HyNet North West

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 8.4 Geophysical Survey Report

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulations 5(2)(a)

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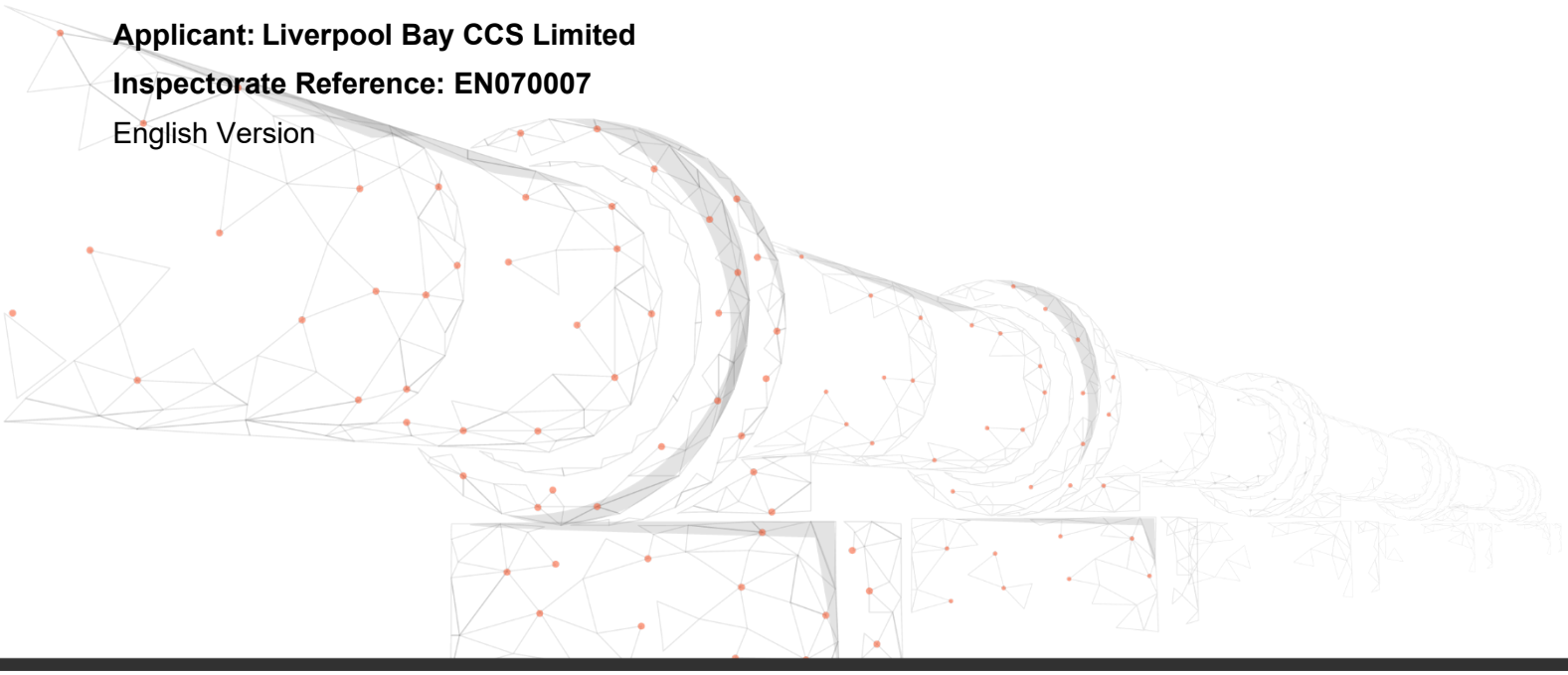

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1.1. Note 1

1. INTRODUCTION

1.1. NOTE

1.1.1. The Study Area of the geophysical survey encompasses a 60 m wide corridor buffered around the proposed line of the Newbuild Carbon Dioxide Pipeline, four Above Ground Installation (AGI) locations, and three Block Valve Station (BVS) locations which are sited on the Newbuild Carbon Dioxide Pipeline. It does not cover the entirety of the Newbuild Infrastructure Boundary and excludes the three proposed BVS locations sited on the existing Flint Connection to Point of Ayr Terminal Pipeline.

1.1.2. The survey started on 21 February 2022 and was based on the indicative route of Newbuild Carbon Dioxide Pipeline at that time. The design was altered during and after the survey and the route shown within the report should not be taken to represent the final design.

magnitude surveys

Geophysical Survey Report

HyNet CO2 Pipeline

For

WSP

Magnitude Surveys Ref: MSSJ1172

HER Event Number: TBC

OASIS Number: magnitud1-507170

May 2022

Unit 17, Commerce Court

Challenge Way

Bradford

BD4 8NW

01274 926020

info@magnitudesurveys.co.uk

Report By:

Filippo Carrozzo MSci

Report Approved By:

Finnegan Pope-Carter BSc (Hons) MSc FGS

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Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 173.5ha area of land along the proposed route of the HyNet CO2 Pipeline. The pipeline runs between a point southeast of Flint, Wales, north of Chester, to another east of Ellesmere Port, Cheshire. A fluxgate gradiometer survey was successfully completed across c. 147.7ha; the remaining area was not surveyed due to access constraints or unsuitable ground conditions. The survey has detected a single area of possible archaeological activity in the form of possible pit alignment. Additional anomalies have been categorised as being of 'Undetermined' origin; these are isolated, fragmentary, or ephemeral, and may be the result of natural variations, archaeological or agricultural activity. Throughout the survey corridor, agricultural activity has been detected, including recent ploughing trends, former field boundaries, drainage regimes, and ridge and furrow. Past industrial activity has been identified in the form of infilled extraction pits/ponds and a large amount of ferrous material near mapped former brickworks. Natural variations have been identified in areas with tidal, sand and gravel deposits. Modern interference has not impacted the quality of the geophysical data with magnetic disturbance generally limited to surrounding services, pylons, current field boundaries and some of areas modern debris and green waste.

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1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by WSP to undertake a geophysical survey over a c. 173.5ha area of land along the proposed route of the HyNet CO2 Pipeline. The pipeline runs between a point south-east of Flint, Wales (SJ 2532 7114), north of Chester, to another east of Ellesmere Port, Cheshire (SJ 4689 7610).

1.2. The geophysical survey comprised hand-pulled cart-mounted and hand-carried GNSS-positioned fluxgate gradiometer survey. Magnetic survey is the standard primary geophysical method for archaeological applications in the UK due to its ability to detect a range of different features. The technique is particularly suited for detecting fired or magnetically enhanced features, such as ditches, pits, kilns, sunken featured buildings (SFBs) and industrial activity (David *et al*., 2008).

1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David *et al*., 2008), the Chartered Institute for Archaeologists (CIfA, 2020) and the European Archaeological Council (Schmidt *et al.,* 2015).

1.4. It was conducted in line with a WSI produced by MS (Adams, 2021).

1.5. The survey commenced on 21st February 2022 and took 6 weeks to complete.

2. Quality Assurance

2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society for Archaeological Prospection).

2.2. The directors of MS are involved in cutting edge research and the development of guidance/policy. Specifically, Dr Chrys Harris has a PhD in archaeological geophysics from the University of Bradford, is a Member of CIfA and is the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter has an MSc in archaeological geophysics and is a Fellow of the London Geological Society, as well as a member of GeoSIG (CIfA Geophysics Special Interest Group); Dr Paul Johnson has a PhD in archaeology from the University of Southampton, is a Fellow of the Society of Antiquaries of London, has been a member of the ISAP Management Committee since 2015, and is currently the nominated representative for the EAA Archaeological Prospection Community to the board of the European Archaeological Association.

2.3. All MS managers, field and office staff have degree qualifications relevant to archaeology or geophysics and/or field experience.

3. Objectives

3.1. The objective of this geophysical survey was to assess the subsurface archaeological potential of the survey area.

4. Geographic Background

4.1. The survey area was a route between a point south-east of Flint, Wales, (SJ 2532 7114), north of Chester, to another point east of Ellesmere Port, Cheshire (SJ 4689 7610) (Figure 1). Gradiometer survey was undertaken across c. 147.7ha covering 156 fields (Figure 2 & 3), with the remaining areas deemed not to be surveyable due to access constraints or unsuitable ground conditions. The survey areas were numbered according to the order they were surveyed in.

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	The survey area consisted of pasture grassland.	The survey area was bordered by hedges and wire fencing to the north and south, the field continued to the east and west. An overhead electrical cable cut across the north of the survey area orientated north-west south-east.
2	The survey area consisted of pasture grassland.	The survey area was bordered by wire fencing to the north, west and south, the field continued to the east.
3	The survey area consisted of an arable field with young crop. The field sloped down from the south-east to the north-west.	The survey area was bordered by wire fencing to the south, hedges to the north-east, the field continued to the east and west.
4	The survey area consisted of a pasture field.	The survey area was bordered by hedges to the east and west, the field continued to the north and south.
5	The survey area consisted of an arable field gently sloping down from the north to the south.	The survey area was bordered by wire fencing to the north and south, the field continued to the east and west.
6	The survey area consisted of an arable field covered by young crop.	The survey area was bordered by metal fencing and hedges to the north and west, the field continued to the south.
7	The survey area consisted of an arable field.	The survey area was bounded by wire fencing and hedges to the east and west, the field continued to the south and north.
8	The survey area consisted of an arable field covered by young crop, gently sloping down from north to south.	The survey area was bordered by wire fencing and hedges to the east and west, the field continued to the south and north.
9	The survey area consisted of a flat pasture field.	The survey area was bordered by wire fencing to the east and south-west, the field continued to the south and north. A metal trough was located along the eastern field border.
10	The survey area consisted of an arable field covered by young crop.	The survey area was bordered by wire fencing and hedges to the north-east and south-west, the field continued to the south and north.
11	The survey area consisted of an arable field covered by young crop.	The survey area was bordered by wire fencing and hedges to the north and west, the field continued to the south and north.

12	The survey area consisted of an arable field with young crop gently sloping from north to south.	The survey area was bordered by wire fencing and hedges to the east and west, the field continued to the south and north. Overhead cables cut across the survey area form north to south, a telegraph pole was at the centre of the survey area.
13	The survey area consisted of an arable field, with young crop, which gently sloped down from north to south.	The survey area was bordered by wire fencing and hedges to the east and west, the field continued to the south and north.
14	The survey area consisted of an arable field, with young crop, which gently sloped down from north-east to the south-west.	The survey area was bordered by wire fencing and hedges to the north, north-west and south, the field continued to the east and west. Overhead cables cut across the north of the survey area orientated east west.
15	The survey area consisted of a pasture field which gently sloped down from east to west.	The survey area was bordered by wire fencing to the north and south, with the field continuing to the east and west. An overhead cable cut across the north of the survey area heading east to west.
16	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing to the north and south, with the field continuing to the south and north. Across the centre of the survey area a hedge and trench cut across the survey area.
17	The survey area consisted of a flat pasture field.	The survey area was bordered by wire fencing and hedges to the north and south, the field continued to the east and west. Overhead cables cut across the survey area orientated north-east south-west.
18	The survey area consisted of a flat arable field.	The survey area was bordered by wire fencing to the north, the field continued to the north-west and south-east, a farm track went along the south-western border.
19	The area consisted of an arable field with crop stubble.	The survey area was bordered by hedges and trees in the north-west corner, a gravel track along eastern most border. No physical boundary was along the north or south borders.
20	The survey area consisted of an arable field, gently sloping from south to north. The area to the south-east and north-east was not surveyed due to the presence of a ditch and dense vegetation.	The survey area was bordered by wire fencing to the south-east and south-west, a ditch to the north-east, the field continued to the north-west.
21	The survey area consisted of an arable filed with young crop, sloping down from the south-west to the north.	The survey area was bordered by a wire fence and hedges to the south-east, by hedges to the north and south-west, the field continued to the north-west.
22	The survey area consisted of an arable field, with young crop,	The survey area was bordered by hedges and wire fencing to the north, and north-east, central

	which gently sloped down from the south-west to the north-east.	area of the east and south, the field carried on in all other directions.
23	The survey area consisted of two pasture fields which gently sloped down from the south to the north. Small ponds and waterlogged areas meant some areas were not surveyed.	The survey area was bordered by wire fencing to the south-west and north, field continued in all other directions. The survey area was partial cut by a field boundary oriented east west.
24	The survey area consisted of a flat pasture field.	The survey area was bordered by a hedge and wire fencing to the north and east, the field continued to the south and west.
25	The survey area consisted of a flat pasture field.	The survey area was bordered by a hedge and wire fencing to the north and east, the field continued to the south and west.
26	The survey area consisted of a flat pasture field.	The survey area was bordered by wire fencing to the north, east and west, the field continued to the south. A pile of bricks was in the north-east.
27	The survey area consisted of a pasture field sloping from the south-east to the north. Tall vegetation along the northern edge could not be surveyed.	The survey area was bordered by wire fencing to the north and east, the field continued to the south.
28	The survey area consisted of a gently sloping pasture field.	The survey area was bordered by wire fencing to the south and west, the field continued to the north.
29	The survey area consisted of a flat arable field.	The survey area was bordered by wire fencing to the east and west, the field continued to the north and south. Overhead cables crossed the south-west of the survey area.
30	The survey area consisted of an arable field sloping down from the north to south.	The survey area was bordered by wire fencing to the east and west, metal fencing at the centre of the field, overhead cable ran along the south-west. The field continued in all other directions.
31	The survey area consisted of an arable field gently sloping down from north to south.	The survey area was bordered by wire fencing to the north-east and south-west, field continued to the north-west and south-east. An overhead cable crossed the north of the survey area orientated east west.
32	The survey area consisted of a pasture field, sloping gently down from north to south. An area to the north and south-east was not surveyed due to being fenced off.	The survey area was bordered by electrical fencing to the north-east, south-west and south-east.
33	The survey area consisted of a pasture field, sloping down form the north-west to the south-east.	The survey area was bordered by electrical fencing to the east and west, the field continued to the north and south.
34	The survey area consisted of a pasture field sloping down from	The survey area was bordered by wire fencing to the west, east and south-west, field continued in

	the north-east down to the south-west.	all other directions. Metal drain cover was recorded in the centre of the field. A canal ran along the southern edge of the field.
35	The survey area consisted of a pasture field sloping down from north to south.	The survey area was bordered by wire fencing to the east and south, a tree line to the west and the field continued to the north. A drain cover was recorded in the centre of the survey area. A canal was to the south-east.
36	The survey area consisted of a pasture field sloping down to the east, west and south from the north.	The survey area was bordered by wire fencing to the northwest and metal fencing to the north-east, the field continued in all other directions.
37	The survey area consisted of a pasture field which sloped down from the northeast to the south. A waterlogged area at the centre of the field could not be surveyed.	The survey area was bordered by a wire fencing to the north and south-east, a metal fence was to the west, the field continued in all other directions. Some metal farm equipment was present in the north of the field.
38	The survey area consisted of a flat pasture field. An area of slurry/manure was not surveyed in the south-east corner.	The survey area was bordered by wire fencing to the south, metal fencing to the west and south-east, wooden fencing to the north and north-east.
39	The survey area consisted of a flat pasture field. An area of slurry/manure was not surveyed in the south-east corner.	The survey area was bordered by metal fencing to the west, wooden fencing and metal fencing to the south, wire fencing to the north and an iron barn to the west. Telegraph poles where in the east and west corners.
40	The survey area consisted of a pasture field that sloped steeply from south-west to north-east.	The survey area was bordered by telegraph poles with overhead wires to the north. Field 39 was on the eastern boundary and the two were separated by a metal gate and fence. The south and west boundaries were undefined and open to the field.
41	The survey area consisted of a pasture field which sloped from the north down to the south.	The survey area was bordered by wire fencing to the north and north-west, a metal barrier was also present in the north-west, the field continued to the south and north.
42	The survey area consisted of a horse pasture field.	The survey area was bordered by wire fencing to the west, electrical fencing to the east, the field continued to the south and north.
43	The survey area consisted of horse pasture field.	The survey area was bordered by wire fencing to the east and electrical fencing to the west, the field continued to the south and north.
44	The survey area consisted of a flat, grass pasture field that was waterlogged in places.	The survey area was bordered by hedges to the west, south and part of the northern boundaries. Other areas were open to the rest of the field. An area on the southern boundary was not surveyed due to the presence of young trees and being heavily waterlogged.
45	The survey area consisted of a flat, very waterlogged, arable	The survey area was open to the field on the northern, southern and part of the western

	field with stubble still present from harvested crop.	boundaries. The eastern boundary and part of the western edge were defined by hedges. Parts of the northern and southern boundaries were not surveyed due to being heavily waterlogged.
46	The survey area consisted of a flat, slightly wet/ waterlogged grass field.	The survey area was bordered with hedges on the south-western, north-eastern and eastern boundaries. The remaining boundaries were open to the field and undefined. Telegraph poles and overhead cables were located along the south-western boundaries.
47	The survey area consisted of a flat, slightly wet grass field.	The survey area was bordered by hedges on the eastern and southern borders. The remaining north-western boundary was open to the field. A metal gate was located along the eastern boundary.
48	The survey area consisted of a flat, slightly wet grass field.	The survey area was bordered by hedges on the eastern, western and south-western boundaries. The northern and southern boundaries were undefined and open to the remaining field. Metal gates were located on the eastern and western boundary. A ditch and stream were located on the eastern boundary
49	The survey area consisted of a flat, slightly wet/waterlogged grass field.	The survey area was bordered by hedges on the western and eastern boundaries. A wooden post and barbed wire fence formed a further part of the eastern boundary. The remaining boundaries were undefined and open to the remaining field area.
50	The survey area consisted of a flat, slightly wet/waterlogged grass field.	The survey area was bordered by hedges on the eastern and part of the southern boundaries. The northern and remaining southern boundaries were undefined and open to the reaming area of the field. The western boundary was defined by a wooden post and barbed wire fence, part of this area was not surveyable due to being heavily waterlogged. Overhead power cables ran along the southwestern corner of the field.
51	The survey area consisted of mostly dry arable field with wheat crop. The field sloped gently down from northeast to southwest.	The survey area was bordered by hedges on the northern and south-eastern boundaries. The remaining boundaries were undefined and open to the field. Overhead cables crossed the survey area from a post on the eastern boundary to the north-western corner.
52	The survey area consisted of mostly dry arable field with wheat crop. The field sloped gently down from north-east to south-west.	The survey area was bordered by hedges on the north-western, western and southern boundaries. Slight ditch ran along the survey area from the north-west to the eastern boundaries. The remaining boundaries were open to the field.

53	The survey area consisted of a flat, slightly wet arable field with wheat crop.	The survey area was bordered by a wood and metal fence to the northeast, a hedge on the south-west and undefined boundaries on the remaining boundaries. A hedge crossed part of the survey area from the southern boundary.
54	The survey area consisted of a flat, very waterlogged, arable field with corn stubble present.	The survey area was bordered by a hedge on the southern and eastern borders. The remaining boundaries were open to the field. Parts of the field on the north-eastern corner and eastern boundaries were not surveyed due to being heavily waterlogged.
55	The survey area consisted of a flat, slightly wet, arable field with corn crop.	The survey area was bordered by hedges on the north-eastern and south-western borders. The remaining boundaries were undefined and open to the field.
56	The survey area consisted of an arable field sloping slightly from west to east.	The survey area was bordered by hedges on the western and south-western boundaries, and vegetation on the west. The remaining boundaries were all undefined.
57	The survey area was a mostly dry horse pasture field that sloped from north-west down to the south-east.	The survey area was bordered by a wood and metal fence to the south-east, hedges on the eastern and northern boundaries. The remaining boundaries were all open to the field. A metal gate was located in the south-eastern corner.
58	The survey area consisted of flat, slightly wet arable fields with wheat crop.	The survey area was bordered by hedges on the north-eastern and south-western boundaries, the remaining boundaries were undefined. Part of the survey area was not surveyable due to tractor ruts and a boggy ground.
59	The survey area consisted of flat, slightly wet arable fields with wheat crop.	The survey area was bordered by hedges on the north-eastern and south-eastern boundaries. A metal gate was located on the south-eastern corner. The western boundary was undefined. Overhead cables crossed the western border and ran diagonally across the survey area to the south-eastern boundary.
60	The survey area consisted of a flat, slightly wet, arable field with wheat crop.	The survey area was bordered by hedges on the north-eastern boundary, and a wooden fence on the south-western boundary. The remaining boundaries were undefined.
61	The survey area consisted of flat, mostly dry arable fields	The survey area was bordered by hedges on the northern and western boundaries. The remaining boundaries were undefined.
62	The survey area consisted of flat, mostly dry arable fields	The survey area was bordered by hedges on the eastern and southern boundaries. A metal fence was located in the south-eastern corner. The remaining boundaries were undefined.
63	The survey area consisted of flat, waterlogged horse pasture.	The survey area was bordered by a wooden fence and hedges on the north-western boundaries and a wooden post and electric fence

		on the south-eastern boundaries. The remaining boundaries were open to the field.
64	The survey area consisted of flat, waterlogged horse pasture.	The survey area was bordered by a wooden fence on the south-western boundary. The remaining boundaries were undefined.
65	The survey area consisted of a flat, slightly wet, boggy and waterlogged arable field with no visible crop present.	The survey area was bordered to the north-east by hedges and a metal fence. The remaining borders were undefined. An area in the middle of the survey area was not surveyed due to being very waterlogged.
66	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing to the east and a wooden fence to the west. A wire fence bisected the survey area from north to south on the south-west side. Areas were not surveyed due to being waterlogged, and multiple pieces of agricultural equipment were present.
67	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing as well as trees and hedgerows to the north, east, west and south-west. There was no physical boundary to the south.
68	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing and hedgerows to the north and west, and wire fencing to the east. There was no physical boundary to the south, apart from one small stretch of electric fencing in the south-west.
69	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by metal fencing and hedgerows to the south, a metal fence to the west, and no physical boundaries to the north and east. Over half of the area was not surveyed due to the presence of pigs.
70	The survey area consisted of a school playing field.	The survey area was bordered by metal fencing and trees to the north and east, and by no physical boundary to the south and west.
71	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by metal fencing to the south and west, with trees to the east and south. A hedgerow bisected the survey area from north to south-west. Standing water caused some areas to be not surveyable.
72	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by hedgerows to the north, east and west, and by no physical boundary to the south. A pile of branches was present in the north of the survey area which was not surveyed.
73	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by trees to the east, a ditch to the south and north and no physical boundary to the west. Piles of branches were collected to the north-west which resulted in an area that could not be surveyed.
74	The survey area consisted of a pasture field.	The survey area was bordered by hedgerows and a ditch to the south and north, and by no physical boundary to the east and west.

75	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing and hedgerows to the north-east, south, and part of the west. The other boundaries were undefined.
76	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by wire fencing, trees, and hedgerows to the north-east, east, south, and south-west. The other boundaries had no physical boundary. Small areas of long grass and standing water were not able to be surveyed.
77	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by wire fencing and hedgerows to the north, east and west, and by no physical boundary to the south.
78	The survey area consisted of a pasture field.	The survey area was bordered by a ditch and hedgerow to the north-west, by a horse paddock to the north, and by a hedgerow to the south. Half of the survey area was encompassed by electric fence.
79	The survey area consisted of a waterlogged pasture field.	The survey area was bordered by metal fencing and a hedgerow to the west, and a ditch and hedgerow to the south. The other boundaries consisted of no physical boundary.
80	The survey area consisted of a pasture field.	The survey area was bordered by wire fencing, a ditch and hedgerows to the north and south, and by no physical boundary to the east and west.
81	The survey area consisted of a pasture field.	The survey area was bordered to the north-west by a ditch and a hedgerow and to the south-east by a hedgerow. The other boundaries consisted of no physical boundary.
82	The survey area consisted of a pasture field. The land sloped down from south to north at the north of the field and from west to east in the south of the field.	The survey area was bordered to the north, south and east by hedges. The remaining borders were undefined and open to the field. A metal gate was in the south-eastern corner of the survey area.
83	The survey area consisted of a pasture field sloping down to the north and east.	The survey area was bordered by hedges and barbed wire to the south, and by treeline to the east. A metal gate was present on the south-eastern border. The field continued to the north-east and south-west.
84	The survey area consisted of an undulating arable stubble field in the north, and pasture in the south, sloping down to the south.	The survey area was bordered by hedgerow and barbed wire to the east, by a treeline in the south and by a hedge in the north. The field continued to the west.
85	The survey area consisted of a pasture field, sloping down from a peak in the centre of the survey area.	The survey area was bordered by a footpath and barbed wire to the south and east. To the west and south-west, the area was bordered by treelines. The field continued to the north.
86	The survey area consisted of a flat pasture field.	The survey area was bordered by treelines to the north, east and west. A wire fence was present

		along the eastern border. The field continued to the south.
87	The survey area consisted of a pasture field sloping down to the east and west from a central topographic high.	The survey area was bordered by a tree line in the north-east corner, and by metal fencing to the south. The field continued to the north-west and south-east. Overhead cables ran from north-east to south-west in the southern region of the survey area.
88	The survey area consisted of a pasture field sloping down to the south-west.	The survey area was bordered by wire fence to the east and the west. The field continued to the north and south.
89	The survey area consisted of a pasture field sloping down to the north-east.	The survey area was bordered by hedges and wire fence in the east and west, with overhead cables running along the eastern border. The field continued to the north and south.
90	The survey area consisted of a flat pasture field.	The survey area was bordered by a metal fence to the north-east and south-west. The field continued to the north-west and south-east.
91	The survey area was a flat pasture field.	The survey area was bordered by hedges and wire fence in the north and south. On the northern boundary, there was a drain cover and a playing area. The field continued to the east and west.
92	The survey area was a flat pasture field.	The area was bordered by hedges in the north. The field continued in all other directions.
93	The survey area consisted of a flat dry pasture field.	The survey area was bordered by treelines to the north-east and south-west. Metal gates were present on these borders. The field continued to the north-west and south-east.
94	The survey area consisted of a pasture field sloping down to the south.	The survey area was bordered by hedges and trees to the north and the south. The field continued to the east and west. A metal fence is present on the northern boundary.
95	The survey area consisted of a dry flat pasture field.	The survey area was bordered by hedgerow to the north-east and north-west. A metal gate was present on the north-eastern border. The field continued to the south.
96	The survey area consisted of a dry field with overgrown vegetation.	The survey area was bordered by hedges on all borders. In the eastern corner there was an electric pylon with overhead wires.
97	The survey area was a dry pasture field, sloping gently down to the east.	The survey area was bordered by treelines to the north, west and south. The eastern border was made up of hedgerow.
98	The survey area was dry pasture field, sloping gently to the east.	The survey area was bordered by trees and wire fence in the south and west. The eastern border was made up of hedgerow. The field continued to the north.
99	The survey area was a dry pasture field sloping down to the south.	The survey area was bordered by treelines to the north, east and south. The field continued to the west. Overhead cables ran approximately east to west through the centre of the survey area. A

		metal gate was present in the southwest corner of the survey area.
100	The survey area was a flat, dry pasture field.	The survey area was bordered by hedges, wire and wooden fences in the north, east and south. The field continued to the west. A metal gate was located on the southern border.
101	The survey area was pasture field gently sloping down to the north.	The survey area was bordered by hedges, wire and wooden fences in the north, east and south. The field continued to the west. A small area of waterlogged ground was present at the southern border which could not be surveyed.
102	The survey area was a flat, dry pasture field.	The survey area was bordered by hedges, wire and wooden fences in the north, west and south. The field continued to the east. Metal gates were present on the southern border of the survey area, and a wooden gate at the northern border. Telegraph poles and overhead cables ran east to west in the southern part of the survey area.
103	The survey area was a flat, dry pasture field.	The survey area was bordered by hedges, wire and wooden fences to the west and north. The field continued to the east. Metal gates were present on the northern boundary.
104	The survey area was a dry pasture field sloping down gently to the south.	The survey area was bordered by treelines to the east and west. The northern border consisted of hedges and the field continued to the south. Overhead cables ran east to west near to the southern border.
105	The survey area was a dry pasture field sloping down gently to the south.	The survey area was bordered by hedges, wire and wooden fences to the east and west. The field continued to the north and south.
106	The survey area was flat and under arable cultivation with wheat crop present. Some areas were wet underfoot and an area in the south-east was unable to be surveyed due to deep tractor ruts.	The survey area was bordered by hedges, wire and wooden fences to the north and south, and continued to the east and west
107	The survey area was a dry pasture field sloping gently down to the south-east.	The survey area was bordered by hedges, wire and wooden fences to the north, west and south. The field continued to the east. A metal gate was present on the northern boundary.
108	The survey area was a dry pasture field sloping gently down to the south-east.	The survey area was bordered by hedges, wire and wooden fences to the north and south. The field continued to the west and east. A metal gate was present on the southern boundary.
109	The survey area was a dry pasture field sloping gently down to the north.	The survey area was bordered by hedges, wire and wooden fences to the north and south. The field continued to the west and east. A metal gate was present on the northern boundary.

110	The survey area was a dry pasture field sloping gently down to the north-west.	The survey area was bordered by hedges, wire and wooden fences to the northeast and south. The field continued to the north-west and south-east. A metal gate was present on the southern boundary.
111	The survey area was a flat, dry arable field with young crop	The survey area was bordered by hedges, wire and wooden fences to the south. The area was bordered by a ditch alongside vegetation to the north. The field continued to the east and west. A ditch ran through the centre of the survey from north to south, and at the northern and southern edges there were tractor ruts. These areas could not be surveyed.
112	The survey area was a dry arable field with young crop, sloping down to the north.	The survey area was bordered by ditches and vegetation to the north-west and south-east. The field continued to the north-east and south-west.
113	The survey area was a dry arable field with young crop, sloping down to the north.	The survey area was bordered by hedges, wire and wooden fences to the south-west and north. The field continued to the east and west. Telephone poles and overhead cables ran in the southern part of the survey area from north to south.
114	The survey area was a flat, dry pasture field.	The survey area was bordered by hedges, wire and wooden fences to the east and west. The field continued to the north and the south. In the north-east corner, there was a shack with debris that could not be surveyed. Fence posts were seen running north-east to south-west through the centre of the survey area. Overhead cables ran north to south in the eastern part of the survey area.
115	The survey area comprised a pasture field that sloped gently from south-west to north-east and steeply from west to east.	The survey area was bordered on the west by a hedgerow, a wire fence on the south and east. The north boundary was undefined. An area in the south-west corner was not surveyed due to being unsuitable as a result of tractor churn, an area on the eastern boundary was not surveyed due to the presence of bushes and trees.
116	The survey area was comprised of a grass pasture field that sloped from west to east.	The survey area was bordered by hedges on the south border, hedges with a wire fence and ditch on the north border, the remaining borders were undefined and continued into the surrounding field. An area of trees located in the north of the survey area, along the north boundary meant that part of this area was not surveyed.
117	The survey area was comprised of a grass pasture field that sloped gently from north-west to south-east.	The survey area was bordered by hedges on the north-east and south-west borders. The remaining borders were undefined and open to the field.

118	The survey area was comprised of a grass pasture field that sloped from north-west to south-east.	The survey area was bordered by hedges on the north-east and south-east boundaries. The remaining boundaries were all undefined and open to the surrounding field. A metal gate was located partway along the south-east boundary. An area of marshy land ran diagonally across the survey area from southwest to a point on the north-east boundary.
119	The survey area comprised a flat grass pasture field.	The survey area was bordered by a wooden fence with hedges on the north, and a wooden fence on the south. The west and east boundaries were undefined.
120	The survey area comprised a flat, grass pasture field.	The survey area was bordered on the north-west and part of the western boundaries by a wooden fence, the south-western and southern boundaries were comprised of a wooden fence and trees. The eastern boundary was undefined. A metal gate was located on the western boundary, extending down to the south-west corner of the survey area.
121	The survey area comprised a flat, dry, grass pasture field.	The survey area was bordered by a wood fence to the south and west, a wood fence with trees to the north and the east was undefined. Overhead cables ran from a point on the north-west corner across the north-east section of the survey area, exiting to the south-east.
122	The survey area comprised an area of made ground and debris.	The survey area was bordered by a metal gate on the north-east, the east and part of the south boundaries were undefined. An area of debris, mounds and overgrown vegetation comprised the west and half of the south boundaries, this area was not surveyed.
124	The survey area comprised an arable stubble field that sloped gently in the north from north-east to south-west and steeply from north to south in the south of the area.	The survey area was bordered by wire fencing to the north, an area of vegetation that was not surveyed on the south, beyond which was another wire fence. The remaining boundaries were undefined.
125	The survey area was comprised of a wet pasture field. The field sloped substantially from south-east to north-west in the north-west of the survey area, then from west to east towards the south of the survey area.	The survey area was bordered by wire fencing on the northern and southern boundaries. The remaining boundaries were all undefined.
126	The survey area was a wet grass pasture field that sloped gently from east to west.	The survey area was bordered by hedges with a wooden fence on the south boundary, the remaining boundaries were all undefined. A metal trough was located towards the south-east corner of the survey area.

127	The survey area comprised a wet grass pasture field that sloped from north-east to south-west in the bottom of the survey area.	The survey area was bordered by hedges on the eastern boundary, a hedge with a wooden fence through it on the west and the remaining boundaries were all undefined.
128	The survey area comprised a wet grass pasture field. The field sloped from north to south.	The survey area was bordered to the west and south by hedges, the east boundary followed a treeline in the middle of the field, the remaining north, part of the southern and south-western boundaries were all undefined. Overhead cables crossed the site south-east corner, exiting on the south-west boundary.
129	The survey area comprised a grass field. The field sloped from south to north.	The survey area was bordered by hedges on the north-eastern and north-western boundaries, the remaining boundaries were all undefined.
130	The survey area comprised a flat grass pasture field.	The survey area was bordered by hedges along the length of the southern border with a metal gate in the middle. The remaining boundaries were all undefined and open to the field. A trackway bisected the field running from the metal gate in the south to the northern boundary.
131	The survey area comprised an arable field gently sloping, down from north-west to south-east.	The survey area was bordered by hedgerows to the north and east, the field continued to the west and south. There was a telegraph pole in the norther boundary with overhead cables following the northern boundary.
132	The survey area comprised a mostly flat pasture field. A large circular depression was in the northeast corner of the survey area.	The survey area was bordered by hedgerows on the western and part of the southern boundaries. A wire fence was to the east and crossed the field along the northern boundary.
133	The survey area comprised a wet, flat arable field.	The survey area was bordered to the north by hedgerow and on the south by a wire fence. The remaining borders were undefined. Telephone wires crossed the survey area diagonally from the south-east corner to a point on the west border. Electricity wires from pylons outside the survey area crossed in the north diagonally from west to east.
135	The survey area comprised a very wet pasture field.	The survey area was bordered on all sides by wire fencing. Overhead wires passed over the north-west corner of the survey area.
136	The survey area comprised a grass pasture field sloping down from the north to the south.	The survey area was bordered to the east and west by a combination of hedges and a wire fence with wooden posts. Part of the southern boundary was formed of trees, beyond which was the A55. The northern and southern boundaries were undefined. Overhead cables ran along the west boundary and diagonally

		across the north-east corner to the eastern boundary.
137	The survey area comprised a grass pasture field sloping down from north to the south.	The survey area was bordered by a forested area to the east, treeline to the west and fencing to the north. The field continued to the south.
138	The survey area comprised a very wet pasture field.	The survey area was bordered on all sides by wire fencing. Overhead wires passed near the survey area.
139	The survey area comprised a very wet pasture field. The area sloped gently down to the south-west from the north-west.	The survey area was bordered to the west, south and east by wire fencing. The northern boundary was undefined. An area in the centre and a second to the east were not surveyed due to the presence of bushes.
140	The survey area comprised a very wet pasture field that sloped from north-west to south-east.	The survey area was bordered to the east and west by a wire fence. The remaining boundaries were all undefined. A pylon was located along the northern boundary. In the north-east corner overhead wires passed across the survey area to the south.
141	The survey area comprised a grass pasture field.	The survey area was bordered to the west and east by hedges and a wire fence, the remaining boundaries were undefined.
142	The survey area comprised a grassland field.	The survey area was bordered to the north and east by a line of a trees and a stream. The remaining boundaries were all undefined.
146	The survey area comprised a long grass pasture field that sloped gently down from east down to the west.	The survey area was bordered by wire fencing to the east, west, and part of the southern borders, the remaining borders were undefined. An area along the southern border of the survey area was not surveyed to boggy ground conditions.
147	The survey area was a grassland field, which sloped down from south-east down to the north-west.	The area was mostly overgrown with bales of hay and a large embankment.
148	The survey area was a pasture field, which sloped down from south-east down to the north-west.	The survey area was bordered by hedges to the east and west, the field continued to the north and south.
149	The survey area was a pasture field, which sloped down from south-east down to the north.	The survey area was bordered by hedges to the east, south-east and west, the field continued to the north and south-west.
150	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the north-east and west, the field continued to the north-west and south-east.
151	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-east and north-west, the field continued to the west and east. A partial hedge bisected the southern part of the survey area.
152	The survey area was a pasture field, which sloped down from west down to the east.	The survey area was bordered by hedges to the east and west, the field continued to the north

		and south. A tree was in the centre of the survey area.
153	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-east and north-west, the field continued to the west and east.
154	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-east and north-west, the field continued to the west and east.
155	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-east, south-west and north-west, the field continued to the south-east.
156	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-west and north-west, the field continued to the west and east.
157	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-east and north, the field continued to the west and east.
158	The survey area was a flat, pasture field.	The survey area was bordered by hedges to the south-west, the field continued to the north and east.
159	The survey area comprised a wet, flat arable field.	The survey area was bordered by hedges to the south and a metal fence to the north, the field continued to the west and east.
160	The survey area consisted of a wasteland/grassland field and was very overgrown along the northern boundary.	The survey area was bordered by hedges to the east and west, the field continued to the north and south.

4.3. The underlying geology of the survey corridor consists, of east of the River Dee, the Kinnerton sandstone formation (Areas 1-5, 46-53, 56, 58-62, 65, 132-133, 141, 150, & 159), with a band pebbly (gravelly) sandstone of the Chester Formation (Areas 6-45, 54-55, 63-64, 147-149, 152, 155-158), bisecting it. To the west of the river the underlying geology comprises mixture of mudstone, sandstone and conglomerate of the Etruria Formation (Areas 79-81, 142, 151, & 153-154), mudstone, siltstone and sandstone from the Pennine Middle Coal Measures (Areas 66-78, 83-84, 93-94, 96-98, 100-103, 106-107, 111-112, 114, 119-122, 126-128, 135, & 138-140), sandstone and (subequal/subordinate) argillaceous rocks of Gwespyr Sandstone Fomation (Areas 85-89, & 118), interbedded mudstone from the Bowland Shale Formation and sandstone of the Hollin Rock Formation (Areas 57, 92, 99, 104-105, 129-131, 136-137, & 160).

4.4. The superficial geology across the survey area mostly consists of Devensian diamicton and till (Areas 3, 5-17, 20-28, 33, 37-40, 42-50, 52, 54-56, 58-59, 63-64, 66, 68-69, 90-91, 93-132, 135-140, 146-150, 155-157, & 159-160), with areas of clay, silts and sand from tidal flat deposits near to the Rivers Dee and Mersey (Areas 1-2, 4, 53, 60-62, 65, 67, 70-81, 133, 141-142, & 151-154). Across the survey area bands of blown sand, sand, (Area 41) and Glaciofluvial deposits, Devensian of sand and gravel are also present (Areas 57, 83-89, 92, & 149) (British Geological Survey, 2022).

4.5. Across the survey area the majority of the soils consist of slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils (Areas 3-33, 41-45, 50, 54, 57, 63-64, 66-69, 72-75, 78, 83-84, 88-132, 135-140, 146-149, 155-156, & 160). However, east to west further soils include: Loamy and sandy soils with naturally high groundwater and a peaty surface to the north-east (Areas 1 & 2); freely draining slightly acid sandy soils in the east (Areas 28 & 149); slightly acid loamy and clayey soils with impeded drainage (Areas 34-40, 152, & 157); loamy and clayey soils of coastal flats with naturally high groundwater(Areas 53, 60-62, 65, 70-71, 76-77, 79-81, 133, 141-142, & 151-154); freely draining slightly acid loamy soils (Areas 85-87); in addition to slowly permeable seasonally wet acid loamy and clayey soils in the west (Areas 93, 114, & 96). (Soilscapes, 2022).

5. Archaeological Background

5.1. The following is a summary of an Existing Baseline produced and provided by WSP (WSP, 2022).

5.2. Within close proximity of the survey area, there is a single scheduled monument. This is a late medieval moated site, fishpond, and connecting channel at Elton, c.60m north of Area 9.

5.3. Evidence of prehistoric activity in close proximity to the survey area consists of three Bronze Age round barrows between Northop Hall and Northop (101848, 100051, and 100049) that are noted on the HER report as having been destroyed. Additional evidence of prehistoric activity consists of a standing stone near Northop (97726), a hillfort near Hawarden (132195), Mesolithic and Bronze Age peat layers (MCH25132) near Ince, and isolated finds.

5.4. Roman presence in this area began around mid-1st century AD following the Roman conquest of south-east England in 47 AD. The Roman fort of Castra Deva in the modern city of Chester was established in 79 AD as a permanent military installation. The lines of Roman roads are noted within the HER records (MCH1278 and MCH6164; CPAT Refs. 104572, 128773, 46802 and 47802) and it is thought that remains of the roads could extend across the survey area. The presence, extent, and survival of the roads or any associated features have not been confirmed through archaeological investigation. Additional evidence of Roman activity surrounding the survey area is limited to isolated finds.

5.5. The whole of survey area is located on the Mercian side of the Wat's Dyke but little evidence of Saxon activity has been identified. The only evidence of Saxon activity near the survey area is a cross shaft currently located within Grade I listed St Mary's Church in Thornton-le-Moors approximately 200m west of the survey area. Medieval activity is limited to moated sites such as ones near Elton and Thornton-le-Moors Green (NHLE 1012122). Medieval agricultural activity within the survey area consists of ridge and furrow remains (97837 and MCH25127 15191) and later medieval field boundaries (99060).

5.6. The post-medieval period saw an increase in industrial activity within both Cheshire and Flintshire. North Wales was known for its rich mineral deposits with increasingly honeycombed with marl pits (85036 and 85035), sand pits (85032), clay pits (99035), and collieries (103786, 99047 and 103806) around and within the survey area. Brickfields were established in the late post-medieval period within the survey area near Ewloe Green and Northop Hall to take advantage of the clay and lime deposits. Developing infrastructure included local railway lines (99043), tramways (99039), and the construction of the Wirral branch of the Ellesmere Canal (MCH18836 10101/0/0), all of which are crossed by the survey area.

6. Methodology

6.1. Data Collection

6.1.1. Magnetometer surveys are generally the most cost effective and suitable geophysical technique for the detection of archaeology in England. Therefore, a magnetometer survey should be the preferred geophysical technique unless its use is precluded by any specific survey objectives or the site environment. For this site, no factors precluded the recommendation of a standard

magnetometer survey. Geophysical survey therefore comprised the magnetic method as described in the following section.

6.1.2. Geophysical prospection comprised the magnetic method as described in the following table.

6.1.3. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

6.1.4. The magnetic data were collected using MS' bespoke hand-pulled cart system and hand-carried GNSS-positioned system.

6.1.4.1. MS' cart and hand-carried system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multi-channel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.

6.1.4.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.

6.1.4.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were collected by traversing the survey area along the longest possible lines, ensuring efficient collection and processing.

6.2. Data Processing

6.2.1. Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to the EAC and Historic England guidelines for 'minimally enhanced data' (see Section 3.8 in Schmidt *et al.*, 2015: 33 and Section IV.2 in David *et al.,* 2008: 11).

Sensor Calibration – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen *et al.* (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3. Data Visualisation and Interpretation

6.3.1. This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images of the gradient and total field at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figures 62, 65, 68, 71, 74, 77, 80, 83, 86, 89, 92, 95, 98, 101, 104, 107, 110, 113, 116, 119, 122, 125, 128, 131, 134, 137, 140, 143, 146, 149, 152, 155, 158, 161, 164, 167, 170, 173, 176, 179, 182, 185, 188, 191, 194, 197, 200, 203, 206, 209, 212, 215, 218, 221, 224, 227, 230, 233, 236, 239, 242, & 245). XY trace plots visualise the magnitude and form of the geophysical response, aiding anomaly interpretation.

6.3.2. Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historical maps, LiDAR data, and soil and geology maps. Google Earth (2022) was also consulted, to compare the results with recent land use.

6.3.3. Geodetic position of results – All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF) respectively. Figures are provided with raster and vector data projected against OS Open Data.

7. Results

7.1. Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible, an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports, as well as reports from further work, in order to constantly improve our knowledge and service.

7.2. Discussion

7.2.1. The geophysical results are presented in combination with satellite imagery and historical maps (Figure 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, & 59).

7.2.2. The fluxgate gradiometer survey has responded well to the environment of the majority of the survey area with one area of possible archaeology identified. However, it should be noted that the limited extent of the survey area has provided a reduced context for interpreting the data. As such, it is not always possible to provide a definitive interpretation of all the anomalies detected. As such, an archaeological origin for anomalies categorised as undetermined should not be discounted. Agricultural activity in the form of mapped and unmapped former field boundaries and recent ploughing was also identified, along with evidence of historical agricultural practice in the form of multiple ridge and furrow regimes.

7.2.3. Modern interference has impacted the data along many parts of the survey corridor. This has taken the form of magnetic disturbance around field edges where they are bounded by roads or metal fencing, along with multiple buried services. The effects of this are locally significant and the haloes from the magnetic disturbance will have obscured any weaker anomalies, if present, within their vicinity.

7.2.4. Natural variations relating to superficial geology are present in some areas of the survey corridor and are most visible in the total field data. Some of these variations take the form of discrete positive anomalies, which are likely to be caused by unsorted and unstratified deposits of till, sands, gravels and tidal deposits. It should be noted that it is possible that some of these anomalies have an anthropogenic origin, as they can be difficult to distinguish in the magnetic results from those produced by natural processes. Broad bands of

both strong and weak, positive and negative anomalies cross the survey area in several places. Many of these are in places where the corridor crosses areas of tidal deposits that cause variations in the superficial geology.

7.2.5. In the east of the survey corridor, south of Elton, evidence of possible archaeological activity has been identified in the form of possible pit alignment (Figure 211), which could date from prehistory to the medieval period. However, due to the limited context provided by the survey corridor it is not possible to provide a more definitive interpretation. While this anomaly has a magnetic signal typical of infilled pits, it could be caused by modern agricultural activity such as a drain.

7.2.6. The historical agricultural utilisation of the landscape is evident throughout the survey corridor. This consists of numerous mapped former field boundaries and divisions, in addition to several anomalies which could possibly represent unmapped subdivisions. Ridge and furrow have also been identified. These trends are typical of pre-mechanised agriculture, but due to the limited extent of the survey area it is not possible to identify whether these are of post-medieval or of medieval origin. Several other linear trends have been identified which could relate to ridge and furrow but have been categorised as agricultural trends because their origin cannot be identified with certainty. Recent agricultural practice is present throughout the survey corridor in the form of several networks of field drains and agricultural trends which align with the recent ploughing regime.

7.2.7. The industrial use of the landscape was also recorded through multiple possible extractions areas, both mapped and unmapped. In addition, large spreads of magnetic debris were identified within Areas 68, 69, 135, 138, 139, 91 & 140. This has been interpreted as a result of local industry seen on historical mapping (Figures 21 & 23) such as brickworks, mining shafts, extraction pits, and a former railway line, including a large concentration of such activity south-east of Shotton.

7.2.8. Anomalies of undetermined origin have been detected throughout the survey corridor. These have been identified in a number of different forms and magnetic signals, with varying sizes and orientations. In some cases, it has not been possible to provide a more definitive interpretation of these anomalies because of the limited context provided by the narrow survey corridor. However, these anomalies generally lack any pattern, distinct morphology, or shape which would allow for a more-certain categorisation of their cause. Most of these anomalies will be geological, pedological, or agricultural in origin. However, it is not possible to completely rule out an archaeological origin for any of these anomalies. Many smaller or weaker discrete anomalies, which, taken individually, would not be considered to be obviously of anthropogenic origin, have been highlighted and categorised as Undetermined where they

form linear, circular or other patterns that could be suggestive of past human activity.

7.3. Interpretation

7.3.1. General Statements

7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.

7.3.1.2. **Data Artefact** – Data artefacts usually occur in conjunction with anomalies with strong magnetic signals due to the way in which the sensors respond to very strong point sources. They are usually visible as minor 'streaking' following the line of data collection. While these artefacts can be reduced in post-processing through data filtering, this would risk removing 'real' anomalies. These artefacts are therefore indicated as necessary in order to preserve the data as 'minimally processed'.

7.3.1.3. **Ferrous (Spike)** – Discrete dipolar anomalies are likely to be the result of isolated pieces of modern ferrous debris on or near the ground surface.

7.3.1.4. **Ferrous/Debris (Spread)** – A ferrous/debris spread refers to a concentration of multiple discrete, dipolar anomalies usually resulting from highly magnetic material such as rubble containing ceramic building materials and ferrous rubbish.

7.3.1.5. **Magnetic Disturbance** – The strong anomalies produced by extant metallic structures, typically including fencing, pylons, vehicles and service pipes, have been classified as 'Magnetic Disturbance'. These magnetic 'haloes' will obscure weaker anomalies relating to nearby features, should they be present, often over a greater footprint than the structure causing them.

7.3.1.6. **Undetermined** – Anomalies are classified as Undetermined when the origin of the geophysical anomaly is ambiguous and there is no supporting contextual evidence to justify a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally distinct from those caused by ferrous sources.

7.3.2. Magnetic Results - Specific Anomalies

7.3.2.1. **Possible Archaeology (Strong)** – Crossing Area 41 from south-east to north-west are a series of discrete positive anomalies (Figure 211). These have been identified as a possible pit alignment due to the separated nature of the anomalies and the weakly positive magnetic signal which is suggestive of infilled pits. It is not possible to provide a date for these anomalies based on the magnetic data alone and due to the constraints of the survey area providing a limited context for its interpretation, it is possible that these are modern agricultural in origin.

7.3.2.2. **Undetermined (Weak & Strong) –** Within Areas 9 and 10 are several linear and curvilinear anomalies which have been categorised as undetermined (Figures 226 & 229). These anomalies are typically weak or lack any

morphology that would allow for a confident interpretation, but many do cut perpendicularly to the agricultural regime. A scheduled monument consisting of a moated Medieval site (see Section 5) is located c.50m north of these areas and because of this proximity it should not be discounted that these anomalies have an archaeological origin.

7.3.2.3. **Undetermined (Weak & Strong) –** Within Area 158 a strong fragmented curvilinear anomaly [**158a**], c. 300m in length, with clear cut edges, has been identified (Figure 172). The north-eastern end appears to align with a mapped field boundary, curving to follow the agricultural regime within the field (Figure 39). As such it is considered likely that this anomaly is agricultural in origin, likely a former track or similar feature. However, this anomaly does not align with any feature visible on available historical mapping or satellite imagery. As such its origin is uncertain.

7.3.2.4. **Agricultural (Strong & Weak) -** Numerous linear anomalies have been identified along the survey corridor that appear to collocate with former field boundaries, visible on historical mapping. Examples of these are present in Areas 12, 15, 18, 52, 75, 106 & 109 (Figures 5, 7, 9, 11, 13, 17, 23, 25, 29, 31, 33, 49, 51, & 53). These anomalies exhibit a variety of different magnetic signals, with some appearing to have been truncated by subsequent ploughing. Several linear anomalies are also present which do not match with mapped field boundaries, but due to their similarity in magnetic signal, and positioning often fitting with the wider pattern of boundaries in the landscape, they have also been categorised as agricultural (Figure 5, 13, 15, 17, 25, 29, 33, 43, 45, 49, & 51).

7.3.2.5. **Agricultural (Trend)** – Throughout the length of the survey corridor, multiple weakly positive, parallel linear anomalies and striations have been identified, that appear to run concordantly with the alignment of recent ploughing visible in satellite imagery and will be caused by this activity. Further linear anomalies have been identified throughout the survey area, that do not appear to match the current agricultural regimes, but that are consistent with agricultural activity. Due to the small survey areas, it is difficult to always be certain of what agricultural activity caused them, and they therefore could be related to drainage features, ridge and furrow, or other agricultural activity (Figures 61, 64, 67, 88, 91, 94, 97, 112, 118, 121, 127, 136, 142, 145, 148, 151, 157, 160, 163, 169, 172, 175, 184, 187, 193, 196, 199, 202, 223, 226, 238, & 241).

7.3.2.6. **Ridge and Furrow** – Historical agricultural activity in the form of ridge and furrow has been identified throughout much of the survey corridor (Figure 121 & 124). These anomalies are characterised by broadly parallel linear anomalies, typically 5m to 7m apart, with a weakly positive and/or negative signal.

7.3.2.7. **Industrial/Modern** – Across the survey area discreate areas of highly magnetic material have been interpreted as being due to industrial activity.

Based on evidence from historical mapping, within Areas 15, 16, 45, 50, 68, 69 & 108 discrete zones of strong positive and dipolar enhancement have been identified and interpreted as being due to extraction activity or other similar utilisation of the landscape. These anomalies collocate with, or are in the vicinity of, areas of extraction or infilled ponds identified in 2nd edition OS Maps (Figures 5, 17, 21, 33, 35, 37, 53, & 55). Within Areas 68, 69, 135, 138, 139, 91 & 140, the magnetic data is dominated by strong dipolar anomalies likely caused by material from a brick works, pits and mineshafts recorded on historical OS Maps (Figures 21 & 23) and described in the archaeological background (see Section 5).

7.3.2.8. **Drainage Features –** Across the survey area, multiple linear anomalies have been identified. These anomalies have a variable magnetic signal and pattern but have all been interpreted as field drains, reflecting the impeded drainage of much of the survey area. Weak positive anomalies have been interpreted as cut drains while dipolar anomalies have been interpreted as ceramic drains (Figures 61, 67, 70, 85, 88, 91, 94, 97, 112, 127, 130, 136, 154, 160, 190, 193, 214, 217, 220, 223, 226, 238, & 241).

7.3.2.9. **Services & Overhead Cables –** Distributed throughout the survey corridor, linear anomalies have been identified that exhibit a very strong magnetic signal composed of multiple dipolar anomalies. These are most explicit in the greyscale and XY trace plots. The linearity and alternating polarity of the anomalies suggests they relate to modern underground services. It should be noted that the strength of signal these anomalies exhibit could possibly obscure weaker and more ephemeral anomalies in proximity to them. In addition, there are several locations where the survey area passes pylons and masts for overhead services, which cause similar strong magnetic disturbances (Figures 76, 82, 94, 100, 103, 106, 109, 124, 139, 175, 178, 181, 190, 196, 199, 205, 220, 223, 226, 229, 232, & 235).

7.3.3. **Undetermined (Weak & Strong) -** Across much of the survey area, linear and curvilinear anomalies exhibiting a weak magnetic signal have been detected (Figures 64, 67, 76, 79, 82, 85, 88, 94, 97, 100, 103, 109, 112, 118, 121, 124, 127, 130, 139, 142, 145, 148, 151, 154, 157, 160, 163, 169, 172, 175, 181, 184, 187, 193, 196, 199, 202, 205, 208, 211, 226, 229, & 241). Some of these cross the width of the survey area and in most cases do not align with the agricultural regime. They could have a variety of origins, including natural or agricultural, although due to the lack of contextual evidence it is not possible to ascribe a definitive interpretation. As such an archaeological origin of these anomalies cannot be completely discounted.

8. Conclusions

8.1. A fluxgate gradiometer survey has successfully been undertaken across a c. 147.7ha area following the projected route of the HyNet CO2 Pipeline project, with the remaining area being not surveyed due to access constraints or poor ground conditions. The geophysical survey has

detected a range of different anomalies of possible archaeological, industrial, agricultural and undetermined origin. Modern interference mostly emanates from the field boundaries but also can be seen in areas with services, overhead cables and pylons.

8.2. Possible archaeological anomalies have been detected in the form of a series of pit like features within Area 41. These anomalies lack context or other supporting evidence which could allow for a more definite interpretation, yet their morphology is such that it has been interpreted as a possible pit alignment.

8.3. Agricultural activity has been detected throughout the survey areas as mapped and unmapped field boundaries. In addition, most areas contain evidence of modern ploughing or drainage schemes.

8.4. Past industrial activity has been detected across the survey area, mostly as infilled, mapped and unmapped, extraction pits and ponds. In addition, some areas of very strong magnetic disturbance have been interpreted as being due to mapped brickworks, extraction activity, and railway lines.

8.5. Undetermined anomalies have been detected throughout the survey areas which may represent natural variations in the magnetic data, agricultural anomalies, or archaeology. A more conclusive classification cannot be given due to the limited context provided in narrow survey extents. As such an archaeological origin of these anomalies cannot be discounted.

8.6. Modern services have been detected across the survey area, the strength of these signals may have obscured any weaker anomalies.

9. Archiving

9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report.

9.2. MS contributes reports to the Archaeological Data Service Grey Literature Library upon permission from the client, subject to any dictated time embargoes.

10. Copyright

10.1. Copyright and intellectual property pertaining to all reports, figures and datasets produced by Magnitude Services Ltd is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

11. References

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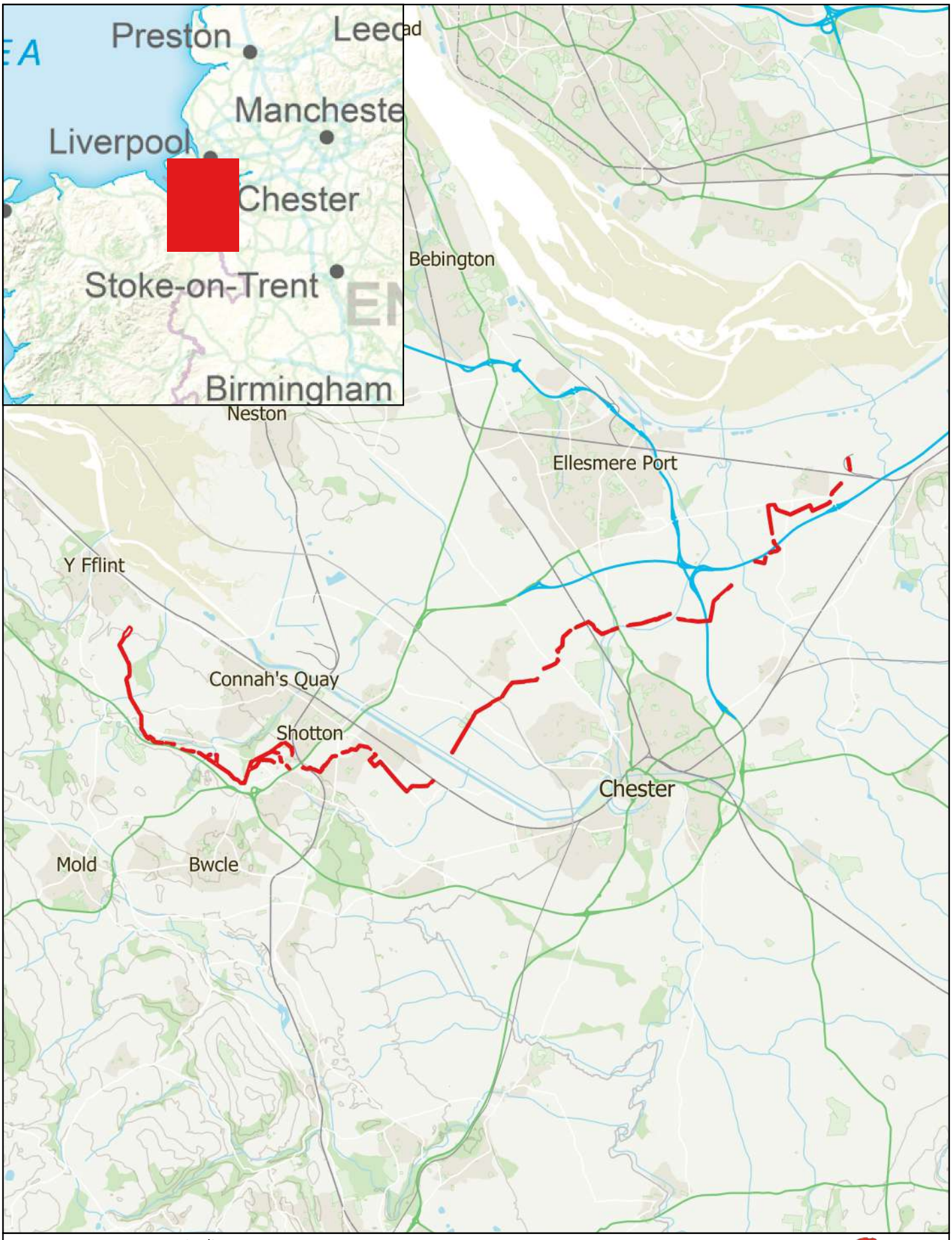
12. Project Metadata

MS Job Code	MSSJ1172
Project Name	HyNet CO2Pipeline
Client	WSP
Grid Reference	SJ 2532 7114
Survey Techniques	Magnetometry
Survey Size (ha)	173.5ha (Magnetometry)
Survey Dates	2022-02-21 to 2022-04-08
Project Lead	Christian Adams BA MSc ACIfA
Project Officer	Christian Adams BA MSc ACIfA
HER Event No	N/A
OASIS No	magnitud1-507170
S42 Licence No	N/A
Report Version	1.0

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	FC	CA	16 May 2022
0.2	Comments from Project Lead	MC	CA	18 May 2022
0.3	Draft for Director Approval	CA	FPC	19 May 2022
0.4	Corrections for Client	KB MC	CA	08 June 2022
1.0	Report Issued as Final	CA	CA	14 June 2022



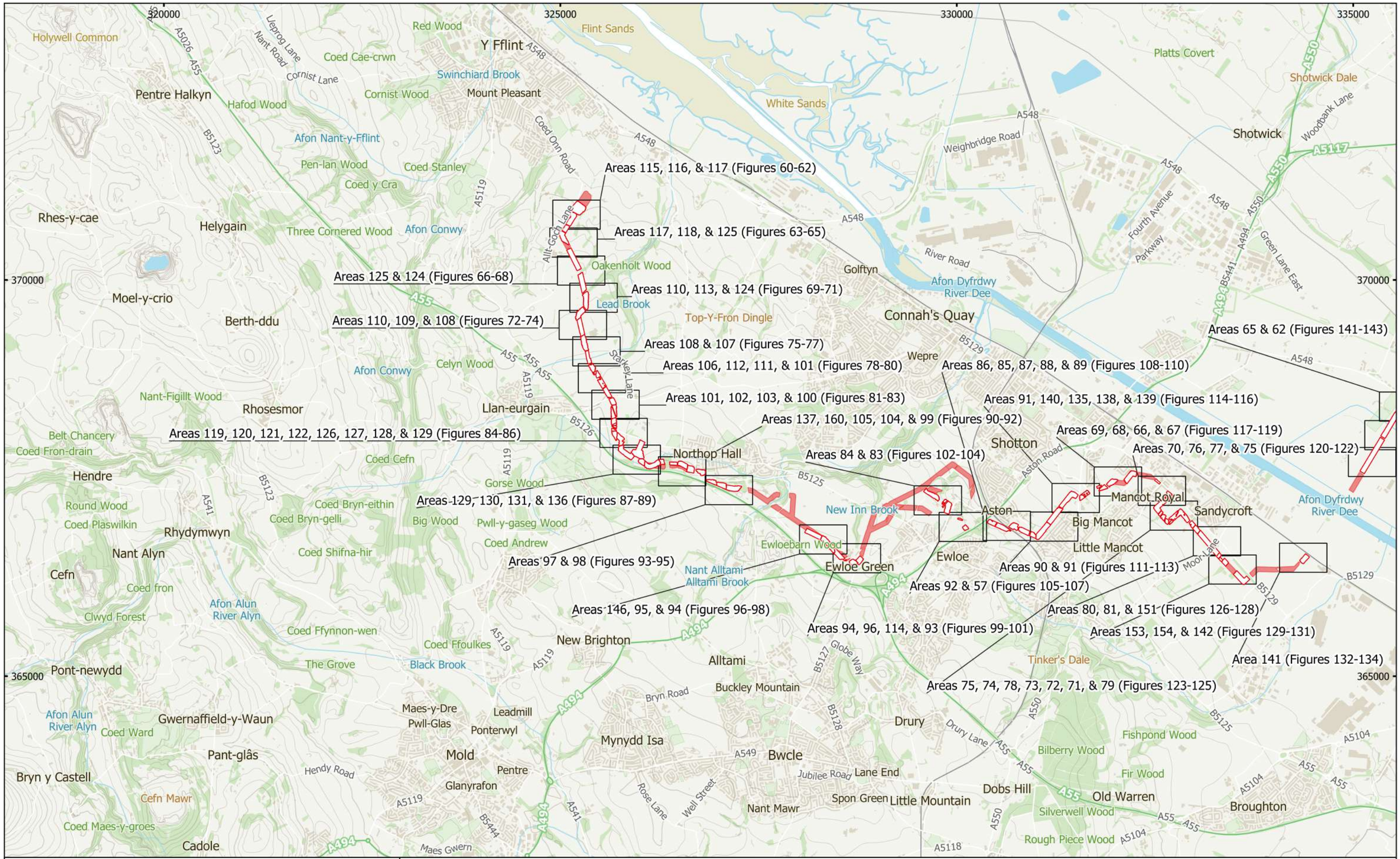
MSSJ1172 - HyNet CO2 Pipeline
Figure 1 - Site Location
1:150,000 @ A4

Site Boundary

N

0 2.5 5 km

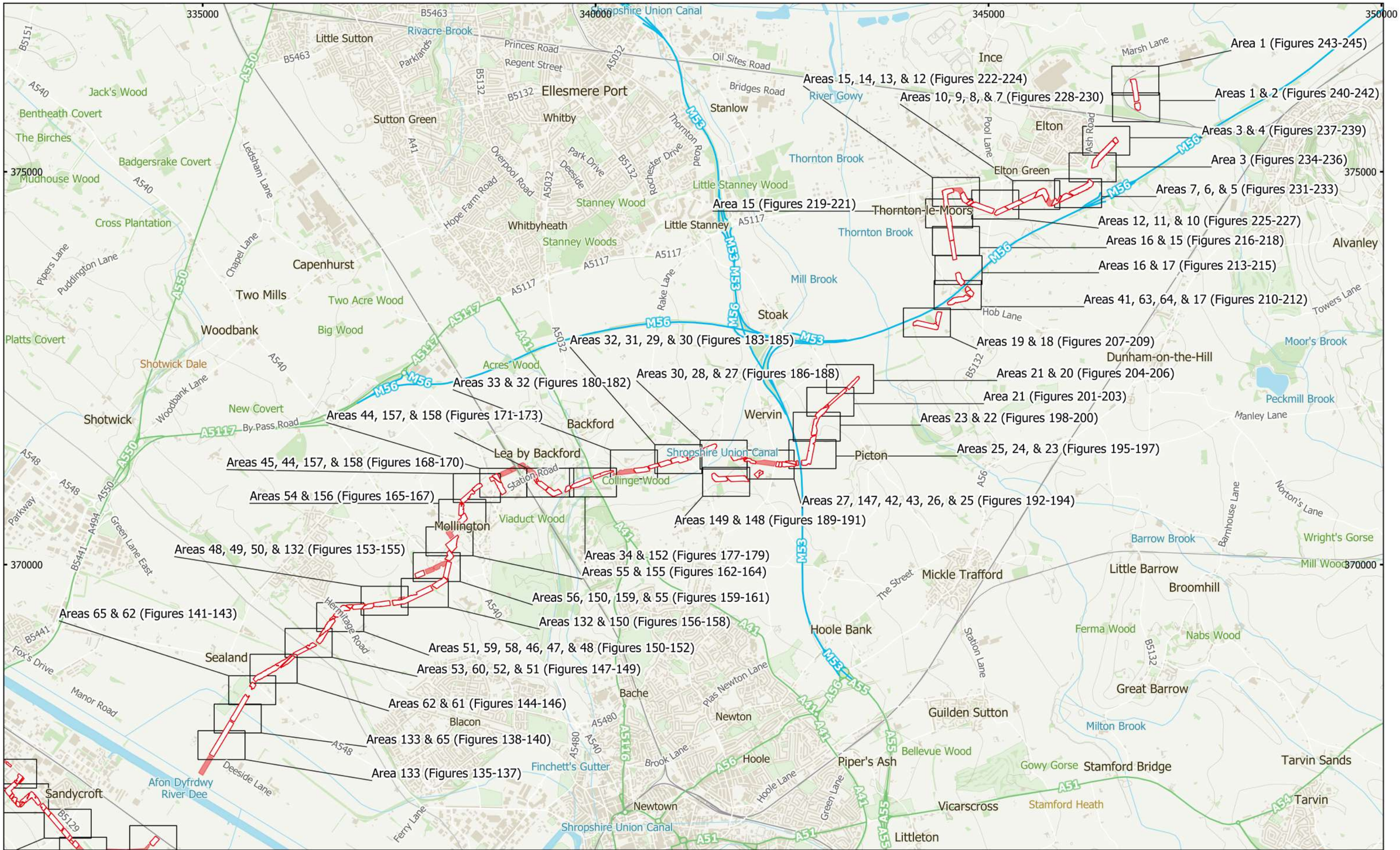
magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 2 - Location of Survey Areas (West)
1:40,000 @ A3

Survey Area
Not Surveyable

magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 3 - Location of Survey Areas (East)
1:40,000 @ A3

Survey Area
Not Surveyable

N
0 1 2 km

magnitude surveys

325000
325500
371000
370500
Waen Isa Farm
Little Leadbrook Farm
Llwyn Onn
Llwyn Onn Lane
Allt-Goch Lane
Waen Isa Cottage
Bryn Mawr
Lon Y Gog
Area 115
Area 116
Area 117
Area 118
MSSJ1172 - HyNet CO2 Pipeline
Figure 4 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 115, 116, 117, 118, & 125)
1:3,000 @ A3

48,998 nT 49,003
N
0 50 100 150 m
magnitude surveys

325000
325500
371000
371000
370500
370500
Area 115
Area 116
Area 117
Area 118
Parly. By.
Flint. District
R.D. By
Little Leadbrook Farm
Waen-isaf
Ford
Bryn-bâch
Bryn-mawr
B.M. 254·2
185
200
233

MSSJ1172 - HyNet CO2 Pipeline
Figure 5 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 115, 116, 117, 118, & 125)
1:3,000 @ A3

Contains historical mapping © CLS Data 2022: Ordnance Survey, 6" 2nd edition c. 1882-1913

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

325000

325500

Area 125

Lon Y Gog

Allt-Goch Lane

Tros-Y-Mynydd

370000

Area 124

370000

Starkey Lane

Hawthorne Cottage

Appleton House

Area 113

Lead Brook

MSSJ1172 - HyNet CO2 Pipeline
Figure 6 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 125, 124, 113, & 110)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

325000

325500

Area 125

370000

370000

Area 124

Area 113

247

264

284.

290

300

300

200

200

F.P.

F.P.

F.P.

F.P.

Tros-y-mynydd

B.M. 281·4

B.M. 284·4

Tai-cochion

Wern Cottages

Wern Hall

Trough

Lead

W

O

O

D

MSSJ1172 - HyNet CO2 Pipeline
Figure 7 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 125, 124, 113, & 110)
1:3,000 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature

N

0 50 100 150 m

magnitude surveys

325000
325500
369500
369500
369000
369000
Area 110
Area 109
Area 108
Area 107
Area 106
Wern Hall Lodge
Ty'n-Y-Coed Farm
Starkey Lane
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 8 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 110, 109, 108, 107, & 106)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

325000
325500
369500
369000
Area 110
Area 109
Area 108
Area 107
Area 106
Lodge
309
321
F.P.
Ty'n-y-coed
300
286
B.M. 275·1
U.D.By.
P

MSSJ1172 - HyNet CO2 Pipeline
Figure 9 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 110, 109, 108, 107, & 106)
1:3,000 @ A3

Contains historical mapping © CLS Data 2022: Ordnance Survey, 6" 2nd edition c. 1882-1913

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Service
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

325500

326000

Area 112

Area 111

Area 101

Area 102

Area 103

Area 100

Area 119

Area 120

Starkey Lane

Bryn Coch Farm

Pont-Einion Cottage

B5126

368500

368500

Park View

Cae Cadno / Fox Field

A55

B5125

B5126

Security House

Galchog Farm

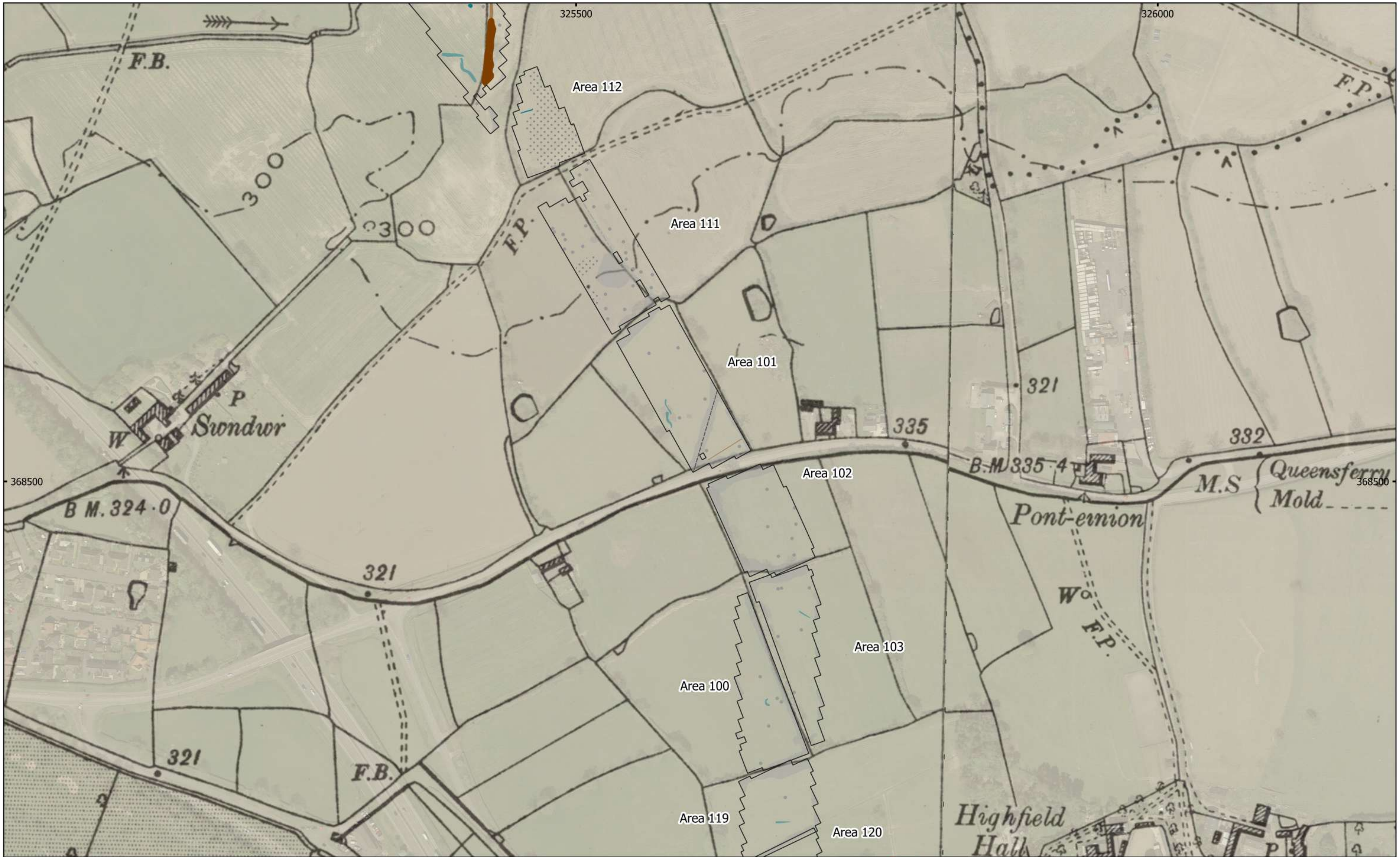
MSSJ1172 - HyNet CO2 Pipeline
Figure 10 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 112, 111, 101, 102, 103, 100, 119, & 120)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 11 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 112, 111, 101, 102, 103, 100, 119, & 120)
1:3,000 @ A3

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Data Artifact
Service
Ferrous (Spike)

N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 12 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 120, 122, 121, 126, 128, 127, 129, 130, 131, 136, 137, 160, 105, & 104)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 13 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 120, 122, 121, 126, 128, 127, 129, 130, 131, 136, 137, 160, 105, & 104)
1:3,000 @ A3

Contains historical mapping © CLS Data 2022: Ordnance Survey, 6" 2nd edition c. 1882-1913

Agricultural (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Undetermined (Trend)
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 14 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 160, 105, 104, 99, 97, & 98)
1:3,000 @ A3

48,998 nT 49,003

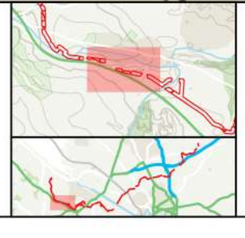
N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 15 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 160, 105, 104, 99, 97, & 98)
1:3,000 @ A3

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Weak)
Agricultural (Trend)
Undetermined (Trend)
Service
Drainage Feature
Ferrous (Spike)



N

0 50 100 150 m

magnitude surveys

328000

328500

329000

366500

366500

Area 146

Area 95

Area 94

Area 114

Area 93

Area 96

Ewloebarn Wood

Magazine Lane

Green Lane

Mold Road

B5127

Ewloe Green

Old Liverpool Road

Pottery Cottages

A494

A494

A55

A55

Smithy Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 16 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 146, 95, 94, 96, 114, & 93)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

328000
328500
329000
366500
366500
Area 146
Area 95
Area 94
Area 114
Area 93
Area 96
Ewloebarn Wood
Ewloegreen Farm
Ewloe Green
Mission Church
Ewloegreen Pottery
School
Meth. Chap.
G.P
F.P.
B.M. 301·2
B.M. 289·3
300
309
335
292
294

MSSJ1172 - HyNet CO2 Pipeline
Figure 17 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 146, 95, 94, 96, 114, & 93)
1:3,000 @ A3

Contains historical mapping © CLS Data 2022: Ordnance Survey, 6" 2nd edition c. 1882-1913

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

330000

330500

Area 84

Shotton Lane

Aston Hill Farm

Area 83

Old Aston Hill

Fern Grove

The Church Of The Holy Spirit

Beech Road

Highland Avenue

Courtland Drive

Hawthorn Close

Cedar Gardens

The Croft

Elm Road

Wedgwood Road

Rowan Road

Alder Avenue

Aston

Llys Gary Speed

Lower Aston Hall Lane

Hillfield Road

Mountfield Road

Moorfield Road

A494

367000

Area 92

Church Lane

Area 57

Playing Field

Area 86

Area 85

Area 87

Briarwood Road

Yowley Road

Llys Y Castell

Crossway

B5125

MSSJ1172 - HyNet CO2 Pipeline
Figure 18 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 84, 83, 92, 57, 86, 85, & 87)
1:3,000 @ A3

48,998 nT 49,003

Shotton

N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 19 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 84, 83, 92, 57, 86, 85, & 87)
1:3,000 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Strong)
Undetermined (Weak)
Service
Ferrous (Spike)

Shotton

N

0 50 100 150 m

magnitude surveys

331000
331500
367000
367000
Area 69
Area 139
Area 138
Area 135
Area 140
Play Space
Area 91
Area 87
Area 88
Area 89
Area 90
A494
A550
Aston Road
The Croft
Llys Gary Speed
Moorfield Road
Lower Aston Hall Lane
The Barnyard
Colliery Lane
Vickers Close
Overlea Drive
Cottage Lane
Brookleigh Avenue
Blackbrook Avenue
Chestnut Grove
Kennedy Drive
Firbrook Avenue
Park Avenue
Braeside Avenue
Bryn Drive
Appleby Drive
Penlan Drive

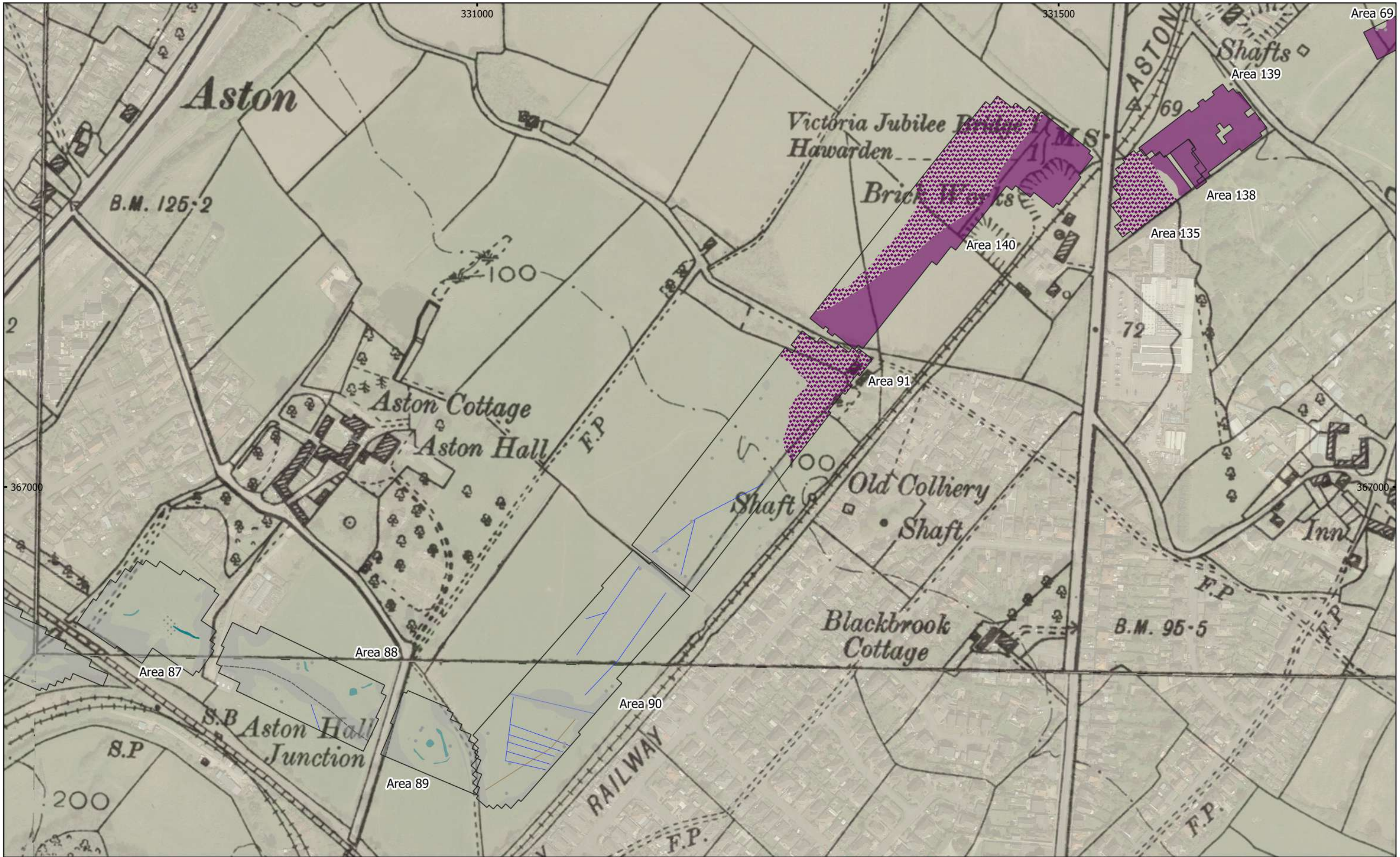
MSSJ1172 - HyNet CO2 Pipeline
Figure 20 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 85, 87, 88, 89, 90, 91, 140, 135, 138, & 139)
1:3,000 @ A3

48,998 nT 49,003

N

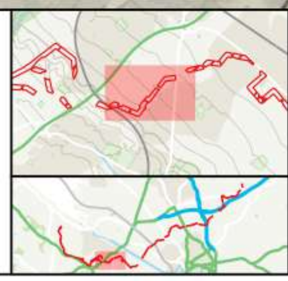
0 50 100 150 m

magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 21 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 85, 87, 88, 89, 90, 91, 140, 135, 138, & 139)
1:3,000 @ A3

- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Industrial/Modern (Spread)
- Industrial/Modern
- Agricultural (Trend)
- Service
- Drainage Feature
- Ferrous (Spike)



N

0 50 100 150 m

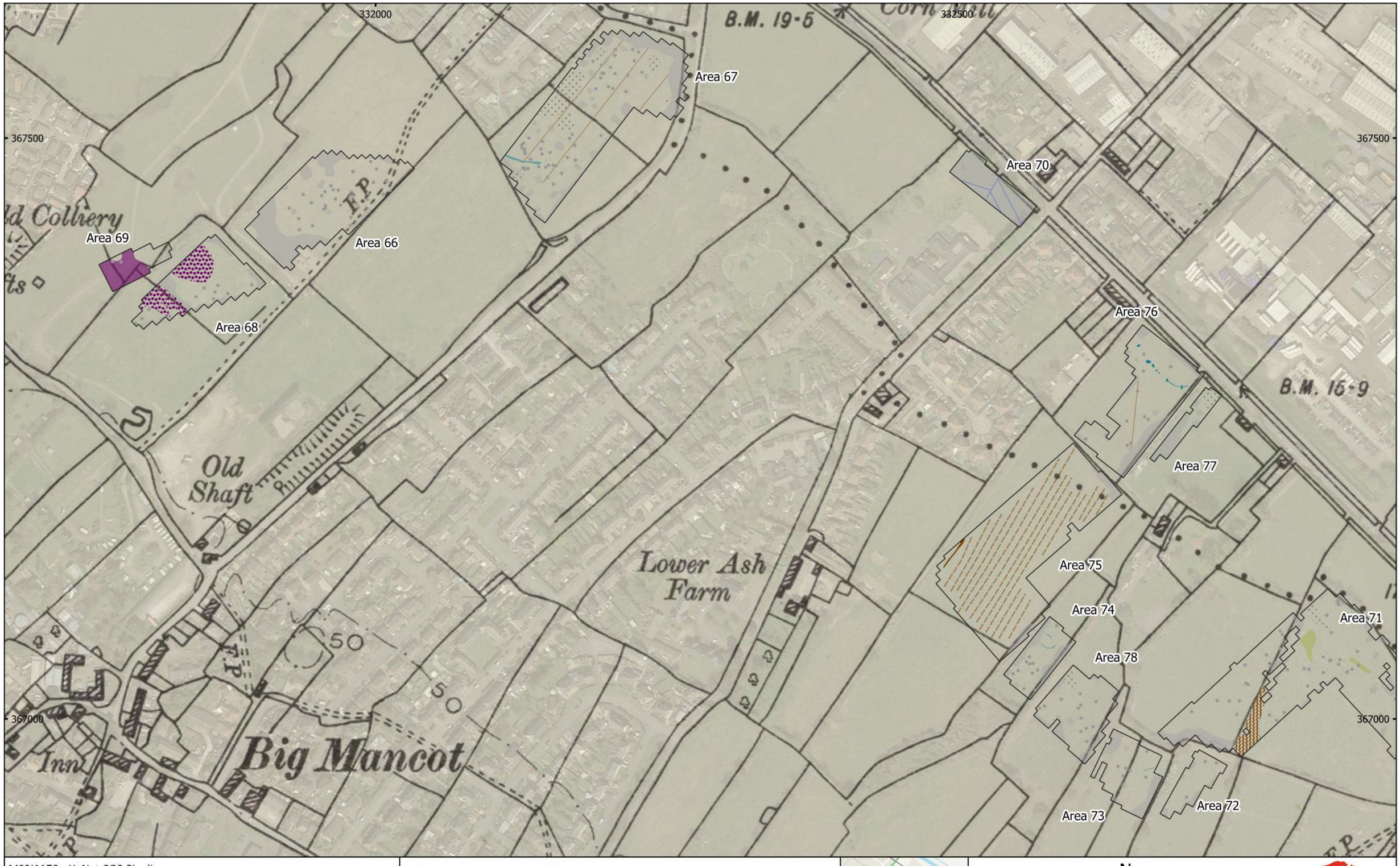
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 22 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 69, 68, 66, 67, 70, 76, 77, 75, 74, 78, 73, 72, & 71)
1:3,000 @ A3

48,998 nT 49,003

0 50 100 150 m

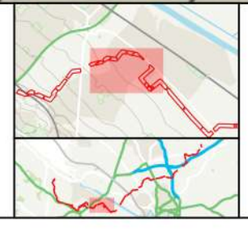
magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 23 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 69, 68, 66, 67, 70, 76, 77, 75, 74, 78, 73, 72, & 71)
1:3,000 @ A3

Contains historical mapping © CLS Data 2022: Ordnance Survey, 6" 2nd edition c. 1882-1913

- Agricultural (Spread)
- Agricultural (Strong)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Natural (Weak)
- Undetermined (Strong)
- Undetermined (Weak)
- Industrial/Modern (Spread)
- Industrial/Modern
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Drainage Feature
- Ferrous (Spike)



N

0 50 100 150 m

magnitude surveys

Area 74
Area 78
Area 71
Area 72
Area 79
Area 80
Area 81
Area 151
Area 153
Area 154
333000
333500
367000
366500
Sandycroft
St Francis' Church
Newtown
Hamilton Avenue
Lawrence Street
Phoenix Street
Fairway
Watkin Street
North Street
Queen's Avenue
Wood Street
Philip Street
B5129
Station Road
Rosslyn Close
Moor Lane
Ducker's Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 24 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 73, 78, 72, 71, 79, 80, 81, 151, 153, & 154)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

Area 74
Area 71
333000
Meth. Chap.
333500
The Grange
Area 78
School
P.O
West's
Row
367000
Sandycroft
367000
B.M. 18-2
Area 79
Area 72
Area 80
F.P.
New Inn
Duckworth
Row
Newtown
Bridge Inn
17
Area 81
41
F.P.
F.P.
Area 151
Area 153
366500
B.M. 17-4
366500
Area 154
Plâs Moor
Farm
F.P.
F.P.

MSSJ1172 - HyNet CO2 Pipeline
Figure 25 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 73, 78, 72, 71, 79, 80, 81, 151, 153, & 154)
1:3,000 @ A3

Agricultural (Spread)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Strong)
Natural (Weak)
Undetermined (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

333500
334000
334500
366500
366500
Area 154
Area 141
Area 142
B5129
B5129
Rake Lane
The Corner Holding

MSSJ1172 - HyNet CO2 Pipeline
Figure 26 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 142 & 141)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 27 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 142 & 141)
1:3,000 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Undetermined (Weak)
Drainage Feature
Ferrous (Spike)

N

0 50 100 150 m

magnitude surveys

335000

335500

Other Sports Facility

Area 65

Deeside Cottages

368000

368000

Deeside Lane

Area 133

Deeside House

MSSJ1172 - HyNet CO2 Pipeline
Figure 28 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 133 & 65)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

335000

335500

368000

368000

Area 65

Area 133

Deeside Farm

B.M. 18·8

17

21

MSSJ1172 - HyNet CO2 Pipeline
Figure 29 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 133 & 65)
1:3,000 @ A3

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Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Undetermined (Weak)
Agricultural (Trend)
Undetermined (Trend)
Service
Drainage Feature
Ferrous (Spike)

N

0 50 100 150 m

magnitude surveys

335500

336000

336500

Area 53

Area 60

Area 61

Area 62

368500

Deeside Lane

A548

Golf Course

Area 65

368500

MSSJ1172 - HyNet CO2 Pipeline
Figure 30 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 65, 62, 61, 60, & 53)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

335500
336000
336500
368500
368500
B.M. 15·8
Bartholomew's Church
B.M. 19·7
M.S
16
L.B
15
S.P.
S.P.
Area 53
Area 60
Area 61
Area 62
Area 65
B.M. 17·2
Church Farm
W

MSSJ1172 - HyNet CO2 Pipeline
Figure 31 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 65, 62, 61, 60, & 53)
1:3,000 @ A3

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Agricultural (Strong)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

336500
337000
369500
369000
The Ridings
Hermitage Road
Hermitage Road
Hermitage Road
Aspen Grove
Green Lane
Area 46
Area 47
Area 48
Area 49
Area 50
Area 51
Area 52
Area 53
Area 58
Area 59

MSSJ1172 - HyNet CO2 Pipeline
Figure 32 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 53, 52, 51, 59, 58, 46, 47, 48, 49, & 50)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

336500
337000
369500
369000
Area 47
Area 48
Area 49
Area 50
Area 46
Area 58
Area 59
Area 51
Area 52
Area 53
B.M. 76·6
B.M. 71·7
Oulton's Farm
Poplars Farm
Little Saughall
LITTLE SAU
Acres 576
74
75
70
50
46

MSSJ1172 - HyNet CO2 Pipeline
Figure 33 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 53, 52, 51, 59, 58, 46, 47, 48, 49, & 50)
1:3,000 @ A3

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Agricultural (Spread)
Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

337500
338000
370000
369500
Overwood Lane
Kingswood Lane
Overwood Avenue
A540
Kings Acre
Pinetree Lodge
Area 55
Area 56
Area 159
Area 150
Area 132
Area 132
Area 50

MSSJ1172 - HyNet CO2 Pipeline
Figure 34 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 50, 132, 56, 150, 159, & 55)
1:3,000 @ A3

48,998 nT 49,003

N
0 50 100 150 m

magnitude surveys

337500
338000
370000
369500
Overwood Cottage
Brewery
G.P Neston 8
M.S Chester 3
B.M. 98·6
F.P.
Area 55
Area 56
Area 159
Area 150
Area 132
Area 132
Area 50
B.S
Crabwall Hall
100

MSSJ1172 - HyNet CO2 Pipeline
Figure 35 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 50, 132, 56, 150, 159, & 55)
1:3,000 @ A3

Agricultural (Spread)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

338000

338500

Area 157

Area 45

Gipsy Lane

Grove Road

Station Road

Area 54

Area 156

Townfield Lane

370500

Mollington

370500

Willow Lea

Well Lane

Mollington Court

Mollington Court

Area 155

Overwood Lane

Feilden Court

Feilden Court

A540

Meadow Court

MSSJ1172 - HyNet CO2 Pipeline
Figure 36 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 155, 156, 54, & 45)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

338000
338500
370500
370500
Area 157
Area 45
Area 54
Area 156
Area 155
Crossloom Farm
The Crossloom
Chapels Townfield Lane
The Willows
Well Farm
Brookside Cottages
Wheat Sheaf (P.H.)
Overwood Lane
Overwood Cottage
Mollington Hall
Fish Pond
Sch.
F.P.
W
P
94

MSSJ1172 - HyNet CO2 Pipeline
Figure 37 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 155, 156, 54, & 45)
1:3,000 @ A3

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Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

338500

339000

339500

371000

371000

Area 158

Area 44

Area 157

Area 45

Area 54

Area 39

Area 38

Area 40

Area 37

Area 36

Grove Road

Station Road

Demage Lane

Gipsy Lane

Well Lane

St Oswald's Church Of England (Aided) Primary School

MSSJ1172 - HyNet CO2 Pipeline
Figure 38 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 45, 44, 158, 157, 40, 39, 38, 37, & 36)
1:3,000 @ A3

48,998 nT 49,003

0 50 100 150 m

N

magnitude surveys

338500
339000
339500
371000
Brickfield
Lea Hall
Moat
Smithy
TON
Mollington Station
Grove House
Sch.
The Willows
Area 158
Area 157
Area 44
Area 45
Area 54
Area 39
Area 38
Area 40
Area 37
Area 36
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Ferrous (Spike)
N
0
50
100
150 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 39 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 45, 44, 158, 157, 40, 39, 38, 37, & 36)
1:3,000 @ A3

339500
340000
340500
371000
371000
The Old Post Office
Station Road
A41
A41
Collinge Farm
Collinge Wood
Area 33
Area 152
Area 34
Area 35

MSSJ1172 - HyNet CO2 Pipeline
Figure 40 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 36, 35, 34, 152, & 33)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

339500
340000
340500
371000
371000
B.M. 87·5
P.O.
G.P
Sand Pit
Collinge Farm
Area 33
Area 152
Area 34
Area 35
Collinge Wood
B.M. 49·3
M.S
Birkenhead 12½
Chester 3
Parly. Co. Div. By.
Tobing Path
50
62

MSSJ1172 - HyNet CO2 Pipeline
Figure 41 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 36, 35, 34, 152, & 33)
1:3,000 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

341000

341500

371500

371500

Higher Inlooms

Shropshire Union Canal

Area 32

Area 31

Area 29

Area 30

Area 28

Area 149

Area 148

Caughall Road

371000

371000

MSSJ1172 - HyNet CO2 Pipeline
Figure 42 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 32, 31, 29, 30, 149, 148, & 28)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

341000
341500
371500
371000
B.M. 89·5
Area 29
Area 30
Area 31
Area 32
Area 28
Area 149
Area 148
B.M. 58·6
B.S
Old Quarry
W
50
41
Parly. Cg. Div. By.
B.M. 45·8

MSSJ1172 - HyNet CO2 Pipeline
Figure 43 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 32, 31, 29, 30, 149, 148, & 28)
1:3,000 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Spread)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

342000
342500
343000
371500
371500
Ocho Rios Cottage
Wervin Road
M53
Area 28
Area 27
Area 25
Area 24
Area 23
Area 42
Area 43
Area 26
Area 148
Area 147
Woodside Farm

MSSJ1172 - HyNet CO2 Pipeline
Figure 44 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 148, 28, 27, 147, 42, 43, 25, 26, 24, & 23)
1:3,000 @ A3

48,998 nT 49,003

N
0 50 100 150 m

magnitude surveys

342000
342500
343000
371500
371500
Wervin Hall
BM 78·7
Area 28
Area 27
Area 147
Area 148
Area 42
Area 43
Area 25
Area 24
Area 26
Area 23
90
50

MSSJ1172 - HyNet CO2 Pipeline
Figure 45 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 148, 28, 27, 147, 42, 43, 25, 26, 24, & 23)
1:3,000 @ A3

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Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

342500

343000

343500

Area 20

Area 21

Area 22

Ashwood Lane

Picton Lane

M53

372000

372000

MSSJ1172 - HyNet CO2 Pipeline
Figure 46 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 22, 21, & 20)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

342500
343000
343500
372000
372000
Area 20
Area 21
Area 22
B.M. 24·9
B.M. 38·4
F.P.
F.B.
F.B.
F.P.
35
42
53
67
41
50
R V I V
7 4 2 · 5 6 3

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Figure 47 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 22, 21, & 20)
1:3,000 @ A3

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Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

344000
344500
345000
373500
373000
Area 17
Area 64
Area 63
Area 41
Area 18
Area 19
Thornton Manor Nursing Home
Temerloh House
Thornton Green Lane
Manor Lodge
Cross House Farm
B5132
M56
The Spinney
Hallsgreen Lane
Hob Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 48 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 19, 18, 41, 63, 64, & 17)
1:3,000 @ A3

48,998 nT 49,003

N
0 50 100 150 m

magnitude surveys

344000
344500
345000
373500
373000
Area 17
Area 64
Area 63
Area 41
Area 18
Area 19
Thornton Green
Spring Farm
Wood Farm
School
B.M. 45·9
B.M. 42·6
41
47
P
W
MSSJ1172 - HyNet CO2 Pipeline
Figure 49 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 19, 18, 41, 63, 64, & 17)
1:3,000 @ A3

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Agricultural (Spread)
Archaeology Possible (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

344000

345000

Park Road

Thornton Green Lane

Area 15

Area 16

B5132

374000

374000

Cryers Farm

M56

MSSJ1172 - HyNet CO2 Pipeline
Figure 50 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 16 & 15)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

344000
344500
345000
374000
374000
LE MOORS
B.M. 40·4
32·314
42
B.M. 24·5
B.M. 30·5
Cryers Brid
Area 15
Area 16
Cryers Farm
P
F.P
B.M. 41·0
43
F.B.

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Figure 51 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 16 & 15)
1:3,000 @ A3

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Agricultural (Spread)
Agricultural (Weak)
Magnetic Disturbance
Industrial/Modern (Spread)
Overhead Cables
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

344500
345000
345500
374500
374500
A5117
Old Hall Lane
Pool Lane
School Lane
B5132
B5132
Cryers Lane
Poole Lane
The Bungalow
Area 14
Area 13
Area 12
Area 15
Area 9
Area 10
Area 11

MSSJ1172 - HyNet CO2 Pipeline
Figure 52 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 15, 14, 13, 12, 11, 10, & 9)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

344500 345000 345500

374500

Area 14 Area 13 Area 12 Area 9 Area 10 Area 11 Area 15

Elton Green Smy. B.M. 42·8 B.M. 29·1 B.M. 30·5 Thornton Hall Cryers Bridge

F.P. F.B. P 31 50

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Figure 53 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 15, 14, 13, 12, 11, 10, & 9)
1:3,000 @ A3

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Agricultural (Spread)
Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Overhead Cables
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N

0 50 100 150 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 54 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 9, 8, 7, 6, & 5)
1:3,000 @ A3

magnitude surveys

345500
346000
346500
375000
374500
Area 8
Area 7
Area 6
Area 5
Area 9
F.P.
B.M. 41·4

MSSJ1172 - HyNet CO2 Pipeline
Figure 55 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 9, 8, 7, 6, & 5)
1:3,000 @ A3

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Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Service
Ferrous (Spike)

N
0 50 100 150 m

magnitude surveys

346000
346500
347000
375500
375000
Orchard Park
Coppice Green
Mimosa Close
Dove Close
Marsh Lane
Birchwood Close
Redwood Drive
Manna Drive
Osier Close
Holm Drive
Ash Road
Ince Lane
Old Hall Lane
Pinewood Close
Mulberry Close
Firbank
Alvanley View
Manley View
Parkland Drive
A5117
Area 4
Area 3
Chester Service Area
M56

MSSJ1172 - HyNet CO2 Pipeline
Figure 56 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 3 & 4)
1:3,000 @ A3

48,998 nT 49,003

N

0 50 100 150 m

magnitude surveys

346000
346500
347000
375500
375000
Elton
Farm
B.M.60·6
Elton Hall
B.M.54·5
HOOTON & HELS
Area 4
Area 3
N

MSSJ1172 - HyNet CO2 Pipeline
Figure 57 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 3 & 4)
1:3,000 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

0 50 100 150 m

magnitude surveys

346500

347000

376000

376000

Area 1

Area 2

Ash Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 58 - Magnetic Total Field (Lower Sensor) (Overview) (Areas 1 & 2)
1:3,000 @ A3

48,998 nT 49,003

N

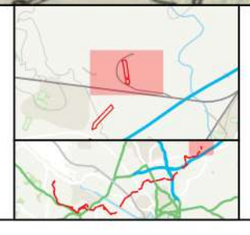
0 50 100 150 m

magnitude surveys

346500
347000
376000
376000
F.P.
F.B.
F.B.
F.P.
F.B.
F.B.
F.B.
15
15
15
B.M. 14·1
Area 1
Area 2
S.P
S.P
L. & N. W. & G. W. J. R.
24
S.P
M. 25·2
HOOTON

MSSJ1172 - HyNet CO2 Pipeline
Figure 59 - Magnetic Interpretation Over Historical Maps (Overview) (Areas 1 & 2)
1:3,000 @ A3

Magnetic Disturbance
Natural (Spread)
Natural (Weak)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)



N
0 50 100 150 m

magnitude surveys

371000
325000
325200
325400
371000
Llwyn Onn
Allt-Goch Lane
Area 115
Area 116
370800
370800
MSSJ1172 - HyNet CO2 Pipeline
Figure 60 - Magnetic Gradient (Areas 115, 116 & 117)
1:1,500 @ A3

-1
nT
2
Allt-Goch Lane
N
0
40
80
120 m
magnitude surveys

371000
325000
325200
325400
371000
370800
370800
Llwyn Onn
Allt-Goch Lane
Area 115
Area 116

MSSJ1172 - HyNet CO2 Pipeline
Figure 61 - Magnetic Interpretation (Areas 115, 116 & 117)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

371000
325000
325200
325400
371000
Llwyn Onn
Allt-Goch Lane
Area 115
Area 116
370800
370800
MSSJ1172 - HyNet CO2 Pipeline
Figure 62 - XY Trace Plot (Areas 115, 116 & 117)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

325000
325200
325400
370600
370400
Area 117
Area 118
Area 125
Allt-Goch Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 63 - Magnetic Gradient (Areas 117, 118 & 125)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

325000
325200
325400
370600
370400
Area 117
Area 118
Area 125
Allt-Goch Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 64 - Magnetic Interpretation (Areas 117, 118 & 125)
1:1,500 @ A3

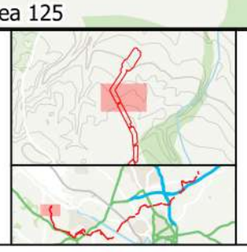
Agricultural (Weak)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

325000
325200
325400
370600
370600
370400
370400
Area 117
Area 118
Area 125
Allt-Goch Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 65 - XY Trace Plot (Areas 117, 118 & 125)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

325000
325200
325400
Area 125
370200
370200
Tros-Y-Mynydd
370000
Area 124
370000
Starkey Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 66 - Magnetic Gradient (Areas 124 & 125)
1:1,500 @ A3

-1 nT 2

Lead Brook

N

0 40 80 120 m

magnitude surveys

325000
325200
325400
Area 125
370200
370200
Tros-Y-Mynydd
370000
Area 124
370000
Starkey Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 67 - Magnetic Interpretation (Areas 124 & 125)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature

N
0
40
80
120 m

magnitude surveys

325000
325200
325400
Area 125
370200
370200
Tros-Y-Mynydd
370000
Area 124
370000
Starkey Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 68 - XY Trace Plot (Areas 124 & 125)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

325200
325400
325600
369800
369800
Starkey Lane
Appleton House
Area 113
369600
369600
MSSJ1172 - HyNet CO2 Pipeline
Figure 69 - Magnetic Gradient (Areas 110, 113 & 124)
1:1,500 @ A3

-1
nT
2
Lead Brook
N
0
40
80
120 m
magnitude surveys

325200
325400
325600
369800
369800
Appleton House
Starkey Lane
Area 113
369600
369600

MSSJ1172 - HyNet CO2 Pipeline
Figure 70 - Magnetic Interpretation (Areas 110, 113 & 124)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Drainage Feature

N

0 40 80 120 m

magnitude surveys

325200
325400
325600
369800
369800
Appleton House
Starkey Lane
Area 113
369600
369600

MSSJ1172 - HyNet CO2 Pipeline
Figure 71 - XY Trace Plot (Areas 110, 113 & 124)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

325000
325200
325400
369600
369600
369400
369400
Area 110
Area 109
Wern Hall Lodge
Starkey Lane
Ty'n-Y-Coed Farm

MSSJ1172 - HyNet CO2 Pipeline
Figure 72 - Magnetic Gradient (Areas 108, 109 & 110)
1:1,500 @ A3

-1 nT 2

Lead Brook

N

0 40 80 120 m

magnitude surveys

325000
325200
325400
369600
369400
Area 110
Area 109
Wern Hall Lodge
Starkey Lane
Ty'n-Y-Coed Farm

MSSJ1172 - HyNet CO2 Pipeline
Figure 73 - Magnetic Interpretation (Areas 108, 109 & 110)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)

N
0
40
80
120 m

magnitude surveys

325000
325200
325400
369600
369400
Area 110
Area 109
Wern Hall Lodge
Starkey Lane
Ty'n-Y-Coed Farm
N
0
40
80
120 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 74 - XY Trace Plot (Areas 108, 109 & 110)
30nT/cm at 1:1,500 @ A3

325200
325400
325600
369200
369200
Area 108
Starkey Lane
Area 107
369000
369000
Area 106
MSSJ1172 - HyNet CO2 Pipeline
Figure 75 - Magnetic Gradient (Areas 106, 107 & 108)
1:1,500 @ A3

-1
nT
2
Starkey Lane
A55
N
0
40
80
120 m
magnitude surveys

325200
325400
325600
369200
369200
369000
369000
Area 108
Area 107
Area 106
Starkey Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 76 - Magnetic Interpretation (Areas 106, 107 & 108)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

325200
325400
325600
369200
369200
Area 108
Starkey Lane
Area 107
369000
369000
Area 106

MSSJ1172 - HyNet CO2 Pipeline
Figure 77 - XY Trace Plot (Areas 106, 107 & 108)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

325400
325600
325800
368800
368600
Area 106
Area 112
Area 111
Area 101
-1
nT
2
A55
A55
B5126
B5126
N
0
40
80
120 m
magnitude surveys
MSSJ1172 - HyNet CO2 Pipeline
Figure 78 - Magnetic Gradient (Areas 101, 106, 111 & 112)
1:1,500 @ A3

325400
325600
325800
368800
368600
Area 106
Area 112
Area 111
Area 101

MSSJ1172 - HyNet CO2 Pipeline
Figure 79 - Magnetic Interpretation (Areas 101, 106, 111 & 112)
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Data Artifact
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

325400
325600
325800
368800
368600
Area 106
Area 112
Area 111
Area 101

MSSJ1172 - HyNet CO2 Pipeline
Figure 80 - XY Trace Plot (Areas 101, 106, 111 & 112)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m

magnitude surveys

325400
368600
325600
325800
368600
Area 101
B5126
Starkey Lane
Bryn Coch Farm
Pont-Einion Cottage
Area 102
Area 103
368400
368400
Area 100

MSSJ1172 - HyNet CO2 Pipeline
Figure 81 - Magnetic Gradient (Areas 100, 101, 102, 103 & 119)
1:1,500 @ A3

-1 nT 2

A55
B5126
B5125

N

0 40 80 120 m

magnitude surveys

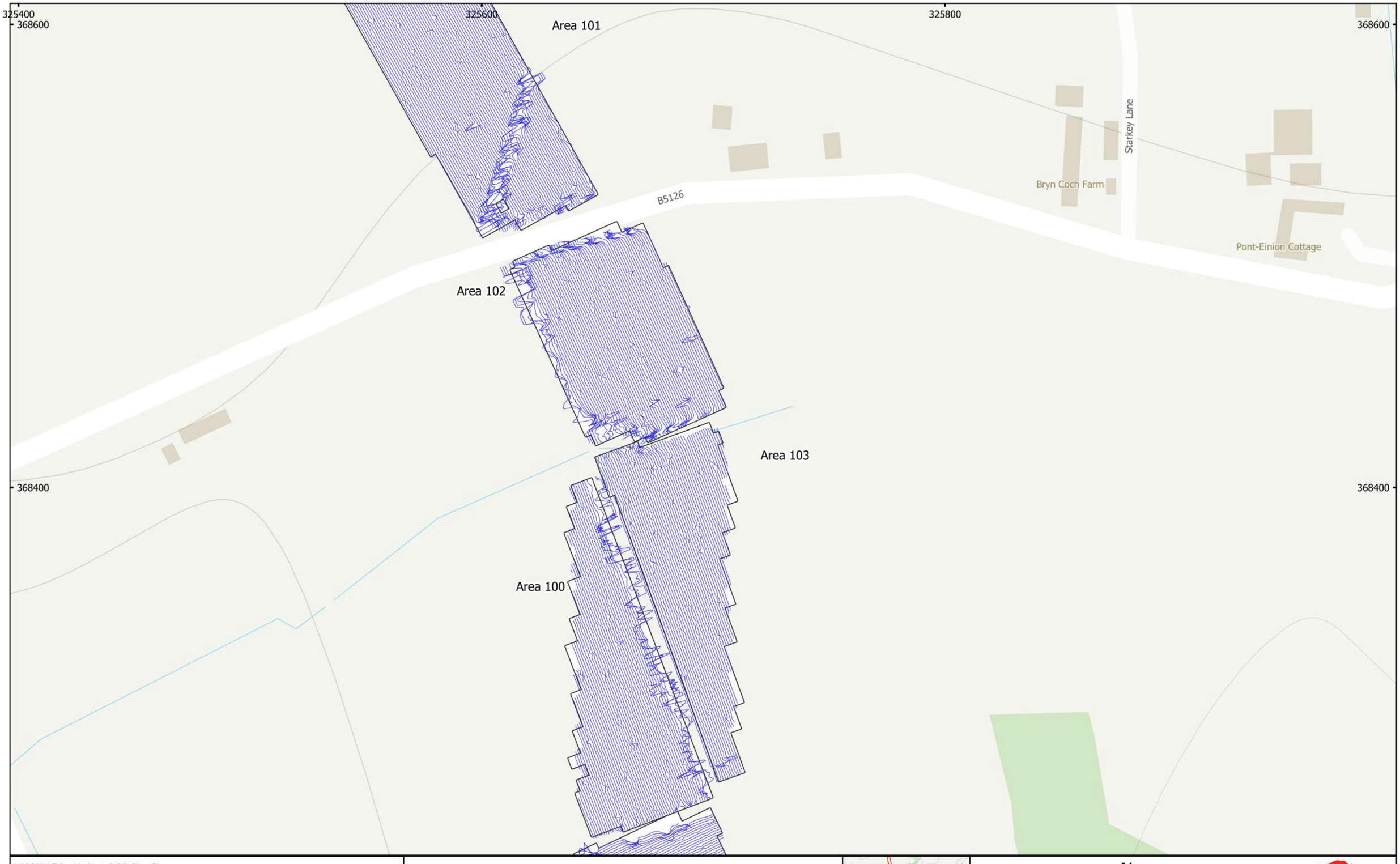
325400
368600
325600
325800
368600
Area 101
Starkey Lane
Bryn Coch Farm
B5126
Pont-Einion Cottage
Area 102
Area 103
368400
368400
Area 100

MSSJ1172 - HyNet CO2 Pipeline
Figure 82 - Magnetic Interpretation (Areas 100, 101, 102, 103 & 119)
1:1,500 @ A3

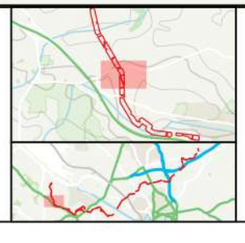
Magnetic Disturbance
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 83 - XY Trace Plot (Areas 100, 101, 102, 103 & 119)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

325600
325800
326000
368200
368000
Area 119
Area 120
Area 121
Area 122
Area 126
Area 127
Area 128
B5125
B5126
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 84 - Magnetic Gradient (Areas 119, 120, 121, 122, 126, 127, 128 & 129)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

325600
325800
326000
368200
368000
Area 119
Area 120
Area 121
Area 122
Area 126
Area 127
Area 128
B5125
A55
B5126

MSSJ1172 - HyNet CO2 Pipeline
Figure 85 - Magnetic Interpretation (Areas 119, 120, 121, 122, 126, 127, 128 & 129)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

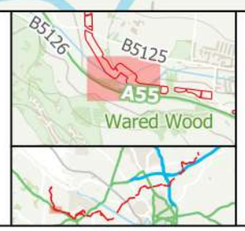
325600
325800
326000
368200
368000
Area 119
Area 120
Area 121
Area 122
Area 126
Area 127
Area 128
B5125
A55
B5126

MSSJ1172 - HyNet CO2 Pipeline
Figure 86 - XY Trace Plot (Areas 119, 120, 121, 122, 126, 127, 128 & 129)
30nT/cm at 1:1,500 @ A3

N
0 40 80 120 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 87 - Magnetic Gradient (Areas 129, 130, 131 & 136)
1:1,500 @ A3

-1 nT 2



N

0 40 80 120 m

magnitude surveys

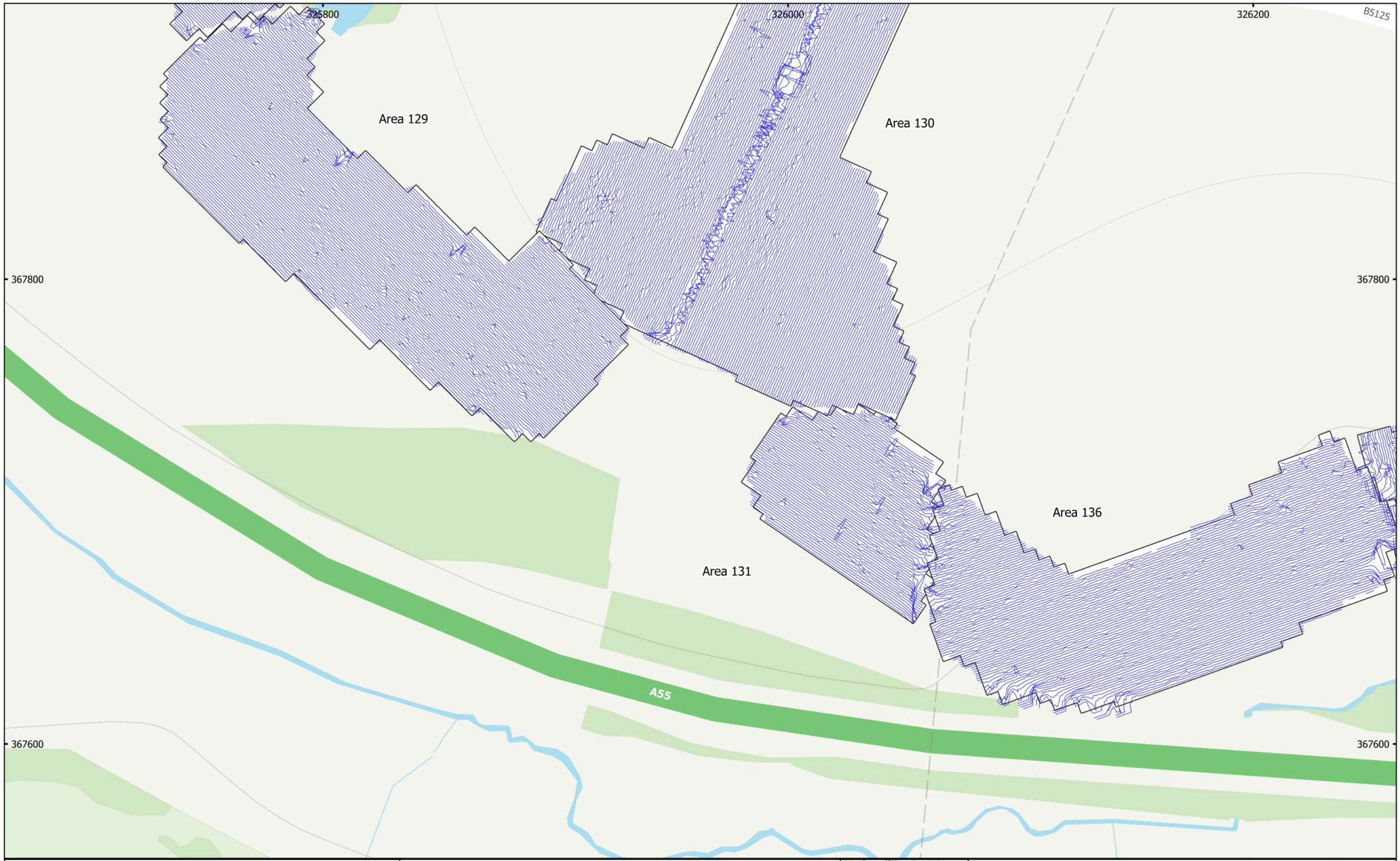
325800
326000
326200
B5125
Area 129
Area 130
367800
367800
Area 136
Area 131
A55
367600
367600

MSSJ1172 - HyNet CO2 Pipeline
Figure 88 - Magnetic Interpretation (Areas 129, 130, 131 & 136)
1:1,500 @ A3

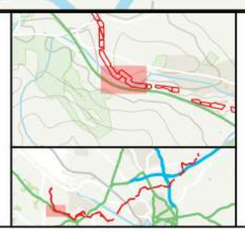
Agricultural (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys



MSSJ1172 - HyNet CO2 Pipeline
Figure 89 - XY Trace Plot (Areas 129, 130, 131 & 136)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

326400

326600

326800

367600

Area 137

Area 160

Area 105

Area 104

Area 99

A55

Brookside

Brookside Terrace

Brookside Crescent

Elm Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 90 - Magnetic Gradient (Areas 99, 104, 105, 136, 137 & 160)
1:1,500 @ A3

-1 nT 2

B5125
Northop Hall
A55
Wared Wood

N

0 40 80 120 m

magnitude surveys

326400
326600
326800
367600
367600
Area 137
Area 160
Area 105
Area 104
Area 99
A55
Brookside
Brookside Terrace
Brookside Crescent
Elm Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 91 - Magnetic Interpretation (Areas 99, 104, 105, 136, 137 & 160)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Agricultural (Trend)
Undetermined (Trend)
Drainage Feature
Ferrous (Spike)

Northop Hall

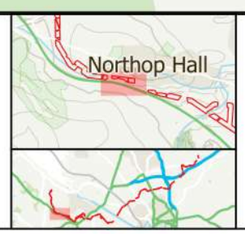
N

0 40 80 120 m

magnitude surveys

326400
326600
326800
367600
367600
Area 137
Area 160
Area 105
Area 104
Area 99
A55
Brookside
Brookside Terrace
Brookside Crescent
Elm Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 92 - XY Trace Plot (Areas 99, 104, 105, 136, 137 & 160)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

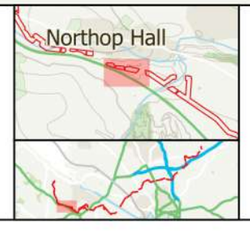
327000
327200
327400
367400
367400
Area 97
Area 98
A55
367200
367200
MSSJ1172 - HyNet CO2 Pipeline
Figure 93 - Magnetic Gradient (Areas 97 & 98)
1:1,500 @ A3

-1
nT
2
B5125
A55
N
0
40
80
120 m
magnitude surveys

327000
327200
327400
367400
367400
Area 97
Area 98
A55
367200
367200

MSSJ1172 - HyNet CO2 Pipeline
Figure 94 - Magnetic Interpretation (Areas 97 & 98)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

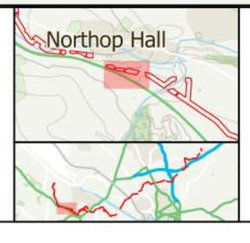


N
0
40
80
120 m

magnitude surveys

327000
327200
327400
367400
367400
Area 97
Area 98
A55
367200
367200

MSSJ1172 - HyNet CO2 Pipeline
Figure 95 - XY Trace Plot (Areas 97 & 98)
30nT/cm at 1:1,500 @ A3



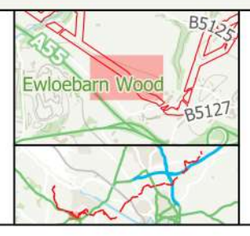
N
0
40
80
120 m

magnitude surveys

328200
328400
328600
366800
366800
Area 146
Area 95
Area 94
Ewloebarn Wood
Magazine Lane
A55
366600
366600

MSSJ1172 - HyNet CO2 Pipeline
Figure 96 - Magnetic Gradient (Areas 94, 95 & 146)
1:1,500 @ A3

-1 nT 2



N

0 40 80 120 m

magnitude surveys

328200
328400
328600
366800
366800
366600
366600
Area 146
Area 95
Area 94
Ewloebarn Wood
Magazine Lane
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 97 - Magnetic Interpretation (Areas 94, 95 & 146)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

328200
328400
328600
366800
366800
Area 146
Area 95
Area 94
Ewloebarn Wood
Magazine Lane
A55
366600
366600

MSSJ1172 - HyNet CO2 Pipeline
Figure 98 - XY Trace Plot (Areas 94, 95 & 146)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m

magnitude surveys

328600
328800
329000
366600
366400
Area 94
Area 96
Area 114
Area 93
Green Lane
B5127
Mold Road
Ewloe Green
Old Liverpool Road
A494
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 99 - Magnetic Gradient (Areas 93, 94, 96 & 114)
1:1,500 @ A3

-1 nT 2

Ewloe Green

N

0 40 80 120 m

magnitude surveys

328600
328800
329000
366600
366600
366400
366400
Area 94
Area 114
Area 93
Area 96
Green Lane
B5127
Mold Road
Ewloe Green
Old Liverpool Road
A494
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 100 - Magnetic Interpretation (Areas 93, 94, 96 & 114)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

328600
328800
329000
366600
366600
366400
366400
Area 94
Area 96
Area 114
Area 93
Green Lane
B5127
Mold Road
Ewloe Green
Old Liverpool Road
A494
A55

MSSJ1172 - HyNet CO2 Pipeline
Figure 101 - XY Trace Plot (Areas 93, 94, 96 & 114)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m

magnitude surveys

367400 329600 329800 330000 367400

Area 84

Shotton Lane

367200 367200

Aston Hill Farm

Old Aston Hill

Area 83

MSSJ1172 - HyNet CO2 Pipeline
Figure 102 - Magnetic Gradient (Areas 83 & 84)
1:1,500 @ A3

-1 nT 2

B5125 A494

N

0 40 80 120 m

magnitude surveys

367400 329600 329800 330000 367400

367200 367200

Area 84

Area 83

Shotton Lane

Aston Hill Farm

Old Aston Hill

MSSJ1172 - HyNet CO2 Pipeline
Figure 103 - Magnetic Interpretation (Areas 83 & 84)
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Undetermined (Weak)
Service
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

367400 329600 329800 330000 367400

Area 84

Shotton Lane

367200 367200

Aston Hill Farm

Old Aston Hill

Area 83

MSSJ1172 - HyNet CO2 Pipeline
Figure 104 - XY Trace Plot (Areas 83 & 84)
30nT/cm at 1:1,500 @ A3

N

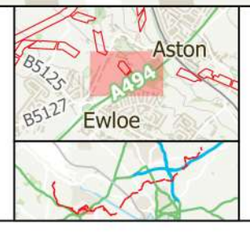
0 40 80 120 m

magnitude surveys

329800
330000
330200
367000
366800
Church Lane
Area 92
Area 57
Old Aston Hill
A494
St David's Close
Estuary View
Grant Drive
Lincoln Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 105 - Magnetic Gradient (Areas 57 & 92)
1:1,500 @ A3

-1 nT 2



N

0 40 80 120 m

magnitude surveys

329800
330000
330200
367000
366800
Area 92
Area 57
Church Lane
Old Aston Hill
A494
St David's Close
Estuary View
Grant Drive
Lincoln Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 106 - Magnetic Interpretation (Areas 57 & 92)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

329800
330000
330200
367000
366800
Area 92
Area 57
Church Lane
Old Aston Hill
A494
St David's Close
Estuary View
Grant Drive
Lincoln Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 107 - XY Trace Plot (Areas 57 & 92)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m

magnitude surveys

330400
330600
330800
367000
366800
A494
Hillfield Road
Mountfield Road
Moorfield Road
Moorfield Court
Lower Aston Hall Lane
The Barnyard
Area 85
Area 86
Area 87
Area 88
Area 89

MSSJ1172 - HyNet CO2 Pipeline
Figure 108 - Magnetic Gradient (Areas 85, 86, 87, 88 & 89)
1:1,500 @ A3

-1 nT 2

Aston

N

0 40 80 120 m

magnitude surveys

330400
330600
330800
367000
366800
A494
Hillfield Road
Mountfield Road
Moorfield Road
Moorfield Court
Lower Aston Hall Lane
The Barnyard
Area 85
Area 86
Area 87
Area 88
Area 89

MSSJ1172 - HyNet CO2 Pipeline
Figure 109 - Magnetic Interpretation (Areas 85, 86, 87, 88 & 89)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Service
Drainage Feature
Ferrous (Spike)

Aston
Ewloe

N
0
40
80
120 m

magnitude surveys

330400
330600
330800
367000
366800
A494
Hillfield Road
Mountfield Road
Moorfield Road
Moorfield Court
Lower Aston Hall Lane
The Barnyard
Area 86
Area 85
Area 87
Area 88
Area 89

MSSJ1172 - HyNet CO2 Pipeline
Figure 110 - XY Trace Plot (Areas 85, 86, 87, 88 & 89)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

331000
331200
331400
367000
366800
Area 90
Lower Aston Hall Lane
Vickers Close
Overlea Drive
Blackbrook Avenue
Chestnut Grove
A550
Firbrook Avenue
Braeside Avenue
Bryn Drive
Appleby Drive
Penlan Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 111 - Magnetic Gradient (Areas 90 & 91)
1:1,500 @ A3

-1 nT 2

0 40 80 120 m

N

magnitude surveys

331000
331200
331400
367000
366800
Area 90
Vickers Close
Overlea Drive
Blackbrook Avenue
Chestnut Grove
A550
Lower Aston Hall Lane
Firbrook Avenue
Braeside Avenue
Bryn Drive
Appleby Drive
Penlan Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 112 - Magnetic Interpretation (Areas 90 & 91)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

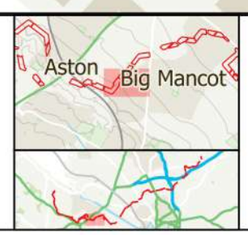
Aston
Big Mancot

N
0
40
80
120 m

magnitude surveys

331000
331200
331400
367000
366800
Vickers Close
Overlea Drive
Blackbrook Avenue
Chestnut Grove
A550
Lower Aston Hall Lane
Area 90
Firbrook Avenue
Braeside Avenue
Bryn Drive
Appleby Drive
Penlan Drive

MSSJ1172 - HyNet CO2 Pipeline
Figure 113 - XY Trace Plot (Areas 90 & 91)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

331400
331600
331800
367400
367200
Area 69
Area 140
Area 139
Area 138
Area 135
Area 91
Play Space
Colliery Lane
A550
Vickers Close

MSSJ1172 - HyNet CO2 Pipeline
Figure 114 - Magnetic Gradient (Areas 68, 69, 91, 135, 138, 139 & 140)
1:1,500 @ A3

-1 nT 2

A494
A550
Big Mancot

N

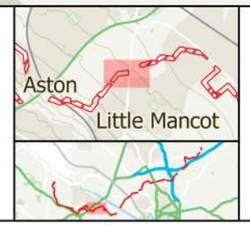
0 40 80 120 m

magnitude surveys

331400
331600
331800
367400
367200
Area 69
Area 139
Area 138
Area 135
Area 140
Area 91
Colliery Lane
A550
Play Space
Vickers Close

MSSJ1172 - HyNet CO2 Pipeline
Figure 115 - Magnetic Interpretation (Areas 68, 69, 91, 135, 138, 139 & 140)
1:1,500 @ A3

Magnetic Disturbance
Industrial/Modern (Spread)
Industrial/Modern
Ferrous (Spike)



N
0
40
80
120 m

magnitude surveys

331400
331600
331800
367400
367200
Area 69
Area 139
Area 138
Area 135
Area 140
Area 91
Colliery Lane
A550
Play Space
Vickers Close

MSSJ1172 - HyNet CO2 Pipeline
Figure 116 - XY Trace Plot (Areas 68, 69, 91, 135, 138, 139 & 140)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m

magnitude surveys

331800
332000
332200
367600
367400
Willow Lane
Clos Coed
Marnel Drive
Area 66
Area 67
Area 68
Area 69
Mancot Lane
Wenlock Crescent
Mancot Way
Colliery Lane
MSSJ1172 - HyNet CO2 Pipeline
Figure 117 - Magnetic Gradient (Areas 66, 67, 68 & 69)
1:1,500 @ A3

-1
nT
2
B5129
A550
Mancot Royal
N
0
40
80
120 m
magnitude surveys

331800
332000
332200
367600
367400

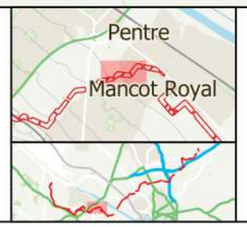
Willow Lane
Clos Coed
Willow Lane
Marnel Drive

Area 66
Area 67
Area 68
Area 69

Mancot Lane
Mancot Lane
Wenlock Crescent
Mancot Way
Colliery Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 118 - Magnetic Interpretation (Areas 66, 67, 68 & 69)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Industrial/Modern
Agricultural (Trend)
Ferrous (Spike)



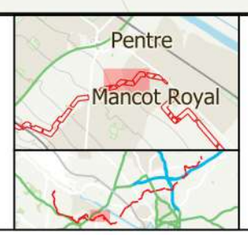
N

0 40 80 120 m

magnitude surveys

331800
332000
332200
367600
367400
Willow Lane
Marnel Drive
Clos Coed
Area 66
Area 67
Area 68
Area 69
Mancot Lane
Wenlock Crescent
Mancot Way
Colliery Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 119 - XY Trace Plot (Areas 66, 67, 68 & 69)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

332400
332600
332800
367400
367200
Other Sports Facility
Area 70
Rectors Lane
Church View
Sandycroft Primary School
Leaches Lane
B5129
Field View
Foxes Close
Earle's Crescent
Mancot Royal
Hawarden Way
Leaches Lane
Area 77
Area 76
Chester Road
Glendale Avenue

MSSJ1172 - HyNet CO2 Pipeline
Figure 120 - Magnetic Gradient (Areas 70, 75, 76 & 77)
1:1,500 @ A3

-1 nT 2

B5129
Mancot Royal

N

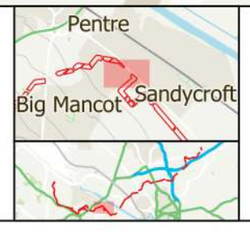
0 40 80 120 m

magnitude surveys

332400
332600
332800
367400
367200
Other Sports Facility
Area 70
Rectors Lane
Church View
Sandycroft Primary School
Leaches Lane
B5129
Field View
Foxes Close
Earle's Crescent
Mancot Royal
Hawarden Way
Leaches Lane
Area 77
Area 76
Chester Road
Glendale Avenue

MSSJ1172 - HyNet CO2 Pipeline
Figure 121 - Magnetic Interpretation (Areas 70, 75, 76 & 77)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ridge and Furrow (Trend)
Drainage Feature
Ferrous (Spike)

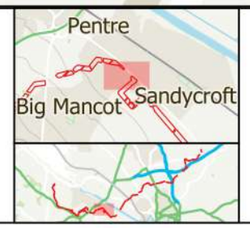


N
0
40
80
120 m

magnitude surveys

332400
332600
332800
367400
367200
Other Sports Facility
Area 70
Rectors Lane
Church View
Sandycroft Primary School
Leaches Lane
B5129
Field View
Foxes Close
Earle's Crescent
Mancot Royal
Hawarden Way
Leaches Lane
Area 77
Area 76
Chester Road
Glendale Avenue

MSSJ1172 - HyNet CO2 Pipeline
Figure 122 - XY Trace Plot (Areas 70, 75, 76 & 77)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

332600
332800
333000
367200
367000
Area 76
Area 75
Area 74
Area 78
Area 73
Area 72
Area 71
Area 79
Chester Road
Glendale Avenue
Bernsdale Close
B5129
Hamilton Avenue
St Francis' Church
Newtown

MSSJ1172 - HyNet CO2 Pipeline
Figure 123 - Magnetic Gradient (Areas 71, 72, 73, 74, 75, 76, 78 & 79 & 80)
1:1,500 @ A3

-1 nT 2

Mancot Royal
B5129

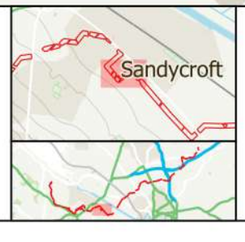
N

0 40 80 120 m

magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 124 - Magnetic Interpretation (Areas 71, 72, 73, 74, 75, 76, 78 & 79 & 80)
1:1,500 @ A3

Agricultural (Spread)
Agricultural (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Undetermined (Weak)
Service
Ridge and Furrow (Trend)
Drainage Feature
Ferrous (Spike)

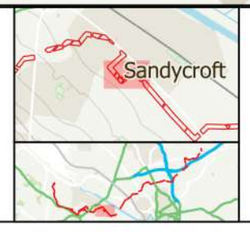


N
0
40
80
120 m

magnitude surveys

332600
332800
333000
367200
367000
Area 76
Area 75
Area 74
Area 78
Area 73
Area 72
Area 71
Area 79
Chester Road
Glendale Avenue
Bernsdale Close
B5129
Hamilton Avenue
St Francis' Church
Newtown

MSSJ1172 - HyNet CO2 Pipeline
Figure 125 - XY Trace Plot (Areas 71, 72, 73, 74, 75, 76, 78 & 79 & 80)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

333000
333200
333400
366800
366600
Philip Street
Wood Street
Station Road
Station Road
B5129
Rossilyn Close
Moor Lane
Area 81
Area 151

MSSJ1172 - HyNet CO2 Pipeline
Figure 126 - Magnetic Gradient (Areas 79, 80, 81 & 151)
1:1,500 @ A3

-1 nT 2

Sandycroft
B5129
Moor Lane

N

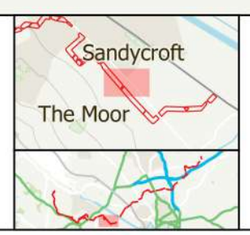
0 40 80 120 m

magnitude surveys

333000
333200
333400
366800
366600
Philip Street
Wood Street
Station Road
Station Road
B5129
Rossilyn Close
Moor Lane
Area 81
Area 151

MSSJ1172 - HyNet CO2 Pipeline
Figure 127 - Magnetic Interpretation (Areas 79, 80, 81 & 151)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Natural (Strong)
Natural (Weak)
Undetermined (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

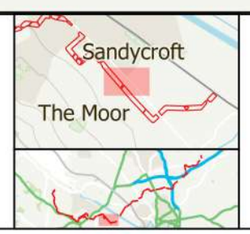


N
0
40
80
120 m

magnitude surveys

333000
333200
333400
366800
366600
Philip Street
Wood Street
Station Road
Station Road
B5129
Rosslyn Close
Moor Lane
Area 81
Area 151

MSSJ1172 - HyNet CO2 Pipeline
Figure 128 - XY Trace Plot (Areas 79, 80, 81 & 151)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

333200
333400
333600
366400
366200
Area 153
Area 154
Area 142
B5129
Moor Lane
B5129
-1
nT
2
0
40
80
120 m
N
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 129 - Magnetic Gradient (Areas 142, 153 & 154)
1:1,500 @ A3

333200
333400
333600
366400
366200
Area 153
Area 154
Area 142
B5129
MSSJ1172 - HyNet CO2 Pipeline
Figure 130 - Magnetic Interpretation (Areas 142, 153 & 154)
1:1,500 @ A3

Magnetic Disturbance
Natural (Weak)
Undetermined (Weak)
Drainage Feature
Ferrous (Spike)
The Moor
N
0
40
80
120 m
magnitude surveys

333200
333400
333600
366400
366200
Area 153
Area 154
Area 142
B5129
The Moor
0
40
80
120 m
N
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 131 - XY Trace Plot (Areas 142, 153 & 154)
30nT/cm at 1:1,500 @ A3

334200

334400

334600

366600

366600

Area 141

366400

366400

MSSJ1172 - HyNet CO2 Pipeline
Figure 132 - Magnetic Gradient (Area 141)
1:1,500 @ A3

-1 nT 2

B5129

B5129

N

0 40 80 120 m

magnitude surveys

334200

334400

334600

366600

366600

Area 141

366400

366400

MSSJ1172 - HyNet CO2 Pipeline
Figure 133 - Magnetic Interpretation (Area 141)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

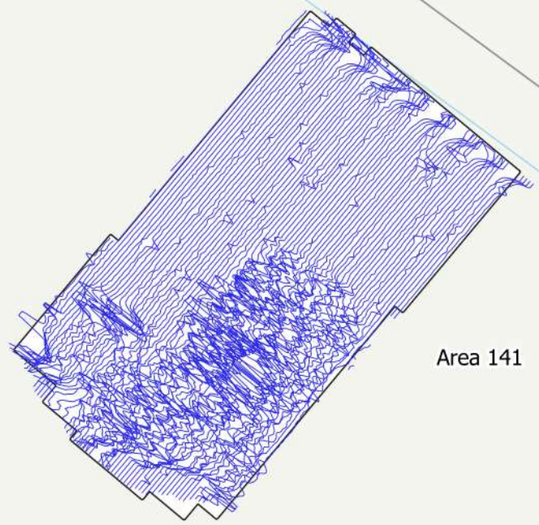
334200

334400

334600

366600

366600



Area 141

366400

366400

MSSJ1172 - HyNet CO2 Pipeline
Figure 134 - XY Trace Plot (Area 141)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

335000
335200
335400
367800
367800
367600
367600
Area 133
Deeside Lane
-1
nT
2
Deeside Lane
N
0
40
80
120 m
magnitude surveys
MSSJ1172 - HyNet CO2 Pipeline
Figure 135 - Magnetic Gradient (Area 133)
1:1,500 @ A3

335000
335200
335400
367800
367800
367600
367600
Area 133
Deeside Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 136 - Magnetic Interpretation (Area 133)
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Agricultural (Trend)
Undetermined (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

335000
335200
335400
367800
367800
Area 133
Deeside Lane
367600
367600

MSSJ1172 - HyNet CO2 Pipeline
Figure 137 - XY Trace Plot (Area 133)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

335200
335400
335600
368200
368200
Deeside Lane
Area 65
368000
368000
Area 133
MSSJ1172 - HyNet CO2 Pipeline
Figure 138 - Magnetic Gradient (Area 65 & 13)
1:1,500 @ A3

-1
nT
2
Deeside Lane
A548
N
0
40
80
120 m
magnitude surveys

335200
335400
335600
368200
368200
Deeside Lane
Area 65
Area 133
368000
368000

MSSJ1172 - HyNet CO2 Pipeline
Figure 139 - Magnetic Interpretation (Area 65 & 13)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

335200
335400
335600
368200
368200
Deeside Lane
Area 65
368000
368000
Area 133

MSSJ1172 - HyNet CO2 Pipeline
Figure 140 - XY Trace Plot (Area 65 & 13)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

335400

335600

335800

Deeside Lane

Golf Course

Area 65

A548

368400

368400

MSSJ1172 - HyNet CO2 Pipeline
Figure 141 - Magnetic Gradient (Areas 31 & 65)
1:1,500 @ A3

-1 nT 2

Sealand

Deeside Lane

A548

N

0 40 80 120 m

magnitude surveys

335400

335600

335800

Deeside Lane

Golf Course

Area 65

A548

368400

368400

MSSJ1172 - HyNet CO2 Pipeline
Figure 142 - Magnetic Interpretation (Areas 31 & 65)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

335400

335600

335800

Deeside Lane

Golf Course

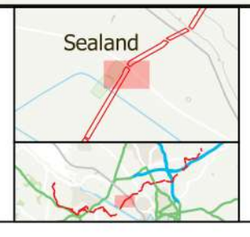
Area 65

A548

368400

368400

MSSJ1172 - HyNet CO2 Pipeline
Figure 143 - XY Trace Plot (Areas 31 & 65)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

335800

336000

368800

368800

Area 62

Area 61

368600

368600

A548

MSSJ1172 - HyNet CO2 Pipeline
Figure 144 - Magnetic Gradient (Areas 60, 61 & 62)
1:1,500 @ A3

-1 nT 2

Sealand

A548

N

0 40 80 120 m

magnitude surveys

335800

336000

368800

368800

Area 62

Area 61

368600

368600

A548

MSSJ1172 - HyNet CO2 Pipeline
Figure 145 - Magnetic Interpretation (Areas 60, 61 & 62)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

Sealand

N

0 40 80 120 m

magnitude surveys

335800

336000

368800

368800

Area 62

Area 61

368600

368600

A548

MSSJ1172 - HyNet CO2 Pipeline
Figure 146 - XY Trace Plot (Areas 60, 61 & 62)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

336200

336400

336600

369000

369000

Area 52

Area 53

Area 60

MSSJ1172 - HyNet CO2 Pipeline
Figure 147 - Magnetic Gradient (Areas 51, 52, 53, 60 & 61)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

336200

336400

336600

369000

369000

Area 52

Area 53

Area 60

MSSJ1172 - HyNet CO2 Pipeline
Figure 148 - Magnetic Interpretation (Areas 51, 52, 53, 60 & 61)
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

336200

336400

336600

369000

369000

Area 52

Area 53

Area 60

MSSJ1172 - HyNet CO2 Pipeline
Figure 149 - XY Trace Plot (Areas 51, 52, 53, 60 & 61)
30nT/cm at 1:1,500 @ A3

N

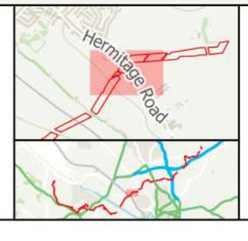
0 40 80 120 m

magnitude surveys

336600
336800
337000
369400
369200
Hermitage Road
Hermitage Road
Aspen Grove
Area 46
Area 47
Area 48
Area 58
Area 59
Area 51

MSSJ1172 - HyNet CO2 Pipeline
Figure 150 - Magnetic Gradient (Areas 46, 47, 48, 51, 52 & 59)
1:1,500 @ A3

-1 nT 2



N

0 40 80 120 m

magnitude surveys

336600
336800
337000
369400
369200
Hermitage Road
Hermitage Road
Aspen Grove
Area 46
Area 47
Area 48
Area 51
Area 58
Area 59

MSSJ1172 - HyNet CO2 Pipeline
Figure 151 - Magnetic Interpretation (Areas 46, 47, 48, 51, 52 & 59)
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

336600
336800
337000
369400
369200
Hermitage Road
Hermitage Road
Aspen Grove
Area 46
Area 47
Area 48
Area 51
Area 58
Area 59

MSSJ1172 - HyNet CO2 Pipeline
Figure 152 - XY Trace Plot (Areas 46, 47, 48, 51, 52 & 59)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

337200
337400
337600
369600
369600
369400
369400
Kingswood Lane
Pinetree Lodge
Area 132
Area 50
Area 49
Area 48

MSSJ1172 - HyNet CO2 Pipeline
Figure 153 - Magnetic Gradient (Areas 48, 49, 50 & 132)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

337200
337400
337600
369600
369400
Kingswood Lane
Pinetree Lodge
Area 48
Area 49
Area 50
Area 132

MSSJ1172 - HyNet CO2 Pipeline
Figure 154 - Magnetic Interpretation (Areas 48, 49, 50 & 132)
1:1,500 @ A3

Agricultural (Spread)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

337200
337400
337600
Kingswood Lane
Pinetree Lodge
369600
369600
Area 132
Area 50
Area 49
Area 48
369400
369400

MSSJ1172 - HyNet CO2 Pipeline
Figure 155 - XY Trace Plot (Areas 48, 49, 50 & 132)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

337600
337800
338000
369800
369600
Area 132
Area 150
-1
nT
2
A540
N
0
40
80
120 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 156 - Magnetic Gradient (Areas 132 & 150)
1:1,500 @ A3

337600
337800
338000
369800
369600
Area 132
Area 150

MSSJ1172 - HyNet CO2 Pipeline
Figure 157 - Magnetic Interpretation (Areas 132 & 150)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

337600
337800
338000
369800
369600
Area 132
Area 150

MSSJ1172 - HyNet CO2 Pipeline
Figure 158 - XY Trace Plot (Areas 132 & 150)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

337800
338000
338200
370000
369800
Overwood Lane
A540
Overwood Avenue
Area 55
Area 159
Area 56

MSSJ1172 - HyNet CO2 Pipeline
Figure 159 - Magnetic Gradient (Areas 55, 56, 150 & 159)
1:1,500 @ A3

-1 nT 2

A540

N

0 40 80 120 m

magnitude surveys

337800
338000
338200
370000
369800
Overwood Lane
A540
Overwood Avenue
Area 55
Area 159
Area 56

MSSJ1172 - HyNet CO2 Pipeline
Figure 160 - Magnetic Interpretation (Areas 55, 56, 150 & 159)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

Mollington

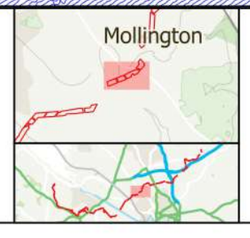
N

0 40 80 120 m

magnitude surveys

337800
338000
338200
370000
369800
Overwood Lane
A540
Overwood Avenue
Area 55
Area 56
Area 159

MSSJ1172 - HyNet CO2 Pipeline
Figure 161 - XY Trace Plot (Areas 55, 56, 150 & 159)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

338000
338200
338400
370400
370200
Mollington Court
Townfield Lane
Overwood Lane
A540
Area 155
MSSJ1172 - HyNet CO2 Pipeline
Figure 162 - Magnetic Gradient (Areas 55 & 155)
1:1,500 @ A3

-1 nT 2
Mollington
A540
N
0 40 80 120 m
magnitude surveys

338000
338200
338400
370400
370200
Mollington Court
Townfield Lane
Overwood Lane
A540
Area 155

MSSJ1172 - HyNet CO2 Pipeline
Figure 163 - Magnetic Interpretation (Areas 55 & 155)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

Mollington

N

0 40 80 120 m

magnitude surveys

338000
338200
338400
370400
370400
370200
370200
Mollington Court
Townfield Lane
Overwood Lane
A540
Area 155

MSSJ1172 - HyNet CO2 Pipeline
Figure 164 - XY Trace Plot (Areas 55 & 155)
30nT/cm at 1:1,500 @ A3

Mollington

N

0 40 80 120 m

magnitude surveys

338200
338400
338600
370800
370800
370600
370600
Area 54
Area 156
Townfield Lane
Mollington Court
Mollington
A540
Mollington
-1
nT
2
N
0
40
80
120 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 165 - Magnetic Gradient (Areas 45, 54 & 156)
1:1,500 @ A3

338200
338400
338600
370800
370800
370600
370600
Area 54
Area 156
Townfield Lane
Mollington
Mollington Court

MSSJ1172 - HyNet CO2 Pipeline
Figure 166 - Magnetic Interpretation (Areas 45, 54 & 156)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Industrial/Modern (Spread)
Ferrous (Spike)

Mollington

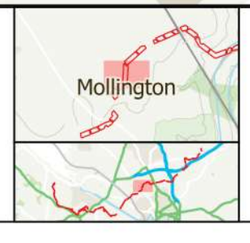
N

0 40 80 120 m

magnitude surveys

338200
338400
338600
370800
370800
370600
370600
Area 54
Area 156
Townfield Lane
Mollington Court
Mollington

MSSJ1172 - HyNet CO2 Pipeline
Figure 167 - XY Trace Plot (Areas 45, 54 & 156)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m
magnitude surveys

338200
338400
338600
371000
371000
Area 44
Area 45
Grove Road
St Oswald's Church Of England (Aided) Primary School
Gipsy Lane
Station Road
Station Road
MSSJ1172 - HyNet CO2 Pipeline
Figure 168 - Magnetic Gradient (Areas 44, 45, 157 & 158)
1:1,500 @ A3

-1
nT
2
N
0
40
80
120 m
magnitude surveys

338200
338400
338600
371000
371000
158A
Area 44
Area 45
Grove Road
St Oswald's Church Of England (Aided) Primary School
Gipsy Lane
Station Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 169 - Magnetic Interpretation (Areas 44, 45, 157 & 158)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Ferrous (Spike)

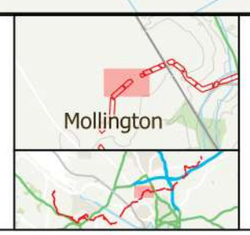
Mollington

N
0
40
80
120 m

magnitude surveys

338200
338400
338600
371000
371000
Area 44
Area 45
Grove Road
St Oswald's Church Of England (Aided) Primary School
Gipsy Lane
Station Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 170 - XY Trace Plot (Areas 44, 45, 157 & 158)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

338600
338800
339000
371200
371000
Area 158
Area 44
Area 157
Grove Road
Station Road
Gipsy Lane
St Oswald's Church Of England (Aided) Primary School

MSSJ1172 - HyNet CO2 Pipeline
Figure 171 - Magnetic Gradient (Areas 44, 157 & 158)
1:1,500 @ A3

-1 nT 2

0 40 80 120 m

N

magnitude surveys

338600
338800
339000
371200
371000
Area 158
158A
Area 44
Area 157
Grove Road
Station Road
Gipsy Lane
St Oswald's Church Of England (Aided) Primary School

MSSJ1172 - HyNet CO2 Pipeline
Figure 172 - Magnetic Interpretation (Areas 44, 157 & 158)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

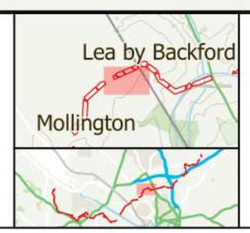
Lea by Backford
Mollington

N
0
40
80
120 m

magnitude surveys

338600
338800
339000
371200
371000
Area 158
Area 44
Area 157
Grove Road
Station Road
Gipsy Lane
St Oswald's Church Of England (Aided) Primary School

MSSJ1172 - HyNet CO2 Pipeline
Figure 173 - XY Trace Plot (Areas 44, 157 & 158)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

339200
339400
339600
371200
371200
371000
Demage Lane
Station Road
Area 39
Area 38
Area 40
Area 37
Area 36
Area 35
MSSJ1172 - HyNet CO2 Pipeline
Figure 174 - Magnetic Gradient (Areas 34, 35, 36, 37, 38, 39 & 40)
1:1,500 @ A3

-1
nT
2
Lea by Backford
Station Road
Viaduct Wood
N
0
40
80
120 m
magnitude surveys

339200
339400
339600
371200
371000
Demage Lane
Station Road
Area 39
Area 38
Area 40
Area 37
Area 35
Area 36

MSSJ1172 - HyNet CO2 Pipeline
Figure 175 - Magnetic Interpretation (Areas 34, 35, 36, 37, 38, 39 & 40)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

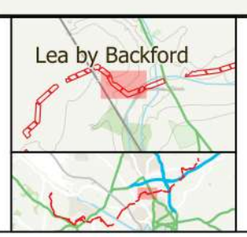
Lea by Backford

N
0
40
80
120 m

magnitude surveys

339200
339400
339600
371200
371200
371000
371000
Demage Lane
Station Road
Area 39
Area 38
Area 40
Area 37
Area 36
Area 35

MSSJ1172 - HyNet CO2 Pipeline
Figure 176 - XY Trace Plot (Areas 34, 35, 36, 37, 38, 39 & 40)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

339800
340000
340200
371200
371000
Area 34
Area 152
A41
-1
nT
2
MSSJ1172 - HyNet CO2 Pipeline
Figure 177 - Magnetic Gradient (Areas 34, 35 & 152)
1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

339800
340000
340200
371200
371000
Area 34
Area 152
A41

MSSJ1172 - HyNet CO2 Pipeline
Figure 178 - Magnetic Interpretation (Areas 34, 35 & 152)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Service
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

339800
340000
340200
371200
371000
Area 34
Area 152
A41

MSSJ1172 - HyNet CO2 Pipeline
Figure 179 - XY Trace Plot (Areas 34, 35 & 152)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

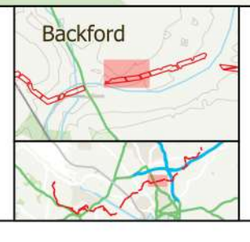
340200
340400
340600
371400
371400
371200
371200
Collinge Farm
Area 33
Area 32
MSSJ1172 - HyNet CO2 Pipeline
Figure 180 - Magnetic Gradient (Areas 33 & 32)
1:1,500 @ A3

-1
nT
2
A41
Collinge Wood
N
0
40
80
120 m
magnitude surveys

340200
340400
340600
371400
371400
371200
371200
Collinge Farm
Area 33
Area 32

MSSJ1172 - HyNet CO2 Pipeline
Figure 181 - Magnetic Interpretation (Areas 33 & 32)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Service
Ferrous (Spike)



N

0 40 80 120 m

magnitude surveys

340200
340400
340600
371400
371400
371200
371200
Collinge Farm
Area 33
Area 32
MSSJ1172 - HyNet CO2 Pipeline
Figure 182 - XY Trace Plot (Areas 33 & 32)
30nT/cm at 1:1,500 @ A3

Backford
N
0
40
80
120 m
magnitude surveys

340800

341000

341200

371400

371400

Area 30

Area 29

Area 31

371200

371200

MSSJ1172 - HyNet CO2 Pipeline
Figure 183 - Magnetic Gradient (Areas 31, 29, & 30)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

340800

341000

341200

371400

371400

Area 30

Area 29

Area 31

371200

371200

MSSJ1172 - HyNet CO2 Pipeline
Figure 184 - Magnetic Interpretation (Areas 31, 29, & 30)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Spread)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

340800
341000
341200
371400
371400
Area 30
Area 29
Area 31
371200
371200
MSSJ1172 - HyNet CO2 Pipeline
Figure 185 - XY Trace Plot (Areas 31, 29, & 30)
30nT/cm at 1:1,500 @ A3


N
0
40
80
120 m
magnitude surveys

341400

341600

341800

371400

371400

Shropshire Union Canal

Area 28

MSSJ1172 - HyNet CO2 Pipeline
Figure 186 - Magnetic Gradient (Areas 30 & 28)
1:1,500 @ A3

-1 nT 2

Shropshire Union Canal

N

0 40 80 120 m

magnitude surveys

341400

341600

341800

Shropshire Union Canal

371400

371400

Area 28

MSSJ1172 - HyNet CO2 Pipeline
Figure 187 - Magnetic Interpretation (Areas 30 & 28)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

Wervin

N

0 40 80 120 m

magnitude surveys

341400

341600

341800

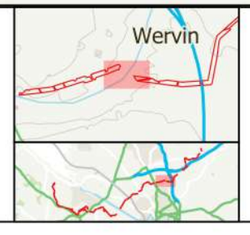
Shropshire Union Canal

371400

371400

Area 28

MSSJ1172 - HyNet CO2 Pipeline
Figure 188 - XY Trace Plot (Areas 30 & 28)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

341400
341600
341800
371200
371200
Caughall Road
Area 149
Area 148
371000
371000
Caughall Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 189 - Magnetic Gradient (Areas 149 & 148)
1:1,500 @ A3

-1 nT 2

Shropshire Union Canal

N

0 40 80 120 m

magnitude surveys

341400
341600
341800
371200
371200
Caughall Road
Area 149
Area 148
371000
371000
Caughall Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 190 - Magnetic Interpretation (Areas 149 & 148)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Service
Drainage Feature

N
0
40
80
120 m

magnitude surveys

341400
341600
341800
371200
371000
Caughall Road
Area 149
Area 148
MSSJ1172 - HyNet CO2 Pipeline
Figure 191 - XY Trace Plot (Areas 149 & 148)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

342000
342200
342400
371400
371200
Ocho Rios Cottage
Area 27
Area 25
Area 42
Area 43
Area 26
Area 147
Wervin Road
M53

MSSJ1172 - HyNet CO2 Pipeline
Figure 192 - Magnetic Gradient (Areas 27, 147, 42, 43, 26, & 25)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

342000
342200
342400
371400
371200
Ocho Rios Cottage
Area 27
Area 25
Area 42
Area 43
Area 26
Area 147
Wervin Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 193 - Magnetic Interpretation (Areas 27, 147, 42, 43, 26, & 25)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

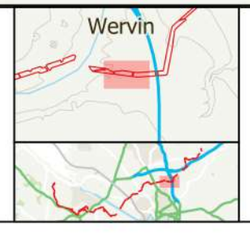
Wervin

N
0
40
80
120 m

magnitude surveys

342000
342200
342400
371400
371200
Ocho Rios Cottage
Area 27
Area 25
Area 42
Area 43
Area 26
Area 147
Wervin Road

MSSJ1172 - HyNet CO2 Pipeline
Figure 194 - XY Trace Plot (Areas 27, 147, 42, 43, 26, & 25)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

342600

342800

343000

371400

371400

M53

Area 23

Area 25

Area 24

MSSJ1172 - HyNet CO2 Pipeline
Figure 195 - Magnetic Gradient (Areas 25, 26, 24, & 23)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

342600

342800

343000

371400

371400

M53

Area 23

Area 25

Area 24

MSSJ1172 - HyNet CO2 Pipeline
Figure 196 - Magnetic Interpretation (Areas 25, 26, 24, & 23)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

Wervin
Picton

N

0 40 80 120 m

magnitude surveys

342600

342800

343000

371400

371400

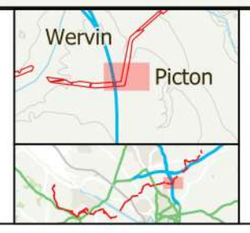
M53

Area 23

Area 25

Area 24

MSSJ1172 - HyNet CO2 Pipeline
Figure 197 - XY Trace Plot (Areas 25, 26, 24, & 23)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

342600
342800
343000
371800
371800
Area 22
M53
371600
371600

MSSJ1172 - HyNet CO2 Pipeline
Figure 198 - Magnetic Gradient (Areas 23 & 22)
1:1,500 @ A3

-1 nT 2

M53 M53 Wervin Road

N

0 40 80 120 m

magnitude surveys

342600
342800
343000
371800
371800
Area 22
M53
371600
371600

MSSJ1172 - HyNet CO2 Pipeline
Figure 199 - Magnetic Interpretation (Areas 23 & 22)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)

Wervin
Picton

N
0
40
80
120 m

magnitude surveys

342600
342800
343000
371800
371800
Area 22
M53
371600
371600
Wervin
Picton
N
0
40
80
120 m
magnitude surveys

MSSJ1172 - HyNet CO2 Pipeline
Figure 200 - XY Trace Plot (Areas 23 & 22)
30nT/cm at 1:1,500 @ A3

342800

343000

372200

372200

Picton Lane

Area 21

372000

372000

MSSJ1172 - HyNet CO2 Pipeline
Figure 201 - Magnetic Gradient (Areas 21 & 22)
1:1,500 @ A3

-1 nT 2

M56 M53 Ashwood Lane

N

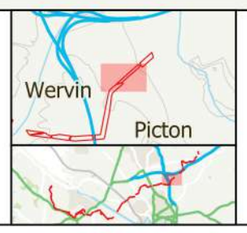
0 40 80 120 m

magnitude surveys

342800
343000
343200
372200
372200
372000
372000
Area 21
Picton Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 202 - Magnetic Interpretation (Areas 21 & 22)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Ferrous (Spike)
Ferrous/Debris (Spread)
Agricultural (Trend)



N
0
40
80
120 m

magnitude surveys

342800

343000

343200

372200

372200

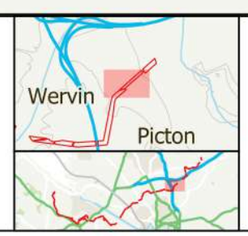
Picton Lane

Area 21

372000

372000

MSSJ1172 - HyNet CO2 Pipeline
Figure 203 - XY Trace Plot (Areas 21 & 22)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

343000
343200
343400
372400
372400
372200
372200
Ashwood Lane
Picton Lane
Area 20

MSSJ1172 - HyNet CO2 Pipeline
Figure 204 - Magnetic Gradient (Areas 21 & 20)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

343000
343200
343400
372400
372400
372200
372200
Ashwood Lane
Picton Lane
Area 20

MSSJ1172 - HyNet CO2 Pipeline
Figure 205 - Magnetic Interpretation (Areas 21 & 20)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Weak)
Ferrous (Spike)
Ferrous/Debris (Spread)
Service

N
0
40
80
120 m

magnitude surveys

343000

343200

343400

Ashwood Lane

Picton Lane

372400

372400

Area 20

372200

372200

MSSJ1172 - HyNet CO2 Pipeline
Figure 206 - XY Trace Plot (Areas 21 & 20)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

344000
344200
344400
373200
373000
M56
The Spinney
Area 18
Area 19

MSSJ1172 - HyNet CO2 Pipeline
Figure 207 - Magnetic Gradient (Areas 18 & 19)
1:1,500 @ A3

-1 nT 2

M56
B5132

N

0 40 80 120 m

magnitude surveys

344000
344200
344400
373200
373000
M56
The Spinney
Area 18
Area 19

MSSJ1172 - HyNet CO2 Pipeline
Figure 208 - Magnetic Interpretation (Areas 18 & 19)
1:1,500 @ A3

Agricultural (Spread)
Ferrous/Debris (Spread)
Ferrous (Spike)
Magnetic Disturbance
Undetermined (Weak)

N
0
40
80
120 m

magnitude surveys

344000
344200
344400
373200
373000
The Spinney
M56
Area 18
Area 19

MSSJ1172 - HyNet CO2 Pipeline
Figure 209 - XY Trace Plot (Areas 18 & 19)
30nT/cm at 1:1,500 @ A3

N
0 40 80 120 m

magnitude surveys

373600
344400
344600
344800
373600
373400
373400
Manor Lodge
Area 64
Area 63
Thornton Manor Nursing Home
Temerloh House
Thornton Green Lane
M56
Area 41
The Spinney

MSSJ1172 - HyNet CO2 Pipeline
Figure 210 - Magnetic Gradient (Areas 41, 63, & 64)
1:1,500 @ A3

-1 nT 2

M56
B5132
Hob Lane

N

0 40 80 120 m

magnitude surveys

373600
344400
344600
344800
373600
373400
373400
Manor Lodge
Thornton Manor Nursing Home
Temerloh House
Thornton Green Lane
M56
Area 64
Area 63
Area 41
41a
The Spinney

MSSJ1172 - HyNet CO2 Pipeline
Figure 211 - Magnetic Interpretation (Areas 41, 63, & 64)
1:1,500 @ A3

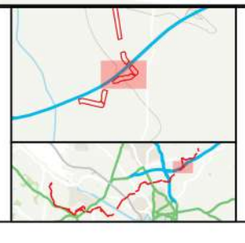
Archaeology Possible (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

373600
344400
344600
344800
373600
Manor Lodge
Area 64
Thornton Manor Nursing Home
Temerloh House
Area 63
Thornton Green Lane
M56
373400
Area 41
373400
The Spinney

MSSJ1172 - HyNet CO2 Pipeline
Figure 212 - XY Trace Plot (Areas 41, 63, & 64)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

344400

344600

344800

373800

373800

Thornton Green Lane

Area 17

M56

373600

373600

MSSJ1172 - HyNet CO2 Pipeline
Figure 213 - Magnetic Gradient (Areas 16 & 17)
1:1,500 @ A3

-1 nT 2

B5132

M56

N

0 40 80 120 m

magnitude surveys

344400
344600
344800
373800
373800
373600
373600
Thornton Green Lane
Area 17
M56

MSSJ1172 - HyNet CO2 Pipeline
Figure 214 - Magnetic Interpretation (Areas 16 & 17)
1:1,500 @ A3

Agricultural (Spread)
Drainage Feature
Ferrous (Spike)
Magnetic Disturbance

N
0
40
80
120 m

magnitude surveys

344400
344600
344800
373800
373800
Thornton Green Lane
Area 17
M56
373600
373600
MSSJ1172 - HyNet CO2 Pipeline
Figure 215 - XY Trace Plot (Areas 16 & 17)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

344400

344600

344800

Area 15

374200

374200

Thornton Green Lane

374000

Area 16

374000

MSSJ1172 - HyNet CO2 Pipeline
Figure 216 - Magnetic Gradient (Areas 15 & 16)
1:1,500 @ A3

-1 nT 2

B5132

M56

N

0 40 80 120 m

magnitude surveys

344400

344600

344800

374200

374200

Area 15

Area 16

Thornton Green Lane

374000

374000

MSSJ1172 - HyNet CO2 Pipeline
Figure 217 - Magnetic Interpretation (Areas 15 & 16)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Industrial/Modern (Spread)
Overhead Cables
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

344400

344600

344800

Area 15

374200

374200

Thornton Green Lane

Area 16

374000

374000

MSSJ1172 - HyNet CO2 Pipeline
Figure 218 - XY Trace Plot (Areas 15 & 16)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

344200
344400
344600
374600
374400
Area 13
Area 15
Poole Lane
Yew Tree Close
Park Road
Thornton Green Lane
MSSJ1172 - HyNet CO2 Pipeline
Figure 219 - Magnetic Gradient (Area 15)
1:1,500 @ A3

-1
nT
2
A5117
B5132
N
0
40
80
120 m
magnitude surveys

344200
344400
344600
374600
374400
Area 13
Area 15
Poole Lane
Yew Tree Close
Park Road
Thornton Green Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 220 - Magnetic Interpretation (Area 15)
1:1,500 @ A3

Agricultural (Spread)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Industrial/Modern (Spread)
Overhead Cables
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N
0
40
80
120 m

magnitude surveys

344200
344400
344600
374600
374400
Area 13
Area 15
Poole Lane
Yew Tree Close
Park Road
Thornton Green Lane

MSSJ1172 - HyNet CO2 Pipeline
Figure 221 - XY Trace Plot (Area 15)
30nT/cm at 1:1,500 @ A3

N
0
40
80
120 m
magnitude surveys

344400

344600

344800

374800

374800

A5117

Poole Lane

Area 14

Area 13

Area 12

374600

374600

MSSJ1172 - HyNet CO2 Pipeline
Figure 222 - Magnetic Gradient (Areas 12, 13, 14, & 15)
1:1,500 @ A3

-1 nT 2

A5117

B5132

N

0 40 80 120 m

magnitude surveys

344400

344600

344800

A5117

374800

374800

Poole Lane

Area 14

Area 13

Area 12

374600

374600

MSSJ1172 - HyNet CO2 Pipeline
Figure 223 - Magnetic Interpretation (Areas 12, 13, 14, & 15)
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Industrial/Modern (Spread)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

344400

344600

344800

A5117

374800

374800

Poole Lane

Area 14

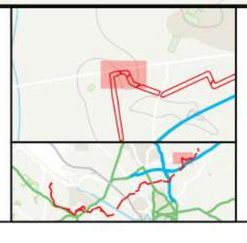
Area 13

Area 12

374600

374600

MSSJ1172 - HyNet CO2 Pipeline
Figure 224 - XY Trace Plot (Areas 12, 13, 14, & 15)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

344800
345000
345200
Cryers Lane
The Bungalow
Area 13
Area 12
374600
B5132
374000
Area 10
Area 11
374400
374400

MSSJ1172 - HyNet CO2 Pipeline
Figure 225 - Magnetic Gradient (Areas 10, 11, 12, & 13)
1:1,500 @ A3

-1 nT 2

Elton Green
A5117
B5132
M56

N

0 40 80 120 m

magnitude surveys

344800

345000

345200

Cryers Lane

The Bungalow

Area 13

Area 12

374600

B5132

374600

Area 10

Area 11

374400

374400

MSSJ1172 - HyNet CO2 Pipeline
Figure 226 - Magnetic Interpretation (Areas 10, 11, 12, & 13)
1:1,500 @ A3

Agricultural (Spread)
Agricultural (Strong)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

Elton Green

N

0 40 80 120 m

magnitude surveys

344800

345000

345200

Cryers Lane

The Bungalow

Area 13

Area 12

374600

B5132

Area 10

Area 11

374400

MSSJ1172 - HyNet CO2 Pipeline
Figure 227 - XY Trace Plot (Areas 10, 11, 12, & 13)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

345400

345600

345800

374800

374800

Area 8

Area 7

Area 9

374600

374600

Area 10

MSSJ1172 - HyNet CO2 Pipeline
Figure 228 - Magnetic Gradient (Areas 7, 8, 9, & 10)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

345400

345600

345800

374800

374800

Area 8

Area 7

Area 9

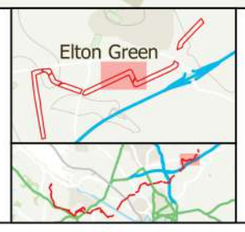
374600

374600

Area 10

MSSJ1172 - HyNet CO2 Pipeline
Figure 229 - Magnetic Interpretation (Areas 7, 8, 9, & 10)
1:1,500 @ A3

Agricultural (Strong)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Service
Ferrous (Spike)



N

0 40 80 120 m

magnitude surveys

345400

345600

345800

374800

374800

Area 8

Area 7

Area 9

374600

374600

Area 10

MSSJ1172 - HyNet CO2 Pipeline
Figure 230 - XY Trace Plot (Areas 7, 8, 9, & 10)
30nT/cm at 1:1,500 @ A3

N

0 40 80 120 m

magnitude surveys

346000
346200
346400
374800
374600
Area 5
Area 6
Area 7
A5117
M56
MSSJ1172 - HyNet CO2 Pipeline
Figure 231 - Magnetic Gradient (Areas 5, 6, & 7)
1:1,500 @ A3

-1 nT 2
N
0 40 80 120 m
magnitude surveys

346000
346200
346400
374800
374600
Area 5
Area 6
Area 7
A5117
M56
Elton Green
MSSJ1172 - HyNet CO2 Pipeline
Figure 232 - Magnetic Interpretation (Areas 5, 6, & 7)
1:1,500 @ A3

Magnetic Disturbance
Undetermined (Strong)
Undetermined (Weak)
Industrial/Modern (Spread)
Service
Ferrous (Spike)
N
0
40
80
120 m
magnitude surveys

346000
346200
346400
374800
374600
Area 5
Area 6
Area 7
A5117
M56
MSSJ1172 - HyNet CO2 Pipeline
Figure 233 - XY Trace Plot (Areas 5, 6, & 7)
30nT/cm at 1:1,500 @ A3

Elton Green
N
0
40
80
120 m
magnitude surveys

346200
346400
346600
375200
375000
Area 3
Firbank
Firbank
Mulberry Close
Manley View
Ash Road
Parkland Drive
Ince Lane
A5117
Ince Lane
Chester Service Area

MSSJ1172 - HyNet CO2 Pipeline
Figure 234 - Magnetic Gradient (Areas 3 & 5)
1:1,500 @ A3

-1 nT 2

A5117
M56 M56

N

0 40 80 120 m

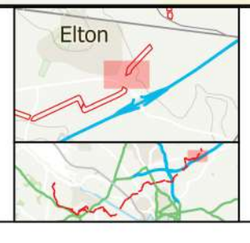
magnitude surveys

346200
346400
346600
375200
375000
Firbank
Firbank
Mulberry Close
Manley View
Ash Road
Parkland Drive
Ince Lane
A5117
Ince Lane
Area 3
Chester Service Area
MSSJ1172 - HyNet CO2 Pipeline
Figure 235 - Magnetic Interpretation (Areas 3 & 5)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Agricultural (Trend)
Service
Ferrous (Spike)
Elton
N
0
40
80
120 m
magnitude surveys

346200
346400
346600
375200
375000
Area 3
Firbank
Firbank
Mulberry Close
Manley View
Ash Road
Parkland Drive
Ince Lane
A5117
Ince Lane
Chester Service Area

MSSJ1172 - HyNet CO2 Pipeline
Figure 236 - XY Trace Plot (Areas 3 & 5)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys

346200
346400
346600
375400
375400
Mimosa Close
Redwood Drive
Ash Road
Osier Close
Holm Drive
Acacia Close
Mulberry Close
Area 4
Area 3

MSSJ1172 - HyNet CO2 Pipeline
Figure 237 - Magnetic Gradient (Areas 3 & 4)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

346200

346400

346600

375400

375400

Mimosa Close

Redwood Drive

Ash Road

Osier Close

Holm Drive

Acacia Close

Mulberry Close

Area 4

Area 3

MSSJ1172 - HyNet CO2 Pipeline
Figure 238 - Magnetic Interpretation (Areas 3 & 4)
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

Elton

N

0 40 80 120 m

magnitude surveys

346200

346400

346600

375400

375400

Mimosa Close

Redwood Drive

Birchwood Close

Ash Road

Osier Close

Holm Drive

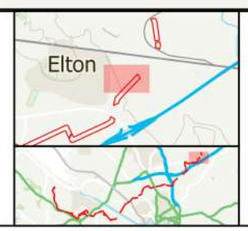
Acacia Close

Mulberry Close

Area 4

Area 3

MSSJ1172 - HyNet CO2 Pipeline
Figure 239 - XY Trace Plot (Areas 3 & 4)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

346600
346800
347000
376000
376000
375800
375800
Area 2

MSSJ1172 - HyNet CO2 Pipeline
Figure 240 - Magnetic Gradient (Areas 1 & 2)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

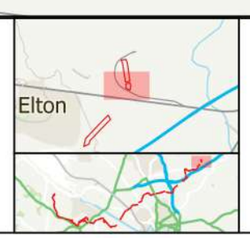
magnitude surveys

346600
346800
347000
376000
376000
Area 2
375800
375800
MSSJ1172 - HyNet CO2 Pipeline
Figure 241 - Magnetic Interpretation (Areas 1 & 2)
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Natural (Weak)
Undetermined (Weak)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)
Elton
N
0
40
80
120 m
magnitude surveys

346600
346800
347000
376000
376000
375800
375800
Area 2

MSSJ1172 - HyNet CO2 Pipeline
Figure 242 - XY Trace Plot (Areas 1 & 2)
30nT/cm at 1:1,500 @ A3



N

0 40 80 120 m

magnitude surveys

346600

346800

347000

376200

376200

Area 1

376000

376000

MSSJ1172 - HyNet CO2 Pipeline
Figure 243 - Magnetic Gradient (Area 1)
1:1,500 @ A3

-1 nT 2

N

0 40 80 120 m

magnitude surveys

346600

346800

347000

376200

376200

Area 1

376000

376000

MSSJ1172 - HyNet CO2 Pipeline
Figure 244 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Natural (Weak)
Agricultural (Trend)
Ferrous (Spike)

Elton

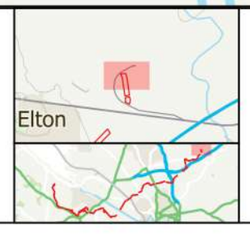
N

0 40 80 120 m

magnitude surveys

346600
346800
347000
376200
376200
Area 1
376000
376000

MSSJ1172 - HyNet CO2 Pipeline
Figure 245 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3



N
0
40
80
120 m

magnitude surveys