

Edwins Close, Barnsley
Desk Study Report
Yorkshire Housing

Solmek Report Number S90715

August 2009

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Edwins Close, Barnsley

Desk Study Report

Contract Number: S90715
Date: August 2009

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Status	Date	Prepared by	Checked by
Final	August 2009	S. J. Fisk Geotechnical Engineer	A. Cutts Engineering Geologist

Edwins Close, Barnsley

Desk Study Report

1 INTRODUCTION AND SCOPE OF WORKS

- 1.1 Solmek were instructed by Acanthus WSM Architects on behalf of Yorkshire Housing to undertake a desk study on a parcel of land south of Edwins Close, Barnsley.
- 1.2 The following steps may be required in the investigation and remediation of potentially contaminated land:
- Phase 1: Desk Study
 - Phase 2: Intrusive Investigation
 - Phase 3: Remediation Statement
 - Phase 4: Validation Reports
- 1.3 Phases 1 and 2 are generally required in the redevelopment of most sites. Phases 3 and 4 are subject to the findings of the initial stages. This report represents Phase 1 of the site investigation.
- 1.4 The purpose of this desk study is to evaluate the ground conditions of the site based on existing information and to plan the scope of the subsequent investigation. The objectives and planned outcomes of the desk study are:
- to assess the impact of local authority guidance on the investigation
 - to identify existing features on and near the site
 - to evaluate the historical and environmental setting of the site
 - to assess the likelihood of finding contamination, its nature and extent
 - to identify associated key contaminants
 - to identify sensitive receptors and define source – pathway – receptor relationships (conceptual model)
 - to identify relevant geotechnical parameters
 - to assess any potential sources of ground gas
 - to assess potential risk of shallow mining
 - to make recommendations for the proposed intrusive investigation
 - to identify constraints to the investigation, i.e. site access and health and safety considerations
- 1.5 This assessment has been undertaken with due regard to contaminated land guidance, issued by the Royal Institution of Chartered Surveyors (RICS) and BS 10175: 2001, “Code of Practice for the Investigation of Potentially Contaminated Land”. Selected elements of BS 5930: 1999, “Code of Practice for Site Investigations” has also been included.

2 REGULATORY AND PLANNING CONTEXT

- 2.1 The Town and Country Planning Regime is the principal means by which contamination is dealt with by the Local Authority. Contaminated land is a material planning consideration and contamination assessments are required on land that may be potentially contaminated.
- 2.2 The Buildings Regulations (2000) also state that “precautions shall be taken to avoid danger to health and safety caused by substances found on or in the ground covered by the building”. A site investigation is frequently required to satisfy the requirements of building control.

3 SITE DESCRIPTION

- 3.1 The preliminary site inspection, as recommended in BS 5930 and BS 10175, was undertaken on Thursday 30th July 2009. Location maps are presented in Appendix 1. The site is centred at the approximate Ordnance Survey Co-ordinates 434965E, 409306N.
- 3.2 The site comprises an irregularly shaped parcel of land that is generally level in topography. The site cover is composed of bare earth with occasional surface demolition rubble. Areas of wild seeded rough grass, weeds and saplings also beginning to grow on site. The boundary of site is marked by a 2m high galvanised metal railing fence.
- 3.3 The site is surrounded by open fields to the south with residential housing to the east and an office building complex to the west. Edwins Close runs along the northern boundary of site.

4 SITE HISTORY

- 4.1 In order to determine the history of the site, previous editions of Historical Maps and Ordnance Survey Plans were inspected. Selected map extracts are presented in Appendix 2.
- 4.2 Table 1 presents a summary of the history of the site from 1890 to 2008. The summary focuses on the historical land uses and changes relevant to the site and the proposed end use. Measurements are taken from the centre of the site and all distances quoted are approximate.

OS MAP	SCALE	ON SITE FEATURES	OFF SITE FEATURES
1890-1891	1:10,560	The site is a parcel of inferred agricultural land. A track runs through the northeast corner of the site.	The immediate surroundings comprise agricultural land with Low Athersley Wood 50m to the southeast. Carlton Lane is shown 50m north with a number of rural residences/farm buildings present. East Gawber Hall Colliery is shown approximately 500m southwest of site with a railway line serving the colliery present beyond. Approximately 700m to the south is Primrose Main Colliery with Wharncliffe Carlton Colliery and an unidentified Colliery beyond to the south. Wharncliffe Woodmoor Colliery is shown approximately 800m northeast with a second railway line that runs to the northwest and is closest to the site approximately 600m north. Carlton Reservoir is shown 500m east of site.
1892-1893	1:2,500	No changes.	Two wells are shown to the immediate northwest of site.
1904	1:10,560	No apparent changes.	No significant changes.
1906	1:2,500	No changes.	No significant changes.
1929-1930	1:10,560	No apparent changes.	A series of semi detached houses have been developed to the northwest along Carlton Lane. Wharncliffe Woodmoor Colliery to the east has increased in size. East Gawber Colliery is no longer present and a sewage works is now present in that area. The collieries to

			the far south are no longer shown. The reservoir 500m to the east of site is now shown as disused.
1938	1:10,560	No apparent changes.	A series of roads and housing has been developed 250m to the west. Approximately 800m southeast an area of residential housing has been developed.
1948	1:10,560	An L-shaped structure is now present along the northwest boundary and partially encroaching onto the centre of the site.	Residential housing is under development 400m to the east and southeast and over 500m to the west.
1951	1:10,560	An extension has been added to the structure on the southeast part of the site.	A new structure is present approximately 50m west of site. A residential estate is under construction to the immediate east of site.
1958-1961	1:2,500	The structure on site is identified as St Edwin's Junior School.	The structure to the west of site is identified as Richard Newman Infant School and St Hilda's Junior School is now present 50m to the southwest of site and Athersley Junior School approximately 200m south. The surrounding areas are now heavily developed with semi-detached residential housing.
1959-1961	1:1,250	No changes.	No significant changes.
1965-1966	1:10,560	No apparent changes.	The surrounding areas are developed with residential housing estates identified as New Lodge, Athersley and Athersley North. The collieries to the south are no longer shown. The colliery to the east is now shown as a mine.
1971-1976	1:1,250	No changes.	No significant changes.
1973-1978	1:10,000	No apparent changes.	The railway lines to the north and west are now shown as dismantled.
1982	1:10,000	No apparent changes.	No significant changes.
1989-1993	1:10,000	he structure on site is labelled as offices.	A horse-shoe shaped structure is now shown to the immediate west of site.
1991	1:1,250	The structure on site is now shown as a Community Centre, Council Offices and St. Edwins Centre.	The horse-shoe shaped structure to the west is identified as St Edwin's Court (Home for the Aged).
2002	1:10,000	Some of the structures have been removed from site.	St Hilda's Junior School to the south has been demolished.
2008	1:2,500	No changes.	No significant changes.
2008	1:10,000	No apparent changes.	No significant changes.
TABLE 1: SUMMARY OF THE SITE HISTORY			

- 4.3 Initially the site was a parcel of agricultural land and was developed on the 1948 OS map with an L-shaped structure that was extended on the 1951 map edition. This was identified a St. Edwins Junior School. On the 1991 OS map the structure was shown as a Community Centre, Council Office and St Edwins Centre.
- 4.4 The area initially comprised mostly undeveloped agricultural land with a number of rural residences/farm buildings present. A number of collieries were shown to the south and east of the site with related railway lines to the north and west. The railway lines were shown as dismantled on the 1973-1978 OS map. The surrounding areas witnessed a steady

residential development from the 1938 map along with gradual decline and removal of the collieries until the 1960's when the development slowed.

5 ENVIRONMENTAL CONTEXT

- 5.1 The services of Ground Sure were used to establish the pertinent environmental records relating to the site. This information, which is presented in Appendices 3 (EnviroInsight Report) and 4 (GeoInsight Report), replaces much of the information traditionally provided by the Environment Agency. Selected relevant information is summarised as follows. Measurements are taken from the centre of the site and all distances quoted are approximate.

Landfill and Waste

- 5.2 Numerous Environmental Agency Historic Landfill sites are included within the Ground Sure Report. The nearest is located 745m south of site; however the type of waste is not shown.
- 5.3 Three records of Local Authority landfill sites are shown within the Ground Sure Report. The closest of these is located 826m southwest and is shown as a refuse tip (1970 mapping).
- 5.4 One BGS/DoE non-operational landfill site is located 977m south of site. The type of waste is not listed; however it is noted that the site is no risk to aquifers.
- 5.5 Several Records of Environmental Agency (REGIS) waste sites are shown in the Ground Sure Report. The closest entry is shown 991m south and the site is listed as a household, commercial and industrial transfer station.

Regulated Industries

- 5.6 No entries are included under the headings of Integrated Pollution and Controls, Water Industry Referrals, Dangerous Substance Inventory Sites, or Records of Radioactive Substance Listings.
- 5.7 One Local Pollution Prevention and Control Authorisation is shown 440m west of site. The authorisation is for a dry cleaners and the status is shown as pending.

Industrial Land Use

- 5.8 The Ground Sure Report identifies current industrial land use. Three entries are included within the Ground Sure Report and the closest of these is shown 25m north of site and is for pest and vermin control. For full details see the Ground Sure Report (Appendix 3).
- 5.9 No entries are included under the heading of Petrol and Fuel sites within the Ground Sure Report.
- 5.10 No underground high pressure oil or gas pipelines are shown within 500m of the site.

Environmentally Sensitive Areas

- 5.11 The site is shown to be located within a nitrate vulnerable zone as designated by DEFRA.

6 GEOLOGY, GROUNDWATER & SURFACE WATER

Geology

- 6.1 Inspection of British Geological Survey Sheet 87 Barnsley (1:50,000 Series: Solid and Drift Edition) was undertaken. The solid geology is expected to consist of sandstone from the Woolley Edge Rock member of the Middle Coal Measures of Upper Carboniferous age. The

strata are shown as dipping approximately 2 degrees to the northeast. Drift deposits are expected to comprise boulder clay. A fault is noted on the geological sheet in the vicinity of site and is listed within the GeoInsight Report as being an inferred normal fault, crossing the north western corner of the site in a northeast-southwest trend and with a downthrow to the north.

Geological Hazards

- 6.2 The Ground Sure Report states that there is a negligible risk of subsidence hazards posed by soluble rocks, compressible ground and collapsible rocks. A very low risk is shown for hazards caused by landslides and running sand. A low risk is shown for hazards caused by shrinking/swelling hazards. For full details see the Ground Sure Report (Appendix 4).
- 6.3 The Ground Sure Report states that there is a low-moderate risk posed by shallow mining hazards.

Radon Risk

- 6.4 The Ground Sure Report states that the site is not within a Radon affected area as less than 1% of homes are above the action level; therefore no radon protective measures are necessary in the construction of new dwellings or extensions.

Mining Situation

- 6.5 The Ground Sure Report states that the site is located within a coal mining area and a coal mining report is presented in appendix 5. The mining report, dated 14th August 2009, states that there are six known worked coal seams beneath the site. The shallowest of these is the Two Foot seam at a depth of 45m with a worked cross section of 95cm and the last date of working is shown as 1937. There are no known shafts or adits within 20m of the property and there are no tips or lagoons in the vicinity of the property. The investigation has shown no evidence of coal mining related subsidence in relation to the property in the past ten years and the report concludes that although old workings are present all settlement is likely to have completed long ago.

Ground and Surface Water

- 6.6 The Ground Sure Report shows that the underlying solid geology beneath the site is classified as a minor aquifer.
- 6.7 The Ground Sure Report classifies the soils on site as having a high leaching potential.
- 6.8 No surface water features are shown within 250m of the site.
- 6.9 No Discharge Consents are listed in the Ground Sure Report.
- 6.10 No groundwater, surface water or potable water abstraction licences are shown within the Ground Sure Report.
- 6.11 No Source Protection Zones are located within 500m of the site.

Flooding

- 6.12 The Ground Sure Report shows that no Environment Agency Indicative Zone 2 or Zone 3 Floodplains are located within 250m of site.
- 6.13 The Ground Sure Report shows that no flood defences or flood storage areas are located within 250m of site.
- 6.14 It is noted within the EnviroInsight Report that there is a Groundwater Flooding Susceptibility Area located within 50m of the boundary of the site. The susceptibility to groundwater

flooding based on underlying geological conditions is classified as not applicable. The Ground Sure report states that where groundwater flooding susceptibility is classified as not applicable no further action need be taken in relation to groundwater hazards in this area.

7 PRELIMINARY GEOTECHNICAL ASSESSMENT

Relict Foundations and Made Ground

- 7.1 Given the site history made ground is likely to be encountered on site. Made ground is likely to comprise construction/demolition waste such as ash, concrete and brick rubble from the former development on site. Due to the age of the former structure on site asbestos may also be present. A Phase 2 investigation would determine the type and extent of made ground.
- 7.2 Some development has taken place on site; therefore there is the potential for buried construction wastes along with relict foundations from the former structures. The client is advised to obtain full utility drawings for the site before commencing any ground works.

Excavations and Groundwater

- 7.3 The solid geology is expected to consist of the sandstone from the Woolley Edge Rock member of the Middle Coal Measures of Upper Carboniferous age. Drift deposits are expected to comprise boulder clay. A fault is noted on the geological sheet in the vicinity of site and is inferred in the Geolnsight Report as being a normal fault. It is considered likely that excavations above rock head should be easily achievable by means of a normal excavator.
- 7.4 There is no evidence to suggest that groundwater will be encountered at shallow depths; however groundwater levels are influenced by seasonal variations and rainfall.

Mining

- 7.5 The mining report states that there are six known worked coal seams beneath the site. The shallowest of these is the Two Foot seam at a depth of 45m with a worked cross section of 95cm and the last date of working is shown as 1937. There are no known shafts, adits, tips or lagoon in the vicinity of the property and the investigation has shown no evidence of coal mining related subsidence in the past ten years. The report concludes that although old workings are present all settlement is likely to have completed long ago.

8 PRELIMINARY CONTAMINATION ASSESSMENT

- 8.1 The desk study has revealed that the site has **potentially** been exposed to contamination given its history. There is a possibility of contamination from the former developments on site. There is the potential for construction waste comprising materials such as ash, brick rubble and concrete along with asbestos.

Development Proposals

- 8.2 The proposal is for development of a residential estate comprising a mixture of semi-detached and terraced residential houses with related hardstanding, access roads and landscaped garden areas.

Potential Hazards from Ground Gases

- 8.3 Ground gases such as carbon dioxide and methane can be classed as a form of contamination. Potential sources of ground gases include:

- Made Ground

- Quarries & Infilled Ponds
- Underlying Natural Strata (alluvium, peat and chalk)
- Petrol re-fuelling sites (which also includes Volatile Organic Compounds)
- Landfill (on and off-site)
- Coal measures

8.4 Based on historical map evidence and consideration of the sites environmental setting, a preliminary comparison of *consequence* against *probability* has been made where ground gas is considered a potential threat to human health.

PRELIMINARY GROUND GAS ASSESSMENT		
Potential Sources	Potential Pathway	Receptor
Coal Measures (CO ₂ , CO and CH ₄)	Ingress and Accumulation into buildings from vertical and horizontal migration	Future end users – possible adult, elderly and infant receptors from the proposed housing development.
Alluvium deposits (CH ₄ and CO ₂)		
Landfill Site (CO ₂ and CH ₄)	Ingress and Accumulation into buildings from vertical and horizontal migration	Construction Workers (in particular utility workers).
Made Ground (CO ₂ and CH ₄)	Ingress and Accumulation into buildings from vertical and horizontal migration	
Petrol Refilling Station (CH ₄ and VOC)	Inhalation of vapours	
Preliminary Comparison of Consequence versus Probability		
	Classification	Justification
Probability <i>(Based on Table 8.1, CIRIA C665, 2007)</i>	LIKELY	The nearest waste facility is located 745m south of site and is listed as a historic landfill site. The mining report states that there are six known worked coal seams beneath the site. The shallowest is at a depth of 45m with a worked cross section of 95cm and the last date of working is shown as 1937.
Consequence <i>(Based on Table 8.2, CIRIA C665, 2007)</i>	MEDIUM	Development of residential housing with related hardstanding for access road and parking along with soft landscaping for garden areas.
	Risk	Details
Consequence vs. Probability <i>(Based on Table 8.3, CIRIA C665, 2007)</i>	MODERATE RISK	Investigation (if not undertaken already) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term. <i>(Based on Table 8.4, CIRIA C665, 2007)</i>
TABLE 2: POLLUTION LINKAGES - GROUND GAS		

8.5 Given the pollution linkages outlined above, it would be prudent to carry out full intrusive works to justify the above risk assumption; this would give the site a risk classification based on the recommendations given in CIRIA Report C665.

9 PHASE TWO – INTRUSIVE INVESTIGATION WORK

9.1 Based on the information collated in this desk study a Phase Two intrusive investigation is recommended. The investigation should comprise a series of boreholes to identify ground conditions beneath the footprint of proposed structures. Boreholes may need to be extended if poor ground conditions are encountered. Trial pitting may be used to provide information

on intermediate ground conditions and for bulk sampling on the made ground for chemical testing.

- 9.2 Samples from the boreholes should be subject to a series of both geotechnical and chemical contamination analysis. Testing requirements may vary depending on the thickness of the made ground encountered, the nature of the natural soils and the depth to rock head if encountered.
- 9.3 Due to the possible presence of fill materials beneath the site gas/groundwater monitoring pipes should be installed in selected boreholes (in accordance with C665) to assess the shallow ground gas and water levels beneath the site. A minimum of three visits should be made initially. However, if high or variable concentrations of ground gases are recorded, an extended period of monitoring maybe necessary.
- 9.4 Site investigations are designed according to the type of development, the requirements of the client, and recommendations in BS 5930 and BS 10175.

10 PRELIMINARY CONCEPTUAL MODEL AND RISK ASSESSMENT

- 10.1 The conceptual model (Table 3) collates the salient aspects of the site to form a model which should enable comparison after fieldwork and testing. This model identifies the **potential** pollution linkages that may influence the proposed development and geotechnical considerations. The risk ratings are based on the current potential liabilities and likely potential future liabilities. This should not be used as a guide to the cost of addressing site specific ground issues. The risks posed by the geotechnical and contamination aspects of the site will be revised following site works, and any mitigating action required added.

PRELIMINARY CONTAMINATION ASSESSMENT					
SOURCES	DETAILS	RECEPTORS	PATHWAYS	DETAILS	RISK RATING
Potential contamination in the made ground	Possible sources include: Possible construction or demolition waste such as ash, brick rubble and concrete. Possible asbestos.	Users of site (once development is complete)	Dermal absorption	Soft landscaping is expected to be present as garden areas.	LOW/MOD
			Inhalation of soil/volatized compounds		
			Ingestion of soil- home grown produce		
			Contact with contaminated drinking water and groundwater		
			Ground gas from vertical and horizontal migration	Ingress and Accumulation into structure.	
	Construction workers and users of site during construction	Construction workers and users of site during construction	Dermal absorption	Contact with made ground and groundwater during ground works	LOW
			Inhalation of soil/volatized compounds		
			Ingestion of soil	Contact with dust during construction	
	Users of surrounding sites	Users of surrounding sites	Dermal absorption	Contact with wind blown dust during construction	LOW
			Inhalation of soil/volatized compounds		
	Vegetation	Vegetation	Ingestion of soil	Soft landscaping is expected to be present as garden areas.	LOW/MOD
			Uptake via roots and leaf surfaces		

	Groundwater	Slow seepage or leaching of contaminants	Minor Aquifer with soils of a high leaching potential.	LOW
	Surface Water	Slow seepage or leaching of contaminants	No surface water features are located within 250m of site. The site is not located within a Source Protection Zone	LOW
		Accumulation of contaminated sediments		
	Construction Materials	Direct contact	Foundations, buried structures and services are possible on site.	MOD
PRELIMINARY GEOTECHNICAL ASSESSMENT				
FACTOR	ON SITE DESCRIPTION			RISK RATING
MADE GROUND	Made ground is expected to include brick rubble, concrete and possible asbestos.			MOD
NATURAL SOILS	Boulder clay.			LOW
SOLID GEOLOGY	Sandstone of the Woolley Edge Member of the Middle Coal Measures of Upper Carboniferous Age.			LOW
MINING	There are six known worked coal seams beneath the site. The shallowest of these is the Two Foot seam at a depth of 45m with a worked cross section of 95cm and the last date of working is shown as 1937. The investigation has shown no evidence of coal mining related subsidence in the past ten years and although old workings are present all settlement is likely to have completed long ago.			LOW
GROUND GAS	Ground gas assessment is recommended.			MOD
RADON PROTECTION	No radon protection measures required			LOW
SUBSIDENCE /GROUND STABILITY	No ground subsidence/instability anticipated.			LOW
FLOODING SUCCEPTIBILITY	No Zone 2 or 3 Environment Agency Indicative Floodplains are present within 250m of site.			LOW
TABLE 3: PRELIMINARY CONCEPTUAL MODEL AND RISK ASSESSMENT				

11 CONCLUSIONS & RECOMMENDATIONS

- 11.1 The results of the desk study are presented in this report and Solmek can comment as follows:

Existing Features on and Near the Site

- 11.2 The site comprises an irregularly shaped parcel of land that is generally level in topography. The site cover is composed of bare earth with occasional surface demolition rubble. Areas of wild seeded rough grass, weeds and saplings are also beginning to grow on site. The boundary of site is marked by a 2m high galvanised metal railing fence.

- 11.3 The site is surrounded by open fields to the south with residential housing to the east and an office building complex to the west. Edwins Close runs along the northern boundary of site.

Historical and Environmental Setting

- 11.4 Initially the site was a parcel of agricultural land and was developed on the 1948 OS map with an L-shaped structure that was extended on the 1951 map edition. This was identified a St. Edwins Junior School. On the 1991 OS map the structure was shown as housing a Community Centre, Council Office and St Edwins Centre.

- 11.5 The area initially comprised mostly undeveloped agricultural land with a number of rural residences/farm buildings present. A number of collieries were shown to the south and east of the site with related railway lines to the north and west. The railway lines were shown as dismantled on the 1973-1978 OS map along with the gradual decline and removal of the collieries. The surrounding areas witnessed a steady residential development from the 1938 OS map until the 1960's when the development slowed.

- 11.6 The solid geology is expected to consist of sandstone from the Woolley Edge Rock member of the Middle Coal Measures of Upper Carboniferous age. The strata are shown to dip approximately 2 degrees to the northeast. Drift deposits are expected to comprise boulder clay. A fault is noted on the geological sheet in the vicinity of site and is listed within the GeoInsight Report as being an inferred normal fault that crosses the northwest corner of the site in a northeast-southwest trend with a downthrow to the north.
- 11.7 The solid geology beneath the site is designated as a Minor Aquifer. The Ground Sure Report classifies the soils on site as having a high leaching potential.
- 11.8 The Ground Sure Report states that the site is not within a Radon affected area as less than 1% of homes are above the action level; therefore no radon protective measures are necessary in the construction of new dwellings or extensions.

Flooding

- 11.9 The Ground Sure Report shows that there no Environment Agency Indicative Zone 2 or Zone 3 Floodplains are located within 250m of site.
- 11.10 The Ground Sure Report shows that no flood defences or flood storage areas are located within 250m of site.
- 11.11 It is noted within the EnviroInsight Report that there is a Groundwater Flooding Susceptibility Area located within 50m of the boundary of the site with the susceptibility to groundwater flooding classified as not applicable.

Impact of Local Authority Guidance

- 11.12 Although the site is unlikely to be considered contaminated with regards to Part IIA of the Environmental Protection Act (1990) and the local authorities contaminated land strategy, the contamination status of the site will be considered as part of the planning process to ensure the site is suitable for use.

Likelihood of Finding Contamination, its Nature and Extent and Key Contaminants

- 11.13 Based on the site walkover, and evidence compiled from the historic maps and Ground Sure Report, contamination is possible due to the former development on site. Made ground is expected to contain construction and demolition debris such as ash, brick rubble and concrete, along with possible asbestos.

Source – Pathway – Receptor Relationships

- 11.14 Pathways (as detailed in the conceptual model) may exist between the potential contamination in the made ground and human health, construction materials, vegetation and water. The site investigation will provide information to assess these pathways and the risks posed.

Proposed Development

- 11.15 The proposal is for development of a residential estate comprising a mixture of semi-detached and terraced residential houses with related hardstanding, access roads and landscaped garden areas.

Geotechnical Considerations

- 11.16 Given the site history made ground is likely to be encountered on site. The made ground is likely to comprise construction/demolition materials such as ash, concrete, and brick rubble from the former school and offices on site. Due to the age of the former structures on site

asbestos may also be present. A Phase 2 investigation would determine the type and extent of made ground.

- 11.17 Some development has taken place on site; therefore there is the potential for buried construction wastes along with relict foundations and services from the former structure. The client is advised to obtain full utility drawings for the site before commencing any ground works.

Intrusive Investigation

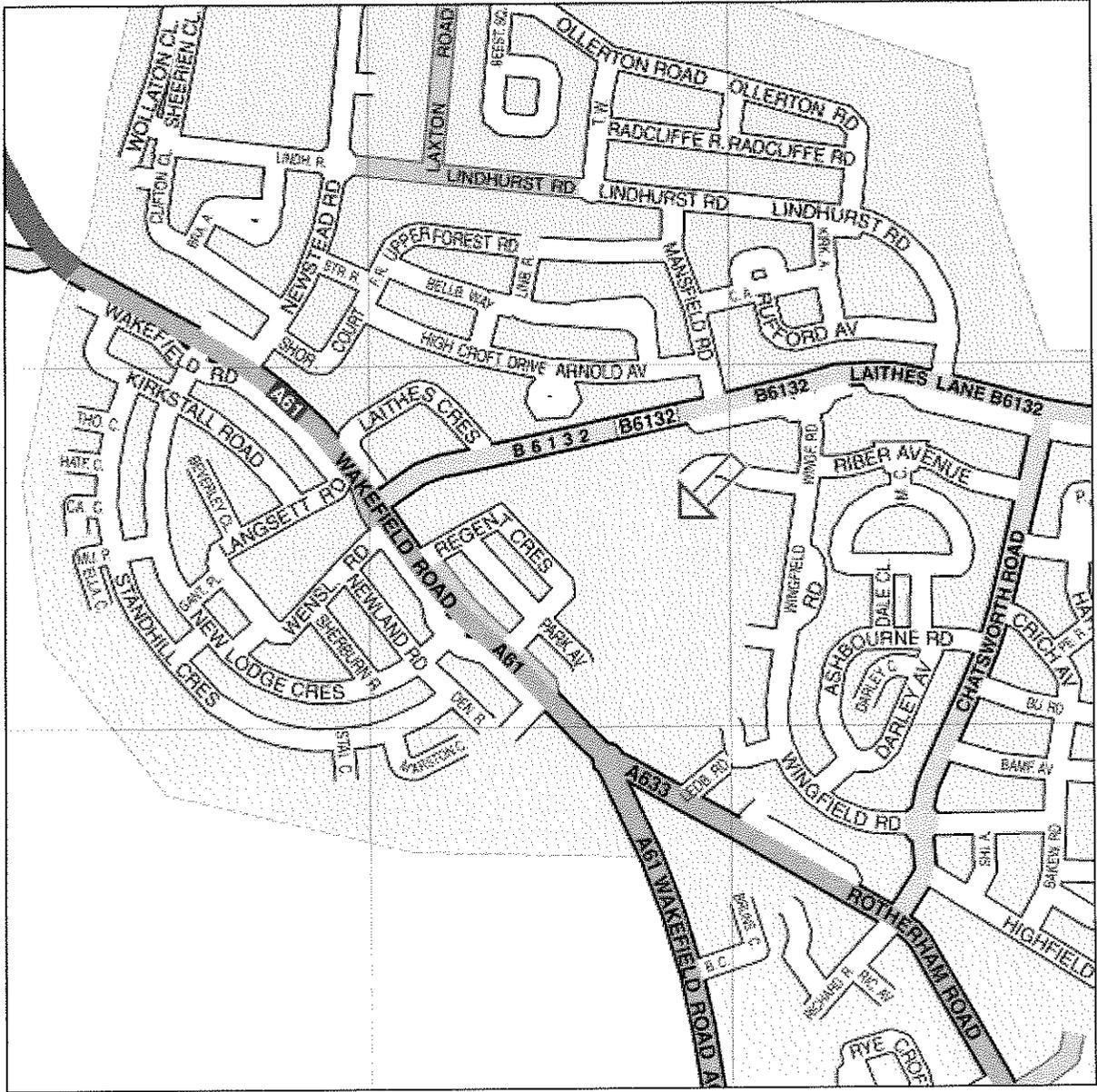
- 11.18 Based on the information collated in this desk study a Phase Two intrusive investigation is recommended. The investigation should comprise a series of boreholes to identify ground conditions beneath the footprint of proposed structures. Boreholes may need to be extended if poor ground conditions are encountered. Trial pitting may be used to provide information on intermediate ground conditions and for bulk sampling on the made ground for chemical testing.
- 11.19 Samples from the boreholes should be subject to a series of both geotechnical and chemical contamination analysis. Testing requirements may vary depending on the thickness of the made ground encountered, the nature of the natural soils and the depth to rock head if encountered.
- 11.20 Due to the possible presence of fill materials beneath the site gas/groundwater monitoring pipes should be installed in selected boreholes (in accordance with C665) to assess the shallow ground gas and water levels beneath the site. A minimum of three visits should be made initially. However, if high or variable concentrations of ground gases are recorded, an extended period of monitoring maybe necessary.

Mining

- 11.21 The mining report states that there are six known worked coal seams beneath the site. The shallowest of these is the Two Foot seam at a depth of 45m with a worked cross section of 95cm and the last date of working is shown as 1937. There are no known shafts or adits within 20m of the property and there are no tips or lagoon in the vicinity of the property. The investigation has shown no evidence of coal mining related subsidence in relation to the property in the past ten years and the report concludes that although old workings are present all settlement is likely to have completed long ago.

SOLMEK

**APPENDIX 1:
Figures and Plates**



Client:	Yorkshire Housing	
Project:	Edwins Close, Barnsley	
Title:	Site Location Map	
Drawing No:	Figure 1	Scale: NTS
Date	August 2009	



Title

Site Location Plan

Project

Edwins Close, Barnsley

Client

Yorkshire Housing

Date

August 2009

Fig No

Figure 2

Scale

NTS

Solmek

12 Yarm Road

Stockton on Tees

Cleveland

TS18 3NA

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Fax: +44 (0) 1642 612 355

Email: south@solmek.com

www.solmek.com

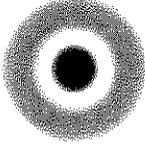




Plate 1: An overview of site looking to the east showing the site surrounded by the railing fence and residential surroundings

Client:	Yorkshire Housing	
Project:	Edwins Close, Barnsley	
Title:	Plates 1	
Drawing No:	Figure 3	Scale: NTS
Date	August 2009	

**APPENDIX 2:
Historical Map Extracts**



GroundSure

Site Details:

OFF EDWINS CLOSE,
BARNESLEY, S71 3BH

Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: County Series

Map date: 1892-1893

Scale: 1:2,500

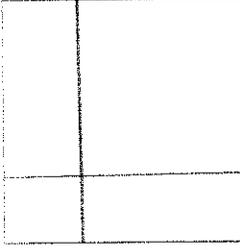
Printed at: 1:2,500

Surveyed 1893
Revised 1893
Edition NA
Copyright NA
Levelled NA

Surveyed 1892
Revised 1892
Edition NA
Copyright NA
Levelled NA

Surveyed 1892
Revised 1892
Edition NA
Copyright NA
Levelled NA

Surveyed 1892
Revised 1892
Edition NA
Copyright NA
Levelled NA

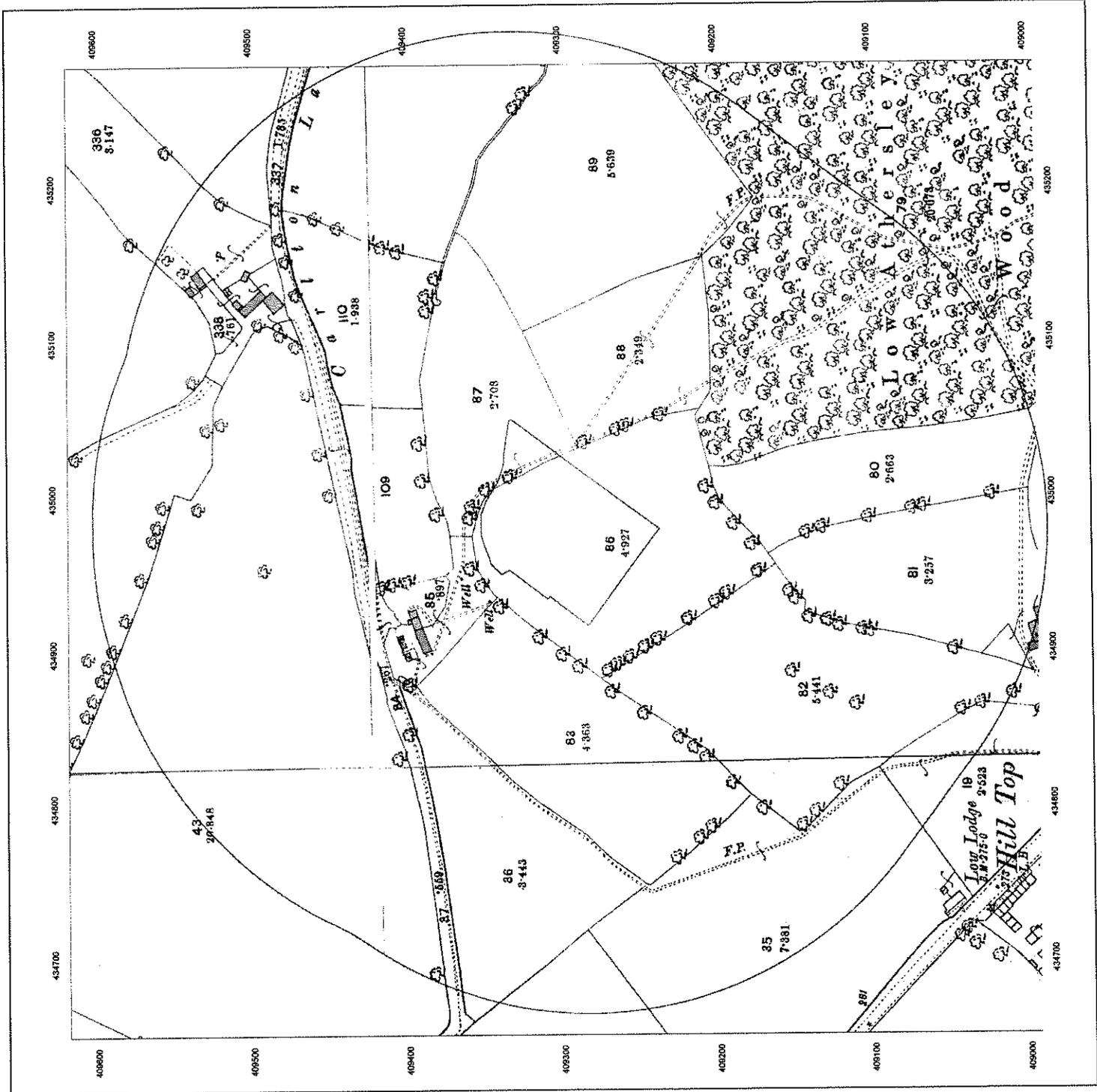


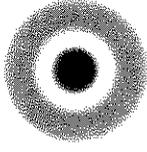
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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

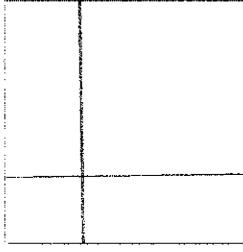
Map Name: County Series

Map date: 1906

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1906
Revised 1906
Edition NA
Copyright NA
Levelled NA



Surveyed 1906
Revised 1906
Edition NA
Copyright NA
Levelled NA

Surveyed 1906
Revised 1906
Edition NA
Copyright NA
Levelled NA

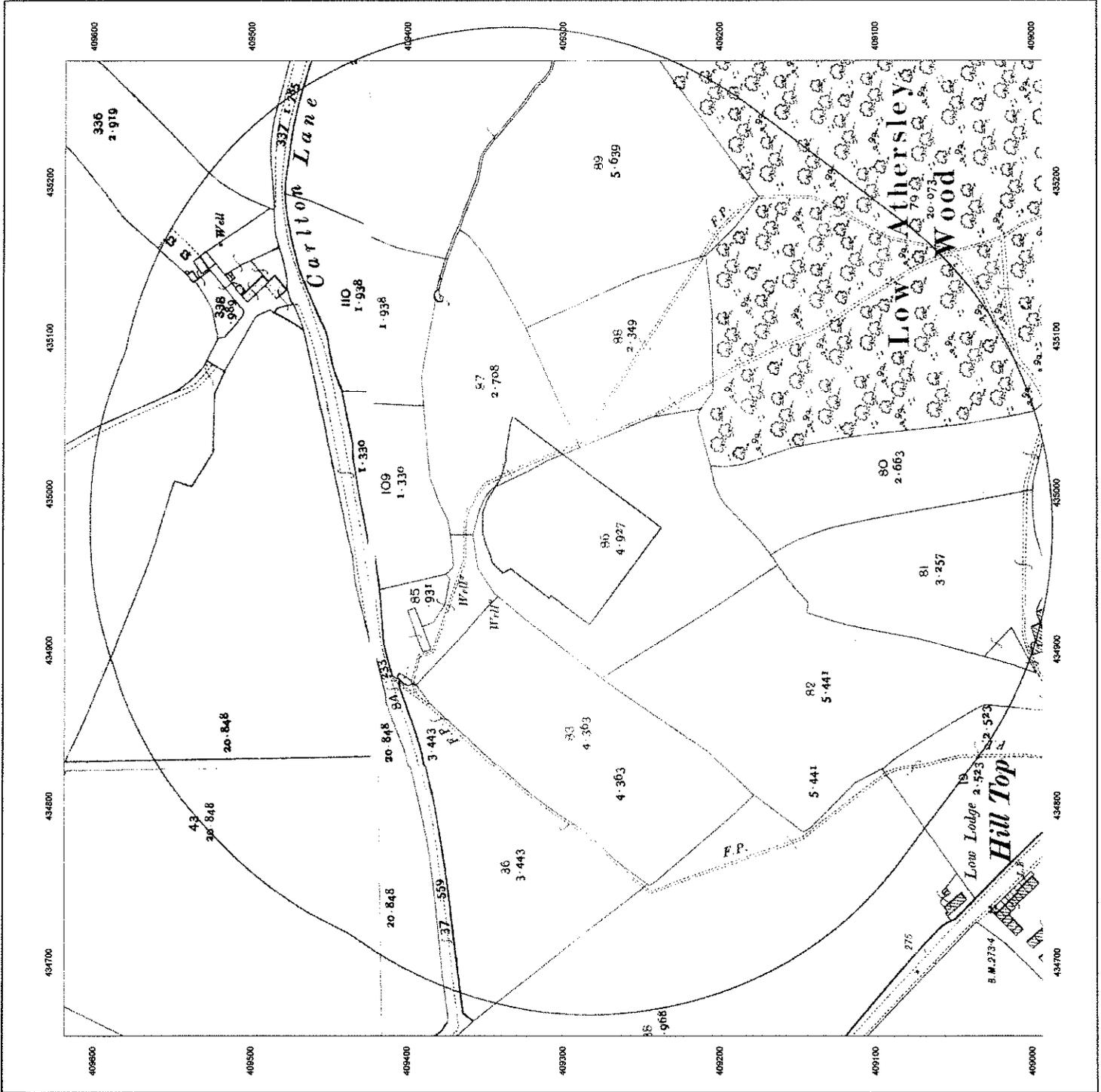
Surveyed 1906
Revised 1906
Edition NA
Copyright NA
Levelled NA

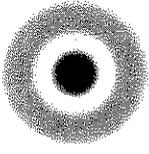
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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: County Series

Map date: 1929-1930

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1851
Revised 1930
Edition NA
Copyright NA
Levelled NA

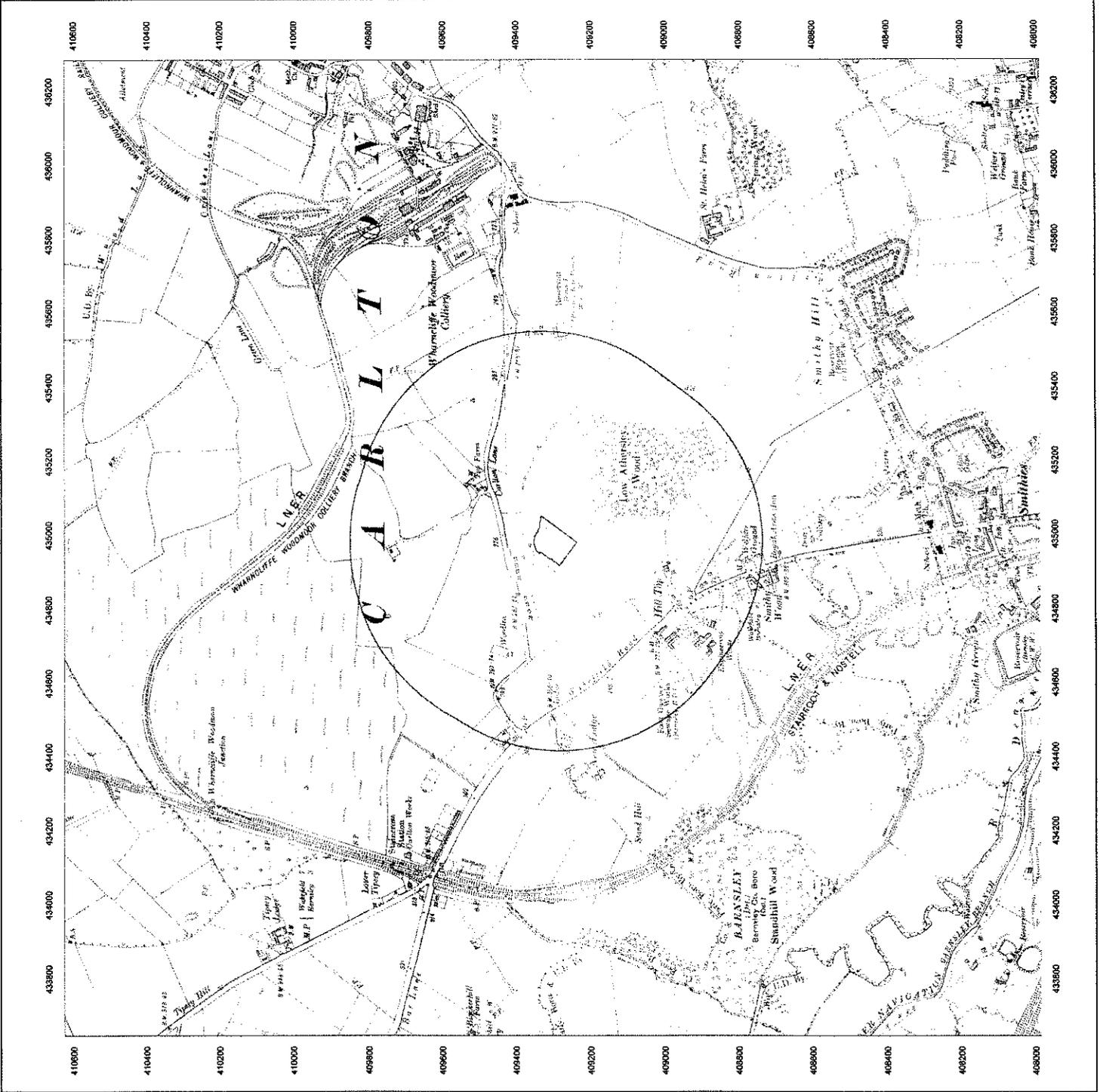
Surveyed 1851
Revised 1929
Edition NA
Copyright NA
Levelled NA

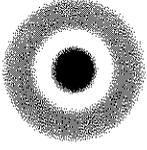


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Grid Ref: 434965, 409306

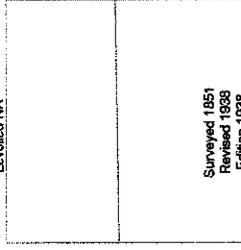
Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1851
Revised 1938
Edition 1938
Copyright NA
Levelled NA



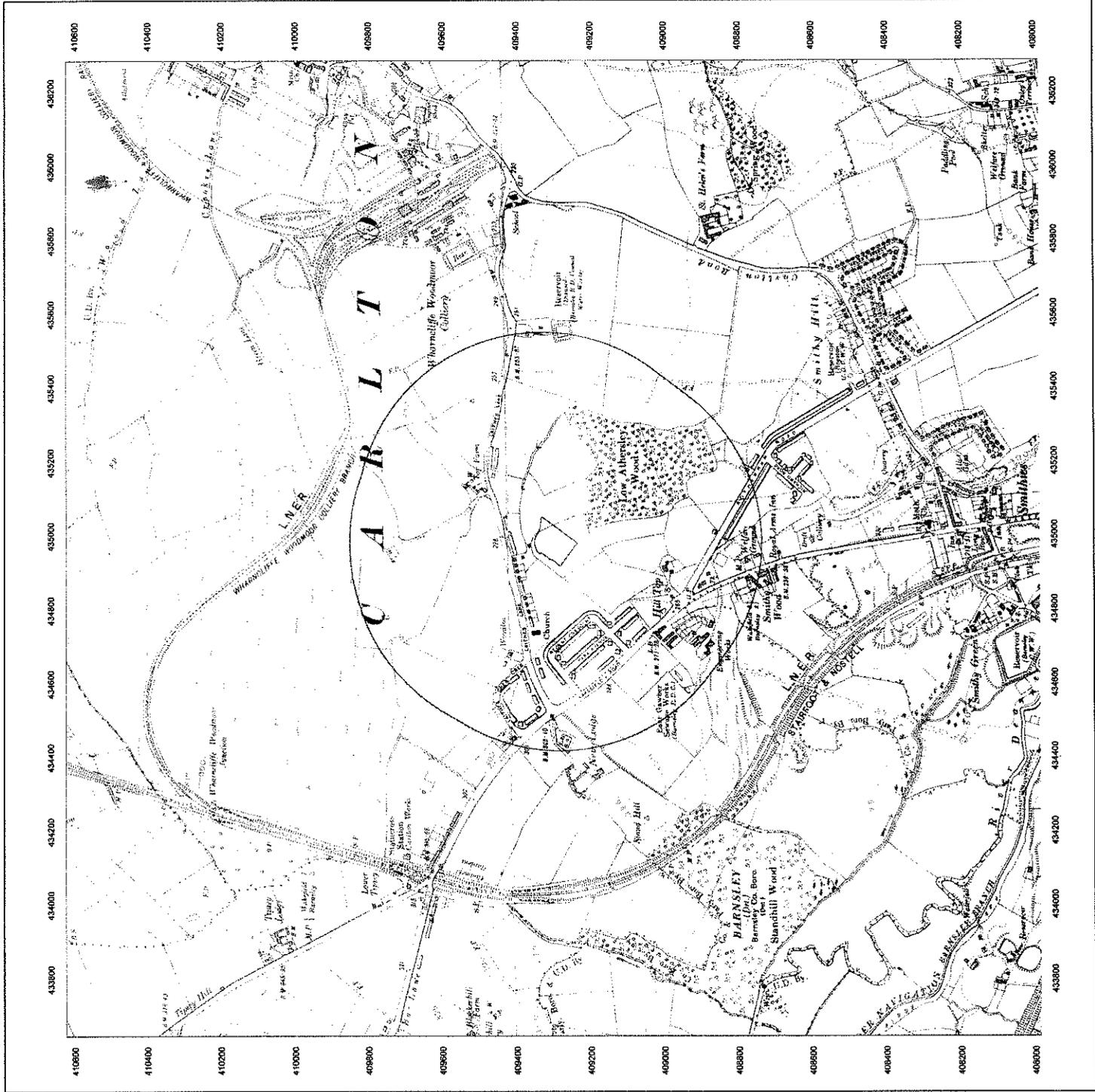
Surveyed 1851
Revised 1938
Edition 1938
Copyright NA
Levelled NA

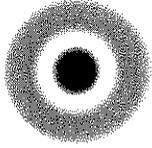


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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: County Series

Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1851
Revised 1948
Edition NA
Copyright NA
Levelled NA

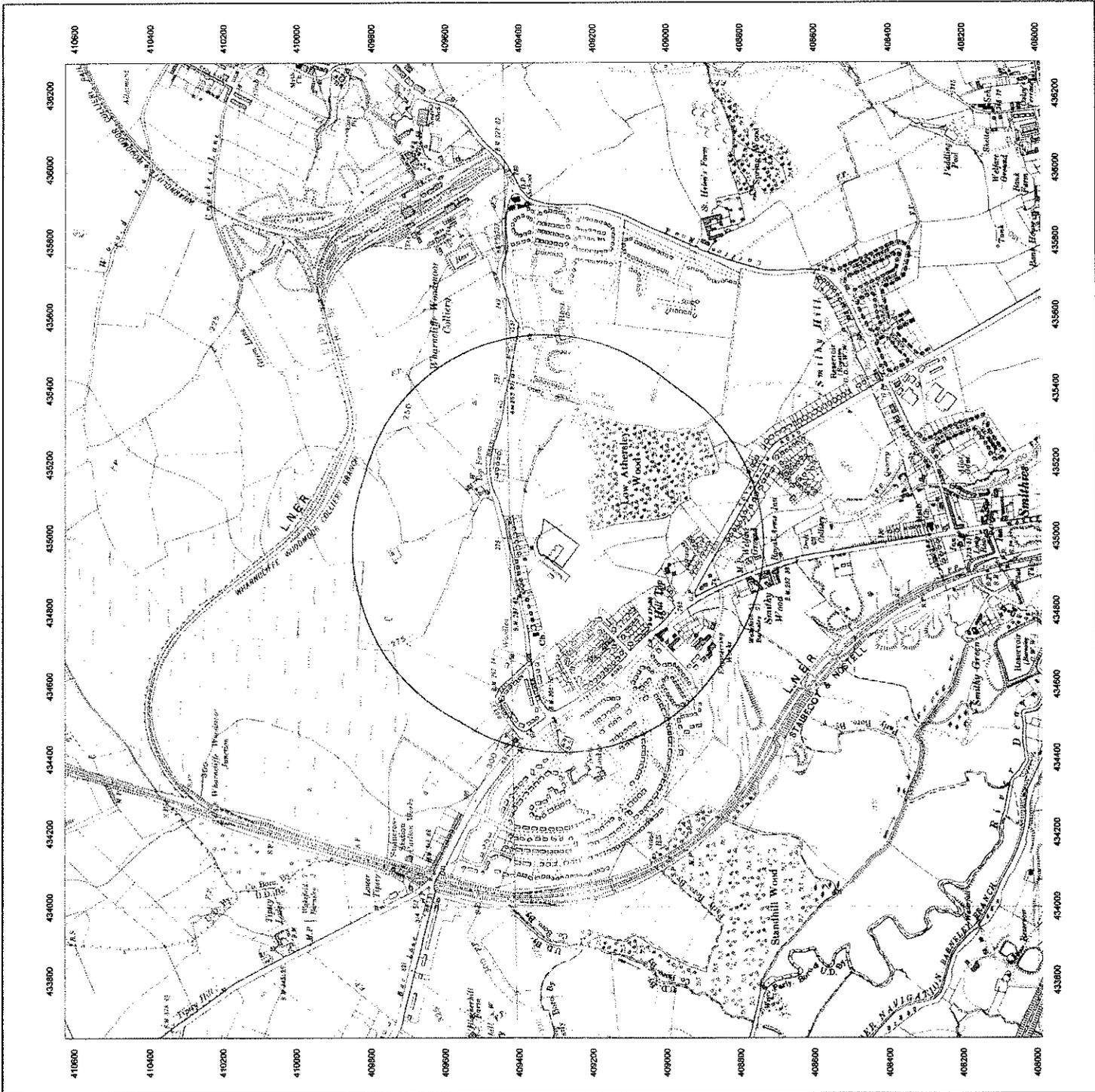
Surveyed 1851
Revised 1948
Edition NA
Copyright NA
Levelled NA

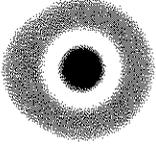
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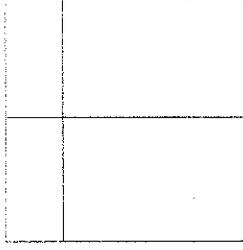
Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA



Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA

Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA

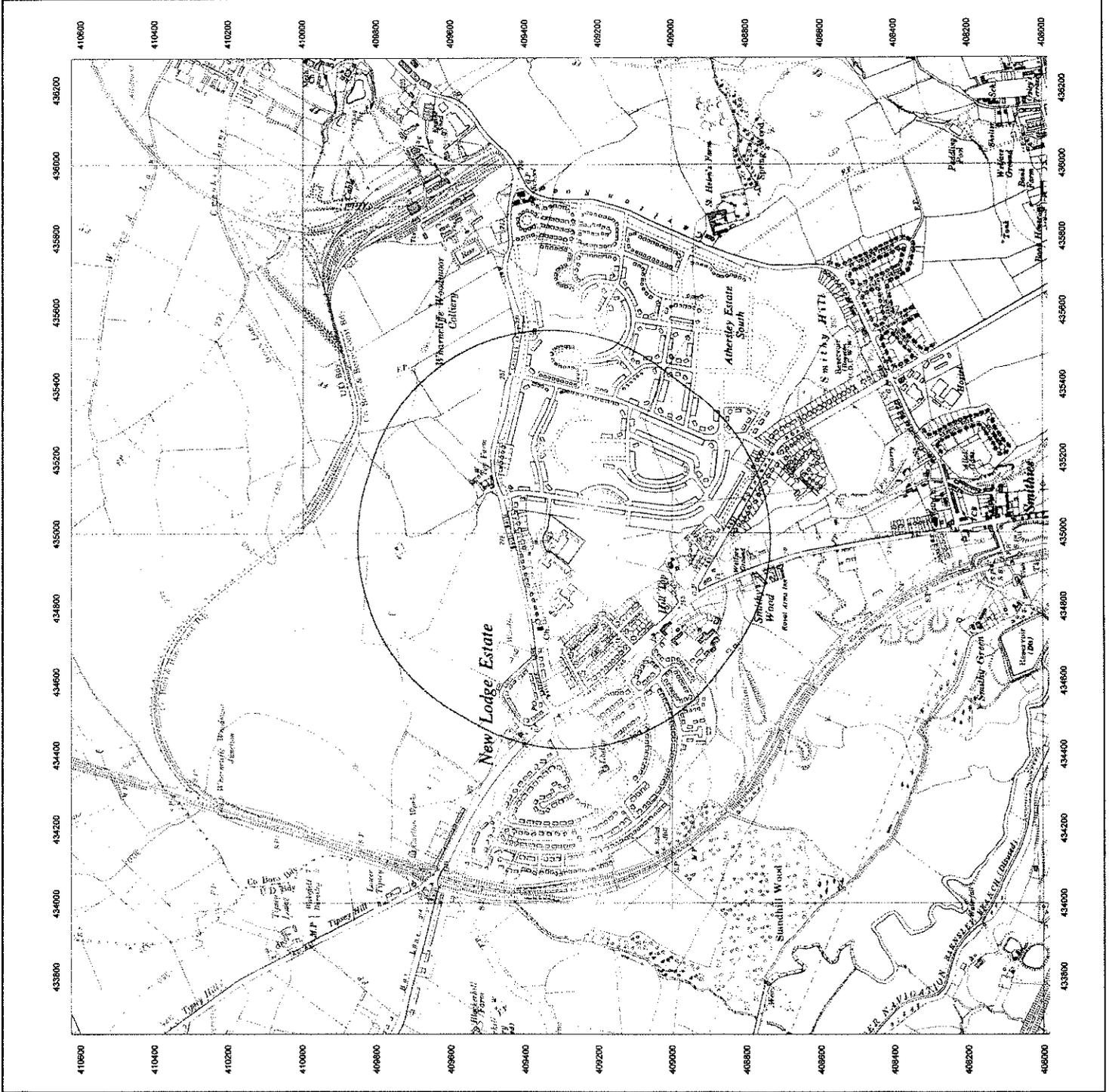
Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA

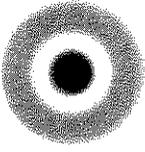


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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: National Grid

Map date: 1959-1961

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1959
Revised 1958
Edition NA
Copyright 1959
Levelled 1930

Surveyed 1958
Revised 1958
Edition NA
Copyright 1959
Levelled 1930

Surveyed 1958
Revised 1961
Edition NA
Copyright 1961
Levelled 1959

Surveyed 1958
Revised 1958
Edition NA
Copyright 1959
Levelled 1930

Surveyed 1958
Revised 1958
Edition NA
Copyright 1959
Levelled 1930

Surveyed 1961
Revised 1961
Edition NA
Copyright 1961
Levelled 1959

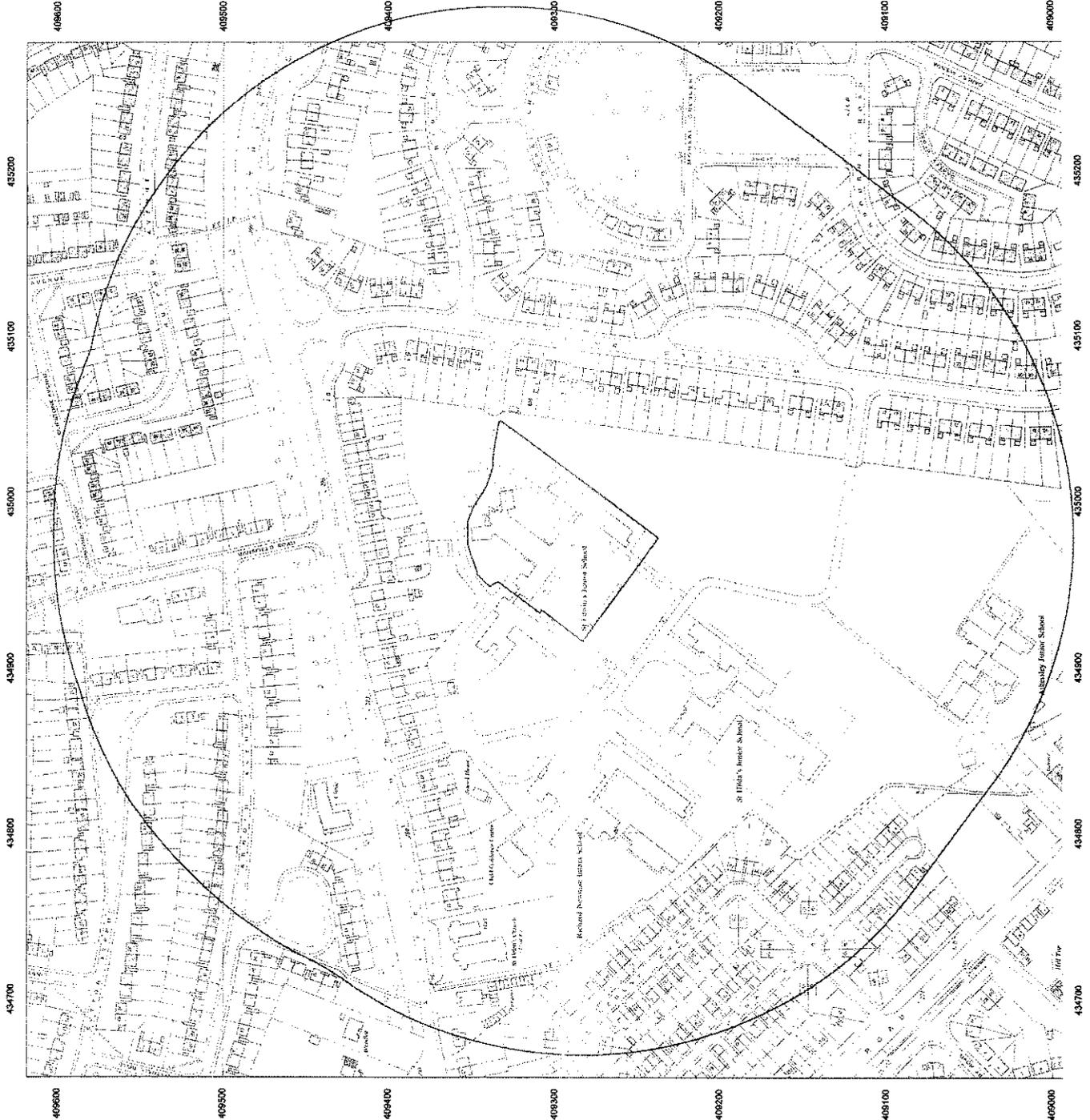


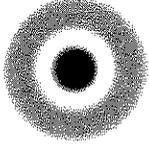
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Grid Ref: 434965, 409306

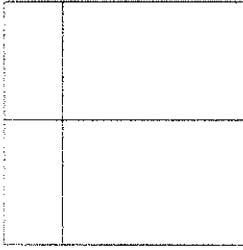
Map Name: Provisional

Map date: 1965-1966

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1965
Revised 1965
Edition NA
Copyright NA
Levelled NA



Surveyed 1966
Revised 1966
Edition NA
Copyright NA
Levelled NA

Surveyed 1966
Revised 1966
Edition NA
Copyright NA
Levelled NA

Surveyed 1966
Revised 1966
Edition NA
Copyright NA
Levelled NA

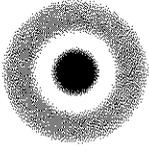
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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: National Grid

Map date: 1971-1976

Scale: 1:1,250

Printed at: 1:2,500

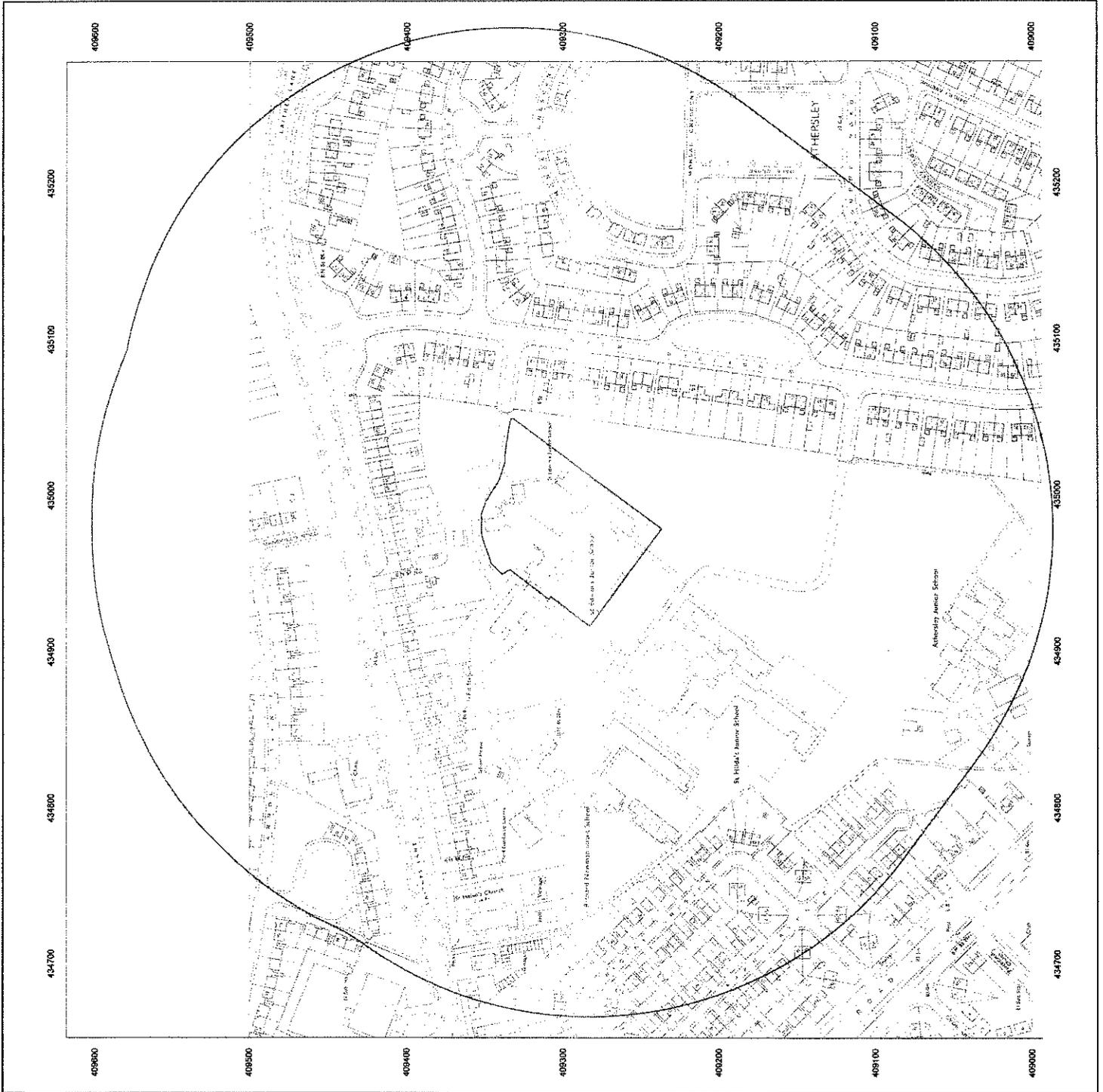
Surveyed 1958 Revised 1970 Edition NA Copyright 1971 Levelled 1963	Surveyed 1958 Revised 1973 Edition NA Copyright 1974 Levelled 1964
Surveyed 1951 Revised 1975 Edition NA Copyright 1976 Levelled 1965	

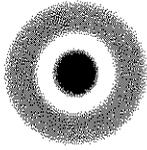
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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

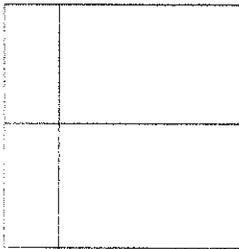
Map Name: National Grid

Map date: 1973-1978

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1977
Revised 1978
Edition NA
Copyright NA
Levelled NA



Surveyed 1976
Revised 1978
Edition NA
Copyright NA
Levelled NA

Surveyed 1973
Revised 1973
Edition NA
Copyright NA
Levelled NA

Surveyed 1974
Revised 1974
Edition NA
Copyright NA
Levelled NA

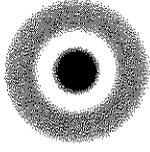


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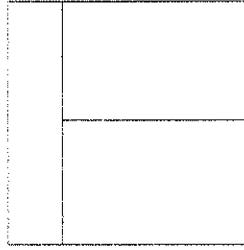
Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: National Grid

Map date: 1982

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1982
Revised 1982
Edition NA
Copyright NA
Levelled NA

Surveyed 1981
Revised 1982
Edition NA
Copyright NA
Levelled NA

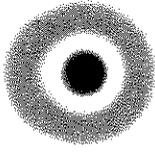


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Client Ref: 5954
Report Ref: HMD-326-512776
Grid Ref: 434965, 409306

Map Name: National Grid

Map date: 1989-1993

Scale: 1:10,000

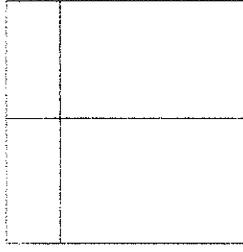
Printed at: 1:10,000

Surveyed 1983
Revised 1980
Edition NA
Copyright NA
Levelled NA

Surveyed 1984
Revised 1988
Edition NA
Copyright NA
Levelled NA

Surveyed 1992
Revised 1993
Edition NA
Copyright NA
Levelled NA

Surveyed 1981
Revised 1982
Edition NA
Copyright NA
Levelled NA

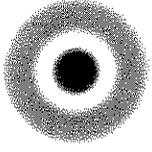


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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: National Grid

Map date: 1991

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1963
Revised 1991
Edition NA
Copyright 1991
Levelled 1963

Surveyed 1963
Revised 1991
Edition NA
Copyright 1991
Levelled 1963

Surveyed 1964
Revised 1991
Edition NA
Copyright 1991
Levelled 1964

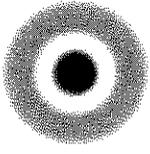
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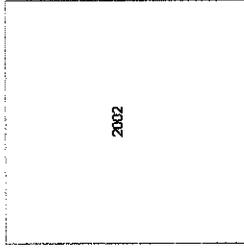
Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



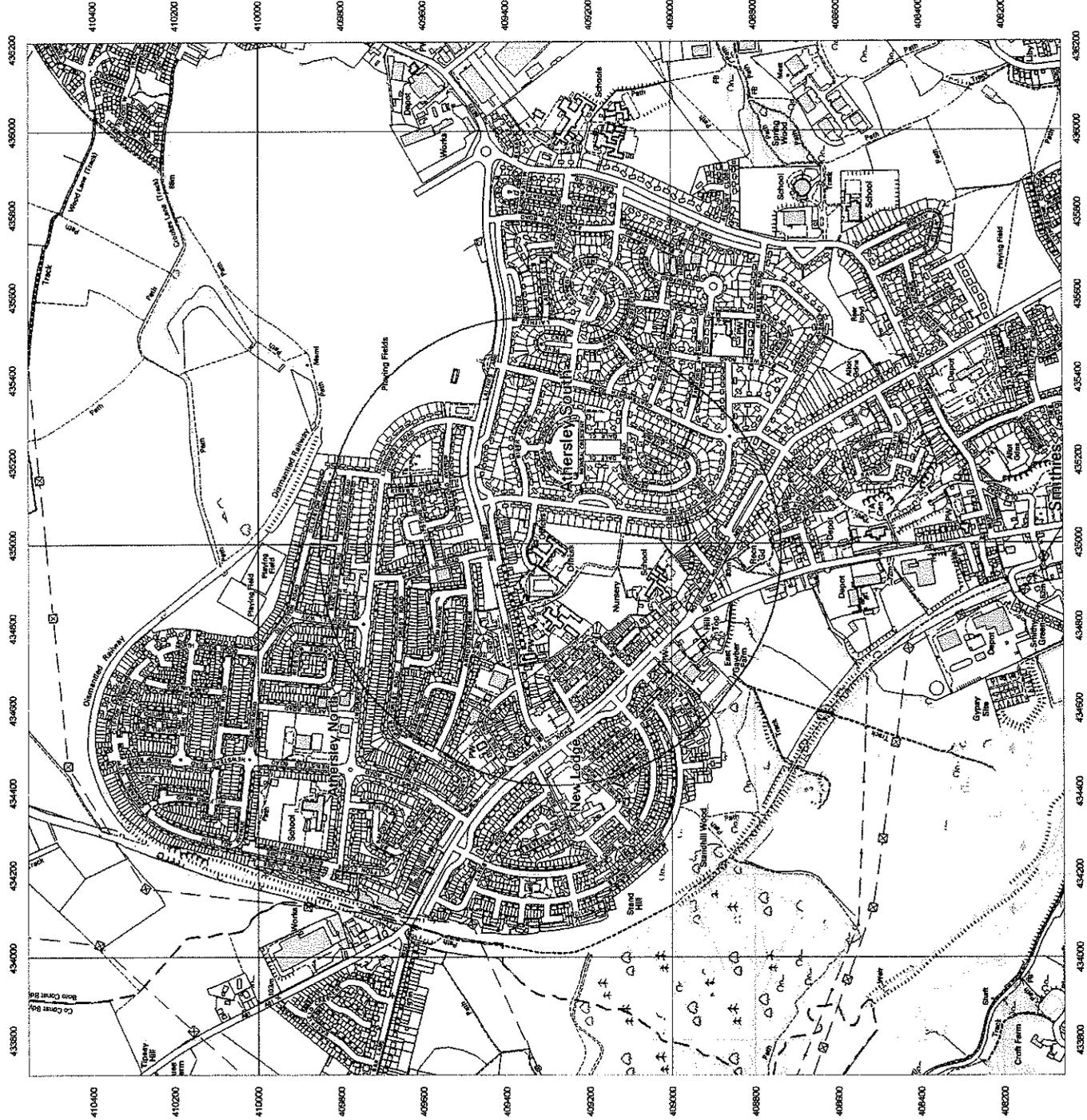
2002

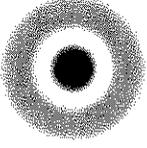
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Client Ref: 5954
Report Ref: HMD-326-512778
Grid Ref: 434965, 409306

Map Name: MasterMap

Map date: 2008

Scale: 1:2,500

Printed at: 1:2,500



2008



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