GEOPHYSICAL SURVEY REPORT
FOR

Watercatch Field, Tynesfield, North Somerset.

NGR: ST 50 71

REPORT NO: ROWE / PRICE 08/01

Philip R Rowe BA MA PIFA
Catherine J Price

August 2008

Watercatch Field, Tynesfield, North Somerset. Geophysical Survey Report

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ACKNOWLEDGEMENTS

In the preparation of this geophysical survey report, acknowledgment is made, with many thanks, to the assistance given by the Martin Pappworth, Archaeologist for the National Trust, Katie Laidlaw, Skills Supervisor, National Trust, and the Tynesfield Estate, for their kind permission in allowing the surveys to be conducted.

Many thanks to you all.

NOTES

Whereas great care has been taken to produce a comprehensive summary of the known and recorded archaeological evidence, no responsibility can be accepted for any omissions of fact or opinion, however caused.

ABREIVIATIONS

AP - Aerial Photograph
a.O.D - Above Ordnance Datum (Sea Level - Newlyn)
NGR - National Grid Reference
TBM - Temporary Bench Mark

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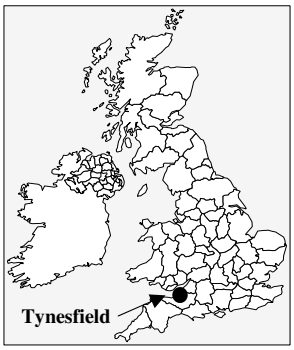
All enquiries should be addressed to:

Philip R Rowe BA MA PIFA & Catherine J Price (Independent Researcher)
University of Bristol
Department of Archaeology and Anthropology
43 Woodland Road
Bristol
BS8 1UU

Email – Philip.R.Rowe@Bristol.Ac.Uk

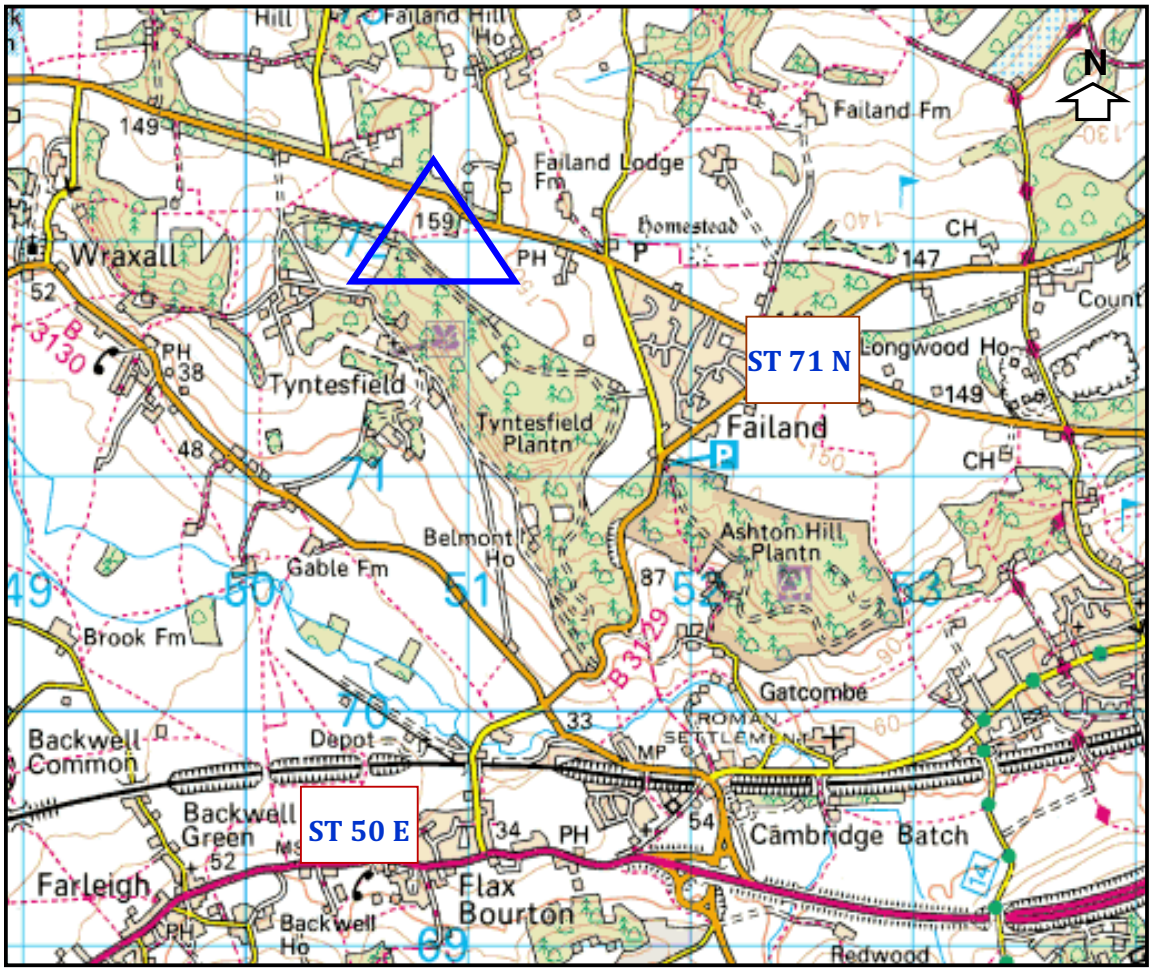
Figure 1

Location of the Study Area



Site Location

Plans and maps based on the Ordnance Survey Sheets are represented by the permission of Her Majesty's Stationery Office.



Based on Ordnance Survey 1:50000 – Illustration not drawn to scale.

Figure 2

Approximate Boundary of Survey Area (Shaded in Red)

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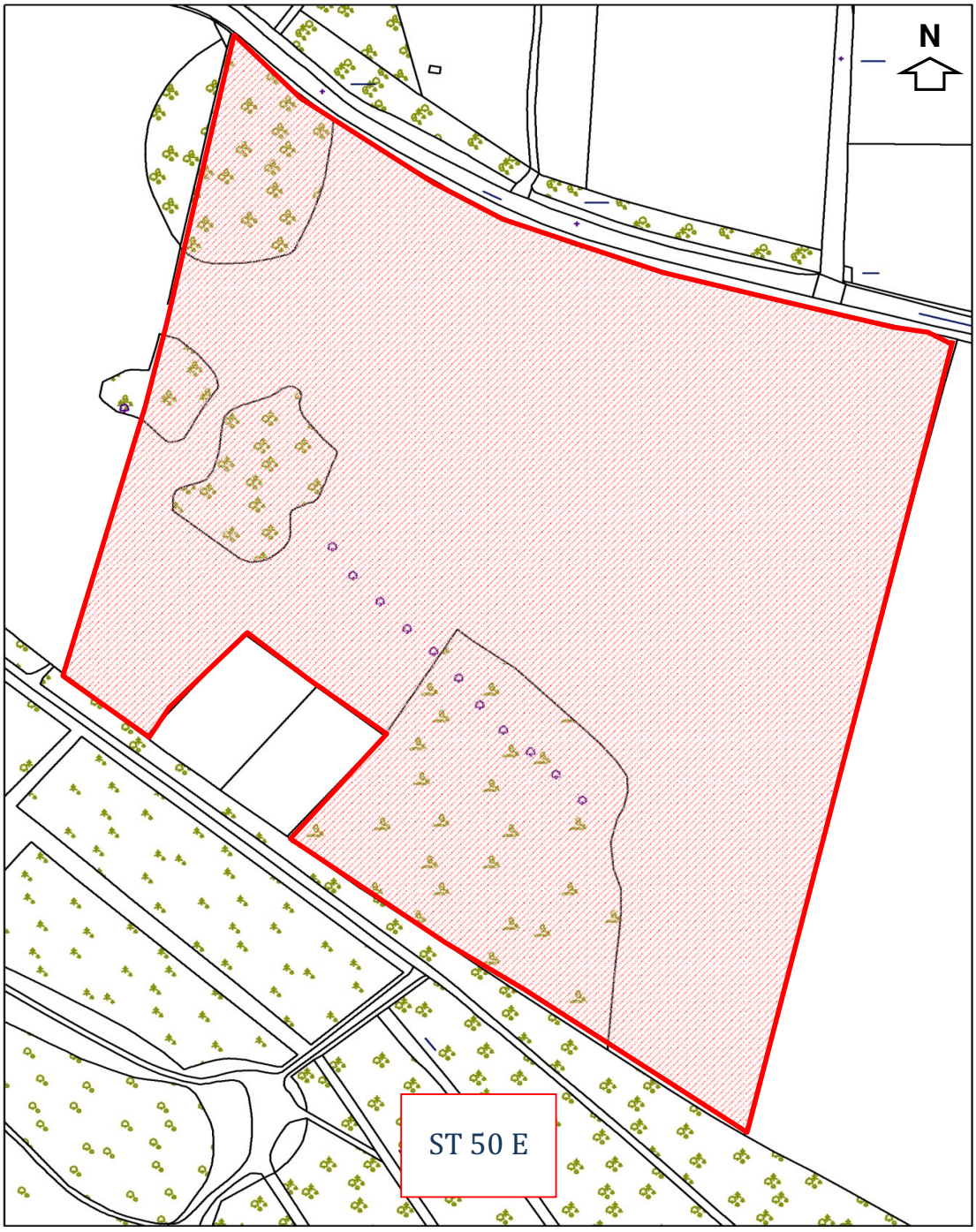

Based on Ordnance Survey 1:2000 – Illustration not drawn to scale.

Figure's 3 & 4

Local Topography of the Study Area (Case area outlined in Red)

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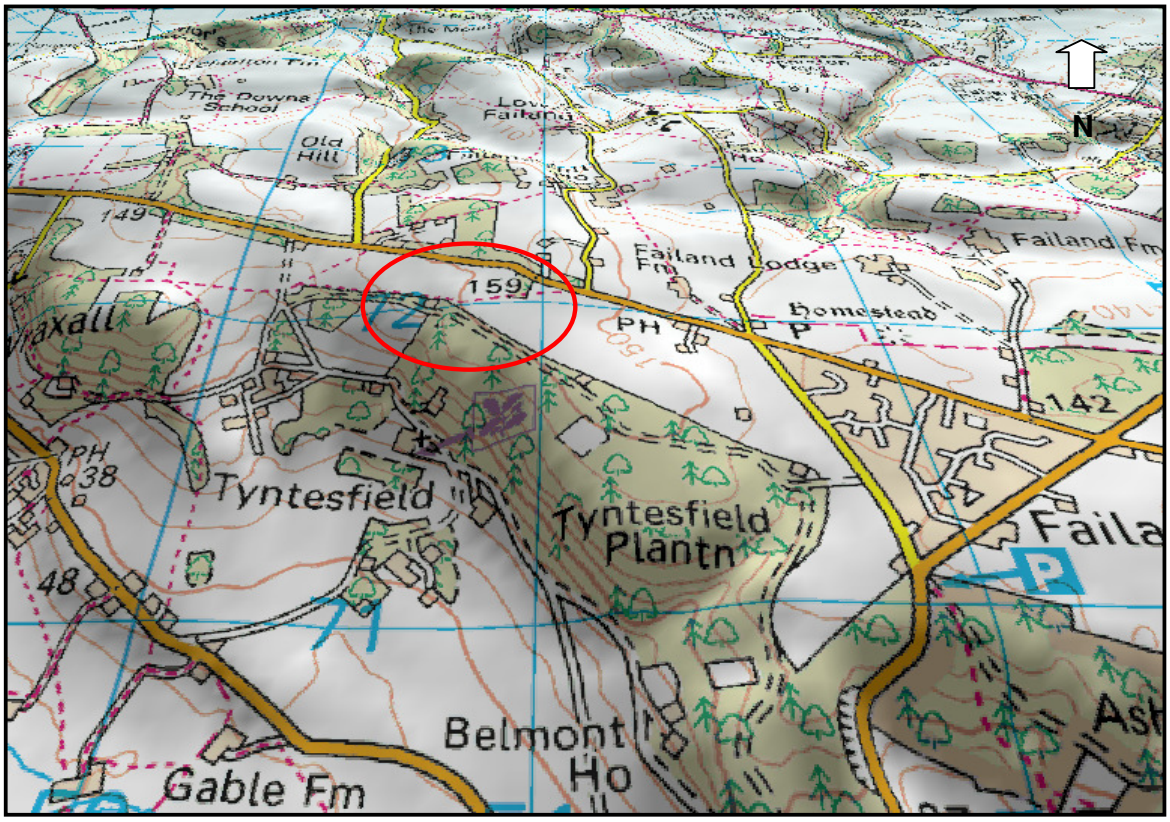

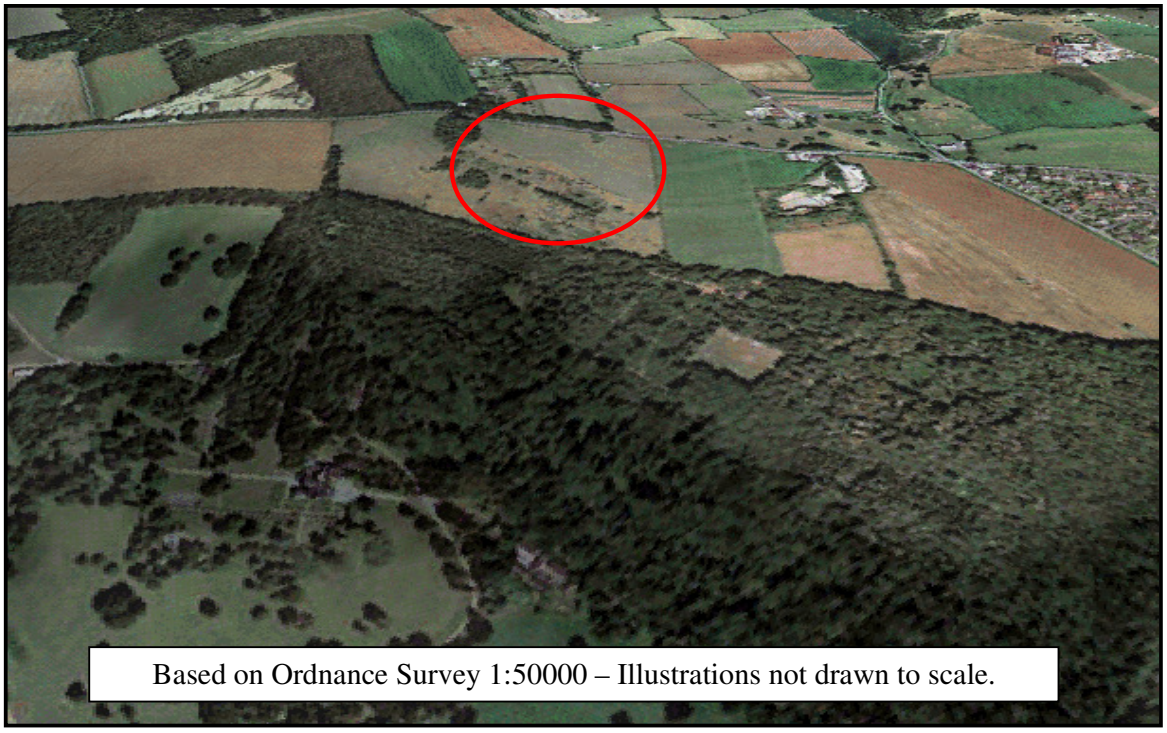

Based on Ordnance Survey 1:50000 – Illustrations not drawn to scale.

Figure 5

Overview of Study Area's Geology (Case area outlined in Red)

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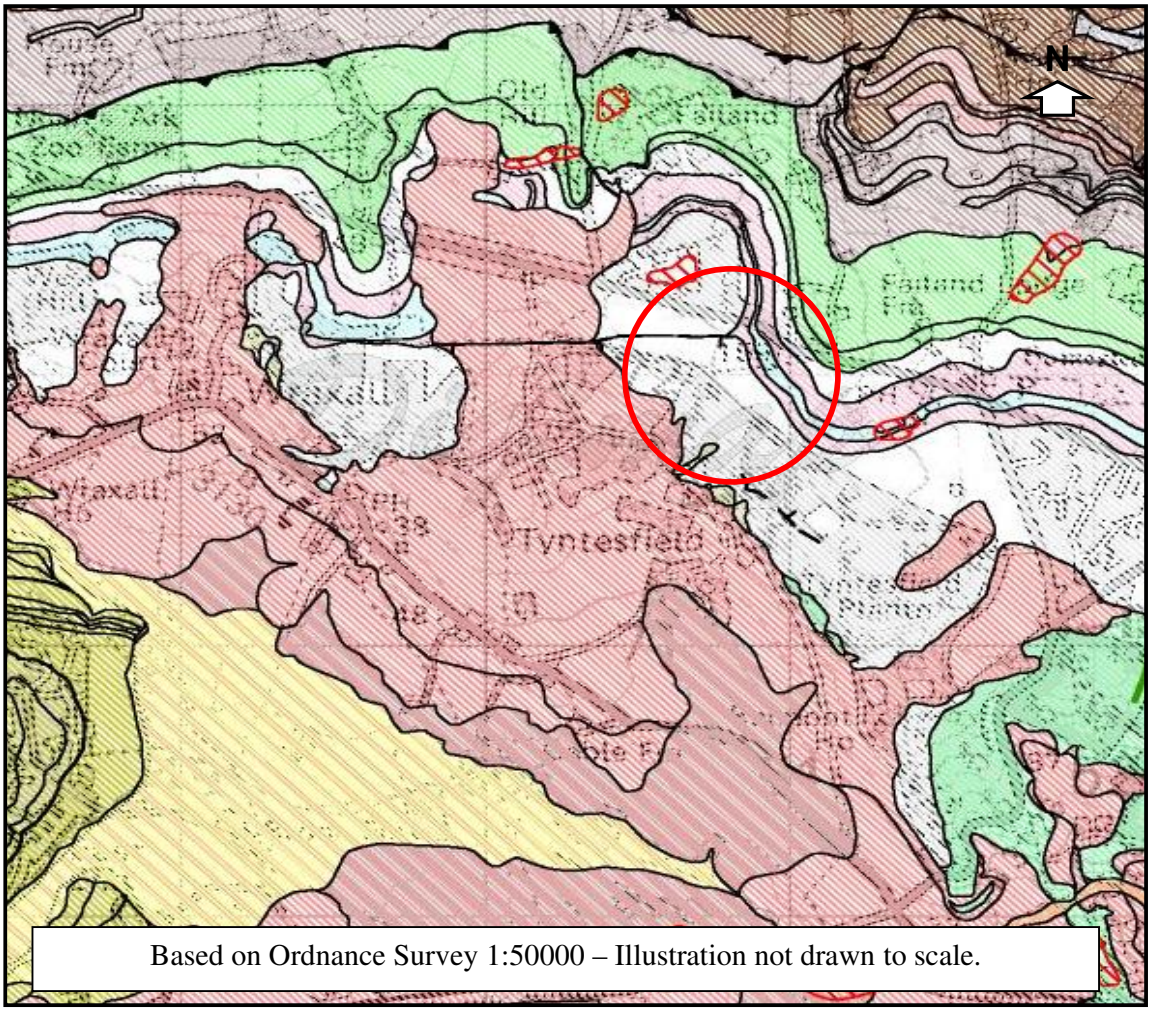
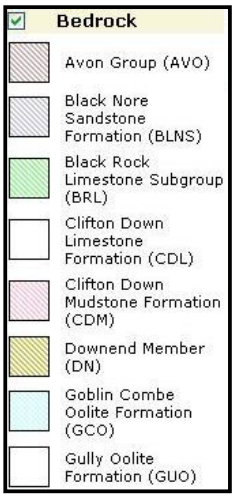
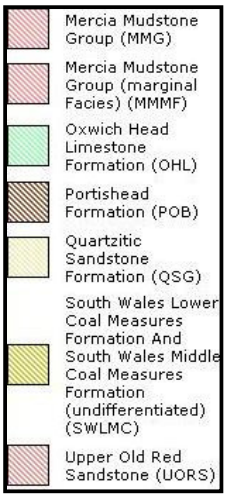
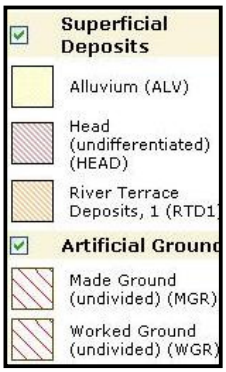


Based on Ordnance Survey 1:50000 – Illustration not drawn to scale.







1 - SITE RESULTS SUMMARY

GEOPHYSICAL SURVEY REPORT NO: Rowe / Price 08/01. **NGR**: ST 509 719.

SITE NAME: Watercatch Field, Tynesfield, North Somerset.

SITE TYPE: Grassed area.

DESCRIPTION: Located adjacent to the B3128 Bristol to Clevedon Road, *c.*7.5km west of Bristol city centre, *c.*3.6km north-east of Nailsea town centre, and *c.*900m north north-east of Tynesfield House, 159.18m aOD.

PERIOD: ?Prehistoric - 20th century.

GEOLOGY: Clifton Down Limestone of the Corrieyairack Subgroup, overburden to an unknown depth by re-deposited soil.

LAND USE: Grassed open area set aside for grazing.

SURVEY TYPE:	Resistance	**METHOD:**	Zig – Zag
INSTRUMENT:	Geoscan RM15	**SURVEY AREA:**	200m x 30m
SAMPLE INT:	1m	**TRAVERSE INT:**	1m

A RM15 resistance survey, total area 200m x 30m (16 x 10m² and 4 x 30m² grids), was completed June / July 2008, providing, as a result, good geophysical raw data that has partly assisted the archaeological knowledge of the site.

Suggesting the presence of features that possibly could pertain to archaeology and in particular to the Second World War Military camp that is known to have formerly stood upon the site; positive geophysical raw data recovered for the site has made conclusive archaeological interpretation unfortunately somewhat limited.

Areas of high resistance can clearly be identified in all the grids surveyed, both north-west, central, as well as south-east of the study area, with the majority, in all possibility, relating to undulating ridges of stone associated with the natural geological composition of the site.

Medium to high resistance north-west and centre of the study area, parallel to a ridge line identified by aerial photography and earthwork analysis as a service road / track way, suggests the possible archaeological presence of a circular bank and slight ditch of possible prehistoric date (?Bronze Age), whilst south-east of the study area can be seen another curving line of medium to high resistance, similar in characteristics to the previous, again possibly suggesting the presence of a small prehistoric bank and ditch.

Central of the study area can be seen two areas of high resistance separated in the middle and turning at a right angle that could possibly predate the military camp once sited within that locality, whilst high resistance seen to cross the service road / track way south-east of the site suggests a ridge of stone, either re-deposited and associated with the track way, or of natural geological origin.

Further archaeological investigation is recommended to confirm these findings.

REPORT AUTHOR(s): Philip R Rowe / Catherine J Price

2 - INTRODUCTION (see Figures 1 & 2)

2.1 Detailed to survey an area north north-east of Tynesfield House, North Somerset (ST 509 719) (Watercatch Field), as identified by the Written Scheme of Investigation (WSI – Price WC08 Report No:1 – **Appendix A**), a grid area totalling 200m x 30m (16 x 10m² and 4 x 30m²) was subsequently surveyed June / July 2008.

2.2 Aerial photographic, oral testimony and postgraduate investigation denote this parcel of land as being the former site of a military encampment, built in the early 1940s as part of Britain's war effort against Axis forces during the Second World War. (**Fig 6, Appendix B)**.

2.3 Producing, as a result, a resistance survey report summary (Paragraph 5.0 onwards); the subsequent findings will be used to enhance the archaeological knowledge of the site, as well as the sites relationship with the rest of the Tynesfield Estate.

3 - METHODOLOGY

3.1 Using a Geoscan RM15 resistance meter, a geophysical survey (Rowe/Price: 08/01) was subsequently made of the area identified in the Written Scheme of Investigation.

Indices and collections within the Public Records Office, National Monuments Records and Tynesfield Estate were consulted, with all the information collated, summarized and presented in the report below.

Photocopies, manuscript copies and notes, including still photographs, are preserved in the project archive, stored at University of Bristol, Department of Archaeology & Anthropology.

4 - TOPOGRAPHY, GEOLOGY AND CURRENT LAND USE (see Figures 3, 4, 5 & Plate 1 (Cover))

4.1 Located on an undulating ridge of high ground, 159.18m aOD [1] and *c.*0.9km north north-east of Tynesfield House, the geophysical study area of Watercatch Field can be found situated adjacent to the B3128 Bristol to Clevedon Road, *c.*7.5km west of Bristol city centre, *c.*3.6km north-east of Nailsea town centre.

4.2 Consisting of a series of rectangular concrete bases, identified from aerial photographic evidence (**Figure 6** – Overleaf) as belonging to building foundations located within an area of open pastoral grassland, depth of re-deposited soil overburden following site formation / re-landscaping is, to date, unknown.

The underlying geological soil association for the study area is Clifton Down Limestone of the Corrieyairack Subgroup, dating from the Holkerian to Arundian period. Undulating north-east and east of the study area is ridges of Clifton Down Mudstone of the Upper Limestone Formation, Goblin Combe Oolite of the Ballachulish Subgroup, both of the Arundian period, and Gully Oolite of the Mercia Mudstone Group of Chadian age; whilst north of the study area is Black Rock Limestone Sub Group of the Bracklesham Group, Chadian to Courceyan in age (see **Appendix C** for full geological compositions).

4.3 Watercatch Field, owned by the National Trust, is an area of open grassland primarily set aside for animal grazing, though can be accessed by the community via public footpaths for recreational purposes (walking).

[1] Information taken from Temporary Bench Mark TBM) (159.18m) placed upon survey site using Leica GPS1200 system (accuracy <5mm).

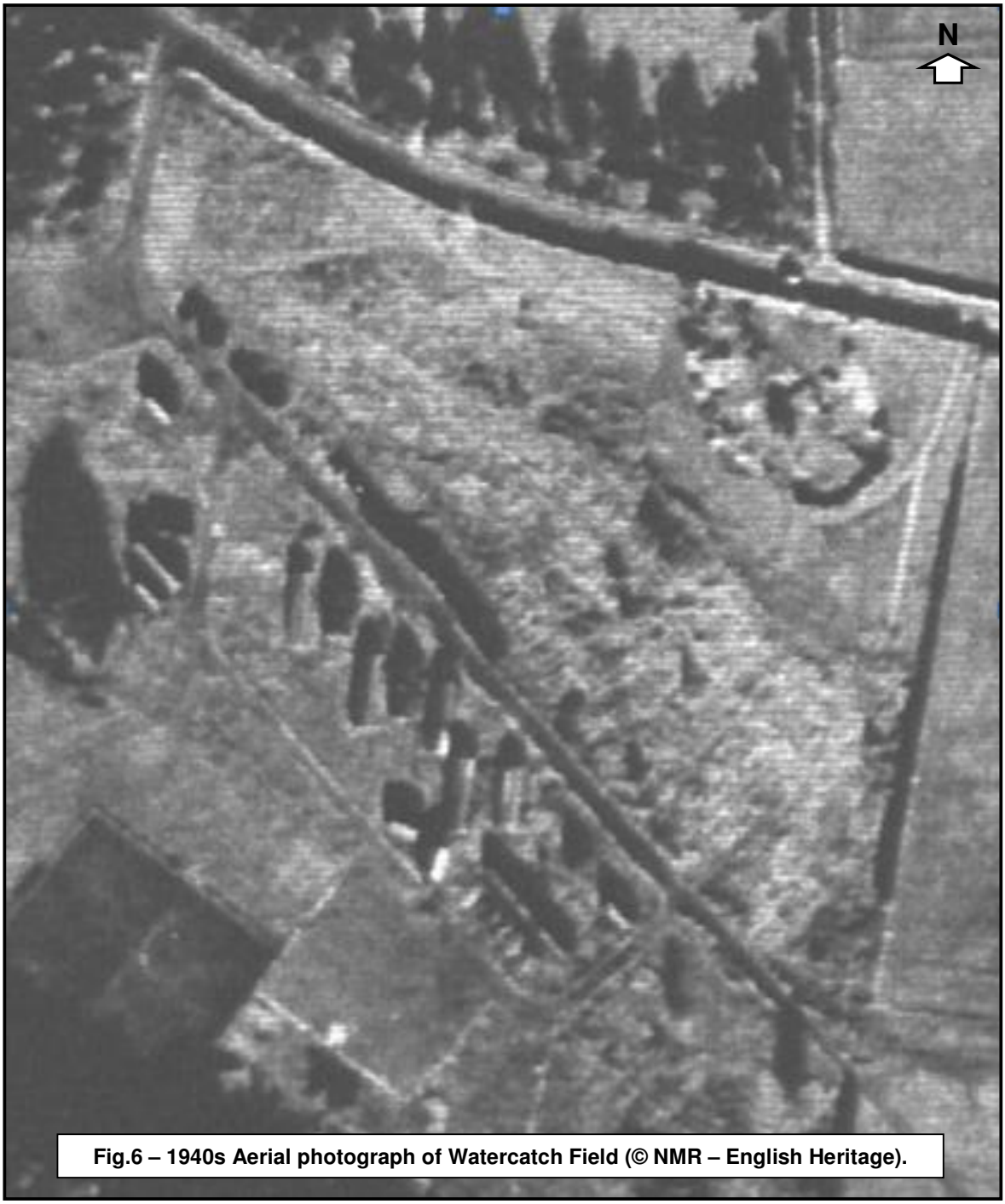


Fig.6 – 1940s Aerial photograph of Watercatch Field (© NMR – English Heritage).

5 - RESULTS

5.1 GEOPHYSICAL SURVEY

5.1.1 Point of Note: Whilst all survey reports are produced as correctly as possible, the resulting information is based on the accuracy of the equipment therefore no responsibility is taken for any errors or omissions.

5.2 INSTRUMENTATION

5.2.1 Resistance Meter – Geoscan RM15: Measuring the electrical resistance of the earth to a current being passed through it via a system of four electrodes (two current and two potential), a twin probe arrangement (0.5m interval) that involves the paring of electrodes (one current / one potential) was passed over a measured grid, with the

results being compared to a back ground reading obtained from a pair of electrodes placed in a '*fixed*' position.

5.2.2 Measured in Ohms and calculated resistivity in Ohm – Metres, the effective dept of penetration is *c.*0.75m – 1m, although the nature of soil overburden as well as underlying geology will cause variations in this generality.

5.3.1 A Geoscan RM15 resistance survey (Rowe/Price 08/01) (16 x 10m² & 4 x 30m²), was completed over a 200 x 30m grid area (**Fig.7**).

5.3.2 Set out by Catherine J Price, with the assistance of Philip R Rowe, the grids were measured in using taped offsets from a baseline running in a south-east to north-west direction parallel to the surveyed track way / service road, and were surveyed into the current Ordnance Survey grid system using a Leica GPS1200 system to an average accuracy of <5mm. Taped offsets to known reference points were also taken (Rowe / Price 08/01 – **Appendix D**).

5.4 DISPLAY

5.4.1 Displayed as greyscale images, this visual format divides a given range of predefined arrangement of dots / shades of grey readings into a set number of classes.

5.4.2 Increasing in intensity as the value increases, the resulting image is displayed as a toned / grey scale enabling fast and accurate interpretation of any sub-surface archaeological features discovered.

5.5 COMPLICATING FACTORS

5.5.1 Various complicating factors were encountered during the geophysical survey. These include uneven, sloping ground level, concrete surfaces and shrubs / bushes.

5.6 RESULTS – Rowe / Price 08/01 – RM15 Resistance Meter (Fig.8 & 9)

5.6.1 Areas of high resistance can visibly be identified in all the grids surveyed, both north-west, central, as well as south-east of the study area, with the majority however, in all likelihood, relating to undulating ridges of material associated with the natural geological morphology of the site (Full data processing information – **Appendix E**).

5.6.2 Medium to high resistance north-west and centre of the study area, adjacent to a clear ridge line identified by aerial photography and earthwork analysis as a service road / track way, suggests the possible archaeological presence of a circular bank and slight ditch of possible prehistoric date (?Bronze Age) (**Points 1, 2 & 3**).

5.6.3 Central of the study area can be seen two areas of high resistance separated in the middle and turning at a right angle that could possibly relate to the military camp once located within that locality (**Points 4, 5, 6 & 7**).

5.6.4 South-east of the study area can be seen another curving line of medium to high resistance, similar in characteristics to the previous, again possibly suggesting the presence of a small bank and ditch, whilst high resistance seen to cross the service road / track way suggests a ridge of stone, either re-deposited and associated with the track way, or of natural geological origin (**Points 8 & 9**).

5.7 INTERPRETATION / CONCLUSION

5.7.1 With clearly defined features present, the archaeological interpretation of the RM15 Resistance survey results for Watercatch Field suggest the presence of material related to both the Second World War Military encampment that was once located on the site, as well as possible prehistoric activity (?Bronze Age). In support, an overlay of aerial photographic evidence onto the RM15 survey results clearly demonstrates an archaeological link between the historical evidence and the findings (**Fig.10**).

5.7.2 Drawing upon the evidence presented, it is recommended that an

archaeological evaluation of the site is conducted to fully establish the presence of these features and their existing condition / preservation.

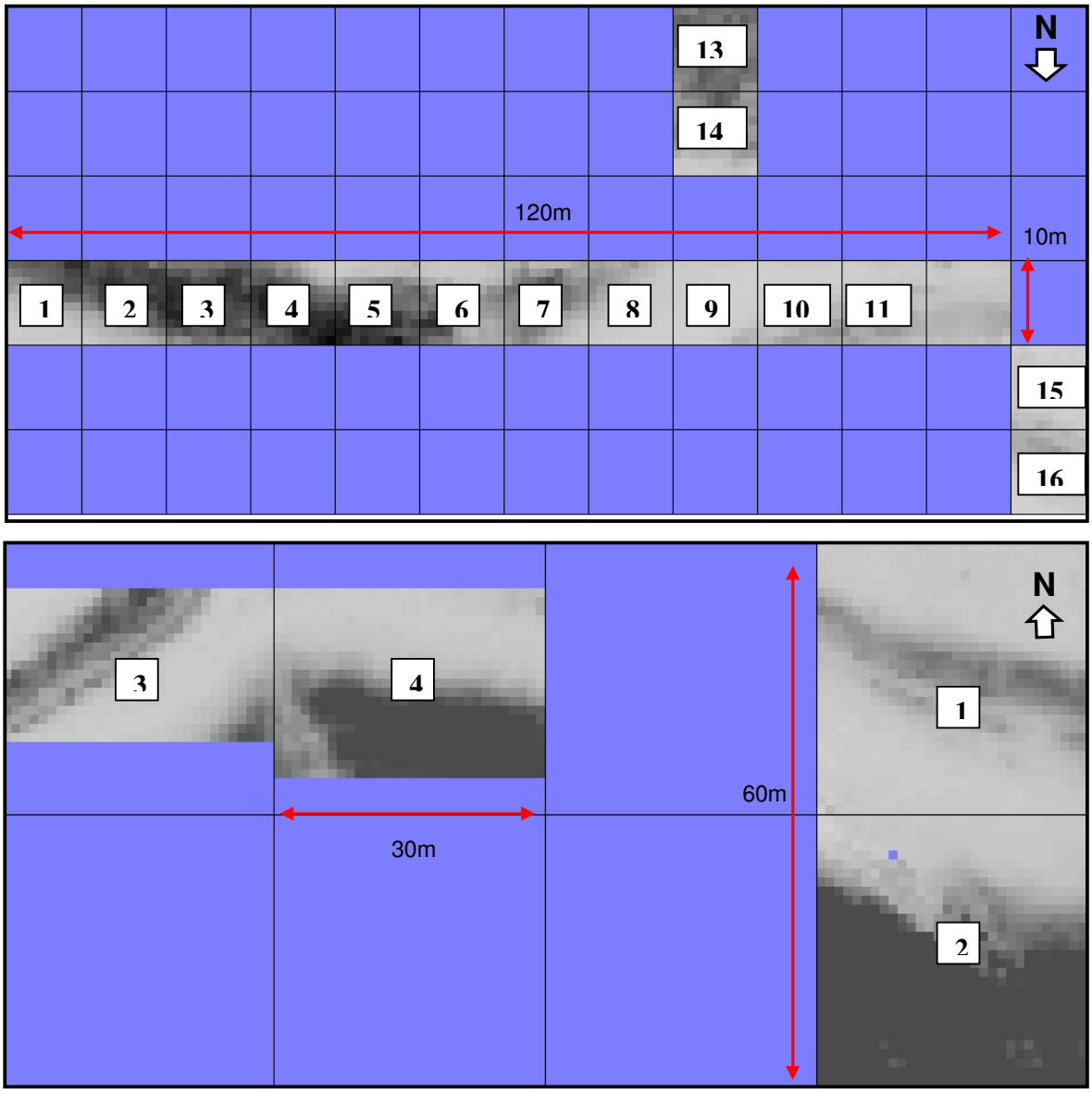


Fig.7 – RM15 Survey Area / Grids - Rowe/Price: 08/01 (© Geoplot)
(Scale as per illustration).

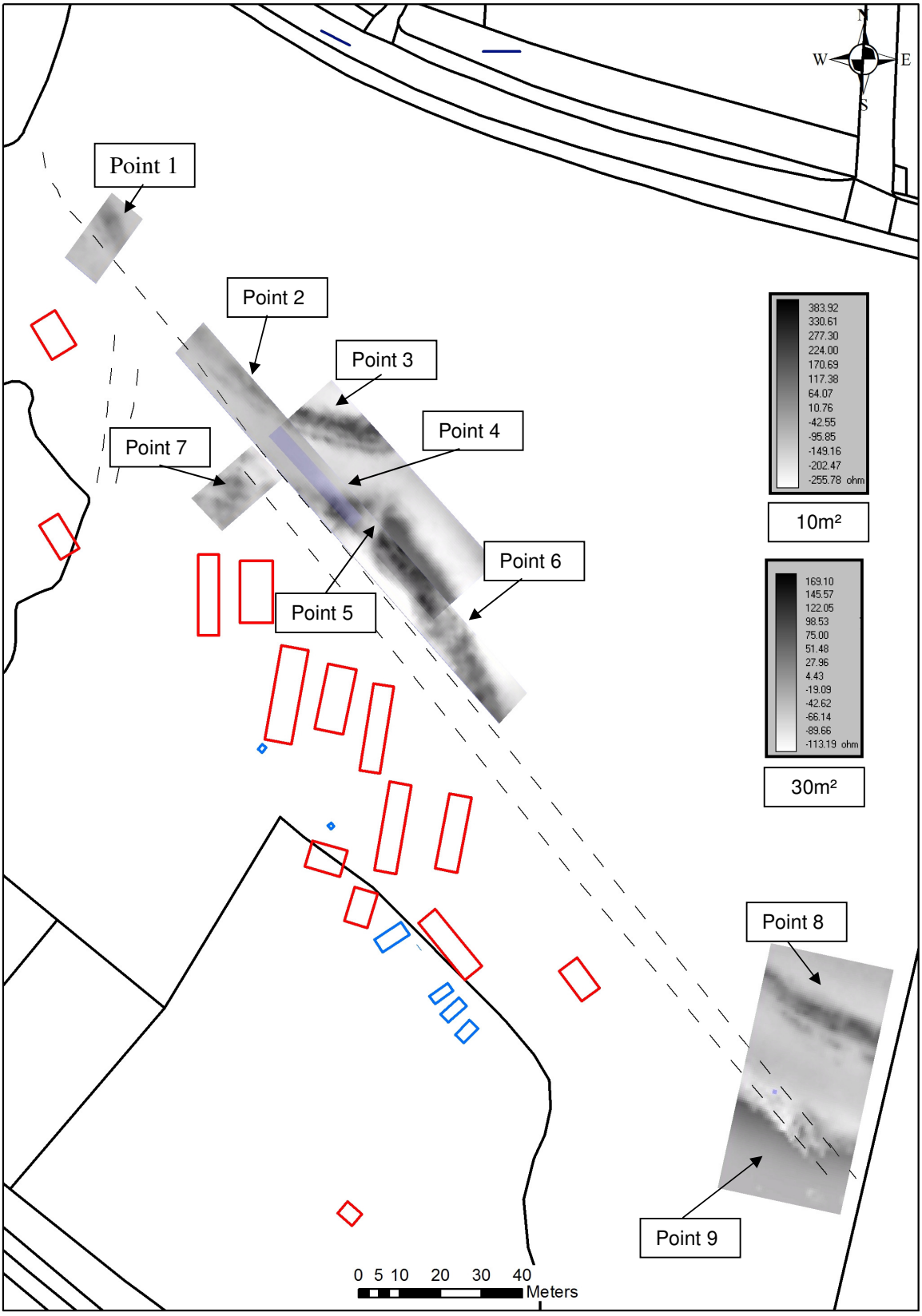


Fig.8 – Plan of site with RM15 Resistivity results (processed) overlaid (Points of note highlighted – See paragraph 5.6 for details).

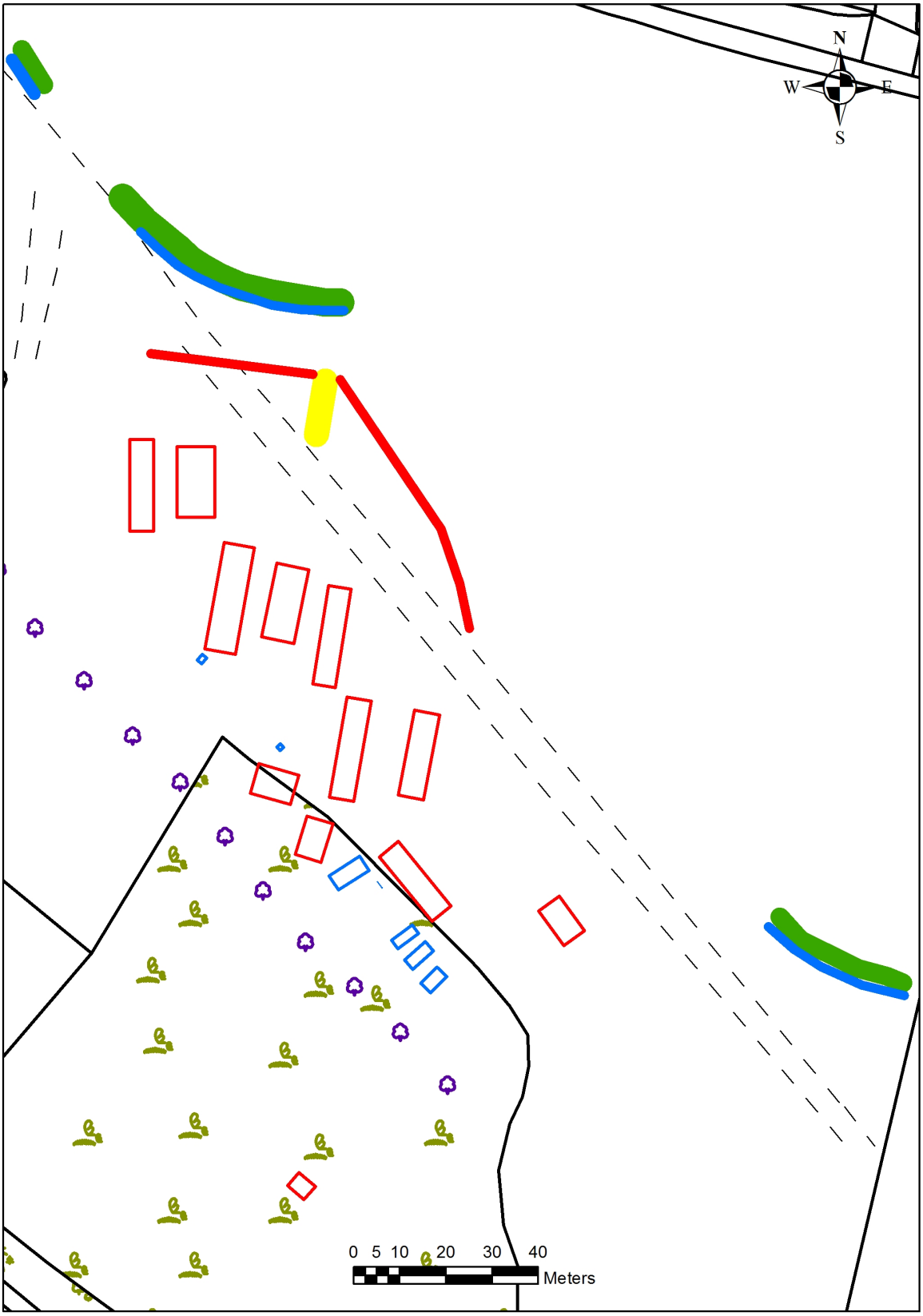


Fig.9 – Plan of site with ?archaeological features denoted – Green - ?Bank, Blue - ?Ditch, Red - ?Boundary of feature & Yellow - ?Entrance way.

Fig.10 – Site plan with survey results and Resistivity results overlaid.

6 - BIBLIOGRAPHY

© **NMR English Heritage –** 1940s Aerial Photograph

Digimap - © Crown copyright/database right 2004 – Ordnance Survey / Edina Supplied Service to the University of Bristol.

Geoplot - © Geoscan Research under licence to the University of Bristol.

Laidlaw, Katie – Personal Communication 28th July 2008.

Memory-Map Inc – © Crown Copyright Ordnance Survey 2003 Licence No: PU100034184.

Written Scheme of Investigation – Price TF08 Report No: 1.

7 – APPENDICES

7.1 Appendix A

Written Scheme of Investigation - Price TF08 Report No: 1

Watercatch Field, Tynesfield Estate.

June 2008

1. Aims of Project

To undertake a resistance survey in Watercatch Field, Tynesfield, North Somerset in order to ascertain / locate any remaining buildings relating to the Second World War Military camp that once was sited there.

2. Methodologies

All archaeological works will be carried out using appropriate methods and practices, and will comply with the '*Code of conduct, Code of approved practice for the regulation of contractual arrangements in field archaeology*', and other relevant by-laws of the Institute of Field Archaeologists (IFA).

Geophysical Survey

i. The geophysical survey will take the form of a resistivity survey, a reliable and proven method for locating buried building features.

ii. Grids: All grids will be laid-out using taped offset from a baseline. The grids will be tied into the national grid (OSGB36®) or the National GPS Network (ETRS89) to allow data collected on site to be related to Ordnance Survey maps and recording systems based upon them.

iii. Equipment: the survey will be carried out using a *Geoscan* RM15 Resistance Meter instrument.

iv. Data Capture: The survey will, as a minimum, utilise a sample interval of 1m, a traverse interval of 1m, and a traverse method of Zigzag. If a highly detailed survey is considered necessary, then the sample interval will be increased to 0.5m.

v. Data Processing: Processing, analysis and presentation of data will employ *Geoscan's* Geoplot 3.0.

vi. Reports: The final report will include the results of the resistance survey, a discussion / interpretation of the results and, if appropriate, recommendations for further work. The material in the report will afterwards be used for PhD research purposes (Philip R Rowe), as well as summarised / published in other related article(s), as deemed appropriate.

3. Location of Investigation

Watercatch Field is located at ST 50 71 on an undulating ridge of high ground situated adjacent to the B3128 Bristol to Clevedon Road*, c.*7.5km west of Bristol city centre, *c.*3.6km north-east of Nailsea town centre, and *c.*900m north north-east of Tynesfield House,159.18m aOD.

4. Previous Research

Despite aerial photographic, historical and cartographic evidence for the estate, as far as could be ascertained, to date no known archaeological geophysical investigative

work has been undertaken in Watercatch Field area in relation to the Second World War camp.

5. Personnel

The archaeological work will be undertaken by Catherine J Price, Independent Researcher, and Phillip Rowe (BA MA PIFA), University of Bristol, Department of Archaeology & Anthropology, 43 Woodland Road, Bristol, BS8 1UU. Contact Catherine J Price on Tel: 0117 983 3376, Philip R Rowe on Tel: 07887 542 946 or Email: Philip.r.rowe@Bristol.ac.uk.

6. Relevance of the Project and Place of Publication

1940s aerial photographic, oral testimonies and previous postgraduate research denote this parcel of land as being the former site of a military camp, built in the early 1940s as part of Britain's war effort against Axis forces.

To confirm the existence of any further remains pertaining to the encampment, a geophysical survey report will be produced, which will help to establish the nature, quality, extent, condition, worth and significance of any features / deposits if found, which may help to inform future conservation and / or restoration projects within Watercatch Field / Tynesfield Estate.

A joint article between Philip R Rowe and Catherine J Price will hopefully be published in relevant journal(s), with the results from the proposed research survey forming an integral part of the article.

7.2 **Appendix B**

Personal Communication – Katie Laidlaw 28th July 2008.

'Hi all,

I've just had Harry Tavener on the phone (one of Leah's interview subjects and a Tyntesfield volunteer) and he mentioned a few things that I thought I'd pass on... much of it we knew already but some a bit new I think... he's hoping to come along on the weekend, probably on Sunday the 10th so that you can meet and interrogate him!

1) He has been speaking to a gentleman called Mervyn Downs, who owns a farm opposite the Failand Inn and who was farming the land there during WW2 (I will send Mervyn a letter about the archaeology so that hopefully he can come over as well).

2) According to Mervyn, the site was initially British (used by Bomb Disposal Squad - another of their camps being near the Battleaxes pub in Wraxall), then American ('Red Indians' working on vehicles).

3) He wasn't sure about the POW angle, although there were certainly POWs in the area (possibly at Ashton) and he remembers Italian POWs specifically.

4) He claims black American units were stationed in Chelvey (near Backwell station), Nailsea (opposite the Masonic Hall) and Failand (near the current village hall).

5) He went drinking with the British soldiers (only a handful of them) that were charged with maintaining security at the big hospital camp between the Americans departing and it being transformed into a residential village'.

7.3 Appendix C –

Information obtained from Digimap - © Crown copyright/database right 2004 – Ordnance Survey / Edina Supplied Service

CLIFTON DOWN MUDSTONE FORMATION			
Computer Code:	CDM	**Status Code:**	INFORMAL, LOCAL
Preferred Map Code:			
Age or Age Range:	[CJ] ARUNDIAN		
Lithological Description:			
Thin- to medium-bedded poorly fossiliferous, calcite mudstones, dolomite mudstones and mudstones. A unit of crinoidal and oolitic limestones occurs in the middle of the Formation, and a 15m-thick unit of oolitic and crinoidal limestone occurs in the upper part of Formation [said to correlate with the Goblin Combe Oolite Formation of Broadfield Down, but this is not proven]. Basalt, tuff and ashy limestone are present in the middle of the Formation on Broadfield Down. Carbonates of the Formation were deposited mainly in a back barrier setting.			
Definition of Upper Boundary:			
In the Bristol area the upper boundary is taken at the sharp contact between the interbedded dolomite and calcite mudstones and mudstones of the formation and the basal sandy limestone of the overlying Clifton Down Limestone Formation. The boundary needs further investigation. In Broadfield Down the upper boundary is taken at the incoming of ooidal limestones of the Goblin Combe Oolite Formation above the interbedded dolomite and calcite mudstones and mudstones of the Clifton Down Mudstone Formation.			
Definition of Lower Boundary:			
Taken at irregular erosive contact of dolomite and calcite mudstones and mudstones of the formation above the clay palaesol of the underlying Gully Oolite Formation.			
Thickness:			
60m at Bristol and northern Broadfield Down thinning to a feather edge on the southern side of Broadfield Down.			
Geological Limits:			
Bristol [ST 60 74] area and Broadfield Down [ST 50 65]. Passes northwestwards into the Llanelly Formation of South Wales and southwards into the Burrington Oolite Subgroup of the Mendip Hills.			
Parent Unit:	UPPER LIMESTONE FORMATION		
Parent Code:	ULGS		

MERCIA MUDSTONE GROUP (MARGINAL FACIES)			
Computer Code:	MMMF	**Status Code:**	INFORMAL, NATIONAL
Preferred Map Code:			
Age or Age Range:	[T] TRIASSIC		
Lithological Description:			
Variable, typically consisting of conglomerate and/or breccia with clasts derived locally from rocks lying immediately below the unconformable base of these deposits. The matrix usually consists of finer grained rock fragments or, less commonly, siltstone, sandstone or micritic limestone. Where these deposits overlie Carboniferous limestones, such as the Bristol and Mendips areas, both the matrix and limestone clasts are commonly dolomitised ("Dolomitic Conglomerate"). Individual clasts can range up to several cubic metres in size. Fenestral and algal carbonates interdigitate with conglomerates and breccias in exposures to the south of Cardiff (Tucker, 1977; Waters and Lawrence, 1987).			
Definition of Upper Boundary:			
Conformable and gradational, interdigitating with reddish-brown mudstone of the Mercia Mudstone Group, or its constituent formations.			
Definition of Lower Boundary:			
Markedly unconformable, at the abrupt base of conglomerates of the Marginal Facies, which infill a buried topography on Proterozoic rocks of variable lithology.			
Thickness:			
Highly variable due to interdigitating relationship with Mercia Mudstone Group; ranges from 1 m or less at some exposures to over 100 m where these deposits fill `buried valleys` in the underlying pre-Triassic topography.			

Geological Limits:			
Deposits occur on the flanks of the Mercia Mudstone Group outcrop, where the latter oversteps onto Palaeozoic or Proterozoic rocks; the thickest deposits lie unconformably on Carboniferous limestones in Somerset, Avon and South Wales, and around the flanks of the Charnwood Forest in Leicestershire.			
Parent Unit:	CWMERE FORMATION		
Parent Code:	CMR		
CLIFTON DOWN LIMESTONE FORMATION			
Computer Code:	CDL	**Status Code:**	INFORMAL, LOCAL
Preferred Map Code:	CDL		
Age or Age Range:	[CQ] HOLKERIAN	to	[CJ] ARUNDIAN
Lithological Description:			
Splintery dark grey calcite and dolomite mudstones, pale grey oolitic, dark grey bioclastic and oncolitic limestones and some mudstones. Scattered cherts and silicified fossils in lower half. Sandy limestone at base in Bristol area. Deposited in a barrier/back barrier/shelf lagoon setting.			
Definition of Upper Boundary:			
Taken at the top of the last calcite mudstones of the formation, above which occur the dark grey crinoidal and bioclastic limestones and paler oolitic limestones of the Oxwich Head Limestone Formation.			
Definition of Lower Boundary:			
In the Bristol area taken at the sharp contact between the interbedded dolomite and calcite mudstones of the underlying Clifton Down Mudstone Formation and the basal sandy limestone of the Clifton Down Limestone Formation. The boundary needs further investigation. In Broadfield Down and the Mendip Hills it is taken at the incoming of calcite mudstones of the Clifton Down Limestone Formation above the oolitic and oolitic/bioclastic limestones of the Goblin Combe Oolite Formation and undivided Burrington Oolite Subgroup respectively.			
Thickness:			
266m in the Avon Gorge at Bristol, thinning northwards to 137m north of Bristol and thinning southwards to 150-200m in the Mendip Hills.			
Geological Limits:			
Bristol [ST 60 74] area and Mendip [ST 50 53]. Passes laterally into the Hunts Bay Oolite Subgroup in the Monmouth and Chepstow area [ST 53 94].			
Parent Unit:	CORRIEYAIRACK SUBGROUP		
Parent Code:	GRCO		
GULLY OOLITE FORMATION			
Computer Code:	GUO	**Status Code:**	FORMAL, NATIONAL
Preferred Map Code:			
Age or Age Range:	[CI] CHADIAN		
Lithological Description:			
Medium- to thick-bedded, pale grey, oolitic grainstone with subordinate beds of fine-grained skeletal packstones. Cross-laminated and cross-bedded, some burrowing. Locally dolomitized, especially on the southeast and east crop of the South Wales Coalfield and in the Chepstow area. A palaeokarstic surface overlain by a green/red mudstone/clay palaeosol caps the Formation. Locally in the north Bristol to Tytherington area 6-21m of grey crinoidal limestones, the Sub-Oolite Bed, occurs at the base of the Formation.			
Definition of Upper Boundary:			
The top of the Formation is taken at the sharp erosional contact between the mudstone/clay palaeosol at the top of the Formation and the overlying thin-bedded calcite mudstones and mudstones of the Caswell Bay Mudstone Formation [South Wales] or the Clifton Down Mudstone Formation [Bristol and Broadfield Down area]. A conglomeratic lag is locally present at the base of the Caswell Bay Mudstone Formation. In the southern part of the outcrop, the Formation is overlain by the High Tor Limestone Formation, the capping palaeosol being absent. Here the top is taken at the irregular erosional contact between the oolitic grainstones of the Formation and the overlying coarse skeletal packstone/grainstones of the High Tor Limestone Formation.			
Definition of Lower Boundary:			
The base is taken at the gradational to sharp contact between the dolomitised sparsely crinoidal packstones of the			

Friars Point Limestone Formation or its parent the Black Rock Limestone Subgroup and the overlying oolitic grainstones or dolomitised oolite of the Formation. In the south the junction appears conformable but in the north a thin red clay overlying a palaeokarstic surface is locally present; in such cases the top is taken at the top of the red clay. The base of the formation in the Bristol area is locally taken at the junction of the sparsely crinoidal dolomites of the Black Rock Limestone Subgroup and the crinoidal limestones of the overlying Sub-Oolite Bed.

Thickness:

83m in the southern Vale of Glamorgan, thinning to 19m on the southeast crop of the South Wales Coalfield.

Geological Limits:

Gower [SS 50 90], Vale of Glamorgan [ST 00 74], southeast crop of the South Wales Coalfield [ST 17 85], Monmouth/Chepstow [ST 53 93], Bristol [ST 60 74], Weston-super-Mare [ST 30 60] and Broadfield Down [ST 50 65] areas. Present but not mapped in the Tenby [SN 13 01] and Pembroke [SM 97 03] areas. Passes east in the Mendip Hills [ST 50 53] into the Burrington Oolite Subgroup.

Parent Unit:	MERCIA MUDSTONE GROUP
Parent Code:	MMG

GOBLIN COMBE OOLITE FORMATION

Computer Code:	GCO	**Status Code:**	INFORMAL, LOCAL
Preferred Map Code:			
Age or Age Range:	[CJ] ARUNDIAN		

Lithological Description:

Pale grey to grey, thick-bedded to massive, medium- to coarse-grained oolite and ooidal limestone with lenses of crinoidal limestone. Deposited in a barrier environment.

Definition of Upper Boundary:

In the Weston-super-Mare area it is taken at the incoming of the calcite mudstones of the Clifton Down Mudstone Formation above the ooidal limestones of the Formation. In the Bristol area it is taken at the incoming of calcite mudstones and skeletal limestones of the Clifton Down Limestone Formation above the ooidal limestones of the Formation.

Definition of Lower Boundary:

In the Bristol area and Broadfield Down it is taken at the incoming of ooidal limestones of the Formation above the dolomite and calcite mudstones and mudstones of the underlying Clifton Down Mudstone Formation. In the Weston-super-Mare area and Steepholm it is taken at the incoming of massive, coarse crinoidal and ooidal limestones of the Formation above the grey to dark grey, medium-bedded skeletal limestones of the High Tor Limestone Formation.

Thickness:

15m in the Bristol area [Avon Gorge] thickening to 70m at Weston-super-Mare.

Geological Limits:

Bristol [ST 60 74], Broadfield Down [ST 50 65] and Weston-super-Mare [ST 30 60] areas. Passes northwards into the Clifton Down Mudstone Formation and southwards into the Burrington Oolite Subgroup.

Parent Unit:	BALLACHULISH SUBGROUP
Parent Code:	DABH

BLACK ROCK LIMESTONE SUBGROUP

Computer Code:	BRL	**Status Code:**	FORMAL, NATIONAL
Preferred Map Code:			
Age or Age Range:	[CI] CHADIAN	to	[CF] COURCEYAN

Lithological Description:

Thin- to thick-bedded, dark grey to black, foetid, fine- to coarse-grained skeletal [mainly crinoid] packstones with subordinate thin beds of shaly argillaceous skeletal packstone and mudstone. Widespread burrowing. Tractional structures and silicified limestones characterise the lowermost part of the Subgroup. Unit of ooidal limestone [Brofiscin Oolite Formation] developed in lower part in Gower, Vale of Glamorgan and east crop of the South Wales Coalfield. The upper part of the Formation is dolomitized in the south, while along the southern and eastern crop of the South Wales Coalfield and in the Monmouth and Chepstow area, the entire Formation is dolomitized. Tuffs developed in the lower part of the Subgroup in the Weston super Mare areas [Middle Hope Volcanic

Member]. Subgroup represents deposition in an inner to mid ramp setting with local ooid shoal development.

Definition of Upper Boundary:

The top of the Subgroup is taken at the sharp contact between the dolomitised packstones of the Subgroup and the overlying oolitic grainstones or dolomitised oolite of the Gully Oolite Formation. In the south the junction appears conformable but in the north a thin red clay overlying a palaeokarstic surface is locally present; in such cases the top is taken at the top of the red clay. In the eastern Mendip Hills it is taken at the incoming of pale grey coarse crinoidal limestones of the Vallis Limestone Formation, above the dolomitised packstones of the underlying Black Rock Limestone Subgroup. Little is known about this contact, which needs further investigation. In the Bristol area the top is taken at the junction of the sparsely crinoidal dolomites of the Black Rock Subgroup and the crinoidal limestones of the overlying Sub-Oolite Bed of the Gully Oolite Formation. Little is known about this contact, which needs further investigation.

Definition of Lower Boundary:

Conformable and taken at the gradational incoming of dark grey fine- to coarse-grained skeletal packstones with scattered mudstone partings of the Subgroup above the interbedded mudstones and skeletal packstones [Cwymyniscoy Mudstone Formation] of the Avon Group.

Thickness:

500m in the southern Vale of Glamorgan, thinning northwards to 70m in the Monmouth area. 365m in the eastern Mendip Hills, thinning northwards to 158m at Bristol and 104m to the north of Bristol at Cromhall.

Geological Limits:

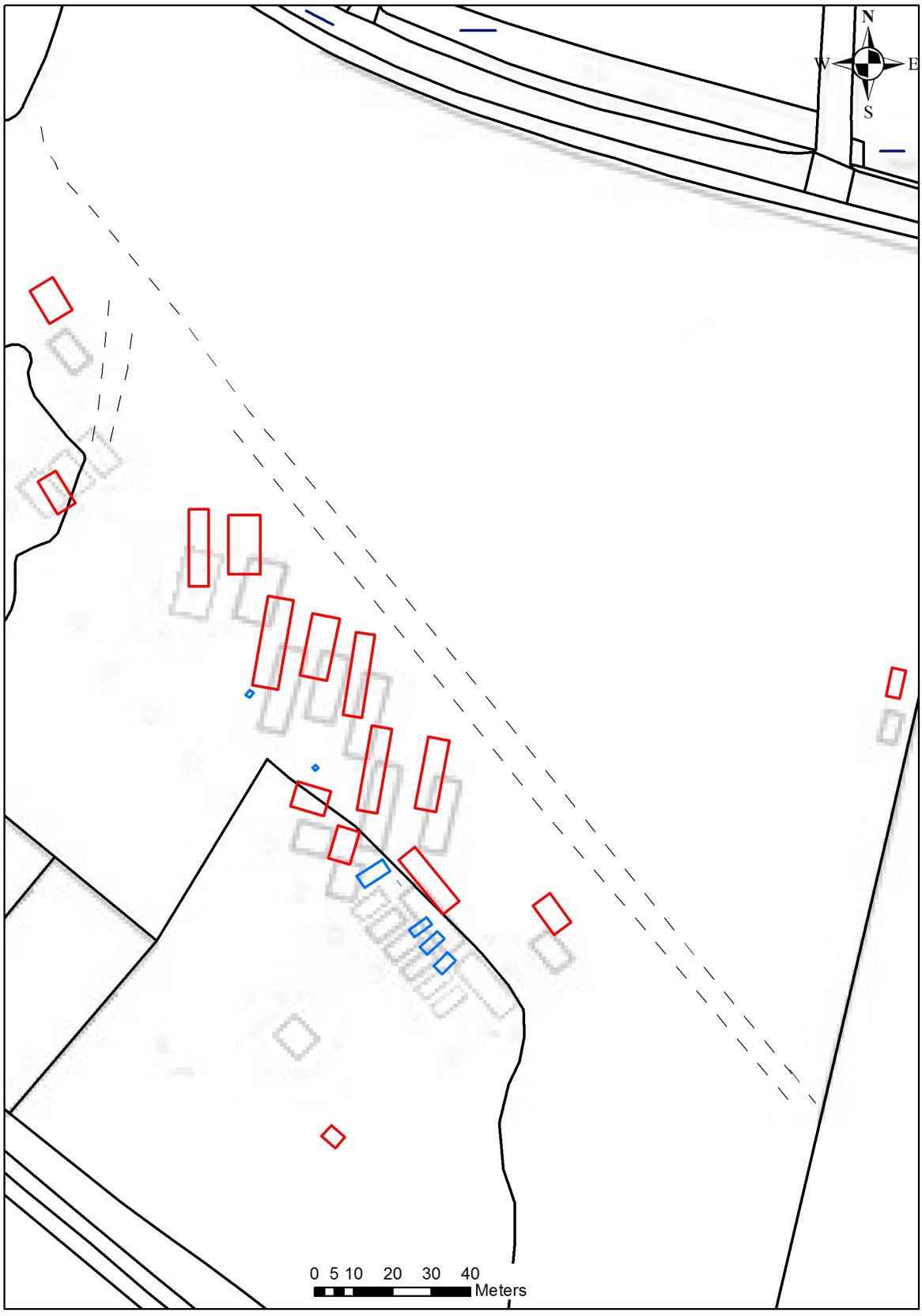
South Pembrokshire [SM 19 90], Gower [SS 50 90], southeast crop of the South Wales Coalfield [ST 17 85], Vale of Glamorgan [ST 00 74], Monmouth and Chepstow [ST 53 93], and Bristol [ST 60 74], areas and the Mendip Hills [ST 50 53]. In Wales, passes northwards into the Clydach Valley Subgroup.

Parent Unit:	BRACKLESHAM GROUP
Parent Code:	BRB

7.4 – Appendix D –

GPS Survey Results

GPS1200 Survey of concrete bases within Watercatch Field, Tynesfield Estate.



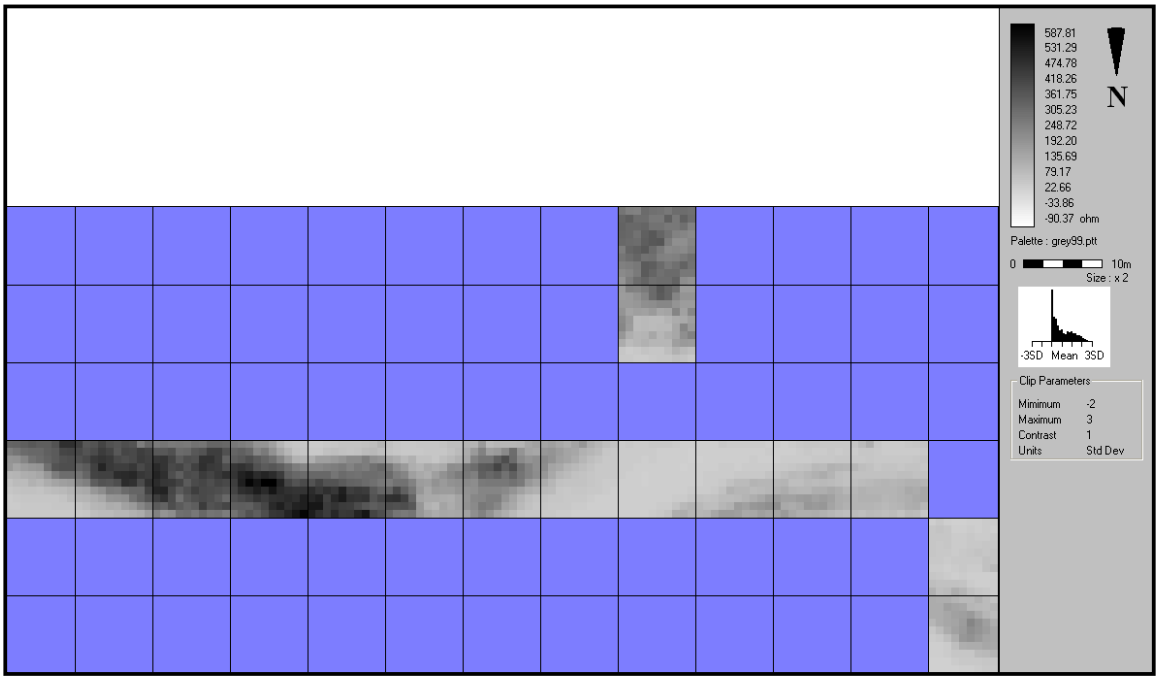
GPS1200 Survey of concrete bases compared to previous survey (accuracy < 5mm average).

GPS Survey of concrete bases with TBM highlighted.

GPS1200 Survey of with AP overlaid, Watercatch Field, Tynesfield Estate.

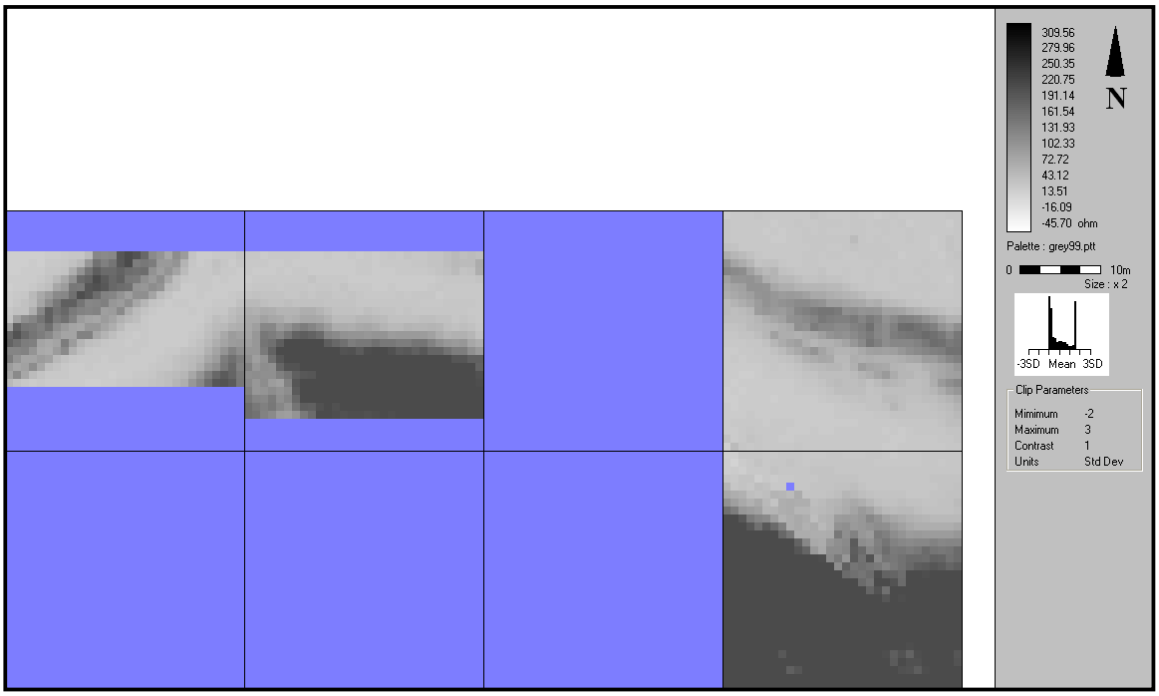
7.5 Appendix E –

Raw Data



10m² Grids

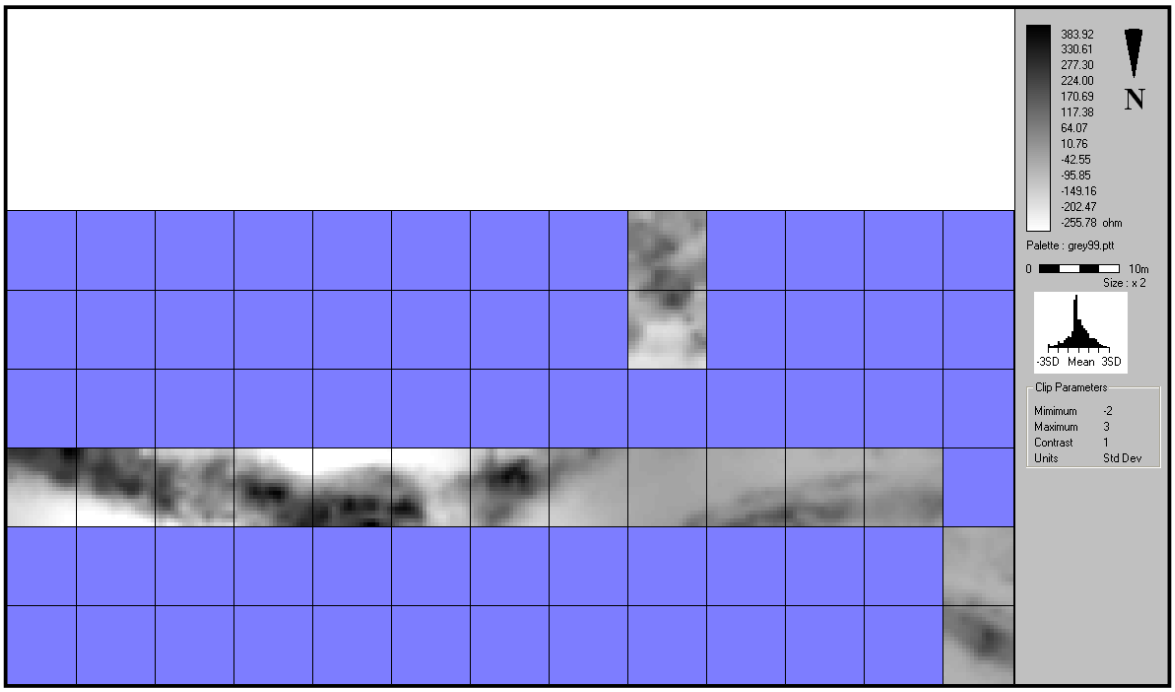
Not Processed.

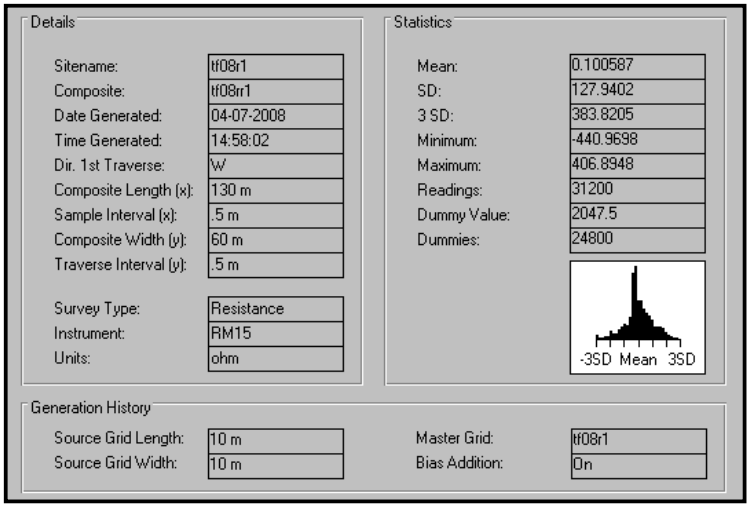


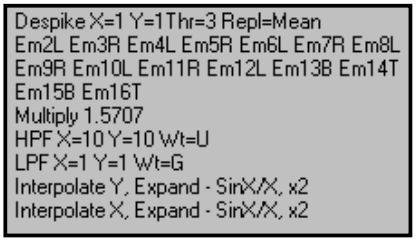
30m² Grids

Not Processed.

Processed Data







Summary of Data Processing (from Geoplot Manual © Geoscan Research).

Despike – Used to automatically (a) locate and remove random, spurious readings often present in resistance / gradiometer data.

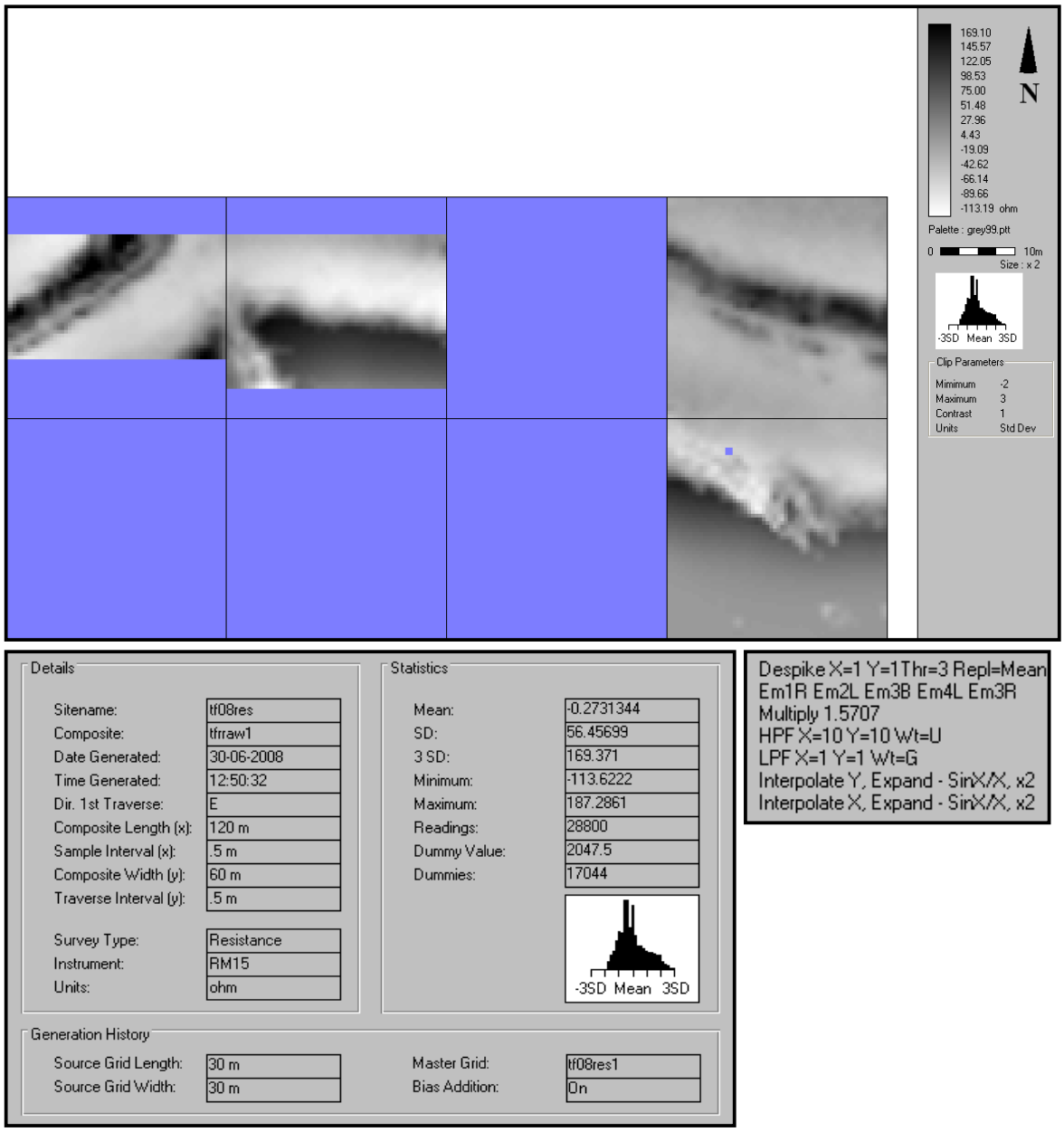
Edge Match – Removes grid edge discontinuities often present in Twin electrode resistance.

Multiply – Multiplies data by a positive or negative constant value, in this case the conversion of Resistance to Resistivity (Resistivity (ohm-metres) = 3.1415 x Resistance (ohms) x Mobile Probe Separation (metres). If the mobile probe separation is 0.5m, then multiplying resistance by (3.1415 x 0.5) = 1.5707 will convert the data to resistivity.

High Pass Filter – Used to remove low frequency, large scale spatial detail, typically the removal of a slowly changing geological "background" response commonly found in resistance surveys.

Low Pass Filter – Removes high frequency, small scale spatial detail, and is useful for smoothing data or for enhancing larger weak features.

Interpolate – Increases / decreases the number of data points in a survey (Increasing the number can be used to create a smoother appearance to the data, whilst Decreasing the number of data points using can be used to investigate the effect of different sampling strategies).



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