

CONTAMINATED LAND RISK ASSESSMENT

DESKTOP STUDY AND WALKOVER

Orchard Enterprises (Southern) Ltd

**Chalcroft Nurseries
Bognor Regis**



Contamination Consultants Ltd
March 2009

Our Ref: CC/OE/CN/1#1

Date: 30th March 2009

Client:

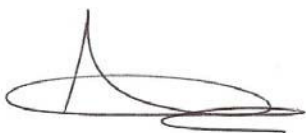
Orchard Enterprises (Southern) Ltd
32A Dorset Road
Bognor Regis
PO21 2DU

CONTAMINATED LAND RISK ASSESSMENT

DESKTOP STUDY AND WALKOVER

**Chalcroft Nurseries
Bognor Regis**

A report prepared on behalf of **Contamination Consultants** by:



Amy Wolstencroft BSc, MSc Environmental Geosciences
Environmental Consultant

Checked by:



Dr Robin S Davies BSc PhD MISOilSci CSci PGC *Contaminated Land Management*
Chartered Scientist

Date: 30th March 2009



INSTITUTE OF PROFESSIONAL SOIL SCIENTISTS

This report has been prepared by Contamination Consultants with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is the property of the client and Contamination Consultants accept no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without prior written approval of the Client.

CONTAMINATIONCONSULTANTS LTD

Contaminated Land
Risk Assessment, Mineral Extraction Soil Planning
The Nanotechnology Centre, Herschel Building, Kings Rd, Newcastle upon Tyne
NE1 7RU
Tel: 0191 243 0678 Fax: 0191 222 3528
Email: robind@contamination-consultants.co.uk
www.contamination-consultants.co.uk

CONTENTS

	Page
1. INTRODUCTION AND OBJECTIVES	4
2. SITE CHARACTERISATION AND FORMER INVESTIGATIONS	5
3. CONCEPTUAL SITE MODEL	9
3.1 Sources	9
3.2 Pathways	10
3.3 Receptors	11
4. PLAUSIBLE POLLUTANT LINKAGES AND RISK ASSESSMENT	12
4.1 Human health	12
4.2 Controlled waters	13
4.3 Ecology	13
5. CONCLUSIONS	14
 DRAWING CSM/1	 Current site location
 APPENDIX A	 Historical maps
 APPENDIX B	 Environmental data

1. INTRODUCTION AND OBJECTIVES

The purpose of this assessment is to examine specifically the current and potential risks to human, ecological and ground and surface water receptors associated with possible contamination of the ground at the site located at:

Chalcroft Nurseries and Garden Centre
Chalcraft Lane
Bognor Regis
West Sussex
PO21 5TS

Grid Ref: 491770, 100530

The site is to be developed as residential properties.

This risk assessment has been designed within the source/pathway/receptor framework for contaminated site investigation as outlined by:

Model Procedures for the Management of Contaminated Land CLR11 (2004).

Reporting and all site work is based on the format outlined in:

Investigation of Potentially contaminated sites – Code of practice BS10175 (2001).

The site was visited on 10th March 2009 to undertake a site walkover survey in order to assess current site conditions, particularly with respect to potential sources, pathways and receptors.

Evaluation of the risks are given and subsequently, if needed, further investigation or remediation recommendations made with regard to risk reduction and or evaluation.

2. SITE CHARACTERISATION AND FORMER INVESTIGATIONS

Current setting and condition

The site assessed for this investigation currently comprises a garden centre and aquatics shop with disused land to the rear. The disused land comprises partially dismantled polytunnels, areas of bracken and piles of builder's waste rubble/bricks (Photo 1). The previous owner of the site was a thatcher and there was disused thatch and wire on the west of the site and burnt thatch on the south west of the site (Photo 2). There were three burnt-out cars on the west boundary of the site (Photo 3). There was a heating oil tank located on the site (Photo 4) which was empty and there was no evidence of leaks or spillages. There were ditches surrounding the site which were 1 m lower than the site and contained water in places (Photo 5).

Photo 1 See Drawing CSM/1 for location



Photo 2 See Drawing CSM/1 for location



Photo 3 See Drawing CSM/1 for location



Photo 4 See Drawing CSM/1 for location



Photo 5 See Drawing CSM/1 for location



Site history (see Appendix A - Historical maps)

Map 1: Prior to 1875

The site was located within agricultural fields. A barn was located adjacent to the south east of the site and a road was located adjacent to the east boundary. Ponds were located adjacent to the north east of the site, 35 m east of the site and 65 m east.

Map 2: 1875 – 1898

A drain had been established running north west to south east adjacent to the north of the site and a drain had also been established along the centre of the site in the same direction.

Map 3: 1898 - 1912

No significant changes on the site had occurred. A pond had been established adjacent to the south west of the site.

Map 4: 1912 - 1932

The southern half of the site had become woodland. A building had been constructed 20 m south east of the site and residential properties had been constructed 170 m north east.

Map 5: 1932 - 1939

Four buildings had been constructed on the north west of the site and named a nursery. The drain along the centre of the site was no longer marked as a drain and several buildings had been constructed adjacent to the north east. A pit had been excavated 10 m north east of the site and residential properties had been constructed to the east.

Map 6: 1939 - 1949

No significant changes on or surrounding the site had occurred.

Map 7: 1949 – 1961

No significant changes on the site had occurred. The pit 10 m north of the site had been in-filled.

Map 8: 1961 - 1964

Three buildings had been constructed on the site. The pond adjacent to the south east had become adjoined to a drain which then ran along the west, south and east of the site.

Map 9: 1964 - 1979

Four of the buildings had been removed from the site and one had been extended. A building had been constructed on the site. The pond 65 m east of the site had been in-filled and the pond adjacent to the north east had also been in-filled. Residential properties had been constructed 30 m east of the site.

Map 10: 1979 – 1993

Three of the buildings on the site had been removed and two had been constructed. The drain adjacent to the west of the site was no longer identified as a drain. The drain and

pond 35 m east were also no longer identified as drains on the map. A cemetery had been established 20 m south of the site.

NB

The site walkover revealed that the previous owner was a thatcher. The main building on the site is currently used as a nursery and garden centre.

Soils, geology and hydrology

Drift geology of the area consists of Quaternary age Aeolian deposits of silts and gravels overlying the Palaeocene age Reading Formation which consists of mottled clays and localised sand.

The site walkover revealed very fine sandy CLAY soils.

The impermeable nature of the clay at depth indicates that water is unlikely to pass to the groundwater. Surface water may pass through the silts and gravels to the local watercourses including the drains surrounding the site.

Previous reports and environmental data

Environmental data (Appendix B) indicates the following:

- The site is in a variably permeable minor aquifer zone
- The site is not in a groundwater source protection zone
- No active landfill sites within 250 m
- No historic landfill sites within 250 m
- No pollution incidents within 250 m
- No waste treatment sites within 250 m
- No pollution inventory sites within 250 m
- No fuel sites within 250 m
- Radon is a possible risk (See Appendix B)

Former investigations

No former investigations have taken place.

3. THE CONCEPTUAL SITE MODEL

The conceptual site model detailed here is by written and diagrammatical (drawing CSM/1) description of the sources, pathways and receptors.

3.1 Sources of contamination

Possible sources generated on-site:

Radon gas

Radon gas from the underlying geology.

Burnt-out cars

The burnt-out cars located on the site (Photo 3) may be potential sources of hydrocarbons, oil and metals.

Heating oil tank

The heating oil tank located on the centre of the site (Photo 5) may have been a potential source of hydrocarbons.

Possible sources generated off-site:

Former pit and ponds

The former pit located 10 m north of the site and the former ponds adjacent to the north east of the site, 35 m east and 65 m east may possibly have been backfilled with putrescible material that could possibly generate methane gas during decomposition.

Cemetery

The cemetery located 20 m south of the site may potentially produce contaminants such as methane, metals and sulphates.

3.2 Pathways

Pathways to and from the site may exist via service channels and drains.

Human health

The main pathways considered possible are:

1. Ingestion of soil
2. Ingestion of dust
3. Ingestion of contaminated vegetables
4. Ingestion of soil attached to vegetables
5. Dermal contact with skin
6. Dermal contact with dust
7. Inhalation of fugitive soil dust
8. Inhalation of fugitive dust
9. Inhalation of vapours outside
10. Inhalation of vapours inside
11. Ingress to water supplies is also considered

Controlled waters

The site is situated on a variably permeable minor aquifer and is not in a groundwater source protection zone.

The clay soils are slowly permeable and it is therefore considered unlikely that a pathway to the groundwater at depth will exist. However the gravels may form a pathway to the surface drains adjacent to the north, south and west of the site, or to the Eastern English Channel 1300 m south.

3.3 Receptors

Humans

- Residents living in the properties.
- Personnel involved with any site development.

Controlled waters

- The site is not in a groundwater source protection zone.
- The site is in a variably permeable minor aquifer.
- The drains adjacent to the north, south and west of the site.
- The Eastern English Channel 1300 m south of the site.

Ecology

- Plants and animals are considered to be possible receptors.

4. PLAUSIBLE POLLUTANT LINKAGES AND RISK ASSESSMENT

4.1 Human health

Risks from possible sources generated on-site:

Heating oil tank

The heating oil tank located on the centre of the site is considered to pose a possible risk to human health due to the possibility that leaks may have occurred and residual fuel may be trapped above the clay.

Burnt-out cars

The burnt-out cars located on the site are considered to pose a possible risk to human health due to the potential for dioxins from burnt plastics.

Radon gas

Radon gas is not considered to pose a risk to human health provided that adequate protection is installed following the advice of the health protection agency (HPA). Information can be obtained via email rpdp@hpa-rp.org.uk or telephone 01235 831600.

Risks from possible sources generated off-site:

Former pit and ponds

The former pit located 10 m north of the site and the former ponds adjacent to the north east of the site, 35 m east of the site and 65 m east are considered to pose a possible risk to human health due to the gravel soils which may permit gas migration to the site.

Cemetery

The cemetery located 20 m south of the site is not considered to pose a risk to human health due to the topography of the land sloping towards the south which will reduce the risk of contaminants from the cemetery reaching the site.

4.2 Controlled waters

The site is considered to pose a potential risk to controlled waters as the gravels may form pathways from the site to controlled waters.

4.3 Ecology

Animals and plants are considered to be at a potential low risk on the basis of the heating oil tank and burnt out cars located on the site.

5. CONCLUSIONS

The site is to be developed as residential properties.

This investigation concludes there is a potential risk to human health due to contamination from the heating fuel tank and burnt out cars located on the site. Also, it may be necessary to install protection against radon gas following the advice of the Health Protection Agency. This may include basic or full protection if deemed necessary by the HPA.

There is considered to be a potential risk to controlled waters.

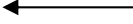
There is considered to be a potential low risk to ecology on the site.

It is recommended that an intrusive investigation is undertaken for the site at Chalcroft Nurseries to further assess the extent of possible contamination on the site.

DRAWING CSM/1

Current site location

NOTES:

-  Site boundary
-  Possible surface water flow
-  Photo location

Contamination Consultants

Contaminated Land Risk Assessment

Tel.: 0191 243 0678

www.contamination-consultants.co.uk

Drawing Title: Conceptual site model

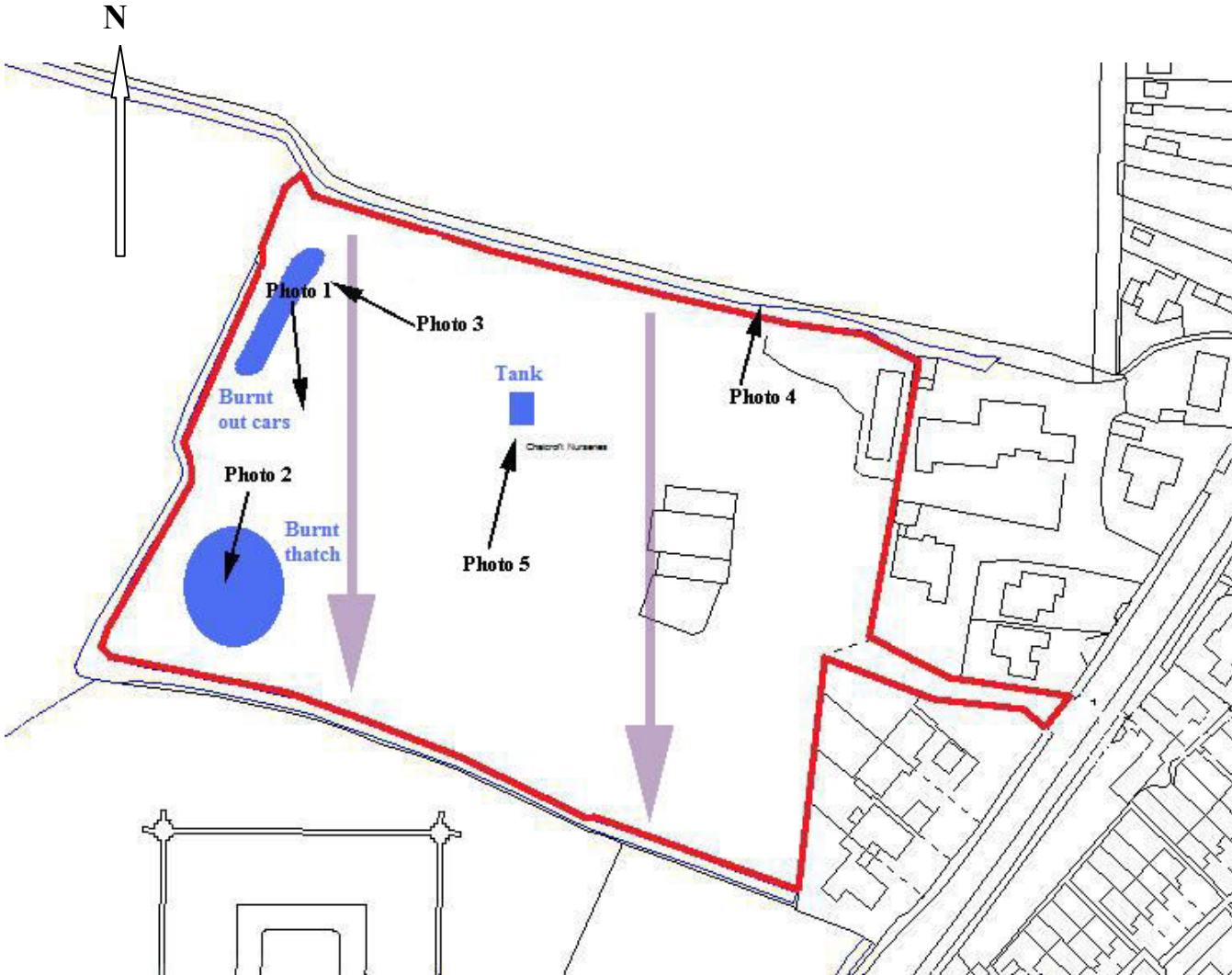
Drawing No.: CSM/1

Client: Planning and Property
Consultants Ltd

Project: Chalcroft Nurseries and Garden
Centre, Chalcraft Lane, Bognor Regis

Scale: 1: 1667

Date: 30th March 2009

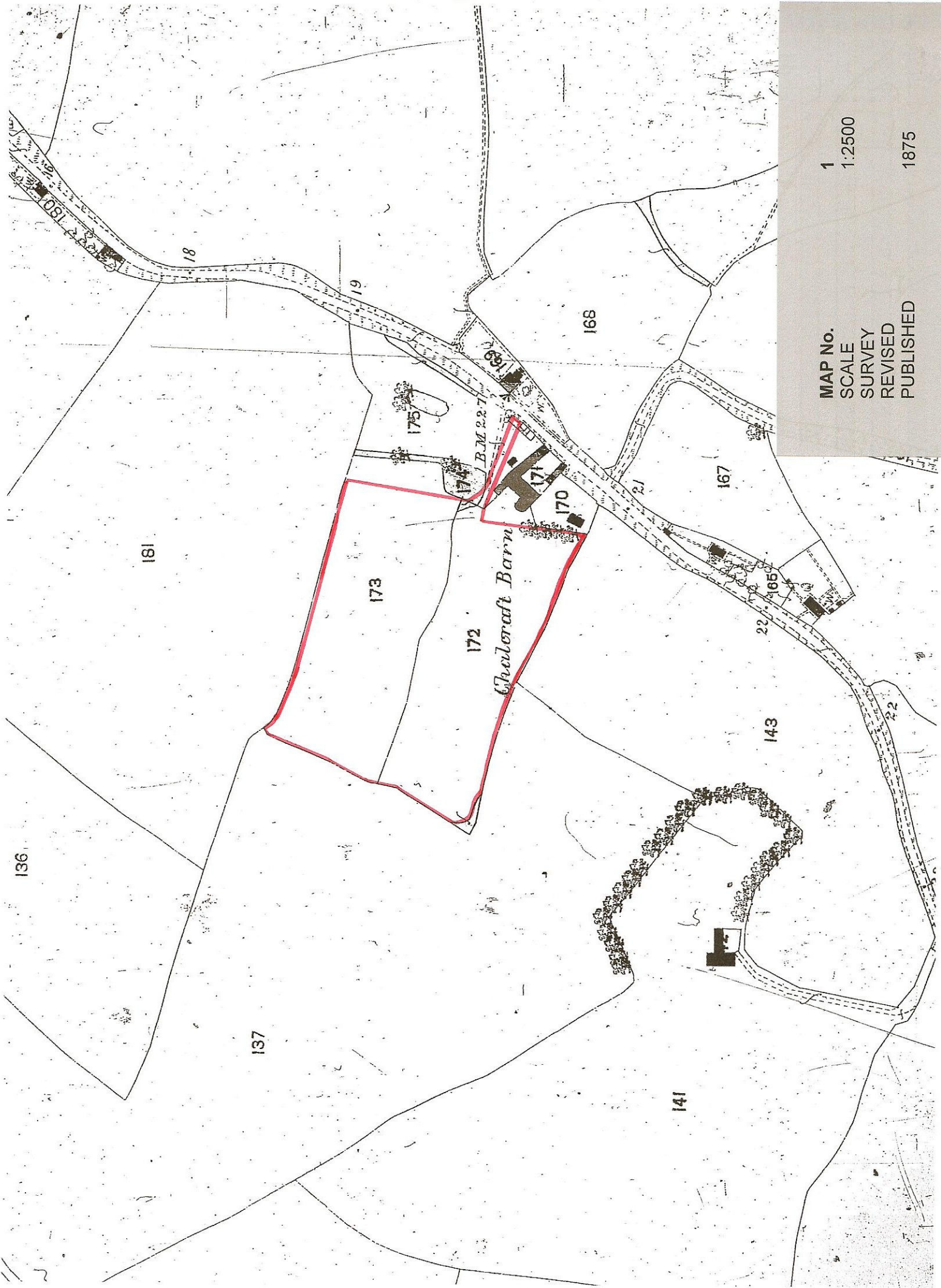


APPENDIX A

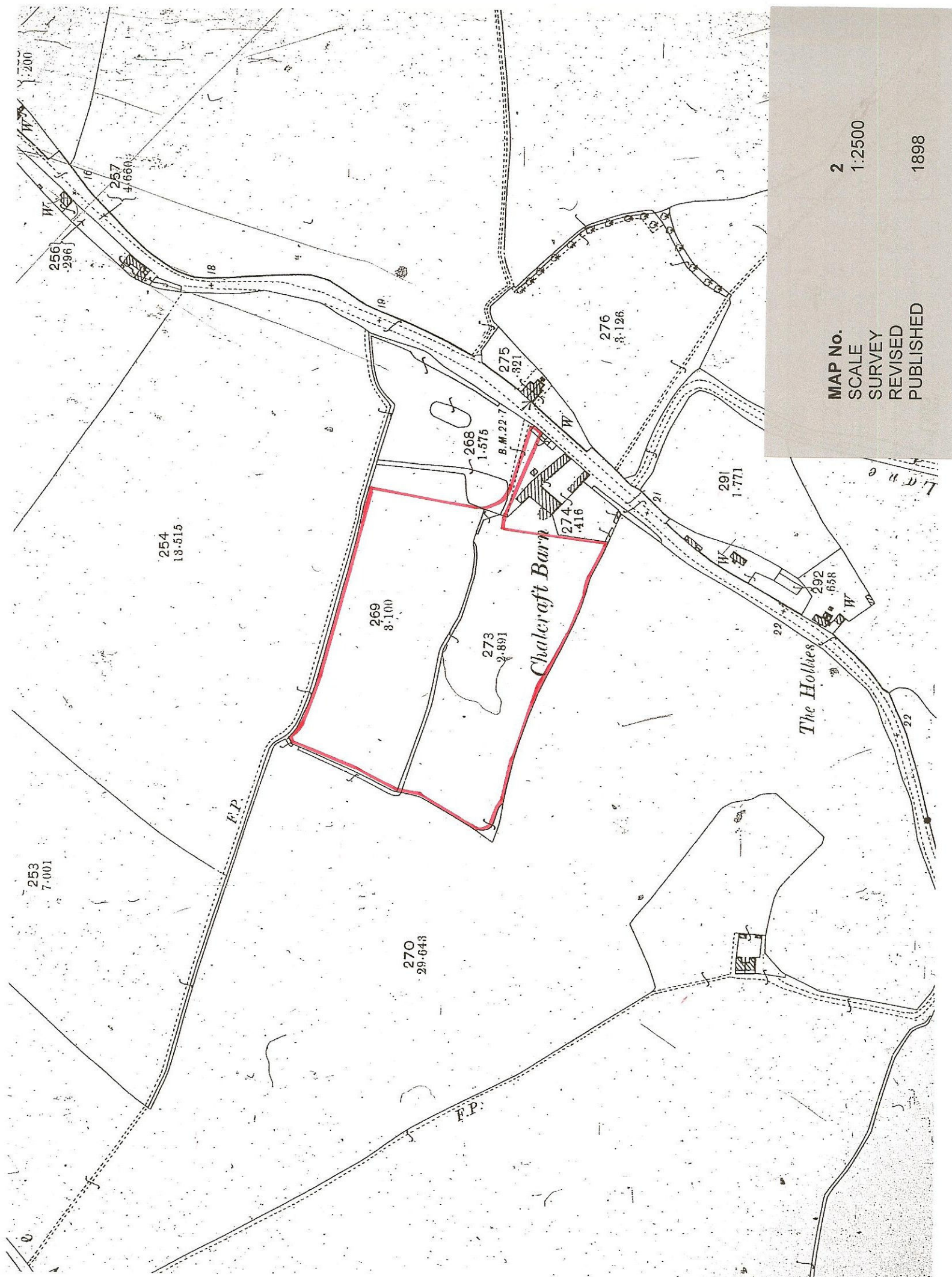
Historical maps

APPENDIX B

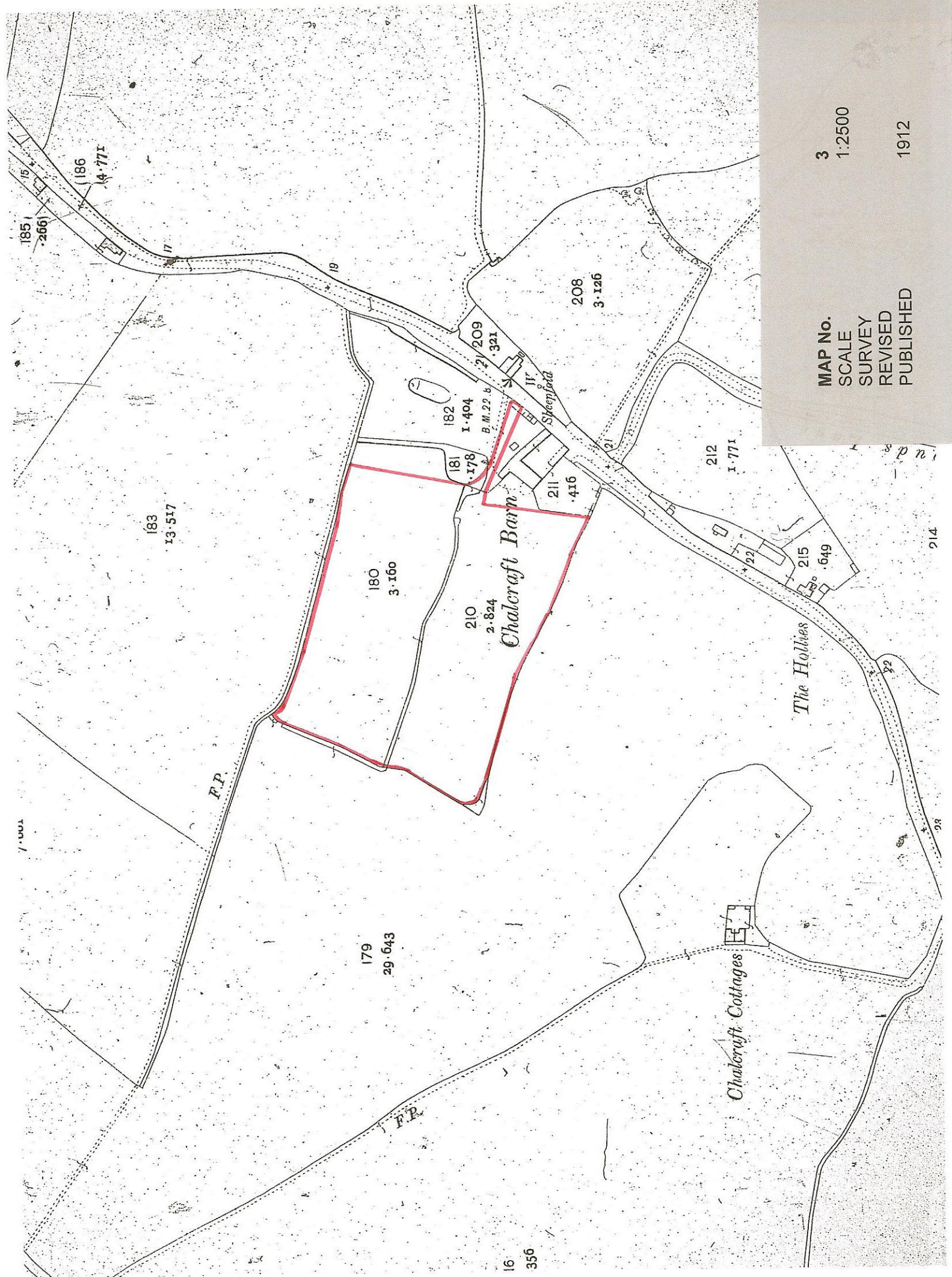
Environmental data



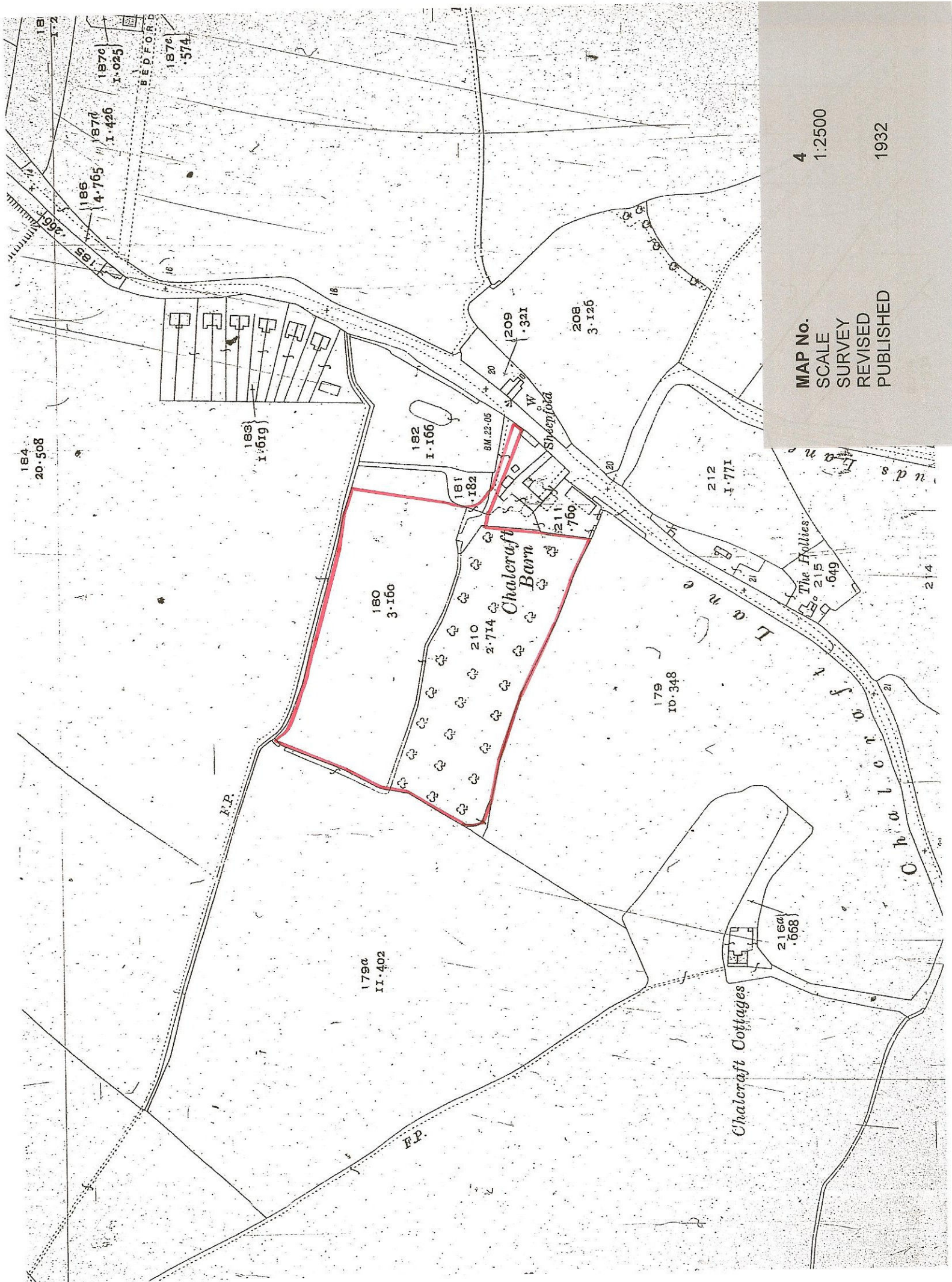
MAP No.	1
SCALE	1:2500
SURVEY	
REVISED	
PUBLISHED	1875



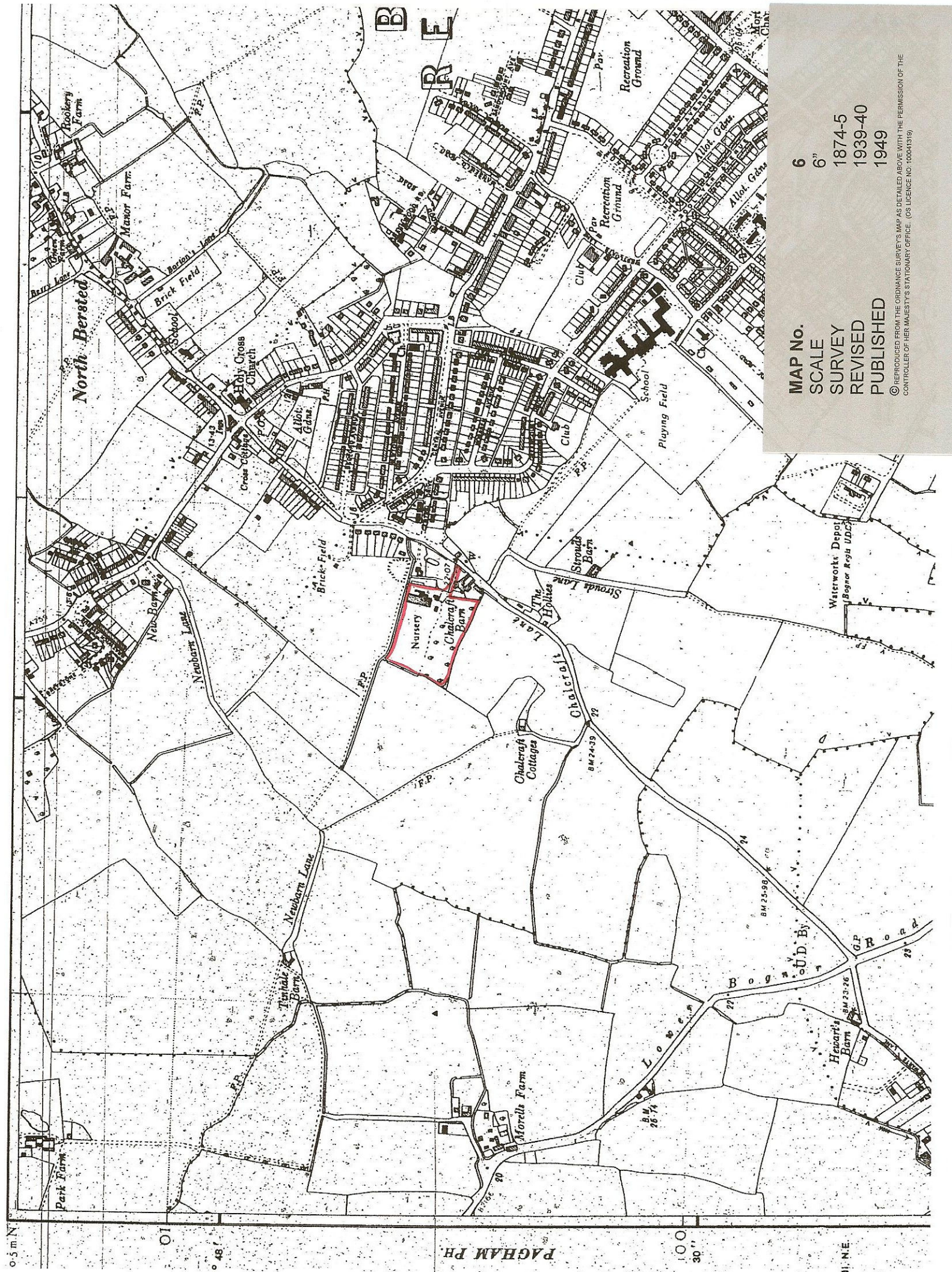
MAP No.	2
SCALE	1:2500
SURVEY	
REVISED	
PUBLISHED	1898



MAP No. 3
SCALE 1:2500
SURVEY
REVISED
PUBLISHED 1912

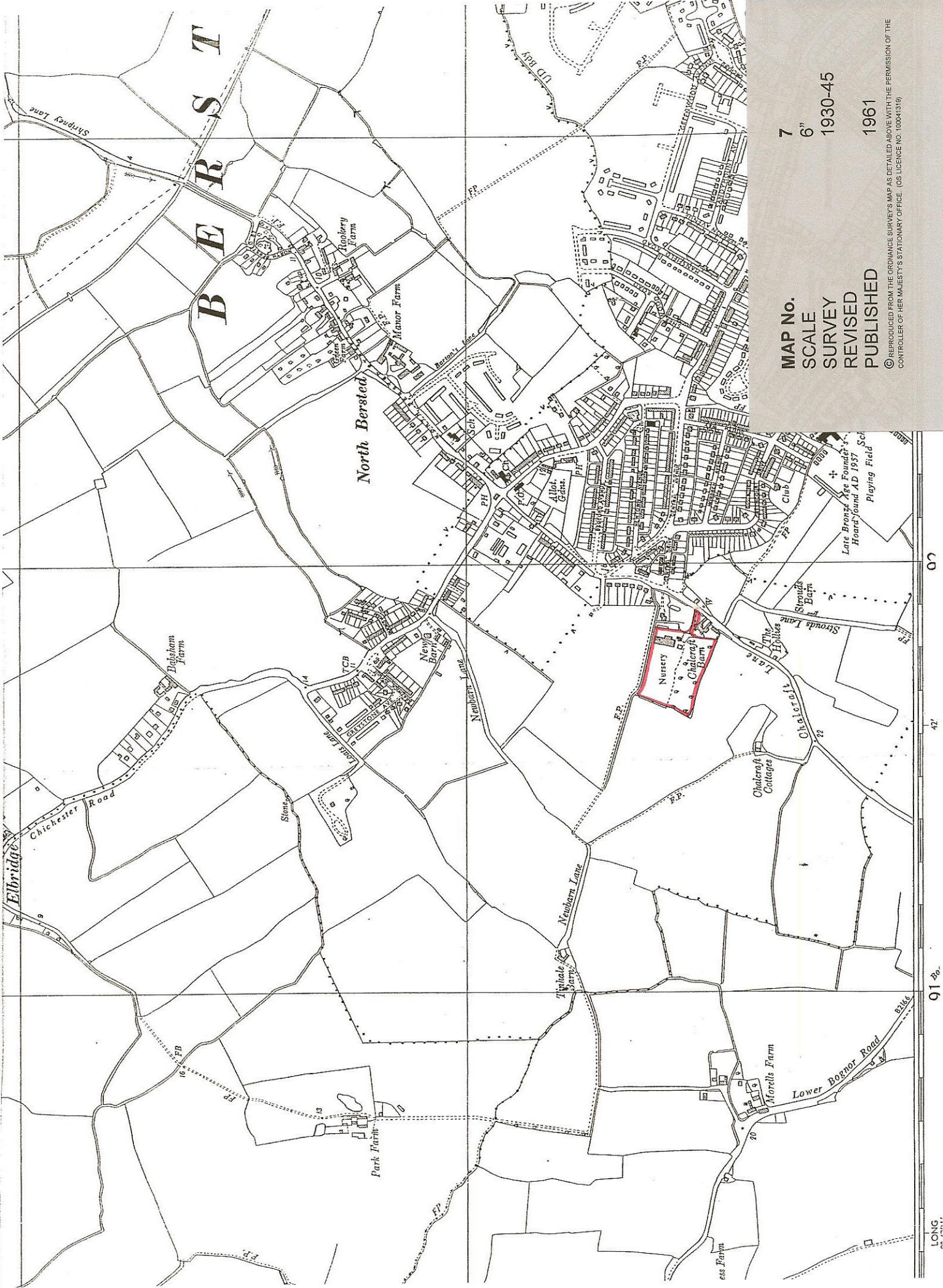


MAP No. 4
SCALE 1:2500
SURVEY
REVISED
PUBLISHED 1932



MAP No. 6
SCALE 6"
SURVEY 1874-5
REVISED 1939-40
PUBLISHED 1949

© REPRODUCED FROM THE ORDNANCE SURVEY'S MAP AS DETAILED ABOVE WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. (OS LICENCE NO. 10041319)



MAP No. 7
SCALE 6" 1930-45
SURVEY
REVISED 1961
PUBLISHED

© REPRODUCED FROM THE ORDNANCE SURVEY'S MAP AS DETAILED ABOVE WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. (OS LICENCE NO. 10004319)

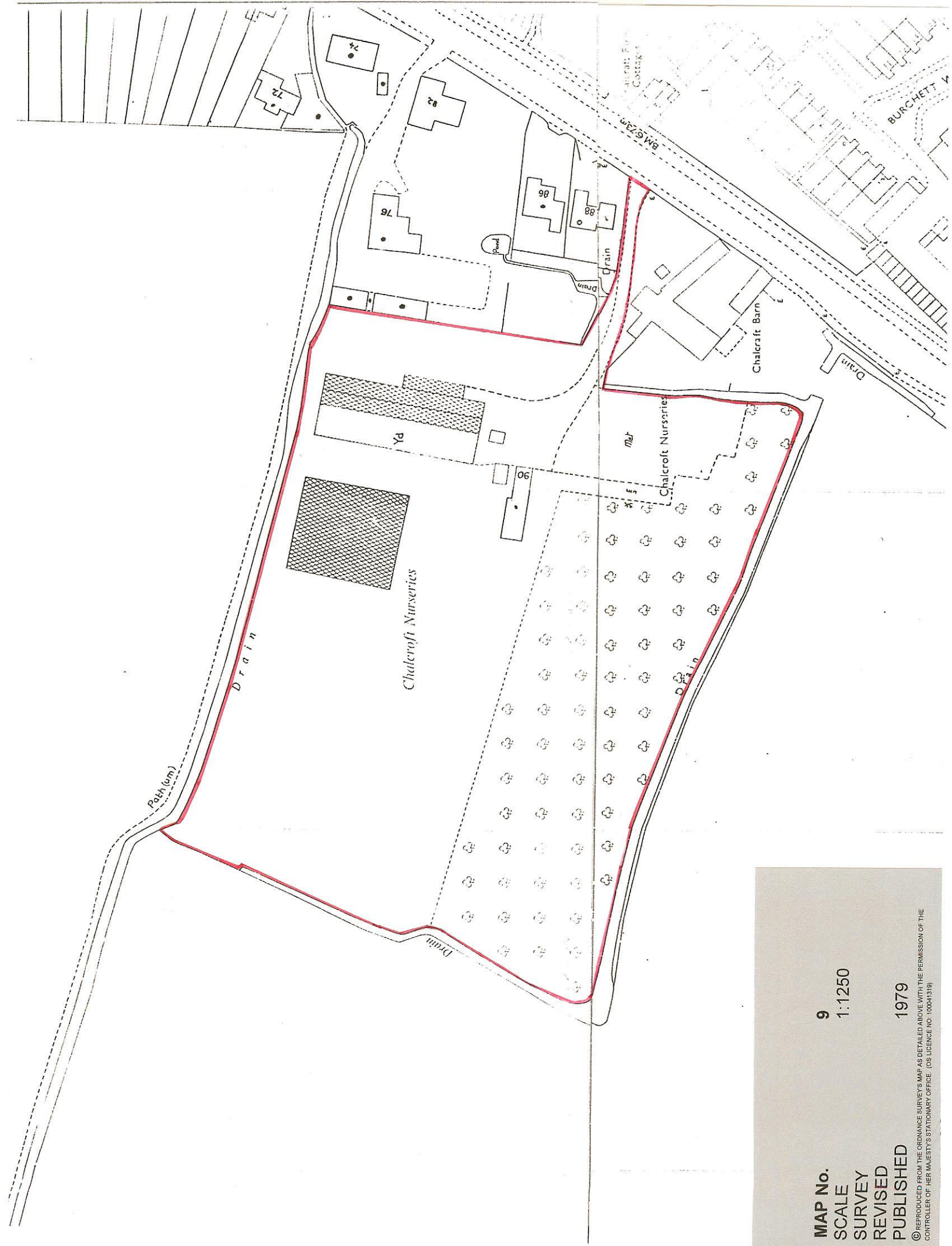


8
1:1250

1964

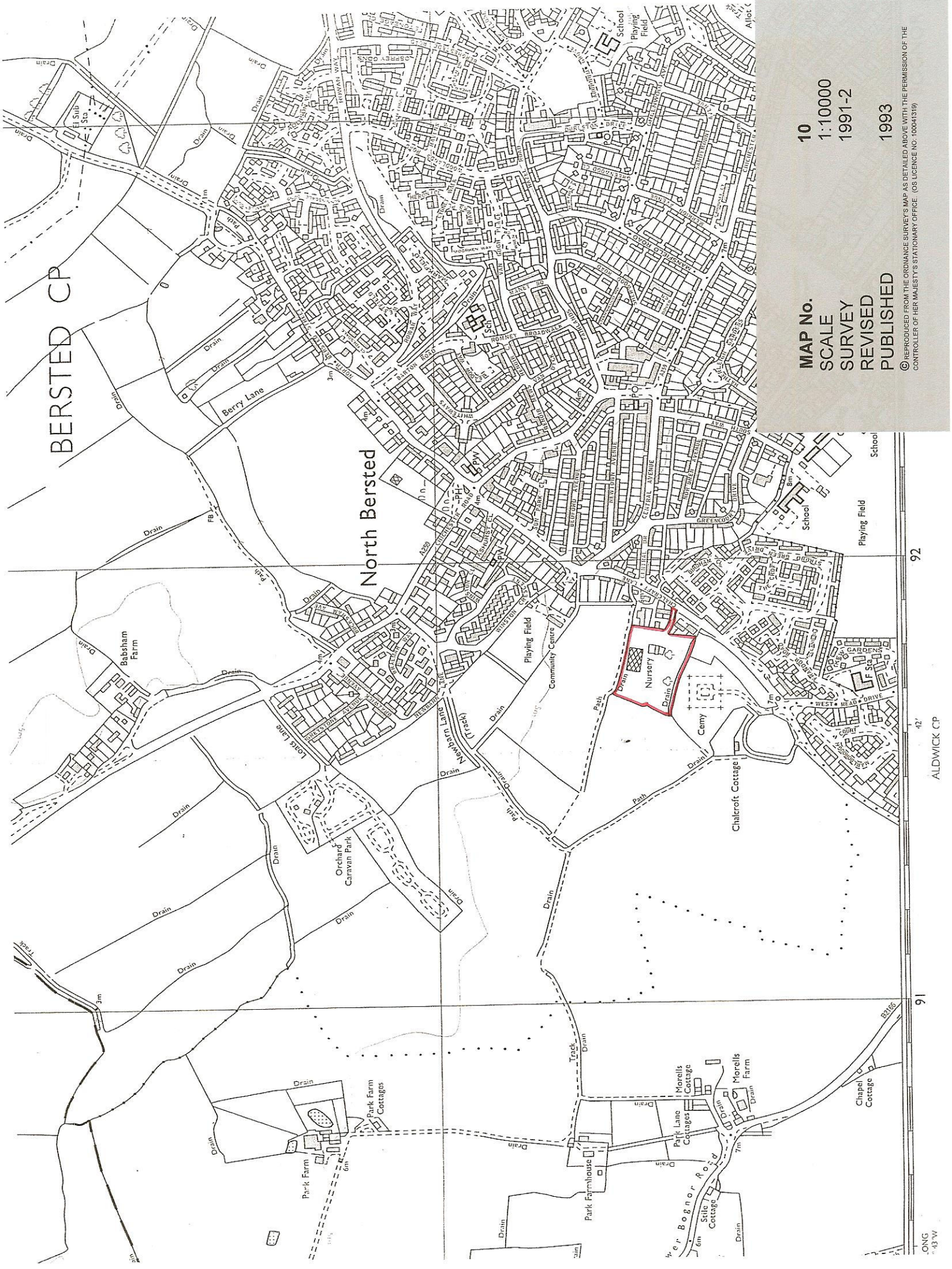
MAP No.
SCALE
SURVEY
REVISED
PUBLISHED

© REPRODUCED FROM THE ORDNANCE SURVEY'S MAP AS DETAILED ABOVE WITH THE PERMISSION OF THE
CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. (OS LICENCE NO. 100041919)



MAP No. 9
SCALE 1:1250
SURVEY
REVISED
PUBLISHED 1979

© REPRODUCED FROM THE ORDNANCE SURVEY'S MAP AS DETAILED ABOVE WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE (OS LICENCE NO. 100041319)



MAP No. 10
SCALE 1:10000
SURVEY 1991-2
REVISED 1993
PUBLISHED

© REPRODUCED FROM THE ORDNANCE SURVEY'S MAP AS DETAILED ABOVE WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE (OS LICENCE NO. 100041319)