analyses	No sampling date given
13/9273	1	BH4	1.0	67-69	All analyses	No sampling date given

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 13/9273

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only accredited when all the requirements of our Quality System have been met. In certain circumstances where the requirements have not been met, the laboratory may issue the data in an interim report but will remove the accreditation, in this instance results should be considered indicative only. Where possible samples will be re-extracted and a final report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.			AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes		AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes	Yes	AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.			AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes	Yes	AR	Yes
PM13	Soil Typing for MCERTS	PM0	No preparation is required.			AR	
TM21	TOC and TC by Combustion	PM24	Eltra preparation			AD	Yes
TM26	Phenols by HPLC	PM21	Methanol : NaOH extraction			AR	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	No
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific			AD	Yes

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific	Yes	Yes	AD	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM20	in-house method based on USEPA 1311 (TCLP). Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.			AD	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM60	1:2 soil to water extraction (as received sample)			AR	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM62	Aqua Regia extraction (Soils) (as received sample)			AR	Yes
TM31	In-house method based on USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. Accredited to ISO 17025 for soils and waters and MCERTS accredited for soils. Accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	Yes
TM31	In-house method based on USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. Accredited to ISO 17025 for soils and waters and MCERTS accredited for soils. Accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes		AR	Yes
TM36	In-House method based on USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-12 by headspace GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS accredited (carbon banding only) on soils. All accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes	Yes	AR	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.			AR	No
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM20	in-house method based on USEPA 1311 (TCLP). Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.	Yes	Yes	AD	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM60	1:2 soil to water extraction (as received sample)	Yes	Yes	AR	Yes

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM50	Total Sulphate by ICP-OES	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific			AD	Yes
TM50	Total Sulphate by ICP-OES	PM62	Aqua Regia extraction (Soils) (as received sample)			AR	Yes
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres			AR	
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres	Yes		AR	
TM73	pH in by Metrohm	PM0	No preparation is required.			AR	No
TM73	pH in by Metrohm	PM11	1:2.5 soil/water extraction	Yes	Yes	AR	No

Jones Environmental Laboratory

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Geotechnics
Unit 1B
Borders Industrial Park
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Chester
Cheshire
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Attention :	Chris Jones
Date :	23rd October, 2013
Your reference :	PN133009
Our reference :	Test Report 13/9273 Batch 2
Location :	Hough End
Date samples received :	10th October, 2013
Status :	Final report
Issue :	1

Five samples were received for analysis on 10th October, 2013. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	73	74	75	76							LOD	Units	Method No.
Sample ID	BH4	TP03	TP04	TP05									
Depth	0.60	0.30	0.20	0.30									
COC No / misc													
Containers	T	T	T	T									
Sample Date	<>	<>	<>	<>									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	2	2	2	2									
Date of Receipt	10/10/2013	10/10/2013	10/10/2013	10/10/2013									
Arsenic #M	15.5	17.8	2.6	6.9							<0.5	mg/kg	TM30/PM15
Cadmium #M	0.3	1.2	<0.1	0.6							<0.1	mg/kg	TM30/PM15
Chromium #M	14.1	12.5	4.8	14.0							<0.5	mg/kg	TM30/PM15
Copper #M	57	41	7	35							<1	mg/kg	TM30/PM15
Lead #M	32	110	18	132							<5	mg/kg	TM30/PM15
Mercury #M	0.9	0.3	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel #M	41.5	16.4	6.3	22.3							<0.7	mg/kg	TM30/PM15
Selenium #M	<1	<1	<1	<1							<1	mg/kg	TM30/PM15
Sulphur	0.10	0.03	-	-							<0.01	%	TM30/PM15
Total Sulphate BRE	0.06	0.03	-	-							<0.01	%	TM50/PM15
Zinc #M	60	689	27	77							<5	mg/kg	TM30/PM15
Magnesium	0.0013	0.0013	-	-							<0.0001	g/l	TM30/PM20
PAH MS				x20 dilution									
Naphthalene #M	-	-	-	<0.80							<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	-	0.81							<0.03	mg/kg	TM4/PM8
Acenaphthene #M	-	-	-	<1.00							<0.05	mg/kg	TM4/PM8
Fluorene #M	-	-	-	<0.80							<0.04	mg/kg	TM4/PM8
Phenanthrene #M	-	-	-	6.28							<0.03	mg/kg	TM4/PM8
Anthracene #	-	-	-	6.21							<0.04	mg/kg	TM4/PM8
Fluoranthene #M	-	-	-	18.49							<0.03	mg/kg	TM4/PM8
Pyrene #	-	-	-	16.36							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	-	-	10.24							<0.06	mg/kg	TM4/PM8
Chrysene #M	-	-	-	10.10							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	-	-	-	18.71							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	-	-	11.56							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	-	-	-	8.92							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	-	-	1.27							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	-	-	9.40							<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	-	118.4							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	-	13.47							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	-	5.24							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	-	122							<0	%	TM4/PM8
EPH (C8-C40) #M	-	-	-	2216							<30	mg/kg	TM5/PM8
GRO (>C4-C8) #M	-	-	-	<100							<100	ug/kg	TM36/PM12
GRO (>C8-C12) #M	-	-	-	<100							<100	ug/kg	TM36/PM12
GRO (>C4-12) #M	-	-	-	<100							<100	ug/kg	TM36/PM12
MTBE #	-	-	-	<5							<5	ug/kg	TM31/PM12
Benzene #	-	-	-	<5							<5	ug/kg	TM31/PM12
Toluene #	-	-	-	<5							<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	<5							<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	<5							<5	ug/kg	TM31/PM12

Please see attached notes for all abbreviations and acronyms

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	73	74	75	76							LOD	Units	Method No.
Sample ID	BH4	TP03	TP04	TP05									
Depth	0.60	0.30	0.20	0.30									
COC No / misc													
Containers	T	T	T	T									
Sample Date	<>	<>	<>	<>									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	2	2	2	2									
Date of Receipt	10/10/2013	10/10/2013	10/10/2013	10/10/2013									
o-Xylene #	-	-	-	<5							<5	ug/kg	TM31/PM12
Total Phenols HPLC	-	-	-	<0.15							<0.15	mg/kg	TM26/PM21
Chloride (2:1 Ext BRE) #M	0.008	0.007	-	-							<0.002	g/l	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE) #M	<0.0025	0.0040	-	-							<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0317	0.0039	<0.0015	0.0326							<0.0015	g/l	TM38/PM20
Organic Matter	20.9	8.1	1.2	5.5							<0.2	%	TM21/PM24
pH #M	8.31	7.52	7.28	8.45							<0.01	pH units	TM73/PM11
Sample Type	Loamy Sand	Loam	Sand	Sandy Loam								None	PM13/PM0
Sample Colour	Dark Brown	Medium Brown	Light Brown	Medium Brown								None	PM13/PM0
Other Items	stones and clinker	stones	stones	stones								None	PM13/PM0

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : NRA Leachate

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	73	74										
Sample ID	BH4	TP03										
Depth	0.60	0.30										
COC No / misc												
Containers	T	T										
Sample Date	<>	<>										
Sample Type	Soil	Soil										
Batch Number	2	2										
Date of Receipt	10/10/2013	10/10/2013										

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Dissolved Arsenic	<2.5	3.2									<2.5	ug/l	TM30/PM14
Dissolved Cadmium	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Chromium	<1.5	1.8									<1.5	ug/l	TM30/PM14
Dissolved Copper	<7	8									<7	ug/l	TM30/PM14
Dissolved Lead	<5	20									<5	ug/l	TM30/PM14
Dissolved Mercury	<1	<1									<1	ug/l	TM30/PM14
Dissolved Nickel	<2	<2									<2	ug/l	TM30/PM14
Dissolved Selenium	<3	<3									<3	ug/l	TM30/PM14
Dissolved Zinc	<3	210									<3	ug/l	TM30/PM14
Sulphate	7.03	1.42									<0.05	mg/l	TM38/PM0
pH	8.21	7.87									<0.01	pH units	TM73/PM0

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
13/9273	2	TP05	0.30	76	PAH's & Possible tarmac / bitumen

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:



Gemma Newsome
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Description	Asbestos Results	Asbestos Level
13/9273	2	TP05	0.30	76	18/10/13	soil/stones	NAD	NAD

Client Name: Geotechnics

Reference: PN133009

Location: Hough End

Contact: Chris Jones

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
13/9273	2	BH4	0.60	73	All analyses	No sampling date given
13/9273	2	TP03	0.30	74	All analyses	No sampling date given
13/9273	2	TP04	0.20	75	All analyses	No sampling date given
13/9273	2	TP05	0.30	76	EPH	Sample received in inappropriate container
13/9273	2	TP05	0.30	76	All analyses	No sampling date given

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 13/9273

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only accredited when all the requirements of our Quality System have been met. In certain circumstances where the requirements have not been met, the laboratory may issue the data in an interim report but will remove the accreditation, in this instance results should be considered indicative only. Where possible samples will be re-extracted and a final report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.			AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes		AR	Yes
TM4	16 PAH by GC-MS, modified USEPA 8270	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes	Yes	AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.			AR	Yes
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM8	In-house method based on USEPA 3510. ISO 17025 accredited extraction method for organic extraction from solid samples using an end over end agitator.	Yes	Yes	AR	Yes
PM13	Soil Typing for MCERTS	PM0	No preparation is required.			AR	
TM21	TOC and TC by Combustion	PM24	Eltra preparation			AD	Yes
TM26	Phenols by HPLC	PM21	Methanol : NaOH extraction			AR	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030W.ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	No
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific			AD	Yes

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific	Yes	Yes	AD	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM20	in-house method based on USEPA 1311 (TCLP). Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.			AD	Yes
TM31	In-house method based on USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. Accredited to ISO 17025 for soils and waters and MCERTS accredited for soils. Accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific			AR	Yes
TM31	In-house method based on USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID. Accredited to ISO 17025 for soils and waters and MCERTS accredited for soils. Accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes		AR	Yes
TM36	In-House method based on USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-12 by headspace GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS accredited (carbon banding only) on soils. All accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes	Yes	AR	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.			AR	No
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM20	in-house method based on USEPA 1311 (TCLP). Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.	Yes	Yes	AD	Yes
TM50	Total Sulphate by ICP-OES	PM15	In-house method based on USEPA 3010A. Acid digestion of water samples and analsyis by ICP-OES as per method TM030S. ISO 17025 and MCERTS accredited extraction method. All accreditation is matrix specific			AD	Yes
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres			AR	
TM65	Asbestos Bulk Identification	PM42	Screening of soils for fibres	Yes		AR	

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM73	pH in by Metrohm	PM0	No preparation is required.			AR	No
TM73	pH in by Metrohm	PM11	1:2.5 soil/water extraction	Yes	Yes	AR	No

Jones Environmental Laboratory

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Geotechnics
Unit 1B
Borders Industrial Park
River Lane
Chester
Cheshire
CH4 8RJ

Attention :	Chris Jones
Date :	23rd October, 2013
Your reference :	PN133009
Our reference :	Test Report 13/9273 Batch 3
Location :	Hough End
Date samples received :	10th October, 2013
Status :	Final report
Issue :	1

Three samples were received for analysis on 10th October, 2013. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Bob Millward BSc FRSC
Principal Chemist

Client Name: Geotechnics
Reference: PN133009
Location: Hough End
Contact: Chris Jones
JE Job No.: 13/9273

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	78-83	84-89	90-95									
Sample ID	BH1	BH2	BH3									
Depth												
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	<>	<>	<>									
Sample Type	Ground Water	Ground Water	Ground Water									
Batch Number	3	3	3									
Date of Receipt	10/10/2013	10/10/2013	10/10/2013									

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Sulphate #	35.20	52.96	29.80								<0.05	mg/l	TM38/PM0
pH #	7.31	7.43	7.27								<0.01	pH units	TM73/PM0

Client Name: Geotechnics

Reference: PN133009

Location: Hough End

Contact: Chris Jones

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
13/9273	3	BH1		78-83	All analyses	No sampling date given
13/9273	3	BH2		84-89	All analyses	No sampling date given
13/9273	3	BH3		90-95	All analyses	No sampling date given

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 13/9273

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

NOTE

Data is only accredited when all the requirements of our Quality System have been met. In certain circumstances where the requirements have not been met, the laboratory may issue the data in an interim report but will remove the accreditation, in this instance results should be considered indicative only. Where possible samples will be re-extracted and a final report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
OC	Outside Calibration Range
NFD	No Fibres Detected

JE Job No: 13/9273

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			

Appendix G

Soil and Leachate Screening Tables

GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA) - SOILS

Site: Hough End Leisure Centre
Project No.: 02108AA
Client: BDP
Sample Collection Date:
Assessment Scenario: **COMMERCIAL**

Data Source:
SGVs (2009): Derived by the Environment Agency using the CLEA 1.04 software.
GAC (2009): Derived by the LQM/CIEH GAC for Human Health Risk Assessment, 2nd Edition) or by CL:AIRE (The Soil Generic Assessment Criteria for Human Health Risk Assessment, published 2009).

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Document Ref:

INORGANICS & METALS

Determinand	SGV/GAC (mg/kg)	No. of Samples Above the SGV/GAC	Soil Concentration (mg/kg)																		
			BH1	BH2A	BH3	BH4	TP01	TP01	TP02	TP06	TP07	BH4	TP03	TP04	TP05	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
			0.25m	0.25m	1.0m	1.0m	0.3m	1.0m	0.7m	0.5m	0.3m	0.6m	0.3m	0.2m	0.3m	Depth	Depth	Depth	Depth	Depth	Depth	Depth
Boron	192000	0																				
Arsenic	640	0	11.1	12.1	1.7		23.9		3.3	3.6	3.5	15.5	17.8	2.6	6.9							
Cadmium	230	0	0.2	0.2	0.1		0.3		0.1	0.2	0.6	0.3	1.2	0.1	0.6							
Chromium III	30400	0	34.6	10.4	14.7		11.3		14.7	23.4	10.8	14.1	12.5	4.8	14							
Copper	71700	0	29	26	4		89		2	21	30	57	41	7	35							
Lead	750	0	44	62	8		149		10	17	72	32	110	18	132							
Mercury - Elemental	26	0	0.1	0.1	0.1		0.1		0.1	0.1	0.1	0.9	0.3	0.1	0.1							
Nickel	1800	0	18.6	13.7	15.5		25.6		6	28.2	22	41.5	16.4	6.3	22.3							
Selenium	13000	0	1	1	1		1		1	1	1	1	1	1	1							
Zinc	665000	0	59	120	39		81		15	55	105	60	689	27	77							
Sulphate (water soluble)	No Critera	0	0.685	0.0015	0.0037	0.0015	0.0117	0.0157	0.0015	0.0137	0.0032											
pH (no units)	No Critera	0																				
Cyanide - Total	No Critera	0																				
Sulphide	No Critera	0																				
Sulphur (%)	No Critera	0								0.03	0.04	0.1	0.03									

GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA) - SOILS

Site: Hough End Leisure Centre
Project No.: 02108AA
Client: BDP
Sample Collection Date:
Assessment Scenario: **COMMERCIAL**

Data Source:
SGVs (2009): Derived by the Environment Agency using the CLEA 1.04 software.
GAC (2009): Derived by the LQM/CIEH GAC for Human Health Risk Assessment, 2nd Edition) or by CL:AIRE (The Soil Generic Assessment Criteria for Human Health Risk Assessment, published 2009).

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ORGANICS

SOM (%)	6		Soil Concentration (mg/kg)																		
Determinand	**SGV/GAC (mg/kg)**	**No. of Samples Above the SGV/GAC**	BH1	BH2A	BH3	BH4	TP01	TP01	TP02	TP06	TP07	BH4	TP03	TP04	TP05	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
			0.25m	0.25m	1.0m	1.0m	0.3m	1.0m	0.7m	0.5m	0.3m	0.6m	0.3m	0.2m	0.3m	Depth	Depth	Depth	Depth	Depth	Depth	Depth
Naphthalene	1100	0					0.23								0.8							
Acenaphthylene	100000	0					0.69								0.81							
Acenaphthene	100000	0					0.21								1							
Fluorene	71000	0					0.26								0.8							
Phenanthrene	23000	0					3.49								6.28							
Anthracene	540000	0					1.29								6.21							
Fluoranthene	23000	0					10.3								18.49							
Pyrene	54000	0					9.27								16.36							
Benzo[a]anthracene	97	0					5.48								10.24							
Chrysene	140	0					5.34								10.1							
Benzo[b]fluoranthene	100	0					6.65								13.47							
Benzo[k]fluoranthene	140	0					2.59								5.24							
Benzo[a]pyrene	14	0					5.95								11.56							
Indeno[123-cd]pyrene	62	0					3.49								8.92							
Dibenzo[ah]anthracene	13	0					1.18								1.27							
Benzo[ghi]perylene	660	0					4.04								9.4							
Benzene	95	0					0.005								0.005							
Toluene	4400	0					0.005								0.005							
Ethylbenzene	2800	0					0.005								0.005							
p-xylene	3200	0					0.005								0.005							
o-xylene	2600	0					0.005								0.005							
Aliphatics EC >8-10	12000	0					100								100							
Aromatics EC >8-10	18000	0					100								100							
Aliphatics EC >10-12	49000	0					100								100							
Aromatics EC >10-12	34500	0					100								100							
Aliphatics EC >12-16	91000	0					3606								2216							
Aromatics EC >12-16	37800	0					3606								2216							
Aliphatics EC >16-35	1800000	0					3606								2216							
Aromatics EC >16-21	28000	0					3606								2216							
Aromatics EC >21-35	28000	0					3606								2216							
Dichlorodifluoromethane	No Critera	0																				
Chloromethane	1.6	0																				
Vinyl Chloride	0.12	0																				
Bromomethane	No Critera	0																				
Chloroethane	2100	0																				
Trichlorofluoromethane	No Critera	0																				
Dichloroethene 1,1-	92	0																				
trans-1,2-Dichloroethene	81	0																				
Dichloroethane 1,1-	850	0																				
Methyl tertiary butyl ether (MTBE)	24000	0																				
Dichloropropane 2,2-	No Critera	0																				
cis-1,2-Dichloroethene	47	0																				
Bromochloromethane	No Critera	0																				
Chloroform	No Critera	0																				
Trichloroethane 1,1,1-	No Critera	0																				
Carbontetrachloride	No Critera	0																				
Dichloropropene 1,1-	No Critera	0																				
Benzene	95	0																				
Dichloroethane (1,2-DCA)	1.8	0																				
Trichloroethene (TCE)	55	0																				
Dichloropropane 1,2,-	12	0																				
Dibromomethane	No Critera	0																				
Bromodichloromethane	7.6	0																				
cis-1,3-Dichloropropene	No Critera	0																				

GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA) - LEACHATE

Site:
Project No.:
Client:
Sample Collection Date:

Water Quality Standard (WQS) Selection Hierarchy:
1 - UK Drinking Water Standards (UK DWS)
2 - Environmental Quality Standards Freshwater (EQS FW)
3 - World Health Organisation (WHO)
Data Source: Environment Agency H1 Environmental Risk Assessment – Annex J, v2.0, April 2010

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				Water Concentration (mg/l)																		
Determinand	**WQS (mg/l)**	**No. of Samples Above the WQS**		TP07-0.3m	BH04-0.6m	TP03-0.3m	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
Calcium	250	0																				
Magnesium	50	0																				
Sodium	200	0																				
Potassium	12	0																				
Nickel	0.02	0		0.002	0.002	0.002																
Chromium	0.0001	3		0.0015	0.0015	0.0018																
Cadmium	0.005	0		0.0005	0.0005	0.0005																
Copper	0.05	0		0.007	0.007	0.008																
Lead (inorganic - dissolved)	0.01	1		0.005	0.005	0.02																
Zinc	5	0		0.004	0.003	0.21																
Manganese	0.05	0																				
Iron	0.2	0																				
Aluminium	0.2	0																				
Arsenic	0.01	0		0.0042	0.0025	0.0032																
Boron	1	0																				
Mercury	0.001	0		0.001	0.001	0.001																
Selenium	0.01	0		0.003	0.003	0.003																
Vanadium	0.02	0																				
Molybdenum	0.07	0																				
Barium	1	0																				
Phosphorous	2.2	0																				
Naphthalene	0.01	0																				
Benzo [a] pyrene	0.00001	0																				
Polycyclic Aromatic Hydrocarbons (I	0.0001	0																				
Benzene	0.001	0																				
Toluene	0.05	0																				
Ethylbenzene	0.3	0																				
Xylene	0.03	0																				
Oils/hydrocarbons (by Pet Ether ext	0.01	0																				
Vinyl chloride (chloroethene)	0.0005	0																				
Dichloroethene 1,1 (1,1-DCE)	0.03	0																				
Dichloroethene 1,2- (1,2-DCE)	0.05	0																				
Chloroform	0.012	0																				
Trichloroethane 1,1,1 (1,1,1-TCA)	0.1	0																				
Benzene	0.001	0																				
Dichloroethane 1,2- (1,2-DCA)	0.003	0																				
Trichloroethene (TCE)	0.01	0																				
Dichloropropane 1,2-	0.0001	0																				
Dichloropropene 1,3-	0.0001	0																				
Toluene	0.05	0																				
Trichloroethane 1,1,2 (1,1,2-TCA)	0.4	0																				
Tetrachloroethene (PCE)	0.01	0																				
Dichloropropene 1,3-	0.0001	0																				
Ethylbenzene	0.3	0																				
Xylene	0.03	0																				
Styrene	0.05	0																				
Dichlorobenzene 1,4-	0.3	0																				
Dichlorobenzene (1,2-)	1	0																				
dibromo-3-chloropropane (1,2-)	0.0001	0																				
Trichlorobenzenes (total)	0.0004	0																				
Naphthalene	0.01	0																				
<BLANK>	N/A	0																				
<BLANK>	N/A	0																				
<BLANK>	N/A	0																				
<BLANK>	N/A	0																				
<BLANK>	N/A	0																				
<BLANK>	N/A	0																				