



Pennington Street

Levenshulme

Greater Manchester

Geophysical Survey

Report no. 4363
September 2025

Client: Onward Homes



Pennington Street, Levenshulme, Greater Manchester

Geophysical Survey

Summary

A geophysical (magnetometer) survey was undertaken on approximately 0.34ha hectares of land located to the south of Pennington Street, Levenshulme, Greater Manchester. Anomalies of possible archaeological origin have been detected which are likely to represent an infilled portion of the Nico Ditch earthwork. Magnetic disturbance dominates the Site and can be assigned to demolition rubble from a street and its associated former housing, with other areas of disturbance along the boundaries due to proximity to extant roads and a railway line. Overall, the archaeological potential of the Site is deemed to be low.



Report Information

Client:	Onward Homes
Report Type:	Geophysical Survey
Location:	Levenshulme
County:	Greater Manchester
Grid Reference:	SJ 87216 94695
Period(s) of activity:	Post medieval
Report Number:	4363
Project Number:	XT60
Site Code:	PNN25
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Contents

Report Information	ii
Document Issue Record	iii
Contents.....	iii
List of Figures	iv
List of Plates	iv
1 Introduction	1
Site location, topography and land-use	1
Soils and geology	1
2 Archaeological Background.....	1
3 Aims, Methodology and Presentation	2
Magnetometer survey	2
Reporting	2
4 Results and Discussion.....	3
Ferrous anomalies and magnetic disturbance	3
Possible archaeological anomalies.....	3
5 Conclusions.....	4

Figures

Plates

Appendices

Appendix 1: Magnetic survey - technical information

Appendix 2: Survey location information

Appendix 3: Geophysical archive and metadata

Appendix 4: Oasis form

Bibliography

List of Figures

- 1 Site location (1:50000)
- 2 Survey location showing processed greyscale magnetometer data (1:1250 @ A3)
- 3 Processed greyscale magnetometer data (1:750 @ A3)
- 4 XY trace plot of minimally processed magnetometer data (1:750 @ A3)
- 5 Interpretation of magnetometer data (1:750 @ A3)

List of Plates

- 1 General view of survey area, facing south
- 2 General view of survey area, facing northeast

1 Introduction

Archaeological Services ASWYAS has been commissioned by Lanpro Services on behalf of Onward Homes to undertake a geophysical survey at land at Pennington Street, Levenshulme, Greater Manchester. This was undertaken in line with current best practice (CifA 2020; Schmidt *et al.* 2015). The survey was carried out on the 18th of August 2025 to provide additional information on the archaeological resource of the Site.

Site location, topography and land-use

The Site is located at SJ 87216 94695 (approximate centre), comprising c. 0.34ha within a single field situated to the west of Levenshulme (see Fig. 1).

The Site is situated to the south of Pennington Street on land used as a public park (see Plates 1-2). It is bounded to the west by the West Coast Main Line Crewe and Manchester railway line, to the south by Parks Grove, and to the east by residential buildings. The Site is relatively flat and lies at 54m (above Ordnance Datum) aOD in the north, rising slightly to approximately 55m aOD in the south.

Soils and geology

The recorded bedrock geology comprises Chester Formation – Sandstone, a sedimentary bedrock that formed approximately 250 to 247.1 million years ago during the Triassic Period. Superficial deposits have been recorded as Till, Devensian – Diamicton, a sedimentary superficial deposit that formed between 116 and 11.8 thousand years ago during the Quaternary period (BGS 2025). Soils have been recorded as slowly permeable, seasonally wet acid loamy and clayey soils (Soilscape 17) (CSAI 2025).

2 Archaeological Background

The archaeological background below is derived from a 1km radial search of heritage assets listed in the Greater Manchester HER and is not an exhaustive compendium.

Previous works on the Site include an excavation of two trenches by Greater Manchester Archaeological Unit (McNeil 1992) to identify and assess a section of the Nico Ditch, an approximately 9.7km long linear earthwork dating from the medieval period, which stretches from Ashton under Lyne to Stretford. The section of the Nico Ditch north of Park Grove survived as an earthwork until the mid-19th century during which time it was culverted and buried to facilitate the construction of Midway Street and its associated housing (demolished as of the late 1970s). During the excavation by Greater Manchester Archaeological Unit, the north and south edges of the ditch were represented in both of the excavated trenches, with a projected width of 3.5–4.0m. No finds were recorded.

Given the urban nature of the Site, the majority of other entries within 1km of the Site which are recorded in the HER are of listed and former buildings, and parks and gardens, including the extant Crowcroft Park 0.3km to the north of the Site, the former site of Rushford Park (removed in 1922) 0.1km to the west of the Site, and Slade Hall, a listed late 16th century timber house approximately 0.25km to the northwest of the Site.

3 Aims, Methodology and Presentation

The aims and objectives of the programme of geophysical survey were to gather sufficient information to establish the presence/absence, character and extent, of any archaeological remains within the specific area and to inform an assessment of the archaeological potential of the site. To achieve this aim, a magnetometer survey covering all amenable parts of the Site was undertaken (see Fig. 2).

The general aims of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore determine the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

Magnetometer survey

The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble R6 model). The survey was undertaken using Bartington Grad601 magnetic gradiometers. These were employed taking readings at 0.25m intervals on zig-zag traverses 1.0m apart within 30m by 30m grids, so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for processing and interpretation. Bespoke in-house software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general Site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 displays processed magnetometer data at a scale of 1:1250. Processed and minimally processed data, together with interpretation of the survey results are presented in Figures 3 to 5 inclusive at a scale of 1:750.

Technical information on the equipment used, data processing and survey methodologies are given in Appendix 1. Technical information on locating the survey area is provided in

Appendix 2. Appendix 3 describes the composition and location of the archive. A copy of the completed OASIS form is included in Appendix 4.

The survey methodology, report and any recommendations comply with guidelines outlined by the European Archaeological Council (Schmidt *et al.* 2015) and by the Chartered Institute for Archaeologists (CIfA 2020). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of His Majesty's Stationery Office (© Crown copyright).

The figures in this report have been produced following analysis of the data in processed formats and over a range of different display levels. All figures are presented to most suitably display and interpret the data from this site based on the experience and knowledge of Archaeological Services staff.

4 Results and Discussion (see Figures 3 to 5)

Ferrous anomalies and magnetic disturbance

The dataset comprises numerous, densely concentrated iron spikes and other clusters of smaller strong magnetic anomalies. These responses are indicative of the former use of the survey area as a housing estate with its associated road (Midway Street), with detected magnetic anomalies likely representing debris remaining beneath the ground surface from the demolition of these residences. Whilst individual housing plots cannot be confidently identified within the former route of Midway Street, in the south of the data set, an area of magnetic disturbance specifically correlates to the former location of two residential properties listed as 26 and 28 Park Grove. These buildings appear on OS mapping from 1908 through to 1957 (NLS 2025) and have been demolished prior to the first available satellite imagery dating from 2000 (GE 2025). It is likely that both Midway Street and its associated housing, along with 26 and 28 Park Grove were demolished contemporaneously to each other in the late 1970s according to a local resident on Pennington Street who spoke to the team at the time of survey.

Further magnetic disturbance along the western boundary of the survey area is due to proximity with the West Coast Main Line Crewe and Manchester railway, with further disturbance from Pennington Street itself along the northern boundary.

Possible archaeological anomalies

A linear band of enhanced magnetic response can be seen clearly within the south of the survey area, which broadly correlates with the location of the Nico Ditch earthwork which is recorded on OS mapping dating from 1848 through to 1957 (NLS 2025). This linear response is not completely aligned with the route illustrated on OS mapping, although there is enough

overlap between the response and the illustrated route that a cautious possible archaeological interpretation has been given.

5 Conclusions

The geophysical survey has detected a linear magnetic anomaly which is likely to represent part of the Nico Ditch earthwork.

The remainder of the survey area is dominated by magnetic disturbance responses which are representative of the demolition rubble associated with the housing on the former route of Midway Street, in addition to two further demolished residences to the north of Park Grove. Further magnetic disturbance responses along the boundaries of the Site are due to proximity to extant roads and housing, and a railway line. Overall, the archaeological potential of the Site is deemed to be low.

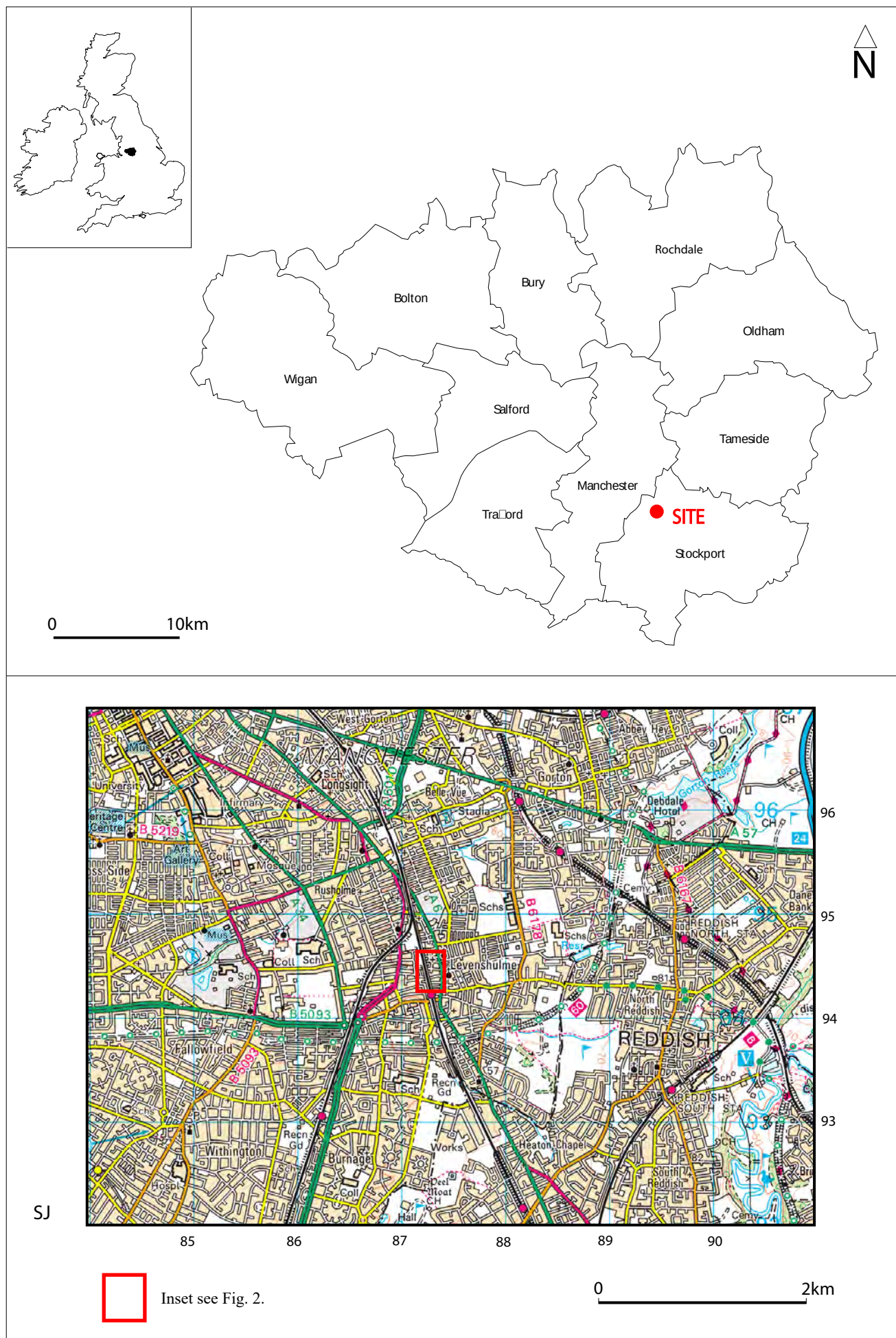


Fig. 1. Site location

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Project ID: XT60_PNN25

XY trace plot of minimally processed greyscale magnetometer data

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Fig. 4



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Project ID: XT60_PNN25

Interpretation of magnetometer data

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Fig. 5

Interpretation

	FERROUS
	MAGNETIC DISTURBANCE
	ARCHAEOLOGY?

0 25m

1:750 @ A3



Plate 1. General view of survey area, facing south



Plate 2. General view of survey area, facing northeast

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haemetite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms. Areas of human occupation or settlement can then be identified by measuring the magnetic susceptibility of the topsoil because of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough.

Types of Magnetic Anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic ‘spiky’ trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an ‘iron spike’ anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

Methodology: Gradiometer Survey

The main method of using the fluxgate gradiometer for commercial evaluations is referred to as **detailed survey** and requires the surveyor to walk at an even pace carrying the instrument within a grid system. A sample trigger automatically takes readings at predetermined points, typically at 0.25m intervals, on traverses 1m apart. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation.

During this survey a Bartington Grad601 magnetic gradiometer was used taking readings on the 0.1nT range, at 0.25m intervals on zig-zag traverses 0.5m apart within 30m by 30m square grids. The instrument was checked for electronic and mechanical drift at a common point and calibrated as necessary. The drift from zero was not logged.

The gradiometer data have been presented in this report in processed greyscale format. The data in the greyscale images have been interpolated and selectively filtered to remove the effects of drift in instrument calibration and other artificial data constructs and to maximise the clarity and interpretability of the archaeological anomalies.

Appendix 2: Survey location information

An initial survey station was established using a Trimble VRS differential Global Positioning System (Trimble R6 model). The data was geo-referenced using the geo-referenced survey station with a Trimble RTK differential Global Positioning System (Trimble R6 model). The accuracy of this equipment is better than 0.01m. The survey grids were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if co-ordinates are measured off hard copies of the mapping rather than using the digital co-ordinates.

Archaeological Services WYAS cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

Appendix 3: Geophysical archive and metadata

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2003), and graphics files (Adobe Illustrator CS6 and AutoCAD 2017) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the Greater Manchester Historic Environment Record).

Appendix 4: Oasis form

OASIS Summary for archaeol11-536626

OASIS ID (UID)	archaeol11-536626
Project Name	Pennington Street, Levenshulme, Greater Manchester: Geophysical Survey
Sitename	Pennington Street, Levenshulme, Greater Manchester
Sitecode	PNN25
Project Identifier(s)	Pennington Street, Levenshulme, Greater Manchester
Activity type	Geophysical Survey, Magnetometry Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning requirement
Organisation Responsible for work	Archaeological Services WYAS
Project Dates	18-Aug-2025 - 18-Aug-2025
Location	Pennington Street, Levenshulme, Greater Manchester NGR : SJ 87216 94695 LL : 53.44886017430057, -2.193955694027753 12 Fig : 387216,394695
Administrative Areas	Country : England County/Local Authority : Manchester Local Authority District : Manchester Parish : Manchester, unparished area
Project Methodology	A geophysical (magnetometer) survey was undertaken on approximately 0.34ha hectares of land located to the south of Pennington Street, Levenshulme, Greater Manchester. The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble R6 model). The survey was undertaken using Bartington Grad601 magnetic gradiometers. These were employed taking readings at 0.25m intervals on zig-zag traverses 1.0m apart within 30m by 30m grids, so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for processing and interpretation. Bespoke in-house software was used to process and present the data.
Project Results	The geophysical survey has detected a linear magnetic anomaly which is likely to represent part of the Nico Ditch earthwork. The remainder of the survey area is dominated by magnetic disturbance responses which are representative of the demolition rubble associated with the housing on the former route of Midway Street, in addition to two further demolished residences to the north of Park Grove. Further magnetic disturbance responses along the boundaries of the Site are due to proximity to extant roads and housing, and a railway line. Overall, the archaeological potential of the Site is deemed to be low.
Keywords	
Funder	Private or public corporation Onward Homes Ltd
HER	Greater Manchester HER - unRev - STANDARD
Person Responsible for work	Jake Freeman, Emma Brunning
HER Identifiers	
Archives	

Bibliography

- BGS, 2025. <https://geologyviewer.bgs.ac.uk> British Geological Survey (viewed September 2025)
- CIfA, 2020. *Standard and Guidance for Archaeological Geophysical Survey*. Chartered Institute for Archaeologists
- CSAI, 2025. <http://www.landis.org.uk/soilscapes/> Cranfield Soil and Agrifood Institute (viewed September 2025)
- GE, 2025. Google Earth Pro 7.3.3.7786
- McNeil, R. 1992. *Nico Ditch, Park Grove, Levenshulme, Lloyd Evans Partnership Ltd*. Report No 1992/3. Greater Manchester Archaeological Unit [assessment & evaluation reports]
- NLS, 2025. <https://maps.nls.uk/index.html>. National Library of Scotland (viewed September 2025)
- Schmidt, A. Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A, and Fassbinder, J. 2015. *EAC Guidelines for the Use of Geophysics in Archaeology*. English Heritage